CURRENT SITUATION, USAGE, MANAGEMENT AND INTEGRATION OF THE SMART CLASSROOM TECHNOLOGIES WITHIN THE SCOPE OF FATİH PROJECT: A MULTIPLE CASE STUDY

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ABSTRACT

CURRENT SITUATION, USAGE, MANAGEMENT AND INTEGRATION OF THE SMART CLASSROOM TECHNOLOGIES WITHIN THE SCOPE OF FATİH PROJECT: A MULTIPLE CASE STUDY

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This study aims to investigate the existing usage of the Smart Classrooms Technologies (SCT) by teachers in the schools in Turkey, the problems they encountered, the solutions for these problems, and needs about the usage of SCT, as well as how the organization (YEGİTEK) conduct the integration process of the SCT within the scope of FATİH Project. The qualitative multiple-case study methodology was performed. Two pilot schools of the FATİH Project were separately analyzed as cases of the study and data were collected via observations, interviews and document analysis. Additional data were also gathered from the administration department of FATİH Project in YEGİTEK. The collected data were analyzed with content analysis method. According to findings of the study, the smart boards in the first case school and the PTIWB in the second case school were mostly used as projectors. The problems encountered while using the SCT were technical problems, lack of knowledge and skills, and inadequate e-contents for SCT. Some of these problems were solved by computer teacher, teachers' themselves, students, private publishers,

and technical services. In addition, the needs for using SCT effectively and efficiently could be listed as sufficient in-service trainings, more suitable e-contents, and accessible support. The analysis regarding integration process of the SCT in the schools revealed that the perceptions of teachers and school administrators were not investigated before the installation of the SCT in the schools. In addition, the project administrators did not informed the teachers and school administrators about the integration process of SCT.

Keywords: FATİH Project, Smart Classroom Technologies, Teacher Education, Technology Integration into Education

ÖZ

FATİH PROJESİ KAPSAMINDAKİ AKILLI SINIF TEKNOLOJİLERİNİN MEVCUT DURUMU, KULLANIMLARI, YÖNETİMİ VE ENTEGRASYONU: BİR ÇOKLU DURUM ÇALIŞMASI

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Doktora, Bilgisayar ve Öğretim Teknolojileri Eğitimi Bölümü
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Bu çalışma Türkiye'deki okullarda bulunan akıllı sınıf teknolojilerinin (AST) öğretmenler tarafından kullanımlarını, karşılaştıkları problemleri, çözüm yollarını ve AST kullanımı için ihtiyaçlarını araştırmayı amaçlamaktadır. Bununla birlikte FATİH Projesi kapsamında okullarda bulunan AST'nin entegrasyon sürecinin YEĞİTEK tarafından nasıl yürütüldüğü de incelenmiştir. Çalışmada nitel çoklu-durum çalışma yöntemi kullanılmıştır. FATİH Projesi'nin iki pilot okulu çalışma için ayrı ayrı birer durum olarak ele alınmış, veriler gözlem, görüşme ve doküman incelemesi yöntemleri kullanılarak toplanmıştır. Buna ek olarak YEĞİTEK'te FATİH Projesi yürütme kurulundan da veri toplanmıştır. Elde edilen veriler içerik analizi yöntemi ile çözümlenmiştir. Çalışma bulguları, ilk durum okulundaki akıllı tahtalar ve ikinci durum okulundaki panel tip etkileşimli tahtaların büyük çoğunlukla projeksiyon cihazı olarak kullanıldığını ortaya koymuştur. Akıllı sınıf teknolojileri kullanılırken karşılaşılan problemler teknik problemler, bilgi ve beceri eksikliği ve içerik yetersizliği olarak ortaya çıkmıştır. Bu problemlerin bazıları bilgisayar

öğretmeni, öğretmenlerin bizzat kendileri, öğrenciler, özel yayınevleri ve teknik servisler tarafından giderilmiştir. Ayrıca akıllı sınıf teknolojilerinin etkili ve verimli şekilde kullanılabilmesi için katılımcılar tarafından belirtilen gereksinimler yeterli hizmet-içi eğitim, daha uygun e-içerikler ve ulaşılabilir destek olarak listelenmektedir. Okullardaki akıllı sınıf teknolojilerinin entegrasyon süreci incelendiğinde okullara bu teknolojiler kurulmadan önce öğretmen ve okul yöneticilerinin görüşlerinin alınmadığı ortaya çıkmıştır. Ayrıca araştırma bulguları, proje yöneticilerinin akıllı sınıf teknolojilerinin entegrasyon süreci hakkında öğretmen ve okul yöneticilerini yeteri kadar bilgilendirmediğini ortaya koymuştur.

Anahtar Kelimeler: FATİH Projesi, Akıllı Sınıf Teknolojileri, Öğretmen Eğitimi, Eğitimde Teknoloji Entegrasyonu

To My Daughter

&

My Wife

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ICT, Information and Communication Technologies

MEOIT - FATİH, Movement of Enhancing Opportunities and Improving Technology Project

MoNE, Ministry of National Education

PTIWB, Panel Type Interactive Whiteboard

SCT, Smart Classroom Technologies

TAM, Technology Acceptance Model

TRA, Theory of Reasonal Action

UOID, User-Oriented Instructional Development

YEGITEK, Yenilik ve Egitim Teknolojileri Genel Müdürlüğü

CHAPTER 1

INTRODUCTION

In this chapter, introduction to the study was provided with the background of the problem, the purpose of the study, the research questions, the significance of the study, the limitations of the study, and definitions of the terms.

1.1 Introduction

In the last century, technological developments affected educational environments as well as other areas like banking, hospital, government etc. With the new technologies, educational institutions have chances to reach more people, to provide flexibility in the teaching spaces and times, to supply rich learning settings and to use distance education opportunities. These improvements caused people to question the adequacy of teaching and learning environments in the traditional education. Hence, educational institutions need to review the ways of duties, especially their courses (Peterson, 1998). Because of these needs, most of technological developments have been used in educational surroundings over a century in order to provide new ways. At the beginning of the 20th century, audio-visual media became widely used instead of traditional ways. Then, other technological developments were seemed as rescuers of traditional education's problems. Some of these were audio and visual materials, radio, educational films, television, and computers. However, most of them had not changed the instructional ways substantially, although they have been used in various contexts (Cuban, 2001; Zhu, 2003; Eteokleous, 2008). Nowadays along with the emergence of the Internet, educational researchers have been striving to integrate

‘Information and Communication Technologies’ (ICT) to educational applications in order to reach efficient and effective usage of ICT in educational environments.

In the most of the developed and developing countries all over the world, governments and other corporations have been making investments on educational technology in order to supply better instructional and training facilities. For example, more than 40 billion dollars were spent in U. S. between 1990 and 2000 (Ertmer et al., 2012). Also, in the beginning of the 2000s, ‘computer laboratories’ were established in the most of the K-12 schools in Turkey and most of these schools are connected to the Internet. General aim of these investments were increasing achievements of students and supplying alternative ways to teachers by using ICT. Nevertheless, these investments have not reached the intended aims over time (Cuban, 2001; Wells & Lewis, 2006; Miranda & Russell, 2011). For that reason, integration process of educational technologies has an important role in order to take advantage of these funds to educational organizations. However, there are various challenges at this integration such as lack of resources, deficient knowledge and skills of teachers, short technical and administrative support, and poor technology planning (Russell, Bebell, O’Dwyer, & O’Connor, 2003, Belland, 2009). Educational institutions might perform some solutions in order to overcome these barriers. At this point, determination of the lack of problems and needs for the solution to these problems might be important in order to remove these barriers for the technology integration in the schools.

Technology integration in educational environments was defined as the sustainable and persistent change in the social system of educational institutions caused by the adjustment of technology to support students to construct knowledge (Jonassen et al., 2003). Solutions for technology integration problems of educational organizations are generally interested with change of their systems. Therefore, the leaders of educational organizations have critical roles for usage of ICT in changes of their organization. On the other hand, most of the problems are originated from the teachers as users of ICT. Also, generally teachers decide the usage of ICT in their courses, even if students use them. It is emphasized that educational leaders firstly

should consider the factors affecting teachers' decision to use ICT in their classrooms, rather than considering the various instructional applications in order to address them in advance and maximize the effectiveness of technology (Baek, Jung & Kim, 2008). Hence, the integration processes of ICT in educational environment might be investigated in the light of both macro-level and micro-level aspects of diffusion. Surry and Farquhar (1997) stated that macro-level ICT diffusion theories are concentrating on organizational features and organizational change; on the other hand, micro-level theories are focusing on adopter characteristics and needs of individuals. Therefore, when educational leaders are applying the technological innovations to educational organizations, they might perform the micro-levels theories such as 'User-Oriented Instructional Development Process' (Burkman, 1987) and 'Environment Analysis' (Tessmer, 1990) along with macro-level viewpoint. These theories were declared as adopter-based theories by Surry and Farquhar (1997), because the opinions, perceptions and needs of the users of ICT, usage process of the ICT by users, and support of the educational leaders to ICT users were emphasized in these theories. That is, educational leaders might deal with the integration of ICT looking from the user side who would implement the use the ICT in the educational environments. For that reason, investigating the technology integration process both from the ICT users' point of view and from the organizational side might be essential for the successful technology integration into schools.

1.2 Background of the Problem

Nowadays, in Turkey, the government has initiated a project by the name of Movement of Enhancing Opportunities and Improving Technology Project (MEOIT Project or FATİH Project). In this project, Ministry of National Education (MoNE) in coordination with Ministry of Transportation purpose to establish ICT to all classes at all K-12 schools in all over the country. These classes may be named as 'Technology-Enhanced Classrooms' (TEC) or 'Smart Classrooms' (SC). With this project, 42.000 schools and 570.000 classes will be converted to Smart Classrooms that will be equipped with LCD Smart Boards, tablet PCs and high-speed Internet connection. In addition, MoNE are planning to supply the educational e-contents in

accordance with the current teaching programs to the educational technology-supported education. Also, as a part of this project, in-service trainings for teachers have been started in order to ensure the effective usage of the ICT. The aim of the project is to facilitate equal chances in education and enhancing technology in the schools for the effective usage of Smart Classroom Technologies (SCT) in the learning-teaching processes (YEGITEK, 2014). MoNE has conducted the pilot study of the project with the personal computers (PCs) and the Panel Type Interactive Whiteboard (PTIWB - LCD smart boards) in the 52 schools across Turkey. Additionally, in the 2012, the classrooms in the high schools around the country have been equipped with the PTIWB as the 1st part of the project.

In FATİH Project like in the most of the technology usage projects at the educational institutions in the past, usage of these technologies by the teachers may not be guaranteed because of the usage problems, teachers' deficient knowledge and skills, and the inadequate support to them. Uluyol (2013) also reported that MoNE has not taken into consideration adequately the needs of the users for ICT integration in the schools. It was also stated that MoNE did not properly conduct the well-planned technology integration processes in the last years before the FATİH Project (Özdemir & Kılıç, 2007; Usluel, Mumcu & Demiraslan, 2007; Uluyol, 2013).

In this point, coordinators' approaches of this project have an important role in respect of how they manage this process, what plan or theory they follow and what solutions they carry out for these problems. That is, not only determination of usage situations of ICT and problems in the school, but also determination of the management approach of this project at this situation may help the successful integration of the ICT at educational environments. Therefore, to supply the effective usage of ICT in the educational processes, determination of some points may be have important role such as usage problems of teachers, solutions to these problems, perceptions of the teachers, expectations from the leaders of educational organizations. Also, views of the project management about these points may be critical in order to compensate these problems and expectations. Lastly, whether the

educational leaders are aware of the opinions and needs of teachers as users of the SCT might be investigated for the integration of the SCT into schools.

1.3 Purpose of the Study

The purpose of this study is to investigate how teachers use ICT in the Smart Classrooms at the K-12 schools; and how these technologies are established and managed. The study also may address future directions to administrators of educational organizations for integrating these technologies to K-12 schools. This study aims to investigate the existing usage of SCT in the classrooms by teachers at K-12 schools in Turkey, the problems they encounter and the solutions for these problems; how the organization (YEGITEK) conduct environment analysis before the establishing the ICT in the smart classrooms; how the organization followed user oriented instructional development process in the project. Another purpose of this study is to explore perceptions of the teachers about these technologies; expectations of teachers from the organization; conditions/barriers to usage of these technologies in the K-12 schools.

1.4 Research Questions

1. What is the current status of smart classroom technology usage in the schools?
    a. How do teachers use the smart classroom technologies in their lessons?
    b. What challenges do teachers encounter when using these technologies?
    c. How do teachers overcome these problems?
    d. What do teachers need to overcome these problems?

2. What attempts did the YEGITEK/MoNE as senior management conduct to provide adequate usage of the SCT in the schools in regard to;
    a. How did YEGITEK/MoNE determine which technologies would be used?
    b. How did YEGITEK/MoNE determine by whom, how and where these technologies would be used?
    c. How did YEGITEK/MoNE gather opinions of users and inform them?
    d. How would the usage of smart classroom technology be maintained?

3. How do teachers and school administrators define the conditions/barriers namely "dissatisfaction with the status qua; time; resources, knowledge and skills, rewards and incentives, participation, commitment and leadership" in the process of implementation of change/or use of smart classroom technologies?

1.5 Significance of the Study

With the each new technology in the last 30-40 years, the government of the developed and developing countries have invested the ICT at educational organizations in order to supply better teaching and learning environments and to solve their educational problems. However, it was indicated that most of these investments have not been translated into widespread use in the educational environments (Cuban, 2001; Wells & Lewis, 2006). Mun and Hwang (2003) also stated that despite the high costs of implementing and maintaining educational technology, many of these technologies were underutilized and abandoned due to lack of user acceptance. What reasons caused this lack of usage is important so as to compensate the investments of governments. For that reason, investigating usage barriers and deficiencies in the practices of ICT in the educational environments may provide benefits for this aim.

Especially, in Turkey, the MoNE are implementing huge technology investment at K-12 schools (FATİH Project) and it is among the most significant educational investments of Turkey. This project will be applied to all K-12 schools (570.000

classes in 42.000 schools) in the throughout Turkey (YEGITEK, 2013). The government's expectation from this investment is "*enabling equal opportunities in education and improving in our schools for the efficient usage of ICT tools in the learning-teaching processes*" (YEGITEK, 2013). Although there were some past investments without reaching efficient usage of ICT, this enterprise for FATİH Project in Turkey as a developing country has more importance in point of efficient usage of ICT and enabling equal opportunities to all students. In this study, usage of these technologies by teachers was investigated in order to investigate the problems that they encounter and the solutions for these problems. Ely (1990) indicated that eight barriers or conditions affecting the integration of ICT in the schools. These are dissatisfaction with the status quo, adequate time, resources, knowledge and skills, rewards and incentives, participation, commitment, and leadership. The role of these conditions for the effective technology integration in the educational environments was also emphasized by some researchers. (Bauder, 1993; Read, 1994; Ravitz, 1999; Ensminger et al., 2004). Also, perceptions and expectations of teachers and school administrators about ICT in this project were identified with the aim of giving some directions for integrating ICT to educational organizations. There were most of the theories in the literature emphasizing the receiving the opinions and needs of users and informing them about the process and technologies might positively affect the integration process of the ICT in the educational environments (Burkman, 1987; Tessmer, 1990; Davis, 1989). In the current study, the integration process of the SCT in the schools was investigated from the both viewpoint of practitioners (teachers and school administrators) and policy makers (YEGITEK administrators). Therefore, the attempts of YEGITEK administrators and opinion of teachers and school administrators could be compared according to results of this study. Moreover, this study tried to determine whether these technologies in the K-12 schools used efficiently and effectively according to invested enormous money.

Miranda (2007) stated that implementation strategies of educational institutions should incorporate both macro-level and micro-level aspects of diffusion. For that reason, investigating diffusion process of the FATİH Project in terms of both the macro-level and micro-level sides might provide useful information for the

educational leaders. Yilmaz (2011) stated that most of the investments carried out by educational institutions regarding the generalization of the use of ICT in education have been planned with mostly macro level viewpoint and she recommended administrators at educational institutions should consider all the dimensions at their policies and practices for the projects of technology integration into schools. For that reason, micro-level studies carried out focusing the usage of ICT in the schools might be important for the implementation of technology integration projects in the educational environments. Identifying perceptions and expectations of teachers as the users of ICT in the light of the micro-level theories might give FATİH Project management some clues in order to solving the problems that teachers encounter. Also, change plans and technology plans for the integration processes might lead to the project management with regard to macro-level theories. Although educational leaders have some technology plans and change plans while they applied ICT to educational organizations, micro-level theories generally might not be consider in depth by educational leaders (Miranda & Russell, 2011). For the FATİH Project, it was stated that the strategies and plans of YEGITEK for integration of the SCT in the schools were not defined clearly and were not enough for the current situation about the management of diffusion process of SCT within the scope of FATİH Project (Sarı, 2011; Ekici & Yılmaz, 2013). For that reason, in this study, some micro-level instructional technology diffusion theories ('User-Oriented Instructional Development Process' (Burkman, 1987) and 'Environment Analysis' (Tessmer, 1990)) were pursued as theoretical base in order to investigate management of the FATİH Project in the way of micro-level. The properties, perceptions and expectations of teachers were examined in the light of these theories. Therefore, this study could supply some information about how school administrators and projects administrators considered the project from the micro-level theories.

In the literature, there were so many studies investigating the effects of ICT on the achievement of the students and schools. However, Baek, Jung and Kim (2008) emphasized that educational technology researchers should firstly investigate factors affecting to teachers' decisions to use ICT in their courses instead of discussing the various effects and applications of ICT in the educational environments. That is, if

the SCT would not be used effectively and efficiently by teachers in the schools, these technologies could not affect positively learning of the students. In this study, the current usage of SCT, problems while using them, solutions to these problems and needs of teachers were tried to determine by researcher. For that reason, the findings of the current study may provide some suggestions for the policymakers of FATİH Project in order to supply integration of SCT into schools. Therefore, other researches could be conducted so as to investigate the effects of SCT on students' academic achievement, after providing effective and efficient usage of SCT by teachers in their courses and lessons.

1.6 Definitions of the Concepts and Terms Used in the Study

Ministry of National Education (MoNE): MoNE is affiliated with the government in Turkey and it is responsible for the management of public and private educational institutions and whole system in Turkey.

YEGITEK: YEGITEK is general directorate institution at MoNE to deal with, conduct and manage all issues about the educational technologies.

YEGITEK Administrators: In the present study, YEGITEK administrators might be defined as authorities and supervisors at YEGITEK dealing with all issues about the SCT in the FATİH Project.

School Administrators: Principals and assistant principals of the schools were mentioned as school administrators in the current study. The school administrators are responsible for all issues in the school, not only issues about the SCT).

Computer teacher**:** The computer teacher term include the Computer Course Teachers and Computer Coordinators at schools in the current study. The duties of computer teachers explained as teaching about the information technology, hardware and software topics about the computers, office application programs like word processor, spreadsheet, and presentation applications (Becker, 2001). Although computer teachers are generally graduated from Department of Computer Education and Instructional Technology, Computer Coordinators are actually teachers graduated from different departments of the universities and they attended in-service

training programs organized by MoNE in order to be Computer Coordinator. However, computer coordinator was mentioned as computer teachers in the current study.

Information and communication technologies (ICT): ICT was defined by Toomey (2001) as technologies for accessing, collecting, manipulating and presenting or communicating information. In this study, ICT term contained hardware like computers and other devices, software like programs or applications, and connection like networking, accessing with the Internet.

Smart Classroom technologies (SCT): In the current study, SCT inferred the ICT established in the schools by YEGITEK/MoNE within the scope of FATİH Project. These SCT were listed as projectors, laptop computers, smart boards, the Panel Type Interactive Whiteboards (PTIWB), EBA portal, the Internet connection, and speakers.

Integration of SCT: In the current study, SCT integration (or ICT integration) into educational environments inferred effective and efficient usage of SCT by teachers, students, administrators (even all people) in all areas of the educational environments. ICT integration means suitable usage of SCT in education suitable to where, why, when and how the SCT should be used.

In-service training: Training programs for the teachers currently working in a school was represented as in-service trainings in order to cause in-service teachers to gain more knowledge, skills and proficiencies.

E-contents: In the current study, e-contents referred contents for using with SCT such as e-books, animations, simulations, videos, sounds, images, maps, interactive applications, electronic version of textbooks.

CHAPTER 2

LITERATURE REVIEW

In this chapter, related literature was reviewed in two main parts in order to lead the study and construct research questions. For the first part, ICT and Education title was examined with the three subtitles as (1) ICT integration to education, (2) factors influencing ICT integration, and (3) situation of ICT integration to education in Turkey. In the second part, Diffusion of Innovation theories were analyzed in the four subtitles: (1) environment analysis, (2) user oriented instructional development process, and (3) technology acceptance model.

2.1 Information and Communication Technology and Education

With the emergence of the Internet, information technology had a new dimension and Information and Communication Technology (ICT) began to be used by most of the fields like in the educational environments. ICT was not only the mainstay of the information society, but also had a key role for encouraging educational reforms that change the educational systems (Pelgrum, 2001). Toomey (2001) defined the ICT as technologies for accessing, collecting, manipulating and presenting or communicating information. ICT contain hardware like computers and other devices, software like programs or applications, and connection like networking, accessing with the Internet. With these features of ICT, educational institutions have been trying to solve problems of teaching and learning processes. In addition, so as to prepare the students for the 21st century, various attempts for utilizing ICT in the educational environments have been begun by the administrators of the educational institutions.

2.1.1 ICT Integration in Education

Technology integration to education was described as using technology to supply more efficient and effective learning (Newby, Stepich, Lehman & Russell, 2006). Additionally, Williams (2003) defined ICT integration as utilizing various ICT tools like the Internet, and computers, educational software to support teaching and learning processes in the educational environments. On the other hand, Osin (1998) emphasized that ICT integration into schools were not only installing various hardware, technologies and internet access at the schools. Belland (2009) also stated that technology integration is the constant and persistent revolution in the social system of educational institutions caused by the usage of ICT to help learners create knowledge.

The purpose of the ICT integration to education was stated as enhancing the quality, availability and cost-effectiveness of education's accession (Lloyd, 2005). In addition, Bruniges (2003) indicated the purpose of ICT integration to educational institutions as *"to improve and increase the quality, accessibility and cost-efficiency of the delivery of education, while taking advantage of the benefits of networking learning communities together to equip them to face the challenges of global competition"* (para. 6). ICT integration to learning and teaching processes was explained as not only learning about ICT but also learning with ICT. Yüksel and Alemdar (2012) emphasized this point and they stated that incorporating ICT skills and knowledge both in context knowledge and in pedagogical knowledge were critical issue for ICT integration to educational environments.

2.1.2 Efforts for the ICT Integration to Educational Environments

In order to integrate ICT to education, most of the governmental and private institutions have made investments for the setup of varied technologies to the schools. Ertmer et al. (2012) stated in their paper that more than 40 billion dollars financed to the schools of U.S between 1990 and 2000 and they continued to setup more class with ICT. Also, the Internet connection of public schools' computers has increased from 35% in 1994 to nearly 100% in 2005 (Wells & Lewis, 2006). Nut (2010) summarized the ICT investments to educational institutions for some

countries as; $5 billion in 2008-2009 in United Kingdom, $6 billion in 2009 in United States and over $410 million in every year in New Zealand. Although these investments are continuing increasingly in every year in most of the countries, many of these technologies were underutilized due to some barriers and problems (Mun & Hwang, 2003). In addition, Gulbahar (2007) argued that numerous technological developments have been invested into the educational institutions in Turkey and there was not enough evidence of ICT adoption for the teaching and learning processes.

2.1.3 Factors Influencing ICT integration to Education

Usage of ICT in the educational institutions has been affected by varied factors. While some of these factors may take a role positively, some of them may influence negatively. Perceived Attributes of Innovations Theory of Rogers (2003) were accepted as basic by the most of the researchers for the factors influencing any diffusion or innovation process. In this theory, Rogers (2003) listed five technological characteristics or attributes that influence the decision to adopt an innovation. These were relative advantage, compatibility, complexity, trialability and observability. Moreover, most of the researchers mentioned the conditions affecting the ICT integration in educational environments emphasized by Donald P. Ely (Bauder, 1993; Read, 1994; Ravitz, 1999; Surry & Ensminger, 2002; Ensminger et al., 2004; Uluyol, 2013). Ely (1990, 1999) stated that eight conditions that facilitate implementation of ICT; these were 1) dissatisfaction with the status quo, 2) adequate time, 3) Resources, 4) knowledge and skills, 5) rewards and incentives, 6) participation, 7) commitment, 8) leadership.

On the other hand, factors affecting ICT integration were analyzed in two groups; organizational level (for example resources, funding, leadership, vision, and technology planning), and teachers or students level (such as knowledge, skills, beliefs and perceptions) (Ertmer, 1999; Miranda & Russell, 2011). In addition, Buabeng-Andoh (2012) made another grouping as teacher-level factors, school-level factors and system-level factors preventing usage of the ICT in the educational institutions. He also listed some barriers for the integration of ICT into schools.

These were "*lack of teacher ICT skills, lack of teacher confidence, lack of pedagogical teacher training, lack of suitable educational software, limited access to ICT, rigid structure of traditional education systems, restrictive curricula, etc"* (Buabeng-Andoh, 2012, p.136). In addition, factors affecting the successful ICT integration in the schools were declared in a report as lack of in-service training, time, appropriate teaching and learning materials, technical support and the provision of leadership and management (World Bank, 2005). Moreover, factors affecting the ICT integration into teaching were analyzed with in four dimensions and these are user characteristics, content characteristics, technological considerations, and organizational capacity (Stockdill & Moreshouse, 1992).

When the barriers to ICT integration into educational institutions were analyzed in depth, there were some barriers cited by most of the researchers in the literature. Some of these barriers might be listed as lack of knowledge and skills regarding ICT usage, lack of teacher confidence, lack of training, resistance to change, lack of content, lack of infrastructural resources, lack of technical support, lack of pedagogical support, lack of administrative support, lack of collaboration among teachers, inappropriate curriculum, lack of incentives, and teacher workload and lack of time (Cox et al., 1999; Beggs, 2000; Pelgrum, 2001; Newhouse, 2002; Akbaba-Altun, 2006; Yıldırım, 2007; Göktaş, Yıldırım & Yıldırım, 2009; Bingimlas, 2009; Buabeng-Andoh, 2012; Yüksel & Alemdar, 2012). In Table 2.1, the barriers declared in the literature were presented.

Table 2.1 Barriers for the ICT integration

	Ely (1999)	Çağıltay et al. (2001)	Cuban (2001)	Akbaba-Altun (2006)	Usluel et al. (2007)	Yalın et al. (2007)	Yıldırım (2007)	Bingimlas (2009)	Buabeng-Andoh (2012)	Ertmer et al. (2012)	Göktaş et al. (2013)	Karaca et al. (2013)
Lack of knowledge and skills for ICT usage	•	•	•	•	•	•		•	•		•	•
Lack of in-service training	•	•	•	•	•	•	•	•		•	•	•
Lack of content	•	•	•	•	•	•				•	•	
Lack of hardware and software	•	•		•	•	•	•	•	•	•	•	
Lack of technical support			•	•	•	•	•	•	•	•	•	
Lack of pedagogical support				•		•	•					•
Lack of administrative support	•			•	•	•		•	•	•	•	•
Lack of time	•	•	•		•	•	•	•	•		•	•
Lack of incentives	•						•					
Lack of teacher confidence								•	•			•
Resistance to change	•							•				
Inappropriate curriculum							•					

Lack of knowledge and skills, lack of teacher confidence and lack of training of teachers for using SCT in the educational environment were generally addressed together in the most of the studies. Pelgrum (2001) stated that teachers in the most of the countries did not have adequate knowledge and skills about the usage of ICT and most countries did not yet provide necessary trainings to their teachers in order to gain up-to-date knowledge and skills with regard to new technologies. In addition, professional development was referred as a conspicuous matter teacher so that they could feel themselves as professional users of technology. Beggs (2000) also stated that if teachers did not have enough competencies for using technologies, their lack of confidence could cause fear of failure in using the technology. Therefore, most of the researchers emphasize that teachers need to be educated (Yüksel & Alemdar, 2012).

Lack of resources was also declared as another important barrier for the integration of ICT into schools. Ely (1990, 1999) especially mentioned the resources as a requirement in the eight conditions that facilitate implementation of ICT and he emphasized that ICT should be accessible to teachers. The provision of ICT and other infrastructure like physical conditions, educational software, and e-contents were seen as requirement for the integration of the ICT in the educational institutions (Pelgrum, 2001; Newhouse, 2002; Ensminger et al., 2004; Göktaş, Yıldırım & Yıldırım, 2009).

Lack of technical support, lack of pedagogical support, and lack of administrative support were also indicated as another factor for the integration of the ICT into schools. At this point, role of school administrators and computer teachers in the schools were highlighted in the most of the studies (Ely, 1990; Kotter, 1996; Todd, 1999; Leigh, 2000; Akbaba-Altun, 2006).

2.1.4 ICT Integration to Education in Turkey

As well movements for using technologies in the educational institutions at the most of developing and developed countries, Ministry of National Education (MoNE), which is a central and governmental organization responsible from the education in Turkey, has attempted various initiatives about the integration of ICT to educational

system of Turkey. However, Yilmaz (2011) specified that most of the educational studies about the condition of ICT integration in the Turkish Education System indicated that the technology usage in the classroom activities has not yet reached the expected level because of the problems originating from the factors affecting the integration process, although there has been an increase in the use of these technologies by teachers.

When the ICT integration process in Turkey was analyzed, it was the first time that MoNE begun to use computers at secondary schools in 1984 (Akbaba-Altun, 2006). Approximately, 30 years for the technology integration process into schools were examined in three periods at the study of Yilmaz (2011) as first period from 1984 to 1997, in which basic education was expanded to eight years; second period from 1997 (approval of Basic Education Law expanding basic education to eight years) to 2003; and third period from 2003 (beginning of the '2003 e-Transformation Turkey Project') to 2010 (starting of the FATİH Project by YEGITEK/MoNE). Actually, Yilmaz did not defined the third period ended at 2010, however starting of the FATİH Project caused new generation for the process of technology integration into school at Turkey. Therefore, fourth period may be declared the process begun from 2010, in which the FATİH Project started in Turkey, and this process is still continuing today. For that reason, this technology integration history will be presented under 4 periods summarizing the attempts of the MoNE so as to integrate ICT into educational environments.

First Period (1984-1997)

Akkoyunlu (2002) explained first attempt of MoNE for using computers in the schools as the MoNE conducted a pilot study and 1100 computers were established in 121 secondary schools at a ratio of one computer to ten students. After this initiative of MoNE, totally 2400 computers were obtained for secondary and vocational schools between 1985 and 1987 (Akkoyunlu, 1992). There were also some in-service training for teachers in these schools and MoNE made some arrangements for the usage of these technologies on the curriculums of the courses. Yilmaz (2011) also mentioned that MoNE started a project named as the Computer-

Assisted Education Project (CAEP) in 1988 so that computers were used for computer-assisted education (CAE) in the schools at Turkey, while they were initially used for computer education after first campaign of MoNE at 1984. Askar (1991) also specified that educational and scientific institutions and private research and development centers were provided and approximately 6500 computers were spread to 2400 schools in 1991.

In 1992, The General Directorate of Computer Education and Services (BILGEM) was established by MONE so as to manage the Computer Experimental Schools Project (CES) (Schware & Jaramillo, 2004). This unit intended to integrate ICT into schools by using computers at every level of schooling, training the teachers and improving computer-based education (Akkoyunlu, 2002). Moreover, with the financial support of the World Bank, the National Education Development Project (NEDP) had been conducted by MoNE between 1992 and 1997 (MEB EGITEK, 2002). In this project, MoNE aimed to increase the quality of primary and secondary education in Turkey and two pilot projects (the 53 Computer Try-out School Project and 182 Computer Laboratory School Project) were directed toward the use of computers in education (Yilmaz, 2011). In the 1995–1996 academic year, MoNE and Technical Research Council of Turkey (TÜBİTAK) produced an educational software for Geography, History, Turkish and Science courses at the Centre of Electronic Research and Development (Akkoyunlu, 2002).

Second Period (1997-2003)

In 1997, the government in Turkey made a legal regulation for the Turkish Education System in order to expand the primary basic education to eight years. The Basic Education Project (BEP) was initiated in 1998 by MoNE and financially support of World Bank so as to implement new basic education strategy of government. One of the main aims of this project were declared as generalizing the use of ICT firstly in the primary schools, integrating them into system and realizing technological revolution in the educational environments. (MEB, 2004). MoNE planned to establish computer laboratories in at least two schools at every city and county in 1999 after the extension of compulsory education from five to eight years. Yilmaz

(2011) reported that MoNE established new computer laboratories in the 2541 primary and secondary schools in 80 cities and 921 counties according to their plan. MoNE plans to establish Internet connections in 2500 primary and secondary schools, with the aim to connect teachers and students to the world. In addition, Göktaş and Yıldırım (2007) specified that MoNE aimed to assure each student and teacher become at least literate in ICT with aid of the technology rooms and the internet access in the basic education school within the scope of these projects. Then, at the beginning of the 2000s, MoNE supplied the one or two ICT classes (having computers, internet connections and projector) in each primary and secondary school (YEGITEK, 2014).

This second period between 1997 and 2003 for the technology integration process in Education at Turkey was also named as 'Basic Education Program Phase I' in the study of Akbaba-Altun (2006). The activities completed within this Phase I period were listed as

- *MoNE created 3188 IT classrooms in 2802 elementary schools (K-8) and equipped them with computers, printers, scanners, TVs, videos, multimedia software and slides. All schools had the same number and type of ICT tools, except for the number of computers.*
- *A total of 56,605 computers were distributed to 26,244 rural area elementary schools.*
- *1630 laptop computers were supplied to 3000 primary education supervisors who were then trained on computer literacy, active learning, and teaching strategies.*
- *25,000 elementary school teachers were trained on computer literacy in various in-service programs provided by the MoNE. In addition, 15,928 elementary school teachers received advanced computer training by the contract firms who supplied hardware and software to those schools.*

- *2308 computer coordinators were trained on using projectors and 18,517 schools were sent overhead projectors.* (Akbaba-Altun, 2006, p.176)

Although most of the developments implemented by MoNE in the second period between 1997 and 2003, the goal of the integration of ICT into teaching and learning processes could not be achieved by the BEP (MEB,2003; Akbaba-Altun, 2004; Karagöz, 2004. Yilmaz (2011) expressed that usage of ICT for educational purposes in the schools could not be generalized at this period, because the ICT in the IT classrooms were used mostly for computer education instead of for the teaching and learning processes.

Third Period (2003-2010)

After the 2000, the transformation into information society affected the policies of the government in Turkey. For that reason, MoNE and World Bank conducted the second phase of Basic Education Program (BEP-Phase II) expanding the attempts in the first phase of the BEP. In the report of Word Bank (2002), the planned attempts were listed as establishment of additional 4002 IT classrooms at 3,000 basic education schools and in-service trainings about the ICT skills to 31500 basic education school teachers. In addition, there were some other projects conducted by MoNE and private sector in order to support aims of the BEP Phase II. Some of these projects were 'Computer Based Education Support Project' and the '100% Support to Education Campaign' (Yilmaz, 2011). It was stated in the web site of the MoNE that the number of the IT classrooms installed by means of the support of national and foreign funds and private sectors was 29264 in the BEP Phase II process by 2008 (MEB EĞİTEK, 2008). The situation of the ICT in the schools at Turkey for the third period was specified as at least an IT classroom in almost every school, the Internet access in %96 of the all schools, computer-aided science laboratory in the 1500 schools, and educational software in the 18500 schools (Kayaduman, Sırakaya, & Seferoğlu, 2011). Yüksel and Alemdar (2012) stated the numbers of teachers and students per computer throughout the country according to 2010 Information Society Statistics of MoNE as

- Numbers of teachers per computer: 24.6 in primary schools and 17.8 secondary schools.
- Number of students per computer: 30.9 in primary schools and 27.3 in secondary schools.

Fourth Period (2010-2014)

Currently, MoNE are implementing huge technology investment at K-12 schools (MEOIT Project – FATİH Projesi) and it is among the most significant educational investments of Turkey. The name of the MEOIT Project was stated in Turkish as FATİH Project which was the Turkish abbreviation of the Movement of Enhancing Opportunities and Improving Technology Project. The FATİH project started in November 2010 and MoNE were planning to complement until end of 2014 (YEGITEK, 2014). The budget of the FATİH Project was stated as approximately 3 billion Turkish Lira (US$1.8 billion or 1.04 GBP) (Uluyol, 2013).

2.1.5 MEOIT (FATİH) Project

In the FATİH Project, it was planned that SCT (such as Panel Type Interactive Whiteboard - PTIWB, high speed internet connection) would be established to all K-12 schools (570.000 classes in 42.000 schools) in the throughout Turkey. In addition, there is a second phase of the FATİH Project and 2.5 million tablet PCs would be distributed to as from the 9^{th} and 5^{th} grade students in the schools (Alkan et al., 2011). The MoNE's expectation from this project is "*enabling equal opportunities in education and improving in our schools for the efficient usage of ICT tools in the learning-teaching processes*" (YEGITEK, 2012). The in-service trainings for the usage of the Smart Classroom Technologies (SCT) installed in the schools in scope of FATİH Project were prepared by a council consisted of academicians from a few universities. It was planned that all teachers in the schools in Turkey would receive this in-service training face to face. In addition, there were various efforts of MoNE in order to supply e-content for these SCT and regulate the current teaching programs to ICT supported teaching (YEGITEK, 2014).

MoNE have conducted the pilot implementation for the FATİH Project. Tablet PCs and Panel Type Interactive White Boards (PTIWB - LCD Interactive Boards) to 52 schools in various cities at Turkey. Moreover, 8.500 tablet PCs have been sent to

students in 52 schools at 17 provinces in the scope of second pilot phase of FATİH Project (YEGITEK, 2013). During these pilot implementations, PTIWB were installed in the most of the high schools around the country. 49000 tablet PCs have been distributed to both students and teachers in 81 provinces in the third pilot phase of the FATİH Project.

MoNE is consisted 5 sub-components in order to conduct the implementation of the FATİH Project. These sub-components are providing equipment and software substructure; providing educational e-content and management of e-content; effective usage of the ICT in teaching programs; in-service training of the teachers; and conscious, reliable, manageable and measurable ICT usage (Figure 2.1).

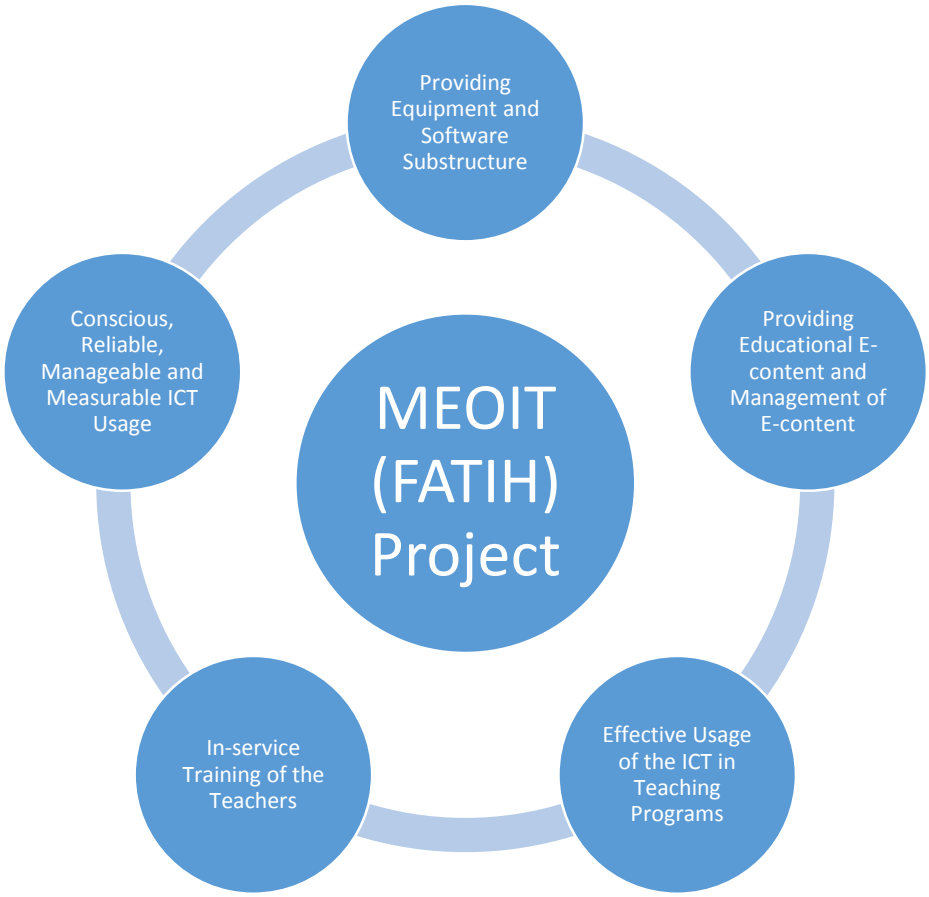

Figure 2.1 Sub-Components of the FATİH Project

Aim of the FATİH Project was declared as

> *"to provide ICT equipment to classes in order to achieve the ICT supported teaching until the end of 2014 in related to the goals that take place in the Strategy Document of the Information Society, the Development Report, the Strategy Plan of our Ministry and The Policy Report of ICT that have described all activities of our country in the process of being an information society and have been formed within the scope of the e-transformation of Turkey."* (YEGITEK, 2014, para. 3)

In addition, Uluyol (2013) expressed the aim of FATİH Project as providing smart classrooms in all elementary and secondary schools in Turkey. YEGITEK (2014) also listed intended acquisitions of the FATİH Project for students as;

- Acquiring knowledge using more sensory organs,
- Participating and taking responsibility more due to self-confidence from knowledge acquisition,
- Shaping their future based on his/her own purpose,
- Knowing what they want and take control of their life path.

They also listed some acquisitions for the teachers in scope of the FATİH Project as;

- Accessing easily to the updated knowledge and latest teaching techniques which will help in teaching process,
- Helping students gain different viewpoints,
- Creating information and transferring it perennially,
- Being innovative,
- Measuring the quality and quantity of their teaching and complete the shortcomings,
- Preparing the future generation from today.

Because of the ongoing process of FATİH Project, there were restricted academic studies in the literature so as to evaluate the integration process of the SCT installed into schools by MoNE in scope of FATİH Project. One of the most comprehensive

studies about the technology integration process of the FATİH Project was the study of Pamuk, Çakır, Ergun, Yılmaz, and Ayas (2013). In this study, the usage of SCT by teachers and students, effectiveness of these SCT in teaching and learning, and problems and issues during the usage of these technologies were investigated. It was concluded that the PTIWB were used by teachers and students as limited, although tablet PC were generally not used by the teachers and students (Pamuk et al., 2013). At this point, usages of the PTIWB by teachers were identified as demonstrating the lecture presentations. In addition, various the technical problems, pedagogical and development issues were stated as important factors for the integration of the SCT in the schools. About the technical problems, sensitivity problem of the PTIWB's touch screen and lack of pen tool was stated. It was also emphasized that limited access to e-content and e-materials developed for the some content areas and lack of knowledge and skills for using these technologies were declared as other problems (Pamuk et al., 2013). Lastly, teachers' anxiety of difficulty in classroom management was reported as another problem during the usage of the SCT in this study.

In another study, it was declared that administrators of FATİH Project did not take into consideration of previous situation of technology integration attempts in Turkey (Uluyol, 2013). He also asserted that there were deficiencies in the determination of "*the short-term outcomes (the knowledge and skills to be acquired by the teachers and students), the intermediate-term outcomes (the changes in organizational behaviors) and the long-term outcomes (the changes in values, circumstances and status of the Turkish school system)*" (p. E12).

Ekici and Yılmaz (2013) conducted a study in order to evaluate FATİH Project within the framework of Project Cycle Management theory. According to their study, it might be concluded that there was not any design and implementation plan for the FATİH Project shared with the public. In addition, it was specified that objectives and strategies were not clear for the FATİH Project. Ekici and Yilmaz (2013) also stated that *"communications with Project stakeholders have not been enough and stakeholders are perceived as mere implementers"* (p.339). Parallel to this, Sarı (2011) emphasized that component of the FATİH Project should be shared with

stakeholders such as teachers and they could participate the decision process of the project. Moreover, provided e-contents by means of EBA portal were interpreted as inadequate for teachers and students. Lastly, it was concluded that the SCT within the scope of FATİH Project could not be integrated into education system of Turkey (Ekici & Yılmaz, 2013).

Kayaduman, Sarıkaya and Seferoğlu (2011) also determined various factors for the success of the FATİH Project. These factors were;

- Perceptions of teachers about the SCT usage in education,
- Attitudes of teachers about the SCT usage in education,
- Perceptions of teachers about computer or technology usage in social life,
- ICT usage situations of teachers,
- Self-confidence of teachers for the SCT integration in their courses,
- Self-efficacy of teachers for the SCT,
- Deficiencies at technological infrastructure at schools,
- Attitudes of school administrators,
- Attitudes of administrators of MoNE,
- Lack of knowledge and skills about SCT usage,
- Lack of in-service education about the SCT usage, and
- Inappropriateness of curriculum for the SCT usage.

2.2 Diffusion Theories and Instructional Technology

Instructional technology field generally used some theories of educational sciences, communication, behavioral psychology, cognitive psychology, management, computer science and other fields. The diffusion of innovation theories have been used by the instructional technologist in order to using ICT in educational environments. Although there are several diffusion theories from a wide variety disciplines focusing different parts of the innovations, there is not one, well-defined, unified, and comprehensive theory for diffusion theory. However, most of the researchers in the field of educational technology referred the ‘Diffusion of

Innovations Theory' of Rogers (2003) as basis while making research about the ICT integration to education. Ensminger et al (2004) stated that Rogers' theories such as diffusion of innovations, innovation-decision process, the perceived attributes of innovation, and the adopter categories were mostly accepted theories by most of the researchers in field for the integration of ICT into educational environments. Rogers (2003) defined the main elements in the diffusion of innovations as *"(1) an innovation (2) that is communicated through certain channels (3) over time (4) among the members of a social system"* (p. 31). Theoretical foundation of this study was constructed according to classification in the Surry's paper titled as "Diffusion Theory and Instructional Technology (1997). He grouped these theories in two group macro theories and micro theories.

2.2.1 Macro and Micro Theories

Diffusion theories for instructional technologies may be analyzed in two main groups according to their goals and scope (Miranda, 2007). In the first group, macro-level theories are interested with reforming and changing educational organizations for the integration of ICT. Some examples for this group are 'Third Wave Educational System' (Reigeluth, 1987) and 'New American Schools Development Corporation' (Mehlinger, 1995). On the other hand, in the second group, there are some micro-level theories concentrating on the adaption of the ICT for the usage of them in the schools. In this study, a few micro-level theories were used for the theoretical base of the research questions and the study. These are 'User-Oriented Instructional Development process' (Burkman, 1987) and 'Environment Analysis (Tessmer, 1990). In addition to these, Technology Acceptance Model (Davis, 1989) and Ely's Eight Conditions (Ely, 1990) provided the basis by the researcher for the some research questions and the study. They were selected as the theoretical base of this study instead of macro-level theories, because administrators of the educational organizations generally plan the change of organizations from the macro-level viewpoint. For that reason, they may overlook the problems in the integration process of ICT skipping micro-level approaches. Therefore, theoretical background of the study was formed with micro-level theories. The other point for selecting them was that they were adopter based diffusion theory. Surry defined the 'adopter-based

theories' as focusing on the needs and opinions of potential users and characteristics of the usage site (1997). That is, they try to understand the social setting of the innovations while they are used.

2.2.1.1 Environment Analysis

Tessmer (1990) stated in his paper (titled as Environment Analysis: A Neglected Stage of Instructional Design) that if an environment analysis was not performed adequately for an instructional design project, the products of this design project might influence theoretically on sound but they might be practically unusable. Then, he (1990) defined environment analysis as *"the analysis of the context of instructional systems, both the physical and use aspects of the instructional products"* (p.56). The important point in this definition is that there is a second dimension of environment analysis and it is the usage of the products by the potential adopters. The importance of the usage aspects of the ICT was stressed as there was a need to analyze the environment in which adopter was anticipated to use the ICT (Carr, 1999). Tessmer (1990) stated two categories for the factors and aspects of Environment Analysis as 'physical factors' and 'use factors' as seen in Figure 2.2.

Physical Factors

- Instructional Environment
  - Facilities
  - Instructional Lifespan
  - Equipment
- Support Environment
  - Site Distribution
  - Management and Coordination
  - Seasons and Climate

Use Factors

- Instructional Environment
  - Patterns of Use
  - Reasons for Use
  - Student-User Characteristics
  - Administrator Characteristics
- Support Environment
  - Production Services
  - Storage and Delivery Services
  - Dissemination Resources
  - Support Resources

Figure 2.2 Aspects of Environment Analysis (Tessmer, 1990, p.57)

In addition, Ensminger et al. (2004) explained the environment analysis as identifying instructional environment and support environment to analyze before the design and development of an innovation. So, with the both physical and usage viewpoints, the environment analysis try to answer these questions; where the products are used, who uses it, how it is used and how it is supported (Tessmer, 1990). That is, the aim of environment analysis may be addressed as constructing a depiction of the physical and usage environment with answering these questions.

2.2.1.2 User Oriented Instructional Development Process

Theory of user-oriented instructional development process (UOID) was based on meeting the perceived needs of potential users for integration of ICT (Burkman, 1987). UOID refuses the opinion that advantage of technology was a sufficient

condition in order to integration of ICT to educational environment (Surry, 1997). Instead of technological superiority, the opinions, requests, and perceptions of the potential users were declared as the primary factors in the integration process of ICT into educational environments.

In this theory, it was emphasized that the needs, ideas and perceptions of potential users were the major factors in the integration of ICT into educational environments. Therefore, for the integration of ICT in educational organizations, Burkman (1987) offered the UOID process consisting of five steps as:

- Identify the potential adopter,
- Measure relevant potential adopter perceptions,
- Design and develop a user-friendly product,
- Inform the potential adopter (of the product's user-friendliness),
- Provide the post adoption support.

These steps have been used successfully for bringing new products by other areas, like education and business. In addition, this process might supply administrators of educational institutions the possibility of being knowledgeable about the potential user's problems and preferences and better communication with them (Burkman, 1987). These five steps of UOID process were mentioned in the study of Ensminger et al. (2004) in parallel with 8 conditions stated by Ely (1990).

2.2.1.3 Technology Acceptance Model

Researchers developed projects in order to use ICT in the education of our children, however these technologies were underutilized or failed totally in the schools (Chadwick, 2002). So as to solving these problems, Davis (1989) developed Technology Acceptance Model (TAM) by focusing the perceptions of users. TAM was actually the revision of Theory of Reasoned Action (TRA) and it suggests a few factors influence the decision of a user about whether, how, and when s/he will use the ICT (Zhao, 2006). Two factors, perceived usefulness and perceived ease of use, were the fundamental determinants of user beliefs of the acceptance of ICT (Adams, Nelson & Todd, 1992). Davis (1989) defined perceived usefulness as "the degree to

which a person believes that using a particular system would enhance his or her job performance" (p. 320) and perceived ease of use as "the degree to which a person believes that using a particular system would be free of effort." (p. 320). Because of limitation of the TAM model, some researchers proposed several extended TAM models (Lee et al., 2003). The extended TAM, which was used in this study, included the organizational support part to original TAM model (Zhao, 2006). Organizational support composed of end-user support and management support (Igbaria, et al., 1995).

2.2.1.4 Ely's Eight Conditions to Implementation of Innovations

Ely (1990) stated that eight conditions that facilitate implementation of ICT; these were 1) dissatisfaction with the status quo, 2) adequate time, 3) Resources, 4) knowledge and skills, 5) rewards and incentives, 6) participation, 7) commitment, 8) leadership.

Dissatisfaction with Status Quo

This condition were related the displeasure of the teachers about the current processes or technologies in their courses. Ely (1990) explained that if teachers said or thought that something is not right and there could be a change in their courses, the new technologies could be better integrated to their courses. The relative advantage theory of Rogers (1995) is related with this condition. Ensminger et al. (2004) stated that the dissatisfaction state might be caused by self-induced or organizational awareness.

Adequate Time

In order to using ICT in the teaching and learning processes, teachers needed time for in-service training, for practicing with new ICT, for revising existing teaching plans, for preparing e-contents (Ely, 1999). For that reason, adequate time was declared as crucial condition for the educational change process.

Resources

Resources conditions covered the needed hardware and software materials like computer, projectors, educational software and e-contents for the ICT. In addition,

finances, materials, personnel and technological support were indicated as resources for the integration of ICT in educational environments (Klein & Sorra, 1996). Ely (1999) emphasized that new resources must not always expensive, difficult and inaccessible.

Knowledge and Skills

Teachers needed to know required knowledge and skills to use ICT in their lessons in order to integrate successfully the ICT in their courses. That is, users should had competency to use the technologies. Ely (1990) mentioned that knowledge and skills was at the top of the list as most important factors leading to integration of ICT in the educational institutions. In-service trainings, self-instructional courses or formal education may be selected in order to acquire required knowledge and skills about the innovations. Ensminger et al. (2004) also emphasized that "*knowledge and skills not only reflect the intended users' current level but also their belief in being able to develop the necessary skills to successfully use the innovation*" (p. 64). In addition, this condition is related with the "complexity of the innovation" theory stated by Rogers (1995).

Rewards and Incentives

This condition was consisted of two parts as intrinsic rewards and extrinsic rewards. Ely (1999) specified that incentives might vary for individuals. That is, while someone could want the new and more e-content or technical and pedagogical assistance for using ICT, the other users could be satisfied by new ICT that made things easier for them. Burkman (1987) also stated that usage of rewards for the implementation of new products might be affective as moral support.

Participation

The participation of the users to the decision making processes might be affective for the ICT integration into educational environments. Ely (1999) expressed that decisions were often made by others in the educational institutions and these situation might affect negatively the implementation of these decisions. For that reason, if individuals feel them as a part of the decision process or implementation part of this decision, they could change their opinions to implement the innovation.

Commitment

This condition was mentioned as visible support by the senior administrators and other stakeholders. That is, perceptions of users about the administrators' commitment to the implementation of the innovation might be effective for the diffusion of the innovations. Ensminger et al. (2004) stated that only verbal confirmation of the innovation by administrators does not create commitment (Ely, 1999, 1990). Instead of this, personal communication, implementation of strategic implementation plans, and active involvement in the implementation of the innovation might be listed as visible commitment.

Leadership

Role of the senior administrators and leaders communicating with users day by day were declared as another conditions for the implementation of the ICT in the educational institutions. Ely (1999) emphasized that administrators in the school might support the teachers day-to-day in order to integrate ICT in their schools. The attitudes of the school administrators could motivate the teachers to use ICT more in their lessons (Kotter, 1996).

2.3 Summary of the Chapter

From the beginning of the 20th century, technological developments have affected the educational environments. In Turkey, the computers and other technologies were begun to use at K-12 schools in 1984. MoNE started the FATİH Project in 2010 so as to integrate ICT to K-12 schools and they planned that this project would be finished in 2014. However, various factors were stated as barriers for successful integration of ICT in the literature and some enablers were suggested to overcome these barriers by various researchers. These barriers may be listed as lack of knowledge and skills about the usage of ICT, lack of hardware and software, in-adequate in-service trainings, deficient contents, lack of technical, pedagogical and administrative support to teachers, lack of time and excessive workload for using ICT, lack of teachers' confidence, and resistance to change. Educational institutions and policymakers generally were interested with change and technology plan for the successful ICT integration into educational institutions. These attempts were planned

according to macro theories about the diffusion of innovation. On the other, micro theories were generally ignored by policy makers in order to receive opinions and decisions of teachers and school administrators as users of ICT in the schools. For the FATİH Project, there were not enough study in order to investigate current situation of SCT usage in the schools and to determine the perceptions and opinions of teachers in the schools. Özkul (2011) also stated that current process of FATİH Project could be investigated from viewpoint of the micro and macro theories. In this study, integration process of SCT within the scope of FATİH Project was analyzed from the viewpoint of micro theories. Additionally, the literature review showed that most of the research studies that investigate technology integration were conducted through quantitative data collection methodology. Therefore, in order to understand the issue deeply, there is a need to investigate technology integration through qualitative data collection methodology. At this point, views of both teachers and school administrators as users and YEGITEK staff as policy makers needs to be investigated through qualitative methodology.

CHAPTER 3

METHODOLOGY

In this chapter, research procedure of this study is presented under these titles; design of the study, researcher's role, selection of participants, instruments of the study, data collection procedure, data analysis, and trustworthiness. Firstly, the purpose of the study will be described with research questions in the following section.

3.1 Purpose of the Study and Research Questions

The purpose of this study is to investigate the existing usage of ICT in the Smart Classrooms by teachers at K-12 schools in Turkey, the problems they encounter and the solutions for these problems; how the organization (YEGITEK) conduct environment analysis before the establishing the ICT in the smart classrooms; how the organization followed user oriented instructional development process in the project. Another purpose of this study is to explore perceptions of the teachers about these technologies; expectations of teachers from the organization; conditions/barriers to usage of these technologies in the K-12 schools. Research questions of the study were listed below:

1. What is the current status of smart classroom technology usage in the schools?
    a. How do teachers use the smart classroom technologies in their lessons?
    b. What challenges do teachers encounter when using these technologies?
    c. How do teachers overcome these problems?
    d. What do teachers need to overcome these problems?

2. What attempts did the YEGITEK/MoNE as senior management conduct to provide adequate usage of the SCT in the schools in regard to;
    a. How did YEGITEK/MoNE determine which technologies would be used?
    b. How did YEGITEK/MoNE determine by whom, how and where these technologies would be used?
    c. How did YEGITEK/MoNE gather opinions of users and inform them?
    d. How would the usage of smart classroom technology be maintained?

3. How do teachers and school administrators define the conditions/barriers namely “dissatisfaction with the status qua; time; resources, knowledge and skills, rewards and incentives, participation, commitment and leadership” in the process of implementation of change/or use of smart classroom technologies?

3.2 Design of the Study

The qualitative, multiple-case study methodology was used in order to answer these research questions. There were some reasons for selecting qualitative approach. Qualitative methodologies lead researcher to understand the phenomena and, moreover, to explore it deeply (Creswell, 1998; Bogdan & Biklen, 2007). In this

study, usage of ICT, the problems while teachers using them, solutions to these problems, management of ICT by educational institutions, supports to teachers and perceptions of teachers were analyzed in-depth. In addition, qualitative approaches give more opportunities to studying things in their natural settings (Denzin & Lincoln, 1994). So, qualitative methodology could be useful investigating the usage process of ICT by means of observations, interviews in the K-12 schools. Furthermore, documents obtained from the case schools and the YEGITEK were analyzed in the current study. In Table 3.1, design of the study was summarized according to data tools, participants and data analysis for the research questions and sub-research questions.

Table 3.1 Research Questions, Data Collection Tools, Participants, and Data Analysis

Research Questions	Data Collection Tools	Participants	Data Analysis
1. What is the current status of SCT usage in the schools? a. How do teachers use the SCT in their lessons? b. What challenges do teachers encounter when using these technologies? c. How do teachers overcome these problems? d. What do teachers need to overcome these problems?	• Observation • Interview • Document Analysis	• Teachers • School Administrators • YEGITEK Administrators	Content analysis
2. What attempts did the YEGITEK/MoNE as senior management conduct to provide adequate usage of the SCT in the schools in regard to; a. How did YEGITEK/MoNE determine which technologies would be used? b. How did YEGITEK/MoNE determine by whom, how and where these technologies would be used? c. How did YEGITEK/MoNE receive opinions of users and inform them? d. How the usage of SCT would be maintained?	• Interview • Document Analysis	• YEGITEK Administrators • School Administrators • Teachers	Content Analysis
3. How do teachers and school administrators define the conditions/barriers namely "dissatisfaction with the status qua; time; resources, knowledge and skills, rewards and incentives, participation, commitment and leadership" in the process of implementation of change/or use of smart classroom technologies?	• Interview	• Teachers • School Administrators	Content Analysis

In the qualitative approaches, generally, case studies supply researchers to investigate the situations in their real-life context from the viewpoint of the participants involved in the situation (Gall, Gall, & Borg, 2003). Also, Yin (1994) stated that multi-case study method was useful in order to predict both similar and contrary results with predictable reasons to increase the external validity. For that reason, two cases (a primary school and a high school) were selected for the study in order to answer research questions in all levels of K-12 schools. In addition, multi-case study approach provided the studying with multiple sources of information such as interviews and observations (Creswell, 1998). Using interviews as a qualitative data collection technique could give a chance to reach what teachers actually thought about the subject with the aid of in-depth questions (probes). Observing the usage of ICT at the schools as well as the interviews with teachers and administrators could facilitate triangulation of the data as taking advantage of relying on multiple sources. Lastly, conducting a qualitative case study made possible the researcher to deeply investigate the context, the participants and the interaction between them (Luetkehans, 1998). In order to understand interactions in the contexts, qualitative multi-case study method selected and the researcher had gone to the case schools during 3 months period for each school. During these three months period, the researcher visited the case school 3-4 days a week and he conducted observations, interviews. In addition, while he were waiting the teachers in the staffroom, he could have chance to observe and to take field notes for the behaviors and talking of the teachers and school administrators about the SCT in the schools. Therefore, these data were also used during the data analysis in order to provide deeply analysis and triangulation of the findings.

3.3 Researcher's Role

In qualitative studies, the researcher might be accepted main instrument of the research as observing, asking questions and interacting with the participants versus a survey or an analytic device in quantitative studies (Merriam, 2001). For that reason, the researcher was responsible from the context of the study, participants, situation of the cases, and development and interpretation of the data in order to prevent the researcher bias. In this point, Lichtman (2010) emphasized that "the research is

shaped by the researcher who, in turn, is shaped by the research." (p.123). That is, there might be the researcher's effect to case of the study, as well as there might be impact of the cases to the researcher. For that reason, the researcher's role in this study was explained in three ways.

Firstly, biography of the researcher was presented. He was a PhD candidate and a research assistant at Computer Education and Instructional Technology department at a public university in Turkey. He took courses about instructional technology and educational research. In addition, he had experience as a computer teacher experience in a high school during six months. Secondly, researcher's role in the interview and observation processes was explained. Each participant was informed about the aim of the study and "informed consent forms" were given to each participant (as seen in Appendix A). In the observations, the researcher explained the study and attended to the lessons as participant observer. Also, he tried to persuade teachers about observing and talking real situations, not ideal situation. In addition, he avoided asking leading questions. Lastly, interpretation of the findings process was clarified. The researcher obtained approval from the teachers sending interview transcribes to them (Appendix B). In addition, he shared the results and consulted to thesis advisor. Furthermore, participants were selected from the all viewpoints about the ICT usage in education.

3.4 Selection of Participants

In this study, purposive sampling technique was used, while the researcher identified the participants of the study. In the qualitative studies, purposive sampling technique is the most frequently used sampling technique (Merriam, 2001). Patton (1990) stated that the purposeful sampling were useful when the researcher intentionally preferred the sample based on various characteristics. Two schools were selected as cases for the study according to some criterions. These criterions could be listed as being the pilot schools of the FATİH Project, socio-economic situations of the schools, getting easily data from the schools, accessibility for the researchers, the importance of schools in the FATİH Project, and features of ICT in the schools. In addition to people in the two case schools, administrators of the FATİH Project at the

MoNE were added to the participants of the study in order to investigate the management process of the SCT in the FATİH Project.

3.4.1 Participants in the First Case School

Firstly, a primary school in Ankara, which is the capital city of TURKEY, was detected as the first case of the study. The location of the first case school was in the suburban of the city (Sincan) and the students of this school were generally children of families from low socio economic status. There were approximately 2000 students in the first case school. Average classroom size in the first case school was about 32. This school had kindergarten to 8th grades. The school building was new and was built in 2007. The school had 32 classrooms, 1 computer lab, 1 science and technology lab, 1 library, 1 auditorium and 1 sports hall. Double-session teaching was applied at this school. That is, some students (early riser students) attended the morning session of school, while other students (afternoon students) attended afternoon session of school. In addition to this, there were a different classroom system structures opposite to general classroom system in the schools at Turkey. Namely, classrooms of students who are kindergarten to 5th grade were regular classrooms, which is they attended the most of the lessons in their classrooms (same classroom) with their primary teachers, while students who are 6th to 8th grades joined the lessons in the classrooms of the each field classrooms like Science Class, Math Class or Turkish Class, etc. In addition, 4th and 5th grade students attended some courses (like English) in the English Class instead of their classrooms. That is, there were one or two classrooms for each field in the school and students went to the classroom which lessons would start. For that reason, teachers of the each field taught their subject in their classrooms regardless of which students attended their lesson. This school was determined as the first pilot school of the FATİH Project by MoNE in order to decide which technology would be installed at the schools in the Turkey. For that reason, there were 10 different smart boards and they had different features in point of working principles. Therefore, it was the only school in Turkey as a case for first phase of this study.

In this school, there were totally 71 teachers, a school principal, and 3 assistant school principals. During the data collection in the current study, 27 teachers from different branches were selected for the interviews and the classroom observations. In addition to teachers, school principal and one of the assistant principals were selected as participants in order to investigate the case from the point of school management. The criterions for the selection of the teachers as participants of the study might be listed as age and braches of the teachers, grade levels of the students that the teachers attended the class, viewpoints of the teachers about technology usage in education, and getting useful information from which teachers. The information about the teachers was attained from the management of the school. Although most of the teachers had the positive viewpoint for using SCT in education, a few teachers had some fears about the using them. 12 of selected teachers were form tutor. Other 15 teachers were branch teacher as Math, Science, Turkish, English, Social Studies, Music, Scripture, and Technology and Design courses. They had classes in all grades (from 1 to 8) in the school. In addition, 15 out of 27 teachers were female while 12 male teachers participated in the first case school (Table 3.2). Principal and Assistant Principal of the school were also male.

Table 3.2 Gender of the participants in the first case school

Gender	**Participants**		
	Teachers	School Administrators	Total
Female	15	0	15
Male	12	2	14

Information about ages of the teachers and participants were presented in Table 3.3. Ages of 19 teachers were at 20-35 age interval, while ages of 7 teachers were at 36-50 age interval. There was only age of a teacher at 51-65 age interval. That is, most of the teachers participated to study were young or middle-age. In addition to teachers, ages of the administrators of the first case school were at 36-50 age interval. Actually, age of the principal of the school was 36 and his age could be accepted as young for being a principal of a school.

Table 3.3 Ages of the participants in the first case school

Age Interval	**Participants**		
	Teachers	School Administrators	Total
20 - 35	19	0	19
36 - 50	7	2	9
51 - 65	1	0	1

In Table 3.4, more detail information for each teacher was presented. A code were assigned to each teacher to hide the identity of the participants. The codes consisted of two parts. First part stated which case the participants belong to and included ‘C’ letter and ‘1’ or ‘2’ number. That is, ‘C1’ meant the teacher or administrator from first case school, while ‘C2’ meant the teacher or administrator from second case school. The second part of the code consisted of letter (or letters) for field of the teacher and a number for stating different participants in same field. The letter for field of the teachers were ‘T’ for Turkish, ‘M’ for Math, ‘S’ for Science, ‘E’ for English, ‘SS’ for Social Studies, ‘MU’ for Music, ‘SC’ for Scripture and ‘TD’ for Technology & Design Courses. In addition, ‘PT’ letters used for Primary teachers. As seen in the Table 3.4, 10 teachers selected as participants attended both an interview and the observations, while 6 participants only participated an interview and each of other 11 participants were only in the 2 lessons.

Table 3.4 Information about Teachers in First Case School

Teacher	Field	Interviewed	Observed	SCT in his/her Classroom
C1_T2	Turkish	Yes	Yes	Smart Board with Touch Panel, Laptop, Internet
C1_M1	Math	Yes	Yes	Smart Board with Touch Panel, Laptop, Internet
C1_M2	Math	Yes	Yes	Smart Board with Touch Panel, Laptop, Internet
C1_S2	Science	Yes	Yes	Smart Board (Magnet frame based), Laptop, Internet
C1_SS1	Social Studies	Yes	Yes	Projector, Laptop, Internet
C1_E2	English	Yes	Yes	Smart Board Projectors (Short throw - signals based), Laptop, Internet
C1_E3	English	Yes	Yes	Smart Board Projectors (Short throw - signals based), Laptop, Internet
C1_PT3	Form Tutor	Yes	Yes	Projector, Laptop, Internet
C1_PT4	Form Tutor	Yes	Yes	Projector, Laptop, Internet
C1_PT8	Form Tutor	Yes	Yes	Smart Board Projectors (Short throw - signals based), Laptop, Internet
C1_MU1	Music	Yes	No	Projector, Laptop, Internet
C1_TD1	Technology & Design	Yes	No	Projector, Laptop, Internet
C1_SC1	Scripture	Yes	No	Smart Board Projectors (Short throw - signals based), Laptop, Internet
C1_PT10	Form Tutor	Yes	No	Panel Type of Interactive Whiteboard (PTIWB), Laptop, Internet
C1_PT11	Form Tutor	Yes	No	Projector, Laptop, Internet
C1_PT12	Form Tutor	Yes	No	Smart Board with Touch Panel, Laptop, Internet
C1_T1	Turkish	No	Yes	Projector, Laptop, Internet
C1_T3	Turkish	No	Yes	Smart Board with Touch Panel, Laptop, Internet
C1_S1	Science	No	Yes	Smart Board (Magnet frame based), Laptop, Internet
C1_E1	English	No	Yes	Smart Board Projectors (Short throw - signals based), Laptop, Internet
C1_E4	English	No	Yes	Smart Board Projectors (Short throw - signals based), Laptop, Internet
C1_PT1	Form Tutor	No	Yes	Projector, Laptop, Internet
C1_PT2	Form Tutor	No	Yes	Projector, Laptop, Internet
C1_PT5	Form Tutor	No	Yes	Projector, Laptop, Internet
C1_PT6	Form Tutor	No	Yes	Projector, Laptop, Internet
C1_PT7	Form Tutor	No	Yes	Projector, Laptop, Internet
C1_PT9	Form Tutor	No	Yes	Smart Board with Touch Panel, Laptop, Internet

There was not a Computer Teacher in the first case school. However, C1_PT10 acted the part as a Computer Teacher in the first case school throughout establishment and the usage of the SCT. He was interested in technology and computer. He did not take extra educational technology course other than most of the teachers. School administration assigned him with duty dealing with teachers' problems about SCT and assisting the school administrators about these technologies. For that reason, some extra questions asked to him while interviewing with him in order to gain extra information about current usage status of the SCT in the first case school.

In addition, the school administrators in the first case school were pleased with being their school the first pilot school of the FATİH Project. Especially, the school principal were volunteer to participate to study and to give detailed information about the usage of the SCT in order to make contribution to study. The two codes were assigned to the school administrators in the first case school (as 'C1_SA1' and 'C1_SA2') while presenting results of the interviews conducted with them.

3.4.2 Participants in the Second Case School

For the second case, a high school in Çankaya, Ankara, Turkey was selected. This school had 9^{th} to12^{th} grades. It had 36 classes and 4 labs equipped with ICT. This school was one of the first phase schools of the FATİH Project. In this school, each class and lab has a Panel Type Interactive Whiteboard (PTIWB) and high-speed Internet connection with cable. The PTIWB as a smart board had been designed by MoNE as a result of pilot study in the first case of this study. Reason of selecting this high school as a second case of the study was that it had same concept with previous case. That is, there are similar SCT in each class at two cases. In addition, other reason is that after investigating situation of smart classrooms at the primary school, this case might give the researcher chance of examining the situation of smart classrooms at high schools. Therefore, purpose of the study could be investigated at all levels of K-12 schools. Actually, there were two education programs in the school. That is, there were general high school students at10^{th} grade to 12^{th} grade) and Anatolian high school students at 9^{th} grades. The difference between these two programs might be explained as 9^{th} grades students of Anatolian high school takes

more English courses (foreign language course) than students of general high school. In addition, the students of Anatolian high school were selected according to results of an exam conducted by MoNE. Location of the school was in the center of the city and students of the school were generally from middle socio-economic status. The school consisted of two buildings and they were built 1955. The school had 36 classrooms, 1 computer lab, 1 physic lab, 1 chemistry lab, 1 biology lab, 1 library, 1 auditorium and 1 sports hall. There were 1080 students at 2011-2012 academic year in the school. Average classroom size in the first case school was about 28. On the contrary to first case school, one-session teaching was applied in this school. While courses for the students of Anatolian high school starts at 8 am and finishes at 3 pm on weekdays, courses for the students of general high school starts at 8 am but finishes at 1 pm on weekdays. In addition, although there was a different classroom system structure at the first case school (there were separately classrooms for each course like Math classroom of English classroom), there were classic classroom structure at the second case school as general classroom system in the schools at Turkey. That is, all of the students had a classroom and they attended the courses at this classroom even if the course were different from others.

In this second case school, there were 80 teachers, a school principal, and 4 assistant principal. 15 teachers from different branches (Math, Turkish Literature, Physics, Chemistry, Biology, History, Geography, and English) were selected for the classroom observations and interviews. The criterions for the selection of the teachers as participants in the second case were age and braches of the teachers, grade levels of the students that the teachers attended the class, viewpoints of the teachers about technology usage in education, and getting useful information from which teachers. In addition, the principal and assistant principal of the school and the Computer Teacher (Computer Coordinator) of the school, which is responsible from the ICT in the school, were added to the participants of the study. Contrary to teachers in the first case school, most of the teachers in this second case school had some fears about using ICT in education. They had classes in all grades (from 9^{th} to 12^{th}) in the school. While 8 of 15 teachers were female, the other 7 teachers in the second case school were male (Table 3.5). On contrary to the first case school, there

were a computer teacher in this school and the gender of this teacher was female. Additionally, the school administrators were male.

Table 3.5 Gender of the participants in the second case school

Gender	**Participants**		
	Teachers	School Administrators	Total
Female	8	0	8
Male	7	2	9

The ages intervals of teachers participated the study were as seen in the Table 3.6. While ages of 4 teachers were at 20-35 age interval, ages of 5 teachers were at 36-50 age interval. The important point for the second case school was that there were ages of 6 teachers at 51-65 age interval. In other words, more than half of the teachers participated to the study were middle and elderly age. In addition, age of the principal of the school was at 36-50 age interval and age of the assistant principal was at 51-60 age interval.

Table 3.6 Ages of the participants in the second case school

Age Interval	**Participants**		
	Teachers	School Administrators	Total
20 - 35	4	0	4
36 - 50	5	1	6
51 - 65	6	1	7

In Table 3.7, the participants were listed in the second case school. In this school, each teacher was not only observed, but also was interviewed to answer the research questions. However, these teachers were observed only one time on contrary to teachers in the first case school. Because, there were time constraints for the suitable lessons of the teachers.

Table 3.7 Participants in Second Case School

Teacher	Field	Interviewed	Observed	SCT
C2_B1	Biology	Yes	Yes	PTIWB and Internet
C2_G1	Geography	Yes	Yes	PTIWB and Internet
C2_G2	Geography	Yes	Yes	PTIWB and Internet
C2_T1	Turkish	Yes	Yes	PTIWB and Internet
C2_H1	History	Yes	Yes	PTIWB and Internet
C2_T2	Turkish	Yes	Yes	PTIWB and Internet
C2_C2	Chemistry	Yes	Yes	PTIWB and Internet
C2_M2	Math	Yes	Yes	PTIWB and Internet
C2_E2	English	Yes	Yes	PTIWB and Internet
C2_P2	Physic	Yes	Yes	PTIWB and Internet
C2_C1	Chemistry	Yes	Yes	PTIWB and Internet
C2_M1	Math	Yes	Yes	PTIWB and Internet
C2_P1	Physic	Yes	Yes	PTIWB and Internet
C2_E1	English	Yes	Yes	PTIWB and Internet
C2_SAFT1	Computer Teacher / Philosophy	Yes	Yes	PTIWB and Internet
C2_SA1	Principal	Yes	No	PTIWB and Internet
C2_SA2	Assistant Principal	Yes	No	PTIWB and Internet

While presenting the results for the second case school, a code would be used for each participant. As for the first case, the codes consisted of two parts. First part of these codes was ‘C2’ and meant that the participant was in the second case school. The second part of the code consisted of a letter (or letters) and a number. While this letter (or letters) were used for the determining the field of the teacher, the number would state for specifying different participants in the same field. That is, the meaning of the letters for each teacher were ‘T’ for Turkish, ‘H’ for History, ‘B’ for Biology, ‘P’ for Physic, ‘E’ for English, ‘G’ for Geography, ‘M’ for Math, and ‘C’ for Chemistry. In addition to these, the Computer Teacher was symbolized with ‘SAFT’. For the school administrators, ‘SA’ letters were used as in the first case school.

The Computer Teacher of the second case school (C2_SAFT1) was assigned by MoNE, however she was not originally educated as a Computer Teacher. Actually, she was educated as a Philosophy Teacher at the university and she began her carrier

as a Philosophy Teacher at various schools. Then, she attended the training program for the being computer trainers. Therefore, she has been served as a Computer Teacher at the second case school for 10 years. On the other hand, administrators in the second case school were not so interested with issues about the SCT established by YEGITEK.

3.4.3 Participants at YEGITEK

In addition to the two cases as schools where the SCT were established by YEGITEK within the scope of FATİH Project, the administrators of the FATİH Project at YEGITEK were interviewed in order to investigate the management process of the SCT in the schools. At YEGITEK, There were 36 personnel for the execution in the 5 components of the project. A person from the each component and the head manager of the project were selected as the participant of the study. That is, 6 participants were added to the sample of the study as seen in Table 3.8.

Table 3.8 Information of Participants at the YEGITEK

No	Participant	Position	Gender
1	PM1	General Manager Assistant	M
2	PM2	General Coordinator	M
3	PC1	Teaching Programmes	M
4	PC2	Hardware & Software	M
5	PC3	In-service Training	F
6	PC4	E-content	F

Although the one of the participants at YEGITEK were in the 36-50 age interval, the other 5 administrators of the FATİH Project were in the 20-35 age interval. In addition, 2 of them were female, while other 4 administrators at YEGITEK were male.

3.5 Instruments

In this study, data were collected through classroom observations, interviews and document analysis. Using multiple sources of data might be useful while gathering the data in the case studies (Creswell, 1998). The details about the instruments of the study are given below.

3.5.1 Interview Protocols

In this study, interviewing was used as the main data collection method in order to reach what teachers, school administrators and administrators of the project in the YEGITEK think about the research questions of the study. According to Patton, "a number of basic questions may be worded precisely in a predetermined fashion while permitting the interviewer more flexibility in probing and more decision-making flexibility in determining when it is appropriate to explore certain subjects in greater depth" (Patton, 1990, p.287). The strengths of the conducting interviews may be listed as one-to-one interaction with participants, getting large amounts of contextual data, reaching in-depth information with immediate follow-up questions, and having chance for discovering complex interactions in social relationship (Marshall & Rossman, 1989). Semi-structured interviews were used for collecting data from the participants of the study. In the semi-structured interview type, generally, there are open-ended questions with prepared probing questions. Also, Morse & Richards (2002) stated that researchers might use unintended probes for reaching actual results.

The researcher developed three different semi-structured interview protocols for the teachers, school administrators in the first case school, and administrators of the project in the YEGITEK. Purpose of the preparing different interview protocols for the participants was the getting data from different resources about the research questions. Although there were same questions in the three interview guides, there were some different questions in the each guide. The interview questions were identified as the result of investigating the related literature about the diffusion of the innovations, technology integration to education, environment analysis, and user oriented instructional development process. After the preparation of the interview protocols, five experts in the field revised the three guides in point of clarity of the questions and suitable content to the study. Then, pilot test for the each interview guide were conducted with a participant from the each group. According to results of the expert reviews and pilot tests, the interview protocols were modified and a few questions were added. For example, two experts suggested that there should be some questions about the technological competency of the participants and two questions

were added to interview guide. In addition, according to pilot implementation of interview protocols, three question in each interview guide were changed by the researcher, because participants stated that they did not exactly understand the how they answer these questions. Consequently, in the interview protocols for teachers, there were 15 open-ended questions (7 questions for demographic information of participants; 4 questions for current usage of the SCT, problems solutions and needs about the SCT; 3 questions for attempts of YEGITEK administrators; and 1 question for the conditions about the integration of SCT), and there were also additional sub-questions for each of the questions (as seen in Appendix C). In the interview protocols of the school administrators (Appendix D), there were 22 questions (7 questions for demographic information of participants; 9 questions for current usage of the SCT, problems solutions and needs about the SCT; 4 questions for attempts of YEGITEK administrators; and 1 question for the conditions about the integration of SCT).

In addition, there were 16 questions (2 questions for demographic information of participants; 3 questions for current usage of the SCT, problems solutions and needs about the SCT; and 11 questions for attempts of YEGITEK administrators and 1 question for the conditions about the integration of SCT) in the interview protocols of the YEGITEK Administrators (Appendix E).

For the second case school of the study, three interview guides again were revised. Because there were some different implications about the usage of SCT for the teacher at the second case school like new in-service training program and 'Education Information Network' (Eğitim Bilişim Ağı - EBA - www.eba.gov.tr). For that reasons, a few questions were added to the interview protocols. Finally, in these interview protocols, there were 19 questions for teachers (7 questions for demographic information of participants; 8 questions for current usage of the SCT, problems solutions and needs about the SCT; 3 questions for attempts of YEGITEK administrators; and 1 question for the conditions about the integration of SCT; as seen in Appendix F), and 26 questions for school administrators (8 questions for demographic information of participants; 12 questions for current usage of the SCT,

problems solutions and needs about the SCT; 5 questions for attempts of YEGITEK administrators; and 1 question for the conditions about the integration of SCT; as seen in Appendix G).

3.5.2 Observation Forms

In this study, classroom observation technique was used in order to detect usage of SCT in the classrooms, usage problems of them, what were done for these problems, and needs for these problems. Observations were defined as "the process of gathering open-ended, firsthand information by observing people and places at a research site" (Creswell, 2012, p. 213). It was used as a data collection tool because the researcher investigated the phenomena in its real setting with actual participants. In addition, observation results provided the basis to the researcher for the interviews in this study. The researcher prepared observation form after investigating other observation forms in the literature (Sun, 2006; Vogler, 2008; Glorvigen, 2011). Then, two experts in the field revised it and pilot test was conducted. Finally, last version of it (as seen in Appendix H) was used in the two case schools. In this form, there were six parts as time period of the action about the technology usage, technologies available in the classroom, usage of technology, problems occurred during the lessons about the usage of technologies , their solutions, and the description of physical environment.

3.5.3 Document Analysis

Document analysis was another data collection method of this study. Documents for a study might be defined as public or private materials at the hand in the written, visual and physical format (Merriam, 1998; Creswell, 2012). The document analysis might be useful for this study, because documents about the FATİH Project supply detailed information to the researcher while analyzing the data together acquired from the interviews and observations. In other words, it provided the triangulation of the data obtained from the interviews and observations. In this study, documents were provided from the administrators of the project in the YEGITEK, administrators of the case schools, web site of the project (www.fatihprojesi.meb.gov.tr) and MoNE. The analyzed documents were listed in Table 3.9. The researcher analyzed the written documents of YEGITEK, PowerPoint

presentations of the projects, evaluation reports, and results of studies conducted by the administrator of the projects.

Table 3.9 List of the Documents Analyzed in the Study

No	Documents
1	FATİH Project Introduction Presentation of YEGITEK
2	FATİH Project Introduction Document (1) of YEGITEK
3	FATİH Project Introduction Document (2) of YEGITEK
4	Cooperation Protocol of FATİH Project by Ministry of National Education and Ministry of Transportation
5	Information note prepared by YEGITEK about the FATİH Project
6	Tender Offer Specifications of FATİH Project
7	Scope Document of FATİH Project
8	Website of MoNE (www.meb.gov.tr)
9	Website of YEGITEK (yegitek.meb.gov.tr)
10	Website of FATİH Project (fatihprojesi.gov.tr)
11	Website of EBA (www.eba.gov.tr)
12	Website of First Case School
13	Website of Second Case School
14	Document of the Effective Usage of the SCT in Teaching Programs Component
15	An Article named as the FATİH Project (Prepared by YEGITEK)
16	Report of Possible Projected Benefits and Social Effects of FATİH Project on Education (Prepared by YEGITEK)
17	Survey and Survey Results Report conducted in the First Pilot School of the FATİH Project
18	FATİH Project Pilot Practice Assessment Report
19	FATİH Project Online Information Collection Module (developed by YEGITEK)
20	Report of FATİH Project Information Collection Module (developed by YEGITEK) for the Institutions
21	Document about the Problems, Suggestions, and Requested Assistance for the PTIWB in the Second Case School
22	Information Form for the Teachers Participating In-service Training
23	Content Suggestion Form for the EBA
24	E-mails between Computer Coordinators at District Directorate of the Ministry of National Education and Computer Teacher in the Second Case School
25	Documents about the Detected Problems Encountered on the PTIWB (prepared and sent to YEGITEK by Computer Teacher in the Second Case School)
26	Information Note for the Configuration Settings of PTIWB
27	Document of Steps for the Creating Failure Logging (Prepared by YEGITEK)
28	Document of Steps for the Creating Failure Logging (Prepared by Technical Services of PTIWB)
29	Contact Information Form of the YEGITEK and Technical Service of the PTIWB

3.6 Data Collection Procedure

Data were collected in two phases in this study. Before the phases, there was the planning and permissions process at university level and MoNE level during the March-April 2011. The data for first case school were collected in two months period (May-June 2011). For the first phase of the study, the researcher collected data from the administrators of YEGITEK during the July and August 2011. For the second phase of the study, planning and permission process at university level and MoNE were performed in November 2012; and the data were collected during the December 2012 and January 2013 at the second case school and YEGITEK. Data collection processes were described below in detail.

- Firstly, the researcher attended the announcement meetings of FATİH Project in the universities. In this meeting, the academicians were informed about the process of the FATİH project by the administrators of the projects at YEGITEK.
- The researcher got an appointment from the YEGITEK administrators so as to take the detail information and documents about the process of the project. Then, the researcher interviewed the General Assistant Manager of the YEGITEK, who is at the head administrator of the FATİH Project, about the pilot schools, which are equipped with ICT. The pilot school of the project was determined as the first case school of study in consequence of this meeting, because this school was only pilot school of the project that equipped with ICT at that stage. In addition, documents about the pilot school were taken from the YEGITEK and the project website.
- The researcher prepared the instruments (interview protocols and observation forms), and then ethical approval was obtained from the Ethical Committee of the Middle East Technical University (Appendix I). After the ethical approval, the researcher got the permission for the studying in the pilot school from the MoNE.

- Piloting of the instruments was conducted with the one teacher and one school administrator at that school before the collection of data for the first phase of study.

After the revision of the instruments, the researcher firstly visited to school for taking detailed information about the teachers in point of their demographic backgrounds and their opinions about ICT usage in education. The needed information was obtained from the school management. In this selection process, administrators of the school suggested some teachers based on his experience and characteristics of the teachers, which were suitable for gathering more information. However, teachers for the observations and interviews were detected according to some criterion like age, gender, branch, grade and teachers' opinions about ICT usage in education. According to this selection, there were participants from all grades, various branches, and different viewpoint to usage of ICT in education. The researcher informed the selected teachers about the study. He explained the observation and the interview process to them. 41 course observations were conducted at the first case school. In Table 3.10, detailed information of observations was presented. While the observations were conducted, the researcher added some additional observations for some teachers and branches so as to investigate in-depth the usage of ICT and problems about it with all viewpoints. Average duration of the observations was 40 minutes (one lesson time). In addition, each teacher was observed two times in class in order to reduce teachers' biased behaviors while they were observed.

Table 3.10 Detailed Information of Observations in the First Case School

No	Date	Time	Teacher	Grade	Classroom	Course	Subject	Class Size
1	11.05.2011	10:45	C1_T1	6/C	Turkish-2	Turkish	Noun Clause	33 (16F+17M)
2	11.05.2011	14:00	C1_S1	7/E	Science-1	Science and Technology	Human and Environment	31 (12F+19M)
3	11.05.2011	14:55	C1_M1	6/D	Math-1	Math	Field Units	33 (12F+21M)
4	12.05.2011	10:45	C1_T1	6/A	Turkish-2	Turkish	Noun Clause	32 (11F+21M)
5	12.05.2011	11:30	C1_M2	7/B	Math-1	Math	Volume of Cylinder	33 (15F+18M)
6	12.05.2011	13:10	C1_E1	8/E	English-1	English	In Case	12 (11F+1M)
7	12.05.2011	14:05	C1_M1	7/F	Math-1	Math	Parallelogram	30 (12F+18M)
8	12.05.2011	15:40	C1_T2	7/E	Turkish-1	Turkish	Reading	32 (14F+18M)
9	13.05.2011	9:50	C1_T3	8/A	Turkish-1	Turkish	Expression Ambiguities	24 (13F+11M)
10	13.05.2011	10:35	C1_S2	6/A	Science-1	Science and Technology	Sound Interaction with Matter	31 (11F+20M)
11	13.05.2011	11:25	C1_E2	8/C	English-2	English	Listening	19 (14F+5M)
12	17.05.2011	9:45	C1_E3	5/A	English-1	English	Present Continuous Tense	31 (14F+17M)
13	17.05.2011	10:40	C1_M2	6/C	Math-1	Math	Geometric Shapes	34 (15F+19M)
14	17.05.2011	11:30	C1_T3	8/C	Turkish-1	Turkish	Expression Ambiguities	24 (13F+11M)
15	17.05.2011	12:15	C1_SS1	6/C	Social Studies-1	Social Studies	Democracy	31 (11F+20M)
16	17.05.2011	14:45	C1_T2	8/F	Turkish-1	Turkish	Expression Ambiguities	23 (18F+5M)
17	18.05.2011	9:00	C1_S2	8/A	Science-1	Science and Technology	Recycling	24 (10F+14M)
18	18.05.2011	9:45	C1_SS1	7/C	Social Studies-1	Social Studies	Cross-National Connections	33 (14F+19M)
19	18.05.2011	10:35	C1_E3	8/A	English-1	English	In Case - So That	24 (15F+9M)
20	18.05.2011	11:30	C1_E2	6/B	English-2	English	Tenses	33 (16F+17M)
21	18.05.2011	13:10	C1_E4	5/D	5/D	English	Body Organs	31 (17F+14M)
22	18.05.2011	14:50	C1_S1	7/F	Science-1	Science and Technology	Solid-Liquid-Gas	29 (12F+17M)

Table 3.10 (Continued)

No	Date	Time	Teacher	Grade	Classroom	Course	Subject	Class Size
23	18.05.2011	15:40	C1_E1	7/D	English-1	English	In Case - So That	27 (16F+11M)
24	25.05.2011	9:00	C1_PT1	3/B	3/B	Turkish	Grammar	32 (14F+18M)
25	25.05.2011	9:50	C1_PT2	2/B	2/B	Turkish	Sentence Structure	32 (16F+16M)
26	25.05.2011	11:30	C1_PT3	1/C	1/C	Introduction to Science	Environment	28 (16F+12M)
27	25.05.2011	14:00	C1_PT4	3/F	3/F	Math	Four Operations	34 (17F+17M)
28	26.05.2011	9:00	C1_PT5	2/C	2/C	Introduction to Science	Solar System	29 (13F+16M)
29	26.05.2011	9:50	C1_PT1	3/B	3/B	Math	Four Operations	32 (14F+18M)
30	26.05.2011	10:40	C1_PT2	2/B	2/B	Math	Mass Units	32 (16F+16M)
31	26.05.2011	11:30	C1_PT3	1/C	1/C	Turkish	Sentence Structure	28 (16F+12M)
32	26.05.2011	13:10	C1_PT4	3/F	3/F	Introduction to Science	We are Changing, When We are Growing	33 (15F+18M)
33	26.05.2011	14:00	C1_PT6	5/D	5/D	Math	Fields of Geometric Shapes	32 (16F+16M)
34	26.05.2011	14:50	C1_PT7	1/G	1/G	Turkish	Opposites and Synonyms	32 (12F+20M)
35	31.05.2011	10:40	C1_PT8	4/B	4/B	Math	Practice Multiplying and Splitting	25 (14F+11M)
36	31.05.2011	11:30	C1_PT8	4/B	4/B	Math	Practice Multiplying and Splitting	25 (14F+11M)
37	31.05.2011	12:20	C1_PT5	2/C	2/C	Music	Sing March	19 (8F+11M)
38	31.05.2011	14:00	C1_PT7	1/G	1/G	Turkish	Making Sentences	28 (9F+19M)
39	31.05.2011	15:35	C1_PT9	4/D	4/D	Science and Technology	Living Creatures	32 (19F+13M)
40	31.05.2011	16:25	C1_PT6	5/D	5/D	Science and Technology	Light	23 (10F+13M)
41	31.05.2011	17:20	C1_PT9	4/D	4/D	Math	Problems	32 (19F+13M)

After the completion of the observations, 18 interviews were conducted face-to-face by the researchers in the school. The detailed information of interviews was listed in Table 3.11. While 16 of them were made with teachers, 2 of them were guided with school principal and school assistant principal. Average duration of interviews for teachers was 35 minutes and it was 65 minutes for school administrators. Although the researcher had planned the using recorder during the interviews, two teachers did not permit the usage of recorder. For that reason, the researcher took notes what these teachers said in these interviews.

Table 3.11 Detailed Information of Interviews in the First Case School

No	Date	Participant	Branch	Duration (minutes)
1	15.06.2011	C1_PT3	Form Tutor	34
2	15.06.2011	C1_SA1	Assistant Principal	54
3	21.06.2011	C1_MU1	Music	34
4	21.06.2011	C1_E2	English	30
5	21.06.2011	C1_PT8	Form Tutor	30
6	22.06.2011	C1_T2	Turkish	66
7	22.06.2011	C1_PT10	Form Tutor	53
8	22.06.2011	C1_PT11	Form Tutor	33
9	22.06.2011	C1_SC1	Scripture	25
10	23.06.2011	C1_SA2	Principal	97
11	27.06.2011	C1_TD1	Technology & Design	28
12	27.06.2011	C1_PT4	Form Tutor	38
13	27.06.2011	C1_PT12	Form Tutor	28
14	27.06.2011	C1_M2	Math	30
15	28.06.2011	C1_SS1	Social Studies	53
16	28.06.2011	C1_S2	Science	32
17	28.06.2011	C1_E3	English	25
18	28.06.2011	C1_M1	Math	30

After the completion of data collection in the first case school, the researcher conducted 5 more interviews with the administrators of YEGITEK in order to investigate the management process of the ICT usage and integration in schools. The researcher got appointments from them for the interviews. These interviews were also conducted face-to-face in their offices and recorded with the sound recorder. They lasted averagely in 50 minutes (Table 3.12).

Table 3.12 Detailed Information of Interviews in the YEGITEK

No	Date	Participant	Position	Duration (minutes)
1	06.07.2011	PM1	General Manager Assistant	82
2	06.07.2011	PM2	General Coordinator	70
3	02.08.2011	PC1	Teaching Programmes	33
4	02.08.2011	PC2	Hardware & Software	36
5	03.08.2011	PC3	In-service Training	40
6	08.11.2012	PC4	E-Content	48

There was a year time interval for the data collection at second case school, because the setup process of the SCT at schools in Turkey was sustained by the MoNE. In that year (2012), MoNE installed approximately 85000 smart boards to 3657 K-12 schools (YEGITEK, 2014). In addition, they setup high-speed Internet connection to some of these schools. Documents about these steps were obtained from the YEGITEK. The researcher again visited the YEGITEK in order to get information about the possible schools for the second case of the study. They gave a school list having smart board and high-speed Internet connection. The second case school was selected among these schools, which had a smart board, and high-speed Internet connection in each class. A high school in Ankara was selected, because it had similar ICT like first case school and it was suitable for easy data collection. The Observation form and interview protocols (Appendix F and Appendix G) were revised according to this school and the SCT in this school.

For the data collection at second case school, the researcher met the administrators of the school so as to get information about the teachers. In this school, the Computer Teacher (Computer Coordinator) were assigned to help the researcher on behalf of school management. The detailed information about the teachers was got from the Computer Teacher in the second case school. 15 Teachers for observations and interviews were selected according to their age, gender, branch, grade, and opinions about ICT usage in education. On the contrary to first case, most of these teachers in this school were older. The selected teachers were again from all grades (9^{th} to 12^{th}), various branches, and different technology usage

viewpoints. Each selected teacher was observed, and totally 15 observations were completed (Table 3.13). Average duration of the observations was 40 minutes (one lesson time). Although some teachers did not want to be observed due to not using SCT in the lessons, the researcher observed their lessons even if they did not use the PTIWB. After the completion of the observations, 15 interviews were conducted with the teachers. In addition, one interview with the teacher trainers and two interviews with school principal and assistant principal were conducted. Average duration of each interview was 50 minutes (Table 3.14). All of the interviews were conducted face-to-face in the computer laboratory of the school. Out of one interview, all interviews were recorded with sound recorder. Lastly, documents in the second case school were taken. These documents were also listed in Table 3.9.

Table 3.13 Detailed Information of Observations in the Second Case School

No	Date	Time	Participant	Grade	Course	Subject	Class Size
1	24.12.2012	12:10	C2_T1	12/A	Turkish Literature	Tanzimat Reform Era	19 (7F+12M)
2	24.12.2012	13:00	C2_H1	9/E	History	Turks in Central Asia	25 (7F+18M)
3	24.12.2012	14:00	C2_SAFT1	9/A	Philosophy	Epistemology	28 (11F+17M)
4	24.12.2012	14:50	C2_B1	9/K	Biology	Cell and Its Structure	21 (5F+16M)
5	26.12.2012	12:10	C2_P1	9/C	Physics	Newton's Laws of Motion	25 (5F+20M)
6	26.12.2012	14:00	C2_E1	9/C	English	Present Tense	25 (5F+20M)
7	26.12.2012	14:55	C2_G1	9/H	Geography	Latitude – Longitude	23 (11F+12M)
8	27.12.2012	09:55	C2_M1	11/E	Math	Permutation	30 (14F+16M)
9	27.12.2012	10:45	C2_C1	12/B	Chemistry	Organic Compounds	09 (2F+7M)
10	27.12.2012	13:00	C2_M2	10/B	Math	Inequalities	31 (15F+16M)
11	02.01.2013	10:00	C2_P2	9/E	Physics	Force and Motion	24 (9F+15M)
12	02.01.2013	10:50	C2_T2	11/F	Turkish Literature	Servt-i Fünun	22 (8F+14M)
13	03.01.2013	12:05	C2_G2	9/D	Geography	Land Forms	29 (9F+16M)
14	03.01.2013	13:00	C2_E2	10/C	English	Active-Passive	23 (10F+13M)
15	03.01.2013	13:50	C2_C2	10/A	Chemistry	Reactions	27 (13F+14M)

Table 3.14 Detailed Information of Interviews in the Second Case School

No	Date	Participant	Branch	Duration (minutes)
1	07.01.2013	C2_B1	Biology	30
2	08.01.2013	C2_G1	Geography	28
3	09.01.2013	C2_G2	Geography	59
4	09.01.2013	C2_T1	Turkish Literature	62
5	09.01.2013	C2_H1	History	63
6	10.01.2013	C2_T2	Turkish Literature	50
7	10.01.2013	C2_C2	Chemistry	40
8	11.01.2013	C2_M2	Math	46
9	11.01.2013	C2_E2	English	33
10	14.01.2013	C2_P2	Physics	30
11	14.01.2013	C2_C1	Chemistry	43
12	15.01.2013	C2_M1	Math	62
13	16.01.2013	C2_P1	Physics	40
14	16.01.2013	C2_E1	English	30
15	24.01.2013	C2_SAFT1	Teacher Trainer	99
16	25.01.2013	C2_SA1	Principal	37
17	25.01.2013	C2_SA2	Assistant Principal	30

3.7 Data Analysis

Analytical procedures of qualitative research were generally typical as coding the data, generating categories, developing themes and patterns, relating these themes under categories, and writing the report (Marshall & Rossman, 1989). In this study, content analysis method was used with the six steps which were defined by Creswell (2012) as follows; (1) prepare and organize the data for analysis, (2) explore and code the data, (3) coding to build description and themes, (4) represent and report qualitative findings, (5) interpret the findings, and (6) validate the accuracy of the findings. In addition, there are two approaches in the data analysis for qualitative research; inductive and deductive data analysis. Holloway (1997) stated that while deductive approach were interested with the usage of the data in order to confirm the existed idea, inductive approach aimed to analyze the data in order to generate idea. Both of inductive analysis and deductive analysis approaches were used by the researcher while the answering the research questions. Because, there were sub questions in the some research questions as the categories of some theories at the hand, although there were not in the other research questions.

After completing the all data collection, the researcher firstly transcribed the interviews using Express Scribe (v 5.50). There were approximately 320 pages transcripts (16 hours interview records) for first case and 280 pages transcripts (14 hours interview records) for second case. Transcriptions were transferred to MS Word. In addition, observation forms were typed as the MS Word files and collected documents were organized for the data analysis. Then, the researcher read the transcripts a few times. So, the researcher had the general outlook about the whole data. After this, the researcher started to code the data. Process of coding was defined as "one of reducing a text or image database to descriptions and themes of people, places, or events" (Creswell, 2003, p. 261). So, the researcher created a code list. According relations of codes in this list, themes and sub-themes were created by the researcher (as seen in Appendix K). In this stage, some themes were formed by the help of sub questions of research questions. After the creating the themes and sub themes, reporting and interpreting the finding will be presented in the results and discussion chapter. Lastly, accuracy of the findings will be validated at the next parts.

3.8 Trustworthiness

There is a different term for validity and reliability in the qualitative methodology on the contrary to quantitative methodology; "trustworthiness". Trustworthiness was interested with valid and reliable data in the qualitative data and it was defined as convincing the people reading the study that findings of the research were worth paying attention to (Lincoln & Guba, 1985). In order to supply trustworthiness of a qualitative study, there are four conditions named as 'credibility', 'transferability', 'dependability', and 'confirmability' (Denzin & Lincoln, 2005). So, the researcher used five techniques to supply these conditions for the trustworthiness of this qualitative study. These are triangulation, member checking, thick description, peer debriefing, and inter-coder.

3.8.1 Triangulation

The researcher collected the data with interviews, observations and documents. Patton (1990) stated that collecting data with different instruments give chance to the

researchers to compare and crosscheck the consistency of information. In addition, triangulation was defined as the collecting data from multiple data sources to support each other (Bogdan &Biklen, 2007). For some of research questions, the data was collected from different participant groups like teachers, school administrators and YEGITEK administrators in order to investigate the phenomena from different viewpoints. Again, data collection at two case schools was useful for the triangulation of the data.

3.8.2 Member Checking

Interviews were recorded with sound-recorder and transcribed. Also, observation forms were typed in the word processing. For the member checking, they were given to the participants in order to see if they were plausible. Member checking was defined as "a process in which the researcher asks one or more participants in the study to check the accuracy of the account" (Creswell, 2012, p.259). The researcher tried to enhance credibility of the study with conducting member checking.

3.8.3 Thick Description

In order to supply transferability of the study, thick description was performed. The researcher explained in-depth every process of the study so as to the readers in order to understand and the findings.

3.8.4 Peer Debriefing

Peer debriefing process was applied in the study in order to supply credibility of the study. Emerging results and interpretations of the study were shared with the dissertation advisor and thesis committee members during the data analysis process. Erlandson et al. (1993) stated that sharing the findings with the colleagues might supply conducting research honestly. For that reason, the researcher shared the information of the study with three colleagues in the same department in order to examine if there were any problem in the process.

3.8.5 Second Coder and Inter-rater Reliability

The researcher coded one interview of a teacher, a school administrator and a YEGITEK administrator in parallel to another researcher in order to provide

reliability of the codes of qualitative data. The second-coder was a research assistant in the Department of Elementary Education in the Middle East Technical University and she was experienced at the field of qualitative data coding. Before conducting inter-rater reliability for the 3 interview data, the researcher clarified in detail the structure of the study and the process of the FATİH Project to the second-coder. The researcher and the second-coder discussed about framework of the data analysis and what were investigated with the research questions of study. In addition, they compromised about some problematic issues like what could be technical problem and what could be challenge for the lack of knowledge and skills. Then, each coder (the researcher and the second-coder) constructed codes for interview of a school administrator. The codes constructed by two coders firstly matched for the providing same terminology of the codes. They corrected their codes according to their discussion about what word should be used for the code. The inter-rater reliability formula of Miles and Huberman (1994) was used so as to calculate inter-rater reliability score. According to this formula, the number of consistent codes was divided into summation of number of consistent codes and number of inconsistent codes. The inter-rater reliability score for the data analysis of the school administrator interview was .68 which was not sufficient according to Miles and Huberman (1994) because they suggested that inter-rater score was at least %80.

After the inter-rater reliability score for the school administrator interview, the researcher and the second-coder discussed about how they coded the words and they came onto agreement for the most of the contradictions of the codes. They again analyzed separately an interview of a teacher selected randomly. When they calculated inter-coder reliability score for this analysis, the score was .86 which was good level for the inter-rater reliability score according to Miles and Huberman (1994). Lastly, they analyzed an interview of YEGITEK administrator and the inter-rater reliability score for this analysis was .84 which was sufficient. After the reaching good inter-rater reliability score, the researcher continued on to analyze all data and construct coded.

Finally, there were some additional points for the trustworthiness of the study. Firstly, researcher applied to Ethics Committee of Middle East Technical University (METU) and got permission for the study (Appendix J). Result of their examination about the study, there was not any problem on account of ethical considerations. In this process, consent forms were prepared to each participant for informing about the study and asking to participate to the study as volunteer (Appendix A). The other point was the researcher effect. For that reason, researcher's role in this study was explained in detail. In addition, direct quotations from the interviews were used at the presenting the results of the study for enhancing the credibility. Lastly, Marshall and Rossman (1989) stated that the case study methodology might support the trustworthiness and credibility of the study, because the researcher described in detail the cases for the replication of the study by other researchers. For that reason, the case study methodology provided trustworthiness with its own structure.

3.9 Limitations of the Study

There were some limitations about the current study. Firstly, only two schools in Ankara were determined as case schools of the study with convenient sample method. Because, it was aimed that two case schools would be investigated in detail through qualitative multiple case study method. In addition, the first case school of the study was also first and only pilot school of the FATİH project. For that reason, administrators of YEGITEK/MoNE, researchers, and pressman have frequently visited the first case school and usage of SCT in this school might be affected by these visits. Therefore, the findings of the study should be interpreted cautiously when generalizing the results to other schools. However, YEGITEK/MoNE has established the same SCT in the schools throughout the Turkey. Therefore, the findings could be compared the results of other studies having similar purpose with the current study in order to investigate general situation in the usage of SCT.

Secondly, the results of the present study are only valid for the integration process of the SCT established in two case schools by YEGITEK. The other type ICT was not included in the study, because YEGITEK only have provided specific SCT to schools within the scope of the FATİH Project in Turkey.

Thirdly, one of the most important limitations of the study is related with the researcher. He collected data in the schools, transcribed and coded them. That is, the researcher was not only the instrument of the study, but also the data analysis tool of the study. Although inter-rater reliability was conducted for the analysis of some interviews, the researcher coded whole data and constructed the themes alone in the study. Thus, the findings of the study are mainly dependent to researchers' interpretation while analyzing and reporting the data. In addition, honesty of the participants was another limitation of the study. That is, the participants might behave and talked unnatural during the observations and interviews. However, the researcher took into consideration these treats and utilized the triangulation technique in order to reduce the effects of these factors on the results.

Fourthly, the data were collected from two schools in Turkey. For that reason, the data were collected in Turkish (mother language of the participants) and then they were translated to English since the results were supposed to be presented in English. While transforming the quotations from Turkish to English, meaning of some results might be missed for the results of the study.

Lastly, in addition to two case schools participated to the current study, the data were collected from the some administrators at YEGITEK in order to investigate management of SCT integration in the schools. However, the administrators of the YEGITEK have changed a few times during the data collection process of the study. In addition, the FATİH Project was a popular topic for the press and public in Turkey. The processes of FATİH Project were monitored by press intensively. For that reason, although YEGITEK administrators supplied detailed information and documentation to the researcher at the beginning of this study and FATİH Project, they became reluctant to share the documents and information about the attempts of YEGITEK for the usage of SCT in the schools at the later stages of the study and the project. This may be accepted another limitation of the study in order to investigate management process of SCT integration in the schools.

CHAPTER 4

RESULTS

In this chapter, findings of the research questions will be presented in four part. Firstly, current status in usage of SCT will be presented separately for each case school. The current usage status of the SCT in two case schools will be approached in point of 4 sub-questions of first research question in detail. Administration-side of these technologies will be expressed in the second part. Lastly, conditions/barriers in the process of implementation of use of SCT will be declared.

4.1 Current Status of SCT Usage in the Schools (R.Q.1)

What is the current status of smart classroom technology usage in the schools?

- *How do teachers use the smart classroom technologies in their lessons?*
- *What challenges do teachers encounter when using these technologies?*
- *How do teachers overcome these problems?*
- *What do teachers need to overcome these problems?*

To answer the question and sub-questions, the findings will be explained for two case schools separately. Firstly, information about SCT, teachers and administrators in the case schools will be described and applications of project managers will be generally mentioned. After that, the themes and sub-themes comprised of analyzing the data will be presented in order to answer research question 1.

4.1.1 First Case School

The first case school of the study was an elementary school in Sincan, Ankara, TURKEY with grades from kindergarten to 8th grades. There were approximately 2000 students in the school. Location of the school was in the suburban of the city, and students of the school were coming generally from low socio-economic status families. The school building was new and was built in 2007. The school had 32 classrooms, 1 computer lab, 1 science and technology lab, 1 library, 1 auditorium and 1 sports hall. Double-session teaching was applied at this school. That is, some students (early riser students) attended the morning session of school, while other students (afternoon students) attended afternoon session of school. In addition to this, there were a different classroom system structures opposite to general classroom system in the schools at Turkey. Namely, classrooms of students who are kindergarten to 5th grade were regular classrooms, which is they attended the most of the lessons in their classrooms (same classroom) with their primary teachers. However, students who are 6th to 8th grades joined the lessons in the classrooms of the each field classrooms like Science Class, Math Class or Turkish Class, etc. In addition, 4th and 5th grade students attended some courses (like English) in the English Class instead of their classrooms. That is, there were one or two classrooms for each field in the school and students went to the classroom which lessons would start. For that reason, teachers of the each field taught their subject in their classrooms regardless of which students attended their lesson. Besides, the schooling system in Turkey was changed by MoNE as kindergarten to 4th grade for primary school, 5th grade to 8th grade for middle school, and 9th grade to 12th grade for high school instead of current school system (kindergarten to 8th grade for elementary school and 9th grade to 12th grade for high schools). This new system was named as '4+4+4' school system in Turkey. However, the data were collected in the first case

school when it had old school system as kindergarten to 8th grade, and then the change for the school system in Turkey was realized by MoNE.

4.1.1.1 Smart Classroom Technologies in the First Case School

The first case school of the study was the first pilot school of the Movement of Enhancing Opportunities and Improving Technology Project (MEOIT or FATIH Project) sustained by the Ministry of National Education and the Ministry of Transport, Maritime Affairs and Communications. Actually, administrators of the FATİH Project had decided to establish different SCT to classrooms at first pilot school of the study in order to set which technology would be installed to other schools. For that reason, there were different SCT like projectors, various smart boards, laptops and printers in the classrooms of the first case school. In Table 4.1, numbers of types of the SCT in the first case school are listed.

Table 4.1 Numbers of the Smart Classroom Technologies in the First Case School

Smart Classroom Technologies	Number
Projector	25
Laptop	35
Panel Type of Interactive Whiteboard (PTIWB)	1
Smart Board with Touch Panel	4
Smart Board (Magnet frame based)	1
Smart Board Projectors (Short throw - signals based)	4

Firstly, there were 25 projectors in the classrooms and these projectors were used with laptops as only projectors for reflecting the screen on the whiteboard. These projectors were generally in the classrooms of kindergarten to 5th grades students. Secondly, Panel Type of Interactive Whiteboard (PTIWB) is actually a LCD Screen Smart Board and it was only in 1 classroom (5th grade's classroom). It was a prototype of PTIWB and it had been developed by the project staffs (YEGITEK) in cooperation with a private corporation. Thirdly, there were 4 different brands smart boards with touch panel (classic smart board) in 4 classrooms (Math-1, Math-2, Turkish-1 and a 4th grade's classroom). These smart boards had various smart board pens. Fourthly, in the Science-1 classroom, there was a magnet frame based smart board. Actually, there were a classic whiteboard and a projector in that classroom,

but this whiteboard could be converted to a smart board mounting the magnet-frame on the white board and then this whiteboard could be used as a smart board by means of the projector in the classroom. Lastly, in 4 classrooms (English-1, English-2, Scripture and a 4th grade's classrooms), there were 4 smart board projectors, which were short throw projectors and operated as the smart board with the aid of signals. That is, there were signal transmitters on the projectors and these transmitters sent signals on the whiteboard in order to use the white board as a smart board.

In addition to these projectors and smart boards, there was also laptop PCs in the classrooms. These laptop PCs were assigned to teachers. Two teachers used a laptop together by turns. In other words, after a teacher used the laptop in the morning session, s/he gave it to other teacher so that s/he may use it at the afternoon session. And also, there were two speakers in the each classroom that can be attached to laptop PCs.

4.1.1.2 General Usage of SCT in the First Case School

In this part, general usage of different types and brands of SCT will be firstly presented. After that, results for usage purposes of these SCT will be introduced. Lastly, general usage rates of the SCT will be reported according to analysis of findings obtained in this study.

General Usage of Different SCT in the First Case School

Because of the establishment of different Smart Classroom Technologies (smart boards, panel type of interactive whiteboards (PTIWB) or projectors) to classrooms at the first case school, there was not same classical SCT usage in the classrooms. For that reason, while presenting general SCT usage in the classrooms, usage of different SCT will be described separately before presenting usage of SCT in detail as usage rate and usage purposes. Therefore, usage of the smart boards will be firstly presented, and then usage of the projectors and laptops will be described. After the comparison of the usage of the smart boards and projectors, usage of the Internet will be introduced in this section.

Usage of Smart Boards

Usage of 10 smart boards in the first case school was examined together in this part. These smart boards were 4 'Smart Board with Touch Panel (Classic Smart Board)', 4 'Smart Board Projectors (Short throw – signal based)', 1 'Smart Board with Magnet Frame', and 1 'Panel Type of Interactive Whiteboard (PTIWB)'.

Generally, the smart boards were utilized by teachers actively in the lessons. An English teacher explained this as saying "*I am teaching the lessons with smart board as an active teacher*" (C1_E2). That is, teachers might be active when they used the smart boards. In addition, teachers might use the activities and e-contents of some private publishers. According to observations conducted for the study, teachers used the smart boards with the contents of some private publishers in order to make lesson more active (Obs6, Obs9, Obs11, Obs19, Obs24, and Obs33). In parallel with this, a primary teacher stated that he was processing course following the contents of the publishers on the smart board (C1_PT10). However, there was an important point for the usage of the smart boards in the first case school. This point is that some teachers have used the smart board as only projectors and they did not use the interaction feature of the smart boards (Obs2 and Obs40). Assistant School Principal also indicated that "*smart boards were used frequently by teachers at first, but they used them only as projector in their lessons*" (C1_SA1). In other words, the teachers did not take advantage of interactivity feature (touchscreen) of them and they utilized them only when they were reflecting the screen of the laptops to the board.

On the other hand, students could use the interaction feature of the smart boards more than teachers. In some observations (Obs3, Obs16 and Obs23), students used them in order to interact with the content by solving practice questions. A Turkish course teacher stated that

> *Students solve multiple choice and matching questions by touching on the smart board, so that they can interact with the content. For example, while students are solving the multiple choice questions, they can touch choices which they think correct answer, then take a*

*feedback (like a sound or an animation) from the smart board according to correctness of their choices. (C1_T2)*Q1

In addition, Assistant School Principal emphasized excessive usage of smart boards by students at the beginning of the semester but he declared that the interest of students on the smart board might decrease in the process of time.

Usage of Projectors

When it is examined in terms of the projectors installed to first case school, the projectors were used by most of the teachers (N=8) who had them in their classrooms. Generally, they used to reflect presentations to whiteboard. However, some teachers utilized them like smart boards writing or drawing with board marker on the whiteboard while projectors reflect the screens of activities (Obs1, Obs21, Obs25 and Obs32). Thus, the students could interact with the content while using only projectors. That is, they could directly write on the board in order to complete activity reflected by the projectors. In addition, the projectors were used by teachers and students for sharing the knowledge with others. A teacher stated that "*students can share their homework to other students using the projector in the classroom*" (C1_PT4). He was satisfied for this property of the projector, because students could easily transfer the information to each other.

Usage of Laptop Computers

There was also a laptop computer for each classroom. In the first case school, two teachers have been using a laptop alternate in their lessons. That is, each two teachers at any field shared a laptop and used it by turn. Generally, a teacher in the morning session used the laptop, and then s/he gave it to other teacher in order to use it at the afternoon session. In addition, responsibility of the laptop belongs to teachers using them together. In the observations, it was observed that these laptops have been used with smart boards and projectors while lecturing and presenting the subject to the students. In addition teachers explained that they are using laptops when they were preparing for courses and reaching the content about the subject (C1_S2, C1_MU1, C1_E2, C1_PT3 and C1_PT11).

Usage of the Internet

There were wired-internet connections in the all classrooms. Teachers connected the laptops to the Internet with a cable to port on the wall. Teachers declared that they used the Internet while they were reaching the content of the lesson (C1_PT3, C1_PT4, C1_PT8, C1_PT10, C1_PT11 C1_PT12, C1_T2, C1_S2, C1_E2, C1_SS1 and C1_MU1). A Social Studies teacher said that

> *I am using the internet for getting the presentations about the subjects. For example, there is a website named as 'sosyalbilgiler.biz' and a valuable Social Studies teacher is uploading very good presentations to this website. I download the presentations prepared by him through Internet in my classroom and I used %90 of them during my lessons. (C1_SS1)* Q2

Also, some teachers stated that they were using the internet connection in the classroom when they need instant information about the topic of the course they teach (C1_PT4 and C1_MU1). A Turkish Course Teacher specified that "*we use internet connection for learning the meanings of the unknown-words searching the dictionaries on the Internet*" (C1_T2). In addition to teachers, the students also used the internet in the lessons and breaks in order to make research about the topic what they learned (Obs8, Obs14, Obs27, C1_T2 and C1_MU1).

Usage of Speakers

Speakers in the most of classrooms were used to hear sound while watching video like films, animations and presentations; and listening music like songs, sounds, voices etc. (C1_MU1, C1_E2, C1_E3, C1_T2, C1_S2 and C1_PT12).

Usages of All SCT Together

All of these technologies in the classrooms were used in the most of the lessons observed by the researcher. In addition to the lessons, the researcher attended an activity that was accomplished at the auditorium and there were approximately 100 students and 20 teachers for watching the show prepared by students. Although the activity was performed at the auditorium, students in the classrooms followed the

show by means of SCT established in the first case school. A teacher, who has sufficient technological knowledge and competency, told this practice like that;

> *We have an auditorium and its capacity is about 150 people, but there are 2000 students in our school. You know that some activities are prepared by our students and teachers, and we want all students in our school can watch these activities. Presenting the activities to students at the same time is very important, of course. In this year, we generated a project named as 'Friend Hearts, Inventor Brains (Dost Gönüller, Mucit Beyinler)' and we aimed to introduce the important Turkish people to all students. The other aim of our project was to reach information about them to all students in a little while. For that reason, we decided to present the activities of the project to students as live broadcast by the help of [smart classroom technologies in the classrooms], because the capacity of the auditorium was restricted for all students in our school. I arranged a web cam, a computer and a web host system in the auditorium and sent the display to the all classrooms through the Internet infrastructure. That is, we transferred the high quality video image of the activities to smart boards and projectors with the Internet. So, all students in the classrooms could watch the show sitting their desks at the same time and we could achieve the aim of our project. Even, parents of our students could watch the show from their home through the Internet. (C1_PT10)* Q3

Up to this point, general usage pattern of the SCT in the first case school were described according to which SCT used. In the observations, it was observed that most of the teachers and students were using SCT at different usage rate for different aims. Now, for what purposes the SCT were used and how long the usage rate of the SCT were in the first case school will be presented in the next two parts.

Usage Purposes of SCT in the First Case School

In the first case school, different types and brands SCT were used for different aims by different teachers. To explain these purposes, themes and sub-themes generated

from analysis of the interviews will be presented in this part. In the Table 4.2, it was presented that how many participants mentioned about each theme for the usage purposes of the SCT. The usage purposes of the SCT may be listed as (1) to use audiovisual materials, (2) to reach the contents, (3) to use time efficiently, (4) to motivate students, (5) to activate students, (6) to use digital version of the textbooks, (7) to prepare and to implement exams, and lastly, (8) to repeat what was learned. In addition to these, findings in the observations will be presented in order to explain each themes and sub-themes in detail.

Table 4.2 Themes for the Usage Purposes of SCT

Usage Purposes of SCT	**Frequency of participants mentioned**
To use audiovisual materials	9
To reach the contents	10
To use time efficiently	11
To motivate students to courses	6
To activate students in class	7
To use the digital version of the textbooks	3
To prepare and to implement exams (Evaluation)	3
To repeat what was learned (Repetition)	5

To Use Audiovisual Materials

The SCT were used by the teachers in order to address audiovisual sense organs of the students while teaching in the classrooms. Nine out of 16 teachers stated that they used these technologies especially utilizing display and sound properties to reach more sense of the students for better learning. A primary teacher of 1st grade students stated that

> *While I was teaching letters to 1st grade students, I used an interactive animation by means of laptop and projector. Students could hear direct sound of the each letter and also they could see the image about the letter. So, students could easily correlate sound and the letter at that moment. (C1_PT3)* Q4

Assistant School Principal also declared that

> *Students can learn more permanently while we teach them taking advantage of addressing audiovisual sense organs. For that reason, teachers in our school generally use these technologies to utilize audiovisual activities. (C1_SA1)* Q5

An English teacher specified her usage purpose of SCT as utilizing sound property for listening activities in English course. She said that

> *I have students listen to songs and conversations by means of the technologies, because it is important that hearing pronounce of words in English is important to learning the English. (C1_E2)* Q6

Furthermore, teachers (C1_PT10 and C1_T2) indicated that they used SCT so that students might watch various videos, films and documentaries. In addition, a teacher (C1_SS1) specified that they used the laptop and projector for showing slides to students.

The other point mentioned by teachers was that they used these technologies while they were teaching abstract concepts. A Social Studies teacher stated that

> *Students had problems while they were learning abstract concepts in Geography or History (Social Studies Course). Because, they did not understand some abstract words or events, when they did not see them. So, they could not imagine what the words or events were. For that reason, we were using the animations, videos or pictures about these abstract concepts so that our students could learn easily. (C1_SS1)* Q7

Last of all, the SCT were used by teachers and students so as to utilize the audiovisual properties for ensuring better learning.

To Reach the Contents

The other most frequently stated purpose by participants was to reach the content about the course. Ten teachers explained that they used SCT while they were getting the content about the subject of the lessons. A Social Studies teacher explained that

> *I search the educational websites on the Internet in order to find content of the course and collect the presentations and slides about the subject. Then, I use them in my lessons. (C1_SS1)* Q8

In addition, some teachers indicated that they used the Internet connection in the classrooms when they need instantly the information about the subject. Two teachers mention this purpose as;

> *In Turkish lessons, we take advantage of dictionaries on the Internet, when we encounter an unknown word. In this situation, we open the website of 'Turkish Language Institute (Türk Dil Kurumu)' or other digital dictionaries and learn meaning of these words. So, we can reach the information about the subject in a very short time. (C1_T2)* Q9

> *I use the internet connection in the class in order to download song, reach the lyrics of songs in the Music course. Thus, students can learn better the Anthems and songs. Moreover, we can find whatever and whenever we want about anything in the classroom. (C1_MU1)* Q10

Also, it was noticed in the observations that some teachers use these technologies (especially the Internet connection in the classroom) to obtain instant information, whereas, some other teachers collect their content at out of the classroom before the lesson.

To Use Time Efficiently

Majority of the participants (N=11) stated that using the SCT in their lessons might provide them saving time and they could make better time management for this reason. Especially, Math and Science courses teachers declared that they could

quickly solved questions on the smart board, so they would show more questions during a lesson time. For instance, a Math teacher said that

> *I open the questions on the smart board instead of writing each question on the white board. Then, I solve with pencil of the smart board. Thus, we could solve more math problem at the same time interval. That is, I can say that I prefer to use SCT in my lessons because of saving time for more questions. (C1_M1)* Q11

In addition, an English Teacher specified that "*I want to use my laptop in all of my lessons, because I can teach more subject in a lesson and I can follow the curriculum in time"* (C1_E2). In parallel with teachers, School Principal also stated that "*our teachers prefer to use these technologies in order to better manage the time while they use the prepared contents on the Internet in their lessons*" (C1_SA2).

To Motivate Students to Courses

Six participants declared that one of their purposes of SCT usage was to motivate students to course in order to teach subject to them effectively. They mean that they could draw the attention of the students when they utilized the sound, color, motion and visual elements (C1_SA1, C1_T2 and C1_S2). A Turkish course teacher stated that

> *In our lessons, we use the electronic visual materials, animations or videos with laptop and the smart board with a view to attract the attention of students. (C1_T2)* Q12

Moreover, it was observed that some teachers showed some comics, pictures, photographs and short videos at the beginning of the lessons to motivate students to subject of the lesson (Obs2, Obs4, Obs10, Obs16, Obs24, Obs28, Obs39 and Obs41). Also, Assistant School Principal emphasized this situation in the interview as the aim of the teachers' SCT usage (C1_SA1).

To Activate Students in Class

Seven teachers expressed that they were using technologies established in the school in order to activate students through lesson. They stated that they could present the contents to all of the students in the classroom by means of these technologies because students might be interested with the subject through the SCT. A teacher said that "*I used the projectors reflecting the presentations to the wall for incorporating all students to lesson process in the classroom*" (C1_PT8). Especially, English course teachers stated that they had chances for activating students in the lesson, because students could solve practice questions on the smart board (C1_E2 and C1_E3). It was also observed that teachers let students to use smart boards because teachers wanted students to be active in class (Obs3, Obs8, Obs11, Obs23, Obs35 and Obs41). In addition, it was stated that

> *We use smart boards in our lessons, because we want all of our students to participate in lessons. Moreover, we let students to use smart boards in order to interact with the content. Because, students want to learn more when they use smart boards. That is, while they were clicking on the smart board, if they saw an animation or heard a sound, they were not bored throughout the lesson. (C1_T2)* Q13

Furthermore, some teachers took homework of the students as digital format and students presented their homework in the classroom with laptops, smart boards and projectors (Obs16, Obs24, Obs27 and Obs32). A teacher declared that

> *While we gave homework to students paper-based, we again took them on paper-based. However, now, we are giving homework to students as digital format and taking as digital file in a USB memory. Sometimes, students present their homework to other students in the class using these technologies. So, students might be exited so that they would present their homework to their friends. For that reason, they might have prepared their homework well. (C1_PT4)* Q14

In addition to these, a teacher (C1_SS1) specified that she let students conduct research about the topic using her laptop and the Internet connection so that students could be active during lesson in the classroom.

To Use the Digital Version of the Textbooks

Three teachers indicated that they used laptops, projectors and smart boards to use digital version of the textbooks in order to teach students not having them or did not bring to school. It was sighted in the observations that most of the teachers used pdf format of the textbook. These digital textbook were provided by officials in the MoNE. They were only scanned version of the normal textbooks. Teachers used these scanned textbooks for two aims. These were to present information in the textbook to students did not bring their textbooks and to project the contents in the textbooks to board. A Math teacher stated that

> *We use the digital format of the Math textbook. Because, some of our students did not have the sense of responsibility and they did not bring their books to the school. So, when we solved the questions at the textbook, we reflected the questions on the smart board so that students not having Math textbook could see the questions and could solve them like other students. (C1_M2)* Q15

To Prepare and To Implement Exams (in the Evaluation Processes)

Three out of 16 teachers declared that they used SCT in the assessment and evaluation processes in their courses. They expressed that they could prepare better exams, because they could reach more question types and they could use audiovisual materials in the exam. An English teacher said that

> *In English courses, when we are preparing an exam by means of these technologies, we can ask more effective and more comprehensive questions. Moreover, we can check every concept. For example, I have included 'listening questions' to my exams with the aid of laptop computer. (C1_E2)* Q16

In addition, another teacher stated that she utilized these technologies at the end of the lesson in order to evaluate students' learning. She said that "*I believe that I used them enormously productive when evaluating the students at the end of each lesson"* (C1_SS1). In the observation, it was also monitored that some teachers solved example and practice questions on the smart boards in order to test what students learned.

To Repeat What Was Learned (Repetition)

As purpose of the SCT usage, five teachers specified that they use them while they were repeating the subject of the lesson. They used these technologies at the end of the lesson in order to re-explain the subject, after they teach the subject to students. A teacher stated that

> *Normally, I lectured my lesson with traditional methods in my lessons. After that, I utilized some animations, videos or animated exercises to students in order to retrace what I taught. (C1_PT3)* Q17

Usage Rates of SCT in the First Case School

In this section, usage of SCT will be presented from the standpoint of usage rate. While reaching findings for this part, main data came from observations and interviews with teachers. In addition, interview with school administrators provided rich data for usage rate of SCT in the first case school. Firstly, usage rate of them will be presented generally, and then it will be detailed in terms of students' grade levels and field of the teachers. After that, usage rate will be analyzed according to effect of time. Lastly, comparison of the usage of different SCT will be reported.

General Usage Rates of SCT

In the observations, each teacher was observed twice at different time. Therefore, the researcher had a chance to see the usage rate of each participant. Also, the researcher asked to participants the usage rates in the interviews. When the usage rates of the SCT were analyzed generally, teachers described their usage as 'often', 'seldom' and 'none'. Parallel to these, SCT usage of teachers was classified at the observations as 'often', 'seldom' and 'none'.

Most of the teachers (N=11) stated that they utilized these technologies often in their lessons. For example, a teacher said that "*I opened my laptop computer and projectors at every lesson and we profited by them throughout the lessons*" (C1_PT3). Moreover, a teacher, who had enough information and skills about technology, said that

> *Because I am already fond of technology, I used them excessively. Usually, I ran PTIWB system when I enter the classroom and it remained open until the end of the day. I mean, we used PTIWB together with students under my control. Furthermore, it stayed open at breaks and students used PTIWB and its pen as well. These were what I could say about my usage rate of these technologies. (C1_PT10)* Q18

Administrators of the first case school also declared that most of the teacher used these technologies frequently. The School Principal expressed that

> *When I toured the classrooms, I saw that almost all technologies were ready to use and our teachers used them frequently. Although I thought that some teachers did not use them in their lessons because of their age and lack of knowledge, I saw that these teachers also utilized from them. (C1_SA2)* Q19

In spite of often usage of them, a few teachers (N=3) preferred to use SCT seldom in their lessons. These teachers emphasized that they generally teach with traditional methods and they use these technologies when they have to explain the subject again. A teacher stated that

> *Generally, I did not utilize from these technologies, because I could do a lesson in traditional ways. On the other hand, I used them when I need extra information about the topic and when I repeat the subject. (C1_PT8)* Q20

Conversely, only a teacher did not use these technologies in the lessons observed by the researcher. When the researcher asked her to whether she used them, she asked that "*I did not want to use these technologies because I encountered some problems and I did not have enough knowledge and skills about them*" (C1_S1). These problems will be investigated at further sections in detail.

Usage Rates of the SCT in point of Teachers' Fields and Students' Grade Levels

While usage rate of SCT could differ according to various factors, participants mentioned that these technologies might be used in different proportions according to grade levels of students and fields of the course teachers gives.

Some participants stated that these technologies could be more suitable for the students at higher grades. This situation was also declared by administrators at YEGITEK. For example, a teacher of 1st grade students said that

> *If I used these technologies frequently at courses of 1st grade students, it would be able to be boring for these students. In fact, I utilized some animations and I reflected them by projector when teaching letters. However, when I continued to use these technologies at other topics, students were not interested with the activities presented on the board by projectors. (C1_PT3)* Q21

In addition, some teachers asserted that these technologies were used more frequently at some field like Math, Science and Social Studies (Geography and History). A Primary teacher stated that he used these technologies for some topics at Math and Geometry courses. He said that

> *I used them at Math course, while teaching the Geometry topics. We could draw easily the geometric shapes on the PTIWB using smart board software. Because of this, these technologies and software were more suitable to Math and Geometry courses. (C1_PT10)* Q22

Moreover, a Social Studies teacher specified that "*these technologies were more appropriate to topics of History and Geography, because students could learn better watching videos and animations about the topics*" (C1_SS1).

Effects of Elapsed Time on Usage Rate of SCT (Novelty Effect)

Five participants stated that the usage of SCT have been decreasing over time, although they were used frequently when they were established. They expressed that they were curious about SCT when they were established, because they were new for them and they did not know so much about these technologies. They also specified that their usage began to decrease afterwards. A teacher declared that "*I utilized less from them in the second semester while we had used often throughout first semester"* (C1_PT3). School Principal also said that

> *Generally, new technologies are used frequently in the school. For example, our teachers preferred to utilize the smart boards intensively when they came new to our schools. (C1_SA2)* Q23

In addition, the Assistant School Principal asserted that teacher used less SCT as time goes by, because they started thinking that they are less useful. Furthermore, he expressed that "*because of their curiosity about SCT at the beginning, they had used them, but they did not use them when their curiosity run out later on"* (C1_SA1).

On the other hand, three out of 18 participants stated that they utilized more form SCT as time goes by. Teacher declared that they got used to these technologies, so they could use easily in more time. A teacher said that "*I am using them more as I explore them*" (C1_T2). In addition, another teacher specified that

> *At the beginning, students found strange these technologies and I do not prefer to use them in my lessons. However, I began to use my laptop PC and projector towards the end of the semester, because most of the students addicted to these technologies. (C1_SS1)* Q24

Comparison of the Usage Rate of Different SCT

In this title, statements of participants about usage rate of different SCT like PTIWB, smart boards and projectors will be presented. Most of the teachers declared that projectors were the mostly used SCT in the first case school. Furthermore, they stated that they used the smart boards as only a projector in their lesson. In parallel to this, in the observations, it was observed that interaction function of various brands and types of smart boards were not used frequently by teachers (Obs2, Obs6, Obs10, Obs16, Obs22 and Obs39). That is, teachers having smart boards in their classroom preferred mostly using their smart boards as projectors rather than using their interaction properties as a smart board. A teacher stated that

> *Projectors were used more frequently then smart boards. For example, we use the projector function of a smart board during one hour while we use it as a smart board during only 15 minutes. (C1_T2)* Q25

In addition, a Primary teacher said that *"although I used the projector in %50-60 of my courses, duration of my smart board usage in my lessons could be only %20-30 of them"* (C1_PT8).

On the other hand, PTIWB was used more than other smart boards. The teacher (C1_PT10) having PTIWB in his classroom expressed that he usually used PTIWB for activities including interaction. He also declared that the PTIWB had some advantages (like more sensitive for easy usage) and he did not encountered so many technical problems (such as calibration adjustment and not requiring smart board pen) when it was compared with other smart boards. Therefore, some teachers (N=6) wanted to have a PTIWB in their classrooms instead of other types of smart boards. In addition, an administrator at YEGITEK declared that they got feedback from teachers and school administrators in the first case school for mostly used smart board type, and teachers reported that PTIWB was mostly used smart board type (PM1). Consequently, projectors and PTIWB were used more than smart boards in the first case school.

4.1.1.3 Challenges and Problems While Using SCT in the First Case School

Various challenges and problems came up while SCT were used in the first case school. In this section, these challenges will be presented according to data obtained from observations, interviews and document analysis in this study. After the data analysis, 9 themes were generated in the light of problems teachers encountered. These themes and how many participants mentioned them were presented in Table 4.3. The challenges and problems while using the SCT may be listed as (1) technical problems, (2) inadequate content, (3) lack of knowledge and skills, (4) deficiency of support to teachers, (5) limited time, (6) challenges for classroom management, (7) excessive visit to the school, (8) difficulties to maintain motivation, and (9) problems for establishment of different types and brands SCT. In the next sections, these problems and challenges will be mentioned in detail.

Table 4.3 Themes for the Challenges While Using SCT

Challenges While Using SCT	**Frequency of participants mentioned**
Technical problems	15
Inadequate content	13
Lack of knowledge and skills (Inadequate training)	11
Deficiency of support to teachers	9
Limited time	8
Challenges of classroom management	7
Excessive visit to the school	6
Difficulties to maintain motivation	5
Problems at different types and brands SCT Established	5

Technical Problems

Technical problems were mostly cited problems by participants while SCT were being used. Technical problems might be defined as problems including mechanic and software problems of SCT and technical infrastructure disruptions in the school. For that reason, technical problems will be presented separately for each type of SCT. In Table 4.4, it was showed that the sub-themes for technical problems and how many participants mentioned about them. Then, infrastructure problems will be explained.

Table 4.4 Sub-themes for the Technical Problems

Technical Problems	**Number of participants mentioned**
Projectors	11
Smart boards	10
Technical infrastructure in the school	10
Internet connection	6
Laptop computers	1

Technical Problems for Projectors

Teachers using projectors in their classrooms indicated that they encountered problems mainly about the view projected on the board or on the wall. They complained that the images on the wall reflected by projectors were sometimes breath (C1_PT3, C1_E2, C1_T2 and C1_SC1). It is also noticed in the observations that some teachers did not adjust the 'focus control' of the projectors in order to attain clear and good image on the board. Because of this, they experienced difficulties while reflecting contents with projectors so that all students could see the subjects about the lesson. In addition, the teacher, who was assisting the other teachers when it was necessary, stated that

> *Teachers using projectors complained that their shadow fall on the image when they came near to the board in order to show, to write or to sing something on the board. That is, there is a shadow problem for the projectors and this is inconvenient for using projectors as interfering the content [on the board]. (C1_PT10)* Q26

This shadow problem was declared by the YEGITEK administrators and they asserted that this problem might occur on the PTIWB. Another teacher (C1_PT3) also specified another problem for the projector that the image of the projector suddenly got dark while using it. This problem was determined in the observation of this teacher and this problem was about of 'screen saver' property of the projector. However, teacher did not adjust the duration of this property in order not to encounter this problem. She explained that she did not know how to adjust this option and she did not have enough time to do so.

Technical Problems for Smart Boards

Although there were various problems for different smart boards such as lack of software and students' usage difficulties for smart boards' pen, the mostly cited technic problems was corruption of calibration adjustment of the smart board screens. Calibration adjustment of smart boards may be clarified as conformity of frameworks of the screen and of the display projected on the board. If the calibration is adjusted well, smart board can be used easily and impeccably. That is, when there is no problem for calibration adjustment of smart boards, the point clicked on the smart board fully coincide with point detected by its software. From this perspective, calibration problems were expressed especially for Smart Board Projectors (Short throw – signal based Smart Boards). A teacher said that

> *There were some deficiencies of the smart board [projectors]. For example, you know, we adjust the calibration of smart boards. If there is any sliding as 1 mm on the projector of the smart board, there would be 1 or 0.5 cm change on the screen of the smart board. Even if we open the windows of the classroom, the adjustments of the calibration could be destroyed. So, we have to adjust frequently the calibration of the smart boards. Eventually, this could be big problem for us [as a user]. (C1_PT8)* Q27

In addition, calibration problem were also stated for other smart board types. A teacher, who were using smart board with touch panel, expressed that

> *Students could touch the projector part of smart board, and so, calibration [of the smart board] could be affected negatively. Because, projector of the smart board in my classroom is extra low and students could easily touch it. (C1_T2)* Q28

School Administrators also mentioned about the calibration problems of smart boards. On the other hand, it was observed that there were shadow problems for the smart boards, out of PTIWB. Users could cause shadow on the screen while they

want to write or sign something on the smart board. This situation was also mentioned by a teacher, who was assisting the other teachers when it was necessary.

Lack of software in the smart boards was stated as another technical problem. An English (C1_E2) teacher complained that she could not use the smart board because of the usage difficulty of smart board's software.

The other technical problem for smart boards was about the pen of the smart boards. A teacher (C1_PT8) declared that students had difficulty in holding the pens of the smart boards and writing with it on the smart board. In addition to this, an administrator at YEGITEK expressed the battery problem for the smart boards' pen (PM1).

Technical Problems for the Technical Infrastructure at School

In addition to other technical challenges, users of the SCT encountered some additional problems with regards to technical infrastructure in the first case school. These problems were non-durable infrastructure, power cut, and installation of too many brands and types SCT in the first case school. Firstly, eight out of 16 teachers asserted that one of the foremost problems was failure to provide proper, stable and durable infrastructure for SCT in the classrooms. Teachers stated that ports of the SCT were not stable on the wall and not tough for the long usage. A teacher said that

> *In my classroom, cables on the wall and ports connecting the laptops to projectors broke down a few days ago. Moreover, connection cable of the laptop got lost. So, I could not use my electronic activities. If the laptop and its connections to the smart board were fixed permanently on the table, I would not come across these problems. (C1_E2)* Q29

In the observation at this teacher's lesson, these problems were witnessed and the lesson was affected negatively. In addition, another teacher emphasized that

> *There might be some breakdowns of connection ports, because these technologies were not established as fixed to the classrooms. For example, while setting laptop to the smart board or projector at*

beginning of the lesson and removing it at the end of the lesson in every day, these connection ports could become deformed easily at later times. (C1_PT10) Q30

This teacher also asserted that he did not encounter these type problems while using PTIWB in his classroom because their connection port was fixed on the wall. Additionally, the pile of the connection cables in the classrooms was specified by a teacher as a technic problem of inadequate infrastructure in the school (C1_SS1). This cable might be intermixed and teachers could not find right cable for using which technology they want to use.

At the result of failure to provide proper, stable and durable infrastructure for SCT in the classrooms, each laptop computer belonged to two teachers and they had to use the laptops rotative. That is, both two teachers are responsible from lost or stolen of each laptop. Therefore, teachers (C1_M2, C1_S2, C1_SS1 and C1 E2) complained that they felt pressured of the responsibility of these laptops while they were carrying, preserving and using them together with another teacher. For example, an English teacher declared that

There was a laptop at each classroom and we had to use alternately [these laptops] together with another teacher. I did not want to take responsibility [of the laptop]. Besides, there was no place to put the laptops in the school, and so I had to take away the laptop to my home, even if I did not want to do this. This responsibility is bothering me. However, if these laptops were fixed at classrooms, we would not take the responsibility [of the laptops]. (C1_E2) Q31

Secondly, school administrators emphasized that no laptop computers were given them, although each two teacher had a laptop. School Principal (C1_SA2) asserted that his deficiency affected negatively the school administrators' usage of the technologies. In addition, it was observed that they did not help to teachers, because they did not have laptop and they did not have enough knowledge about it.

Thirdly, power cut was also expressed by teachers as another challenge. Teachers stated that electric infrastructure was not built for these technologies and there might be some power cut on the electricity connection of the SCT. A Math teacher said that

> *While I was solving an example question on the smart board, the electricity suddenly went off and my solution on the smart board was interrupted. What I wrote until that time deleted and I did not know what I should do. We waited for the electricity, because there was not a generator [power plant] at our school. (C1_M1)* Q32

Fourthly, in terms of technical infrastructure in the first case school, having various kinds of SCT could be another challenge. A School Administrator (C1_SA1) explained that these different technologies required special infrastructures and providing special infrastructures to them could be challenge for us as school administrator.

To sum up, technical problems for each SCT and infrastructure at first case school were explained above. In addition to these technical problems mentioned by participants, some teachers also asserted that they did not generally encounter with a lot of major technical problems throughout the last academic year (C1_PT8, C1_PT11, C1_PT12, C1_SS1, C1_SC1 and C1_E3).

Technical Problems for Internet Connection

Technical problems were also stated for the Internet connections in the classrooms. These problems might be listed as interruptions on the Internet connection, slow download speed, and restriction on the Internet access. Interruptions in the internet connections were reported not only by teachers but also by school administrators. A teacher (C1_MU1) complained that while they were following content on the Internet, there could be disconnections and the lesson could be affected negatively. The other problem for the Internet connection was slow download speed on the Internet connections. Lastly, MoNE's constraint on the Internet connection was explained as the other technical problem for the Internet in the classrooms. A teacher stated this situation that

> *When I wanted to download a presentation or an animation about the topic, I searched them [on the Internet] and I had to connect a website in order to download them. However, these websites were banned [by MoNE] for safety reasons. So, I could not download the contents [from these websites]. We encountered such challenges. (C1_SS1)* Q33

Restriction on the Internet connection in the classrooms was also determined in the observations as a major challenge for the teachers.

Technical Problems for Laptop Computers

Lack of the software on the laptops was indicated as a problem, although most of the teachers did not report any challenge for the laptop computers. Only a teacher (C1_PT10) stated that there could be some incompatibility for hardware and software of the laptop such as driver issue of the graphic cards of laptops computer.

Inadequate Content

When the problems stated by participants were examined from the perspective of the contents for the usage of SCT, four main sub-themes were formed at the end of the data analysis. These could be listed as; lack of contents in number and variety, difficulty of searching and finding content, lack of content suitable for established SCT, and inappropriateness of the contents to students' level (See in Table 4.5). These four sub-themes are explained in detail below.

Table 4.5 Sub-Themes for the Inadequate Content

Inadequate content	**Frequency of participants mentioned**
Lack of contents in number and variety	10
Difficulty of searching and finding content	8
Lack of content suitable for established SCT	8
Inappropriateness of the contents for students' level	2

Lack of Contents in Number and Variety

Ten out of 18 participants in the first case school emphasized that they encountered the challenge of lack of contents in number and variety in order to utilize SCT in their lessons. Some teachers stated that although MoNE provided e-content to them by means of contents on their websites and contents of private publishers, these contents were not only too few, but they were also same type materials. For example, a teacher said that

> *YEGITEK had put some activities on their web site for the usage of us in the lessons. Nevertheless, when I checked them, I saw that there were only one or two activities for each unit [subject]. I used some of these activities in my lessons, but they were not enough to our students for our lessons. (C1_PT8)* Q34

In addition, one of the school administrators (C1_SA1) emphasized that a few teachers in the first case school informed them about the lack of the content on the YEGITEK's website. On the other hand, there were a few teachers (C1_PT3, C1_PT11 and C1_E2) stating that there were enough content on the using the technologies in their classrooms.

Difficulty of Searching and Finding Content

Because of the lack of content for using the SCT, teachers had some difficulties while they were searching and finding the content for their lessons. Teachers specified that there was not a well-designed website as a content tracking system. The teacher assigned by school management to interest the technological problems in the school stated that

> *In point of e-content, our all teachers said that if they had better e-contents or if MoNE could provide more contents from only one source [a website] (I hope they provide them soon), they could utilized better [from the SCT]. However, we did not have these contents during this academic year and our teachers had to find their contents*

from different sources. Because, they could not prepare their own activities for these technologies. (C1_PT10) Q35

In addition, another teacher emphasized the need of a content tracking system as saying that

I think that there could be a software following and recording which activities were used and which activities were not used. By the help of this system, we could know when a program or software was used. In fact, we could follow the curriculum on it. Because of we have not had this system until now, we could be confused which activities were used previously. (C1_T2) Q36

Same teacher also mentioned another challenge about lack of suitable content. This challenge was that while teachers were searching the content of the lesson on the Internet in the classroom, they could come up against undesirable contents for teachers. A teacher explained that

If students ask a question about the topic, I could not know the answer of the questions. Or, we could suddenly need some extra contents in the lesson. In these situations, I search on the Internet for answering the questions or for finding the additional information about the topic. Unfortunately, there could be some inappropriate contents for our students on the websites which we found. That is, on these websites, there could be an advertisement, a political figure or a sexual image as unsuitable for students. This could be big problem for us, when we opened such webpages. (C1_MU1) Q37

The other point was declared by teachers that they did not reach to some contents because of MoNE's constraint on the Internet connection. Two teachers stated that this restriction on the Internet cause difficulties while they were searching content for the lesson, on the top of lack of adequate contents.

Lack of Content Suitable for Established SCT

Although MoNE or YEGITEK had provided some e-content to the teachers and students, 8 teachers stated that these contents were not suitable to technologies in their classrooms and they could not use these contents in their lessons. Especially, a Turkish course teacher explained that

> *They established the hardware to classrooms. That is, they fixed a smart board to my classroom and gave a laptop to each two teacher. But, when we looked at the software part, there was no suitable software and content for using them with students on the smart board in the classroom. That is, they sent the technologies to us without creating enough [educational-instructional] program and software for them. (C1_T2)* Q38

In parallel with the teacher said, when some example of the contents provided to teachers by YEGITEK or private publishers were analyzed in the process of document analysis, it can be deduced that generally these contents was drill-and practice activities for a student to follow it by oneself on his/her computer or was videos or animations to explain the subject of the study. That is, in consequence of interviews, observations and document analysis, using these contents interactively by teachers and students in the classroom might be unsuitable and difficult. Especially, contents for used on the smart boards were barely provided to teachers in the first case school.

Inappropriateness of Contents to Students' Level

Lastly, inappropriateness of the contents to student's level was declared as another problem about the contents provided to teachers. Two teachers (C1_PT8 and C1_M1) stated that activities and example questions for Math course on the website created by YEGITEK and MoNE were too easy for students at 4^{th} and 5^{th} grades. They emphasized that students did not want to use these contents because students thought level of the contents on the Internet were too simple.

Lack of Knowledge and Skills about SCT and Inadequate Training

Although various SCT have been installed at the first case school, some problems were encountered about the lack of knowledge and skills for these technologies in order to be used properly by teachers and school administrators. If the problems were analyzed in the light of lack of knowledge and skills perspective, these problems may be grouped as not having enough knowledge and skills about SCT, lack of training about SCT, and new SCT for teachers (See in Table 4.6).

Table 4.6 Sub-Themes for the Lack of Knowledge and Skills about SCT

Lack of Knowledge and Skills about SCT	**Frequency of participants mentioned**
Not having enough knowledge and skills about SCT	10
Lack of training about SCT	9
New SCT for teachers	6

Firstly, some teachers stated that they did not have required knowledge and skill for using these SCT in their lesson and they did not frequently utilize from them because of this. The Assistant School Principal also emphasized that

> *In this point, friends [teachers] not having enough skills (especially not being interested in using technologies at education) were experiencing difficulties. So, they did not prefer to use these technologies depending upon this. (C1_SA1)* Q39

The other lack of knowledge and skills were mentioned for preparing e-content. A teacher stated that he could not prepare her own content in order to using it with projectors in the classroom (C1_PT3).

Secondly, most of the teachers and school administrators in the first case school indicated the inadequate training as one of the biggest challenge for them. They emphasized that the teachers and school administrators in the first case school did not receive adequate training about the usage of these technologies. Although, some authorized people (they were technicians establishing technologies to the classrooms) trained teachers to introduce the technologies in the classrooms, teachers

did not attend a special training sessions about the usage of these technologies in educational environments. A teacher said that

> *When a smart board was established in my classroom, technicians establishing [the smart board] told shortly how the smart board works and introduced some software in it. Similarly, my other teacher friends also said that they received maximum one-hour training from technicians and they did not learn too much about how these technologies to be used in the lessons. (C1_S2)* Q40

An administrator at YEGITEK explained that "*the trainings given by technicians of each firm established a SCT to first pilot school were not a planned training program for users*" (PM2). The other complaint about these short trainings was that they did not contain the practice usage example about how these technologies could be used in the courses.

Lastly, participants expressed that they did not have enough information for using these technologies, because these technologies were new for them. Especially, a teacher stated that

> *I can say that I am competence for computer and projector. However, the smart boards are new for me. That is, I have never met before and I have not used it, yet. Frankly, I do not know how to use [smart board] in my lessons. (C1_PT4)* Q41

Also, a school administrator (C1_SA2) confirmed that some teachers did not use the smart boards in the first weeks and he asserted that the reason was that the smart boards were new for teachers.

On the other hand, a few teachers asserted that they had enough knowledge and skills about technologies and they could learn easily the usage of the smart boards even if they were also new for them in first weeks (C1_PT10 and C1_SS1).

Deficiency of Support to Teachers

There was not a Computer Teacher in the first case school appointed by MoNE in order to help and to support the teachers during the usage process of the SCT. Most of the teachers and school administrators emphasized this deficiency in their school for solving technical and other problems. A teacher stated that

> *When we needed help about these technologies, I could consult to one of the teachers having enough information about technology. However, these teachers were not employed for helping us and I might hesitate because of this. If there is a computer teacher employed for helping us, we can easily call for help and we can tell our problems to resolve. Until now, nobody has been assigned to our school as a problem solver. (C1_SS1)* Q42

In addition, a school administrator (C1_SA1) expressed that there was no technical personnel assigned by YEGITEK for handling the technic problems of the SCT and helping them to manage these technologies.

On the other hand, although there was not a Computer Teacher in the first case school, administrators of the school commissioned a teachers (C1_PT10) having enough knowledge and skills about technology in order to help teachers and to interest the problems of SCT. Teachers declared that they received support from that teacher. A teacher stated that

> *When there was a deficiency on the software of the laptop or when there was a virus problem on the laptop, skilled teacher assigned by [school] management met our needs. Nevertheless, we need a Computer Teachers to support us. (C1_E3)* Q43

Moreover, this assigned teacher (C1_PT10) specified that he was trying his best to help other teachers in the school. However, he also stated that his supports might be insufficient for the teachers' needs because of time constraints and excessive workload. In addition, he represented that

> *There is not any authorized person assigned by YEGITEK or MoNE for consulting with them about challenges and problems we encountered. Administrators at YEGITEK might assign a project attendant or a project contact person to our school in order to ensure the coordination in the school. This could be very well. That is, reaching to YEGITEK for resolving the problems might be troublesome, and so, there is not any person to come into contact with YEGITEK. (C1_PT10)* Q44

In addition, teachers declared some special situations when they need technical supports. One of these was that SCT crashed were not repaired. A teacher explained that

> *For instance, our laptops have been out of order for approximately two weeks. It was waiting to be repaired. We did not solve the technic problem of it. We thought that we would send it to technical service, but we had a problem that who would send it. That is, who would send it was unclear and how long its repair was unknown. (C1_PT3)* Q45

Similarly, the uncertainties for technical support were emphasized by other participants. The other lack of support to teachers was declared as no assistance to teachers while they were using smart board. A teacher (C1_E2) stated that they did not know what they should do when they need software on the smart board.

Limited Time

As the challenge for using SCT in the educational environments, time constraints were also revealed another important point. When the data were analyzed in the light of time constraints, four sub-themes were emerged. These sub-themes are allocating time for the usage of SCT in the lessons, the shortage of time for learning how these technologies are used, shortage of time for preparing contents, and waste of time during solving the technical problems, (Table 4.7).

Table 4.7 Sub-themes for the Limited Time

Limited Time	**Frequency of participants mentioned**
Allocating time for the usage of SCT in the lessons	5
Shortage of time for learning usage of SCT	4
Waste of time during solving the technical problems	4
Shortage of time for preparing contents	3

Firstly, teachers were worried about not finishing the curriculum until the end of the semester if they use these technologies in their lessons. Some of the teachers (N=5) stated that arranging these technologies ready for the course could take time at the beginning of the each lesson and they could not teach all issues of the course until end of the lesson. In addition, a teacher declared that

> *Now, one lesson time is 40 minutes. In each lesson, the entrance, greeting and signing the class book takes 5 minutes. Answering the questions of the students also lasts 10 minutes. Totally, 15 minutes pass. There are already 30 students in the class and we do not have a minute for each student in the remaining time. For that reason, we could not use these technologies for each student. (C1_M2)* Q46

This teacher emphasized that if they used these technologies interactively with each student, they would not have enough time for all subject to teach during the lesson.

Secondly, 4 teachers expressed that they could not learn how to use these technologies in their classrooms (especially the smart boards), because they did not have enough time to learn usage of them. There was a special factor for this situation in the first case school. Namely, some of the SCT were established in the classrooms during this academic year, not at the beginning of the year. For example a teacher stated that "because *the smart board was established in my classroom one month ago, I could not use it and in fact I could not learn how to run it in my lessons"* (C1_E2).

Thirdly, the other problem about finding enough time was that solving the problems while SCT were used in the classrooms takes time during the lesson. As these situation was mentioned by teachers, school principal (C1_SA2) in the first case school specified that teachers might lost time while they interesting with problems like calibration adjustment of the smart boards.

Lastly, not having enough time for preparing content was declared by two teachers as challenge. A teacher (C1_T2) explained this point as they did not have spare time for preparing, searching or organizing e-content to use in their lessons.

Challenges of Classroom Management

Seven out of 18 participants stated that they experienced classroom management difficulties while they were using SCT in their lessons. Especially, a teacher (C1_E2) stated that when they encountered an unexpected technical problem and when teachers were dealing with the solution of the problem, there could be some humming and commotion among students. In addition, she added that when she did not solve the problem, she could become irritated to fall into disgrace in front of students. Same classroom management issue also explained by another teacher that

> *When we were searching or selecting the contents on the websites [on Internet], we could encounter some unsuitable images. Students could see them even if we closed them with our body and they might make noise. (C1_MU1)* Q47

Another teacher (C1_SS1) also specified that students could find strange these technologies and they did not behave normally and they could cause some additional classroom management problems. However, she also expressed that these wrong behaviors have been decreasing in the process of time.

On the other hand, there were three teachers asserting that there were not classroom management problems in the classrooms, if the teachers prepared well for using SCT in their lessons.

Excessive Visit to the School

First case school of this study was also the first pilot school of the MEOIT (FATIH) Project performed the YEGITEK. In addition, because the scope of this project is too big and it has got most of the researchers' and lots of the institutions' attention, the school has been visited by too many researchers, pressman and authorized people from the public and private institutions (from Turkey and from all over the world). This situation was considered as a challenge for the proper usage of SCT by teachers, by school administrators and even by project administrators at YEGITEK. Teachers stated that most of these visits created pressure on them for using these technologies in their lessons, if they did not want to use them in all of their lessons. A teacher explained that

> *When we talked with my friends [teachers], I realized that we were generally annoyed about frequently visits of various people interesting with this project (FATİH Project). That is, we worried about whether an inspector would come to our lesson. Perhaps, some authorized people have come once or twice a month and we were waiting them without when they would come to school. We wondered about which classroom they would visit, why they would visit and what they would want. These questions affected negatively to our technology usage in the lessons. (C1_M1)* Q48

Some teachers declared that they had to use these technologies in some of the lessons, even if they did not want to prefer using them in their lessons. In a conclusion, SCT were not used normally because of the visits of people, especially from press and MoNE.

Difficulties to Maintain Motivation

The maintaining the motivation of both teachers and students emerged as another important point at the end of the data analysis. When these technologies were used in the classrooms, some factors might affect the motivation of the teachers and students. For instance, two teachers (C1_PT3 and C1_SS1) emphasized that when an unexpected technical problem occurred during an activity carried on these

technologies, teachers and students lost their motivation on technologies and the subject. In other words, after an unpredicted technical problem was solved, redirecting students' attention to the subject on these technologies could be very difficult for teachers. In addition, it was mentioned that keeping the students' attention on these technologies could be problematic if they were used long-term and if the contents were not well designed for attracting students' attention. Assistant School Principal explained this point as

> *Sometimes, employing these technologies in the lesson might be worse than traditional ways in terms of sustaining the motivation of the students on the subject. Because, there was an ongoing process on these technologies. For example, a teacher has students watch a video [by aid of projector or a smart board] and the video could be long. At this point, you [as a teacher] are not involved to the process. That is, you are out and students are fastened on the video. However, there might be distribution on the perception of the students. At that moment, there is no chance of you in order to interfere in the process. That is, the computer could not say "be quite" or "please watch the video". If you warn the students from outside, you could disconnect contact between students and the video. After, redirecting students to the video could be difficult. (C1_SA1)* Q49

To sum up, participants emphasized that both teachers' and students' motivation for these technologies might be affected negatively if there could be a technical breakdown or if the contents were not prepared adequately.

Problems at Different Types and Brands SCT Established

There was a specific problem at the first case school. Different types and brands SCT were established in this school, because it was the first pilot school of the FATİH Project. Reason of this was explained by an administrator (PM1) at YEGITEK as they established different types and brands SCT, because they want to determine which technologies they would send to all schools in TURKEY in the later stages of the FATİH Project. Therefore, participants were declared some additional challenges

about usage of various types and brands in the first case school of this study. One of these challenges was that too many different technical problems could emerge at the different smart boards and projectors. Also, in order to solve these problems at each different type and brand technology could require different solution and technical support. A school administrator explained that *"while a problem was solved by a technicians of a company [of a smart board], another technicians from different company had to come to solve the other problem [at different smart board]* (C1_SA1). Also, he added that they encountered the problem that they had to contact with many companies for the solution of breakdown at different technology. In addition, a teacher (C1_TD1) expressed that they need separate trainings for each different technology in the school. That is, training the teachers for different types and brands SCT might be also another problematic point. Lastly, teachers explained that they could not easily help another teacher, because technologies they used were different and they did not know well about the technologies other than SCT in their classroom. In addition, they could not share the contents with other teachers having different SCT.

4.1.1.4 Solutions to the Challenges and Problems While Using SCT in the First Case School

Challenges and problems while teachers were using SCT in the first case school were presented in the previous part. Now, what has been done for these problems and challenges in the first case school will be explained in this section. That is, what teachers, school administrators, authorized people at YEGITEK or at MoNE and other stakeholders have done in order to overcome these challenges for adequate usage of SCT in the educational environments were analyzed as the result of data analysis in this study. Again, data obtained from observations, interviews and document analysis for first case school were used in this process. What were done to overcome these problems (mentioned in the previous section) was examined in the light of who deal with or solve them. Therefore, 8 themes emerged at the end of the data analysis corresponding with who deal with or solve these problems and what were done to overcome them. These themes were (1) teachers' own efforts, (2) getting help from another teachers, (3) solutions and attempts of school management,

(4) solutions of YEGITEK/MoNE, (5) solutions of private publishers, (6) solutions of authorized companies' technical service, (7) getting help from students, and (8) no solutions to the problems. These themes and how many participants mentioned about them were presented in Table 4.8.

Table 4.8 Themes for the How the Challenges were Solved

How challenges were solved	**Frequency of participants mentioned**
Teachers' own efforts	16
Getting help from another teachers	11
Solutions and attempts of school management	8
Solutions of YEGITEK/MoNE	7
Solutions of private publishers	6
Solutions of authorized companies' technical service	6
Getting help from students	4
No solutions to the problems	14

Teachers' Own Efforts

To overcome the problems and challenges while the usage of the SCT in the first case school, most of the teachers (N=16) tried to solve the problems by themselves. Although some teachers were striving initially to solve the problems they encountered during the lesson, there were some other teachers trying to find out a solution if they did not reach any solution to problem after they had consulted other people interested with these technologies. The teacher assigned by school management to interest the technological problems in the first case school stated that

> *Teachers in our school were generally trying to remove the problems emerged in the lesson before contacting me about the problems and some of them told me that they could solve of the problems about the software of the laptops and the smart board. (C1_PT10)* Q50

The other teacher also declared that

> *I like to do myself about the problems without help. That is, if there is anything I can do myself about the problems, I will absolutely solve*

myself. For example, if a cable is changed and if there is a cable, I could change it. (C1_PT8) Q51

When teachers' efforts were examined, they would be grouped according to for technical problems and for content problems (Table 4.9).

Table 4.9 Sub-themes for the Problems Solved by Teachers' own Efforts

Problems solved by teachers' own effort	**Frequency of participants mentioned**
Technical problems	12
Content problems	10

For Technical Problems

Some teachers (N=12) in the first case school tried to eliminate the technological problems with their own efforts. School administrators explained that technical problems on the hardware of the SCT could be resolved seldom by the teachers, because their opportunities for repairing them were insufficient. For that reason, they could only be interested with basic technological problems like calibration, connection ports and cables). For example, in an English classroom, it was observed that the connection cable on the wall for transferring vision on the laptop to the projector was not working (Obs20). However, an English Course Teacher found a temporary solution (workaround) placing the two student desks one on the top of the other under the projector and putting the laptop on these desks in order to provide the connection with the aid of short connection cable. This teacher mentioned her solution in the observation that

When the connection cable [on the wall] failed, we found an additional connection cable between laptop and projector. Because we used the laptop computer as two teachers together, this additional cable has lost during the teachers exchanging the laptop. Although I said that I put the cable in the bag of the laptop, we lost this additional cable, too. For that reason, I found a solution that way you saw in the lesson you attended. Because, we do not want to give up

> *using them in the lesson, so we pulled the two desks under the projector and we connected the laptop to the projector with a short connection cable. That is, these technologies were being used in the other lessons and other classrooms and we felt the lack of them. For that reason, we are trying to use these technologies eliminating the problems as much as we can. (C1_E2)* Q52

In addition, two teachers used their own laptops or other resources in order to pass over the deficiency about the technologies. It was observed that a few teachers brought their own laptops to the school for using them in the classroom instead of to give and receive the laptop supplied by YEGITEK to each two teachers. Similarly, it was observed in a class that a teacher brought their own speakers to provide more adequate sound in the classroom while watching a video or an animation (Obs35). There were also other teachers thought to buy a laptop in the next academic year. For example, a teacher told that

> *We will talk about this (lack of laptop) with subject teacher. That is, we will try to find a solution for transferring a laptop between us. Actually, there is nothing to do. For that reason, I like the laptop given us and I am thinking of buying the same laptop so that I am not grateful to anyone. That is, I do not want that I have to give or take a laptop. This may not be a solution, but a way out I found is that. (C1_S2)* Q53

Teachers also found alternative ways to overcome the challenge. In a Social Studies lesson, it was observed that the teacher used the wireless mouse to control the presentation reflected from projector on the board. This teacher explained her solution as

> *There was a problem for me while I was following a presentation on the board. I opened a presentation [file] in my computer and reflected it to the wall by projectors. The problem was that after I was talking about an image or a sentence on a page of the presentation, I had to*

> *go to the teacher's desk in order to move to the next slide. When I went to the teacher's desk, I lost my connection with the presentation and students could be distracted. In order to prevent this, I thought what I could do. Then, I found a solution. I brought a wireless mouse from my home and I tested it how many meters it worked. I determined that I could easily use this [wireless mouse] at everywhere in the classroom. Therefore, I could change the page or slide without going to the teacher's desk. However, I found this solution completely myself. Moreover, I told my friends they could use this way in their classroom, even if they had a smart board. (C1_SS1)* Q54

In addition, the teacher assigned by school management to interest the technological problems in the first case school added that he gave some written directions for solution of some problems so that teachers could overcome themselves these problems (C1_PT10). These directions were also analyzed by researchers and they were interested about calibration problems, visual settings of projections and a few user guides for some smart boards.

On the other hand, although some teachers were dealing with most of the problems to solve, some problems were not solved by these teachers. For instance, a teacher stated that she did not overcome the problem of suddenly darkening of the projector's image (C1_PT12). Moreover, a teacher declared that they were losing time while they were dealing with the problems they did not solve (C1_SC1).

For Content Problems

Deficiencies of the required content on the SCT were also tried to be resolved by teachers with their own effort as well as supplied contents to them by various organizations. Some teachers (N=10) declared that they searched on the Internet in order to find the related presentations, animations or interactive activities for using them in their lessons. They had some problems in the research process for the content and they could find some solutions to them. Firstly, the Internet restriction in the schools applied by MoNE was specified a challenge while teachers reaching the contents on the various website. A teacher mentioned her experience as

> *I may tell about the lack of the content and my solution for it. For instance, I would download a presentation or an animation from the Internet. Correspondingly, I have to connect an alternative website, but this website are banned in [Internet connection of] the school and I cannot download it. For that reason, I have to find and download this material at my home one day before. Actually, I find most of the materials in this at my home. (C1_E3)* Q55

Likewise, another teacher stated that she prepared some of her presentations and activities at her home using her personal computer so that she did not encounter any need for the content in the classroom. Secondly, teachers were trying to cope with not coming across undesirable contents like an advertisement, a political figure or a sexual image as unsuitable for students. They stated a few alternative ways for preventing the students from seeing these undesirable images on the board. These were the examining the websites before the lesson and reflecting these websites on the board not showing these parts in the vision. The Music Teacher explained his solution as

> *I searched on the Internet before the lesson so that we would not reflected the wrong images from the projector. Because of this, I found the website not including such contents and I would show this reviewed websites in my lessons. (C1_MU1)* Q56

Another teacher also expressed that

> *When I found a content from the Internet during a lesson, I firstly opened it at my laptop without reflecting the screen. After I analyzed whether it contained any suspicious content, if it had such a disadvantageous part but if I want to reflect this website to students, I would follow two ways. First one was that I reflecting this website enlarging the page in order to not show unsuitable part on the board. That is, I only reflect the correct part of the website. The second way was that I reflected the website on the board and I was preventing that*

undesirable part from seeing students standing in front of it and hiding it with my body. (C1_T2) Q57

Teachers also found required contents from the websites of YEGITEK and private publishers. A school administrator (C1_SA2) stated that some teachers used the contents at websites of the YEGITEK, while some other teacher was getting required contents from personnel of the private publishers coming to school for introducing their products. Teachers also compensated the lack of e-contents with using printed material such as materials by photocopy duplicate and textbooks. Teachers preferred to use the printed materials with these technologies. A teacher explained that

When I did not find any enough activity about the topic, I used the printed activities that I had in my hand. That is, I reflected the electronic format of the activity on the board and I distributed the printed copies of the activity to the students. Therefore, we solved the practice questions in the activities with students not only on the board but also on the paper at students. (C1_E2) Q58

In addition, a math teacher stated that

Because of I did not have adequate content for Math Course, I decided to use scanned version of the textbook. So, I had scanned myself the all page of Math textbooks for all grades at the beginning of the semester and I used them with the smart board throughout the semester. In my lessons, I opened the pdf file of the textbook at my laptop and reflected the practice problem page on the smart board. Then, students solved these questions using smart board pen on the smart board. Thus, we took advantage of these technologies with interacting the content on the smart board. (C1_M2) Q59

To sum up, teachers overcame some of their content problems with their own efforts as finding extra content from the Internet, using their own computer at their home for preparing the content or for finding content from websites (not opened in the schools because of the Internet restriction) and using printed material with these

technologies. On the other hand, some teachers also used the contents of the YEGITEK and private publishers.

Getting Help from another Teacher Who Had Technological Competency

Teachers generally received help from the nearest source if they reached anyone. As shown in Table 4.10, they got support from the authorized teacher (by school management) in their school and other teachers having enough knowledge and skills about the SCT.

Table 4.10 Sub-themes for the Solutions of Teachers Having Technological Competency

Solutions of Teachers in the School	Frequency of participants mentioned
Authorized Teacher (by school management)	9
Other teachers	8

Firstly, there was a teacher assigned by school management to interest the technological problems of the teachers. For that reason, most of the teachers firstly consulted with this teacher (C1_PT10) when they need any assistance about SCT. In addition to this, this teacher also assisted to school management about the subjects related with SCT. School Principal stated that

> *There was not a Computer Teacher in our school. We informed the MoNE and YEGITEK about this lack, but we do not still have a Computer Teacher. Instead of this, we assigned a teacher having technological competence as authorized teacher about these technologies and the FATİH project in order to help teachers and us when we need assistance or when there was any problem. For that reason, if any teacher applied about a complaint for these technologies, we directed them to this authorized teacher for the technologies. (C1_SA2)* Q60

The authorized teacher also declared that he took office for helping the problems of the teachers in the first case school. Also, he added that this mission was not an

official work for him and he helped voluntarily to the teachers and school administrators. Additionally, he specified that most of the teachers appeal for the solution of the issues they could not overcome especially in the first one-month period of the technologies established. Most of the teachers specified that he solved a lot of problems in the school when they consulted him. The problems solved by this authorized teacher might be grouped as technical problems, virus problems, requested software for the technologies. The authorized teacher explained these technical problems, which he removed as

> *I tried to resolve technical issues delivered by teachers. For example, I arrange some implementations about these issues such as reverse reflection of the screen on the board by the projector and how we could change it. In addition, I gave some written directions for solving basic technological problems. Sometimes, they used these directions and they could overcome some of the technological challenges. (C1_PT10)* Q61

These directions were examined in the document analysis process of the study. At the end of this analysis, it was determined that they include some basic steps for solving the problems about projectors and smart board such as calibration adjustment of the smart boards and screen saver settings of the projectors. In addition, an English teacher mentioned the solution of virus and software problems saying that

> *When I need for the setup of an English exercise software, I took away the software and my laptop to [authorized teacher], he setup the program at my laptop. Furthermore, he removed the viruses in my laptop two times. I thank him for helping us. (C1_E2)* Q62

On the other hand, the teachers and school administrators emphasized that workload of this authorized teacher was too extreme. A teacher (C1_TD1) declared that he wants to help all of the teachers and school administrators in the first case school, but he fell behind solving the problems of all teachers. The authorized teacher mentioned about this as

> *You know, our school is a big school. There were 40-45 teachers in only a period (early riser or afternoon period). All these teachers need small thing from me and these took totally a huge time of me. That is, all the issues in the school were on me and I am usually very busy because of these. However, I am continuing to do my best. (C1_PT10)* Q63

Secondly, teachers in the first case school received support for their problems about SCT from other teachers having enough knowledge and skill about these technologies other than the authorized teachers. It was determined in the observations that when the basic problems (like calibration adjustments or hitches in the software of the laptops) could not be solved by teachers' own efforts in their lessons, teachers might reach the teachers knowing the solution of the problems to overcome that issue. A school administrator also stated that

> *Because there was not a computer teacher in our school, teachers knowing how to know overcoming the problems about these technologies helped other teachers having difficulties in solving the problems. That is, we were trying to overcome that way. (C1_SA1)* Q64

Consequently, in the first case school, teachers preferred to consult firstly the authorized teacher for the solution of a problem they could not solve. Beside this, they received help from several different teachers knowing solution of some specific problems.

Solutions and Attempts of School Management

The other theme of what were done to overcome the problems and challenges about usage of the SCT in the first case school was emerged as the solutions and attempts of school management. At this point, some teachers stated that they informed the school management about the problem on the technologies and they requested the solutions of these problems. Likewise, school administrators expressed that teachers conveyed some problems. One of the school administrators said that

Yes, some of the problems was notified to us by teachers. We also informed the related people and institutions for the solution of these problems. In addition to this, I interfered in personally the problems like breakdown of speakers, blurry screen display on the board reflected by projector, disconnections at the Internet connection and I tried to be helpful for the solution. (C1_SA2) Q65

Other than personal interventions of school administrators, it was also determined the attempts of school management and they might be listed as assigning a teacher (the authorized teacher) (C1_PT10) for assisting students and school management, having the technician make repair at the infrastructure in the school, conveying the problems to the related units at YEGITEK or MoNE, and motivating the teachers so as to use SCT in their lessons (as seen in Table 4.11).

Table 4.11 Sub-themes for the Solutions of School Administrators

Solutions of School Administrators	**Frequency of participants mentioned**
Assigning a teacher (the authorized teacher)	7
Assigning a technician	6
Informing YEGITEK	4
Motivating the teachers	3

Firstly, as mentioned earlier, a teacher having enough knowledge and skills about the SCT have taken the role as a computer teacher by the direction of school management. However, administrators at YEGITEK (PM1 and PM2) explained that this teacher was not assigned by them and his duties were not specified by them. The solutions of these teachers were described above and these solutions also may be accepted as solutions of the school management in the first case school.

Secondly, there was a technician in the first case school and he helped the repair of the breakdown at technological infrastructure in the school. In fact, although teachers stated that this technician repaired some breakdown at the cable connection on the wall and other small-scaled electrical failures, School Principal explained that

> *He was not a real technician and he was actually clerk of the school. We had assigned him as technician before the establishment of these technologies in order to deal with the electrical problems of our school. Actually, there was not any duty of him for these technologies and infrastructure of them. However, we profited by him for cable problems. That is, he changed some out of order cables on the wall and repaired some connection ports. (C1_SA2)* Q66

A teacher (C1_T2) also indicated that the technician (the officer) identified the problems on the cables and could fix it.

Thirdly, unsolvable technic problems by the authorized teacher, the technicians or other people in the school were conveyed to the related units at YEGITEK or MoNE. School administrators declared that they mentioned about the problems for these technologies when authorized people visit the first case school. Also, some teachers represented that when they asked to school management about the problems they said, school administrators explained that they informed the people at YEGITEK about the problems. For example, a teacher said that

> *There was a problem on the display of the projector in my classroom. When I reported these problems to the school administrators, they firstly sent the technician of the school. The technician determined there was a problem at cable in the wall and he said that he could not change this cable, because he did not have replacement cable. After that, I again talked with school administrators about this issue, they said that they would informed the YEGITEK about it. (C1_E2)* Q67

Lastly, in addition to technical problems, the school administrators took part in increasing the motivation of teachers for usage of the SCT. The problem of the decline in motivation of the teachers wherefore the technical and other challenges teachers encountered was tried to overcome by school administrators. A teacher (C1_PT3) emphasized that the School Principal endeavored much effort to keep high

motivation of the teachers for the usage of these technologies. The Assistant School Principal also said that

> *We (as school management) continuously motivated the teachers for the [usage of these technologies]. Now, our school principal followed regularly the teachers about how they were using them. He warned the teachers at teachers' council and he said that we must use these technologies because we had them. Also, he added that we were interesting with your problems about them and we informed to YEGITEK for the solution of them. (C1_SA1)* Q68

Despite these efforts of the school management to solve these problems, some teachers (N=4) declared that they did not apply to school management, because they could do for these problems were so limited. A teacher (C1_PT8) explained this situation as school management did not have enough resource and knowledge about the solution of these challenges like technical problems or lack of content.

Solutions of YEGITEK/MoNE

When the solutions of the challenges for the SCT at the first case school were examined, some of these problems during the usage of these technologies were eliminated by the efforts of authorities and project administrators at YEGITEK and MoNE. Generally, these efforts actualized when these authorities and project administrators visited the school. YEGITEK administrators explained that they met the teachers and the school administrators at the teachers' council and talked about the usage process and problems in this school. Also, they gave some questionnaire about the complaint, preference and expectations of the teachers for these technologies. In the data analysis processes, these surveys were also analyzed for answering the research questions. In addition to this, data obtained from the interviews and observations were utilized. According to results of the data, the efforts of the project administrators for eliminating the problems, might be grouped as for technic problems, for lack of content and for lack of training (Table 4.12).

Table 4.12 Sub-themes for the Solutions of YEGITEK/MoNE

Solutions of YEGITEK/MoNE	**Frequency of participants mentioned**
For technical problems	5
For lack of content	4
For lack of training	4

Firstly, in the first case school, the technologic problems were informed to the official people at YEGITEK when they visit to the school. An administrator (PM2) at YEGITEK stated that their personals took note the problems of the teachers while they were using the SCT and the solutions to these problems were discussed at YEGITEK. One of these solutions was expressed about the possible damages to the technologies caused by the students. A teacher said that

> *I told the officials of the YEGITEK that our students could easily touch the projector part of the smart board because the projection part of the smart board was mounted in low-level. In addition, I complained about the having to adjust frequently the calibration [of the smart board]. They said me that they noted this and they would search a way out for this challenge. (C1_T2)* Q69

In parallel to this, an administrator at YEGITEK also mentioned about eliminating this challenge as

> *Our officials visited [the first case school] in order to receiving the opinion and expectation of the teacher. They talked about the problems they encountered. According to these view, we rearrange the technologies we would establish at other schools. For example, we want to eliminate the calibration problem at new smart boards like PTIWB, because it does not include the projector component. (PM1)* Q70

The problems on the cable infrastructure were also informed to the YEGITEK by teachers and by school administrator as mentioned earlier. Administrators of the

YEGITEK were planning to make new arrangements for the infrastructure at school like more stable raceways for the internet connection and electricity cables. In addition, an administrator at YEGITEK stated that

> *We have a call center at our institution. I do not know whether you know it. We currently have a helpline as 'Alo YEGITEK' for helping teachers. I think that they will work intensely with the establishment of these technologies to all schools. We are planning that we increase the number of them. So, we can solve the problems of teachers about these technologies in that way. (PM1)* Q71

Although there were a call center for teachers, teachers were not aware of these call center and 3 teachers declared that it actually did not serve for these technologies.

Secondly, authorities at YEGITEK were also dealing with the lack of content for the SCT. Some teachers stated that we used some contents from website of the YEGITEK in order to compensate these deficiencies although these contents were not sufficient in number and in quality. Project administrators also specified that they uploaded the content of the private publishers to the website of YEGITEK. In addition, an administrator explained that

> *This school (the first case school) was our trial school for comparing and selecting which the technologies will be installed for later stages of the FATİH Project. Although we had provided some contents to the teachers by means of our website, companies of the smart board in this school have been supplying contents to the teachers in order to prove themselves for being selected as the technologies in the all schools. (PM1)* Q72

Lastly, other point for the efforts of YEGITEK or MoNE was for the lack of trainings of the teachers and the school administrators. Actually, there were not any planned and designed a special in-service training session in the first case school. Nevertheless, the authorities from YEGITEK gave short seminars for introducing the

FATİH Project and the SCT when they visited the first case school. A teacher mentioned that

> *Some officials at YEGITEK came to our school and they briefly told us the aim of the project and usage of the technologies but these trainings were insufficient. Also, they did not give any training except these seminars. (C1_PT4)* Q73

On the other hand, most of the teachers also declared that the problems like lack of content and training were not solved by YEGITEK or MoNE. A teacher asserted that

> *We stated our technical problems like cable problems or out of order technologies in the questionnaire and in the meeting with the project officials, but they (officials at YEGITEK) did not overcome these problems. Moreover, we demanded the content for these technologies, but they did not serve various animations or activities for the smart board. Instead of this, we used the pdf form of the textbook. In case of our training needs for the usage of the smart board, [the administrators of the] YEGITEK did not organized any adequate in-service trainings. (C1_M2)* Q74

To sum up, there were some attempts of the YEGITEK officials, most of the problems about the SCT stated by the teachers at the first case school were not compensated by YEGITEK.

Solutions of Private Publishers

Private publishers have been supplying various contents to the teachers alongside uploading their contents to the websites of the YEGITEK. Teachers and the school administrators indicated that some of the private publishers supplied various e-contents in their websites. A teacher explained that

> *Staffs of some private publishers came to our school in order to promote their products. They arranged a separate meeting for each course teachers and defined a user ID and a password for each*

teacher in these meetings. However, if students want to use these e-contents, they would have to buy a user ID and a password for them. So, the publishers have been trying to persuade the teacher for using their free e-contents. That is, we used these contents in order to compensate lack of content. (C1_PT8) Q75

In addition, some teachers expressed that they preferred the contents of the publishers suitable to the curriculum, although some teachers did not use these contents because of the discrepancy between the curriculum and e-contents of the private publishers.

Solutions of Authorized Companies' Services

The companies establishing only one or more technologies at first case school have been supplying various supports to the teacher about the some problems reported by teachers, school administrators or authorities at YEGITEK (N=6). The supports of authorized companies were grouped as shown in the Table 4.13.

Table 4.13 Sub-themes for the Solutions of Authorized Companies

Solutions of Authorized Companies	**Frequency of participants mentioned**
For technical problems	6
For lack of training	3
For lack of content	2

The first effort of these companies was technical support. Teachers and school administrators stated they received support from technical service of the SCT especially when they encountered a hardware problem on the SCT. For example, a teacher said that

A fault on the sensation of the smart board of my classroom occurred a few weeks ago. I firstly told this situation to the school management. Then, we call for the technical service of this smart board. Although they did not come in short time, they repaired it in the classroom (not

taking it to anywhere). But, we had not been able to utilize from it for a few weeks. (C1_S2) Q76

In addition, these companies separately gave introductory trainings for these technologies. Teachers (N=3) specified that technical staffs of the smart board companies in their classroom told the basic features and usage of these smart boards after they had established it. The authorized teacher (C1_PT10) stated that most of the teachers in their school could use them thanks to these brief trainings. However, even though, some teachers found it sufficient, most of the teachers declared that these short trainings did not eliminate their training needs for the usage of SCT.

As mentioned earlier, these companies also provided some e-contents in these smart boards. However, teachers were not pleased about these contents. They explained that there were only one or two example activities in the smart classroom and these were not enough in terms of the quality and quantity.

The other point expressed by a school administrator was that there were various technologies from lots of company and they did not get contact with these technologies. The communicating with various companies when a technical support was needed might cause confusion about which companies' technical service would solve the problem.

Getting Help from Students

Teachers were resorting to the aid of students in some situations when they came up against unexpected problems on the SCT. A teacher (C1_E3) stated that student was more knowledgeable about these technologies and there therefore they assisted them if a problem occurred on the smart board. Students' assistance for teachers to use of SCT were detailed by a teacher as

Students can use these technologies very easily. They wanted to interfere the problems about the technologies. Even, they could solve some problems of my projectors. Moreover, they could open the projector and connect the computer to projector before the lesson.

> *That is, the students prepared the technologies as ready for the lessons. So, we did not lose time for this in the lesson. (C1_MU1)* Q77

On the other hand, some teachers asserted that the intervention of students to the problems interested with SCT could cause some disadvantageous situations on account of classroom management.

Problems that could not Be Solved

When the teachers could not overcome the problems they encountered during the lesson, it was declared by the participants that the teachers might prefer different ways to continue the lesson. Most of the teachers (N=10) declared that they would switch to traditional teaching methods without using these technologies. Especially, this preference was presented by the teachers if a problem could not be solved in the classroom during the lesson. A teacher stated that

> *If we (as teachers) cannot overcome the problems on the smart board like the breakdown of touch sensation on the smart board screen or cable problems, we are continuing with our classical ways. That is, I immediately say the students that they would open that page at their textbook, and then I would solve an example question about the subject on the whiteboard. (C1_PT4)* Q78

As these teachers would say, some teachers expressed that they turn to printed materials like textbook or the activity on the paper (with photocopying the activity). In addition, 6 out of 18 participants explained the reason of proceeding traditional ways as they did not want to lose time while interesting the issue on the technologies.

When teachers encountered the lack of contents for the SCT, they change their activity in the lesson plan with another activity that does not require these technologies. For example, a teacher (C1_PT3) declared that she did not use these technologies if she did not find the contents such as an interactive activity, a video, animation or a digital presentation. The other teacher (C1_MU1) specified that he did not use these technologies and he closed the laptop and the projector so that the students did not see undesirable images on the screen. Namely, some teachers might

give up using these technologies if the challenges when they encountered during the lesson could not be eliminated easily. When the technical breakdowns were not resolved, some teachers might abort the activity requiring these technologies and they might finished the lesson in there was little time in the lesson in order to rearrange another classical activity.

Lastly, the majority of the teachers emphasized that they found no way out for the most of the challenges such as lack of content, technical problems on the hardware of the SCT, and lack of knowledge and skills about the SCT (especially for the smart boards). In these situations, they reported these challenges to the authorities about the SCT when they could not solve in the lessons.

4.1.1.5 The Needs to Overcome the Challenges and Problems While Using SCT in the First Case School

The problems and challenges the teachers encountered while they were using the SCT in the first case school were presented in the above. Although some of these problems and challenges were eliminated by teachers, students, school administrators, YEGITEK administrators and other stakeholders, there were some unsolved problems and challenges about the SCT. Various necessities to overcome these unsolved problems and challenges were specified by teachers in the first case school. In the interviews, school administrators and YEGITEK administrators also mentioned about the needs and requirements for the usage of the SCT in the schools. In addition, documents about these requirements like results of the surveys completed by teachers in the first case school were analyzed and some deficiencies were detected during the observations by the researcher. As the result of the data obtained from the interviews, observation and document analysis, 6 main themes with regard to the needs for the usage of the SCT were formed by the researcher. These themes and how many participants mentioned about them were presented in Table 4.14. They were (1) e-content, (2) in-service trainings, (3) computer teacher, (4) durable and regular technological infrastructure, (5) unproblematic Internet access, and (6) accessible and sufficient support by senior management.

Table 4.14 Themes for the Needs for the Usage of the SCT

Needs for the usage of the SCT	Frequency of participants mentioned
E-content	13
In-service trainings	12
Computer teacher	9
Durable and regular technological infrastructure	8
Unproblematic Internet access	5
Accessible and sufficient support by senior management	5

E-content

To utilize the SCT in the first case school, majority of the teachers (N=13) mentioned about their e-content demands. Various points for the demanded e-contents were declared by these teachers as more e-contents, qualified e-contents, e-contents for each course and a system supplying e-contents to the users of SCT (See Table 4.15).

Table 4.15 Sub-themes for the Desired E-contents

Desired e-contents	Frequency of participants mentioned
More e-contents (in number and variety)	8
Quality of e-contents	6
Academic proficiency of the e-contents	3
Types of the e-contents	3
Suitable e-contents to the SCT established	3
E-contents for each course	3
E-content supplying and tracking system (website)	2

Firstly, half of the teachers (N=8) wanted the greater number and variety of e-contents. Some teachers specified that more contents should be ensured by [more] various sources like various private publishers. At this point, an authority at YEGITEK declared they would present e-contents of various private publishers from their web site. On the other hand, a few teachers (a Math Teacher and a Turkish Teacher) explained that the administrators should supply at least the electronic version of the textbooks, because they had to scan all pages of the textbooks if they utilize these technologies.

The second point about the contents desired by teachers was the quality of e-contents. The quality theme comprised of the academic proficiency of the content, types of the e-contents and the contents' adequacy to the established technologies in the classrooms. For the academic proficiency, teachers declared that they needed properly prepared electronic materials in order to use with these technologies. A teacher stated "*we had some activities but these were not prepared well and I did not use these activities and the smart board because of these inadequate contents*" (C1_PT12). They desired the contents including enough information about their courses. In addition, some teachers specified that types of the e-contents were insufficient for the usage in some courses. For example, the Social Studies Teacher explained this as

> *The provided contents for the History subjects were not sufficient for our students. Because, they were only a few simple videos and digital version of our textbook. We used some of these, but then our students were bored. Instead of this, YEGITEK[/MoNE] may send more qualified videos or animations about the History subjects. For instance, when I taught 'the conquest of Istanbul', I want to use interactive animation maps. So, I can show how and where the armies came from on these interactive animation maps and the students can easily interpret in their minds how the war occurred. Yes, we want more suitable types of contents to the some specific subjects. (C1_SS1)* Q79

Although administrators at YEGITEK asserted they were supplying enough contents (like electronic version of the textbooks), the teachers were seeking different type contents in order to integrate students to the subjects. The other issue about the quality of the demanded e-contents was the contents' adequacy to the established technology in the classrooms. Some teachers specified that the e-contents of YEGITEK and private publishers were not prepared for the usage at classroom with students. A teacher stated that

> *We have got the smart board in my classroom, but we do not have suitable e-contents for using with these smart boards. That is, we can use only some [drill and practice] activities. These activities were prepared for the usage of students on their own computer at their home. When we want to use them, students may be bored. Because, these contents were not appropriate for using in the classroom. Instead of these e-contents, we want e-contents prepared specially for the smart boards. Also, these contents should be used easily with children in the classroom. (C1_PT8)* Q80

YEGITEK administrators were not mentioned about the special e-contents for these technologies. They stated that they were getting most of the private publishers' e-contents in the market and they would present them to students and teachers so that they used them in the classrooms and their home.

The third point for the e-content demands was the contents for the each course and each subject. Some teachers (like Music and Scripture teachers) were requesting e-contents for their courses in order to utilize the SCT. The Music Teacher expressed that there should be various package contents for each course specially prepared and he emphasized that these packages should be for the Music course.

In addition to these, there were some interesting demands about the e-contents. Four teachers stated that there should be a website or software tracking and they could learn easily which content were used before and which subjects on the syllabus were taught. They wanted to follow easily which subject and activity were used in each class. Because, they said that they might be confused whether they used an e-content in a class. The other request was that the e-contents should be prepared or checked by MoNE. A teacher persistently demanded this as

> *I think, MoNE should develop the contents for these technologies. Because, I did not want to worry about the content I used. That is, I searched on the internet to find activities about the songs. Some websites could include undesirable words or images for the students.*

So, I worried about whether we encountered such an unsuitable image on these websites. Instead of this, If MoNE could supply enough e-contents, I would not have to concern with this. (C1_MU1) Q81

Lastly, a teacher demanded that teacher could reach the e-contents from their computer as offline instead of online. He specified that

We could not have the Internet access out of the school and there could sometimes be disconnections on the Internet connection in the classrooms. For that reason, we could not download the activities from the Internet when we needed them. Here, we could use the activities at such situations if we could reach them as offline. (C1_PT8) Q82

Consequently, not only the greater number and variety e-contents, but also specially prepared contents for these technologies were required.

In-Service Trainings

To use the SCT effectively and efficiently, trainings of the users might play a major role, because the teachers and school administrators in the first case school and project administrators at YEGITEK emphasized that teachers needed the knowledge and skills for using these technologies in the educational environments. Most of them also specified they needed the training about the SCT in order to overcome the problems and challenges while using them in the classrooms. 12 out of 18 participants demanded the in-service trainings for the teachers in the first case school. They also mentioned qualifications of these trainings as time, content, structure and location of the in-service trainings as shown in Table 4.16.

Table 4.16 Sub-themes for the In-service Training Demand

Qualifications of in-service training demanded	**Frequency of participants mentioned**
Structure and location	9
Duration (Time)	4
Content	4

Structure and Location of the Trainings

Majority of teachers (N=9) in the first case school requested well-designed in-service trainings and they mentioned about the structure of in-service trainings. These were separate trainings for teachers in different areas, in-service trainings in teachers' own school, in-service trainings at abroad for computer teachers.

Firstly, in the first case school, only introductory seminars were given to the teachers in their classrooms. However, project administrators were planning the in-service trainings at different locations like at education center or at Provincial Directorate of MoNE. The planned in-service training might be continued five days and it was prepared especially for these technologies. Although, the administrators at YEGITEK were planning the same content for all teachers, some teachers at first case school declared that there should be separate trainings for each course's teachers. A teacher stated that

> *We as Turkish teachers could attend a separate training program including some usage examples for the specific practice of these technologies at Turkish lessons. They could show us example Turkish lessons in which the smart board was used with students. Like this, there could be different training programs for each course. (C1_T2)* Q83

In addition, a school administrator and a few teachers recommend that the in-service trainings might be at school of the teachers and they added that these trainings should not have a classical seminar structure. It was also asserted that organizing the in-service training at schools of the teachers might supply time savings. Because, teachers could attend the in-service trainings according to their timetable at the school. Another teacher (C1_PT11) also said that the teachers having enough knowledge and skills could train the other teachers in his/her school. Lastly, there was also an extreme request by the authorized teacher in the first case school as

> *Actually, these technologies are used successfully at the some foreign countries. In that manner, some teachers from each school may be*

taken abroad so that they could see how these technologies are used effectively and efficiently at the schools and then they can teach other teachers in their school how these technologies used adequately. I think that, this could be very profitable for our teachers from the point of learning the example usage of these technologies. (C1_PT10) Q84

To sum up, the teachers and school administrators were requesting effective and efficient in-service training programs having special structure for the usage of the SCT at their own school.

The Duration of the Trainings

It was mentioned above that the teachers had received short trainings from the technicians of the technology's company (the smart board firm). They explained that these trainings were insufficient in many ways such as time and content. For example, a teacher stated that

Each teacher in our school attended the trainings of the company having the technology in their classroom. Actually, these trainings were only introductory seminars including basic usage of the technologies. However, authorities should arrange long-term trainings so that we could easily use them in our lessons. (C1_E2) Q85

On the other hand, an administrator at YEĞİTEK explained that they were planning in-service trainings about the usage of these technologies for five days.

The Content of the Trainings

The contents of the trainings demanded by teachers were also discussed by participants. The most commonly mentioned point for the content of the in-service trainings was practice-based trainings especially for the smart boards. Some of the teachers stated that the smart boards were new for them and they did not know how to use them in their lessons. Also, a school administrator (C1_SA2) specified that there should be practice-based in-service trainings intended for the usage of these

technologies, instead of introductory seminars. A teacher clarified the practice-based in-service trainings as

> *Although [YEGITEK] gave us these technologies, we (as the teachers) did not know how to use them in the classroom. That is, even though we know how to invoke these technologies and their properties, we did not know how we could integrate them to our courses. In the in-service trainings, they may train us in order to use them in a special subject with a special ways. We could see how these technologies could be used for some subjects. They may show some example usage for each course. (C1_T2)* Q86

In parallel with this, a school administrator stated that

> *Yes, there should be in-service trainings for the teachers, but these trainings should not be with the logic of classical training seminars. We did not believe that the classical seminars were useful. Instead, these trainings should be practice-based. That is, they should not include the benefits of these technologies. Instead of this, they would provide some usage examples of these technologies. They could guide teachers to use them in their lessons. (C1_SA1)* Q87

In addition, a few teachers indicated that the in-service trainings should include usage and introduction of the e-contents provided by YEGITEK/MoNE. They wanted to know how they could use these e-contents with students in a lesson. It was also declared that they should learn the solutions of the some technical problems for the technologies. For instance, a teacher (C1_E3) wanted to know how to set the brightness of the screen and how to adjust the calibration of the smart board.

On the other hand, YEGITEK administrators stated that they were planning an in-service training program for the teachers including the usage of the technologies and solutions to the problems for these technologies.

Computer Teacher

One of the mostly mentioned deficiencies in the first case school was the lack of a computer teacher for helping the other teachers and school administrators. Hereof, half of the participants demanded that a computer teacher should be assigned to first case school by MoNE. For instance, a teacher explained the computer teacher demand as

> *At least, there might be an officer [a computer teacher] interesting with us while we were using the computer and the smart board. I think, the administrators should say that s/he could deal with all of your technological problems and he might be entitled to solve the problems at these technologies. That is, there should be at employee at each school having the technologies. We could take information about these technologies if we need or s/he could organize seminars or trainings about them for us. (C1_PT12)* Q88

Moreover, school administrators stated that although they reported the request for the computer teacher, this request was not met by MoNE until end of the semester.

Durable and Regular Technological Infrastructure

In the first case school, there were also some demands on the technological infrastructure in the classrooms and at school. Firstly, teachers emphasized that these technologies were established sturdier so that the students could harm. School administrators also specified the though establishment of the SCT in the classroom for the students' actions. For example, a teacher (C1_TD1) proposed that the projections could be mounted higher so that student could not disrupt the calibration adjustment of the projections. Additionally, some teachers wanted the stable establishments of the SCT at classrooms so as to not lose time while preparing them for using in the classrooms. They also stated another reason for the fixed technologies in the classrooms as not deformation of the connection parts. A teacher explained that

The connection parts on the wall could be damaged when we plug and unplug the cables on them again and again. For that reason, they should be established as stable at classroom. (C1_PT11) Q89

Including all of the above reasons, there was also a suggestion of a teacher as PTIWB might be installed at all of the classrooms. The authorized teacher at first case school explained that the damages on the connection ports and calibration adjustments could decrease if there were PTIWB at all classrooms. In addition, he added that teachers would not lose their time to prepare the technologies for using.

Additionally, the Music Teacher stated that administrator at YEGITEK should consider the properties of the each course while they were planning the establishment of these technologies such as acoustics arrangements for the music classroom. This teacher also expressed that there should be a printer at each classroom.

The other demand for the technological infrastructure at the first case school was the preventing power outages. Teachers meant that the power failure (interruptions in electricity) stopped their usage and necessary arrangements should be made in electrical infrastructure.

Lastly, corresponding with demands for the technological infrastructure, two teachers (C1_E2 and C1_PT10) stated that there should be a technician at their school so as to dealing with problems on the technical infrastructure and compensating the teachers' requests. They also specified that this technician should be at school constantly, not being partly.

Unproblematic Internet Access

There were also requirements for the Internet access by five participants in the first case school. These demands were about the speed, restriction and connection of the Internet as seen in Table 4.17.

Table 4.17 Sub-themes for the Unproblematic Internet Access

Qualifications of the Internet access in the school	**Frequency of participants mentioned**
Speed	3
Restriction (filter on the Internet access)	3
Uninterrupted the Internet connection	3

Firstly, the teachers wanted faster internet connection at their classrooms in order to utilize the animations and videos in the websites. A Music Teacher specified that

> *When I want to download some songs from the Internet, sometimes, even downloading only a song could take too much time. For that reason, the speed of the Internet in the classrooms should be increased. (C1_MU1)* Q90

Secondly, the other demand for the Internet connection was about the restriction on the Internet connection. The Assistant School Principal (C1_SA1) stated that there should be a filtration for the internet connection at schools in order to prevent to reach unsuitable images or contents. In parallel with this, a few teachers indicated that if there was the restriction on the Internet connection, they could not encounter various classroom management problems wherefore seeing unsuitable images on the screen. Therefore, they were demanding some restrictions on the Internet access.

Thirdly, interruptions in the Internet connection were mentioned by the some participants as problematic and they wanted the regular and uninterrupted Internet connection at the first case school. A teacher explained that

> *In the one of my lessons, when we were watching a video about the topic, the Internet connection was suddenly severed and I did not know what I could do at that moment. These situations might prevent usage of the laptops and projectors in my lesson. For that reason, the regular internet access should be provided by MoNE, if they wanted these technologies were used. (C1_PT4)* Q91

On the other hand, a few teachers specified that the Internet access should be supplied to the teachers and students at their home in order that the SCT could be used effectively and efficiently at educational processes. Authorized teacher mentioned about this as

> *I think, there must be the Internet access at every students' and teachers' home. In fact, it must be at every home. If this could happen, these technologies will be used more influential. There are some personal projects in my mind. However, we have to use the Internet at students' home. For example, we may use the e-contents of some private publishers and I can assign the homework to the students so that they can do it at their home. Therefore, I can track the how they accomplish the homework from my home. For that reason, all teachers and students can reach the internet at their home. (C1_PT10)* Q92

Another teacher also suggested that free internet access could be provided to all students and teachers by MoNE and he added this access could be quoted.

Accessible and Sufficient Support by Senior Management

The teachers and the school administrators at the first case school had some additional requests from the YEGITE/MoNE. Firstly, four teachers mentioned that there should be regular support ways for the teachers and school administrators. It was mentioned above that officers of YEGITEK had visited the first case school throughout the last two semesters and they applied some surveys to teachers in order to investigate the usage of the SCT and problems about them. However, two teachers declared that they did not know whether the YEGITEK administrators took into consideration the results of these surveys. Because, they asserted that they did not get any feedback for their requests at these surveys. For instance, an English Teacher said that

> *In the survey of YEGITEK, I actually mentioned about the cable problem in my classroom, but there were not any action by YEGITEK*

for the change of the cables and ports, as you see. That is, I recommended that project administrators should be interested with our demands in their surveys and they should support us in order to solve our problems. (C1_E2) Q93

Besides, some teachers emphasized that the administrators of YEGITEK should conduct extra researches for detecting the needs of the teachers and school administrators. In addition, the authorized teacher (C1_PT10) at the first case school stated that there should be a technician or an officer in the school so that s/he could be interested teachers' and school administrators problems and s/he could inform the YEGITEK when any support needed.

Secondly, three teachers stated that curriculums should be rearranged according to these technologies. They specified that it should be determined how and when the SCT could be used in their lesson. Because, they mentioned that they had difficulties while using them in their lessons and they did not know how they were utilized in specific subjects. Lastly, teachers need more supports from YEGITEK in order to integrate the SCT into their courses and lessons.

4.1.2 Second Case School

The second case school of the study was a high school in Çankaya, Ankara, TURKEY. It had 9th to 12th grades. This school was another pilot school of the FATİH Project having PTIWB and wired internet connections in the classrooms. Actually, there were two education programs in the school. That is, there were general high school students at10th grade to 12th grade) and Anatolian high school students at 9th grades. The difference between these two programs might be explained as 9th grades students of Anatolian high school take more English courses (foreign language course) than students of general high school. In addition, the students of Anatolian high school were selected according to results of an exam conducted by MoNE. Location of the school was in the center of the city and students of the school were generally from middle socio-economic status. The school consisted of two buildings and they were built 1955. The school had 36 classrooms, 1 computer lab, 1 physic lab, 1 chemistry lab, 1 biology lab, 1 library, 1 auditorium

and 1 sports hall. There were 1080 students at 2011-2012 academic year in the school. On the contrary to first case school, one-session teaching was applied in this school. While courses for the students of Anatolian high school starts at 8 am and finishes at 3 pm on weekdays, courses for the students of general high school starts at 8 am but finishes at 1 pm on weekdays. In addition, although there was a different classroom system structure at the first case school (there were separately classrooms for each course like Math classroom of English classroom), there were classic classroom structure at the second case school as general classroom system in the schools at Turkey. That is, all of the students had a classroom and they attended the courses at this classroom even if the course were different from others.

4.1.2.1 Smart Classroom Technologies in the Second Case School

It was mentioned before that the first case school of this study was the first pilot school of MEOIT Project (FATIH Project) and YEGITEK administrators stated that they tried the different brand and model technologies (like projectors and different smart board types) in order to determine which technologies would be established at other schools in Turkey. An administrator at YEGITEK declared that the PTIWB was determined as the technology of the FATİH Project instead of the projectors or other smart boards. For that reason, there was a PTIWB in the each classroom, in the labs, and in the staff room. That is, there were 41 PTIWB and 2 printers in the second case school as seen in the Table 4.18.

Table 4.18 Numbers of the Smart Classroom Technologies in the second case school

Smart Classroom Technologies	Number
Panel Type of Interactive Whiteboard (PTIWB)	41
Printers	2

Actually, the PTIWB is a LCD screen smart board and there was a computer inside it. That is, it could be used as a touch computer on the wall (Figure 4.1). The teachers of second case school did not have laptop computers, because they could use PTIWB as computers in the classrooms. These smart boards (PTIWB) also include the whiteboard and blackboard parts. Therefore, they could be used according to teachers' preference about what technology they used as electronic touch board,

whiteboard or blackboard. The PTIWBs were also connected to the Internet with wired connections. In addition these smart boards, there were also two multi-functioned printer in the staff room and assistant principal's room of the second case school.

Figure 4.1 The Panel Type Interactive Whiteboard (MEB, 2014)

Unlike for the first case school, YEGITEK/MoNE formed a web portal named as 'www.eba.gov.tr' (EBA) to the teachers and students in order to provide e-contents for these technologies in 2012. For that reason, this website and e-contents in it were accepted as a SCT at this study for the second case school. The name of this website (EBA) consisted of abbreviation of Education Information Network in Turkish (Eğitim Bilişim Ağı). This portal included various e-contents (like videos, animations, electronic textbooks and enriched books) developed by MoNE, private

publishers and teachers. It consisted of 8 parts as News, e-content, e-magazine, e-book, videos, sounds, visuals, and discuss forum. In addition to these, there were some connections like content development tools, EBA Blog, EBA File Sharing System EBA Source, and EBA Courses. Throughout the data collection process (April 2011 to March 2013), the number and variety of e-contents at EBA have been increasing day by day. That is, it has a dynamic structure, because teachers and other stakeholders can upload various e-contents to EBA.

4.1.2.2 General Usage of SCT in the Second Case School

Firstly, the usage of the PTIWB, the Internet, and EBA will be mentioned separately in this part. After that, the usage of these SCT in the second case school will be presented in the light of the usage purposes and the usage rates of the SCT according to analysis of the findings obtained from observations, interviews and document analysis.

General Usage of the SCT in the Second Case School

While presenting the general usage of the SCT in the classrooms, usages of the different SCT will be described separately and some usage examples of them will be mentioned. Firstly, usage of the PTIWB will be described and then usage of the internet connection in the classrooms will be presented. Lastly, some basic usage of the contents at the EBA portal will be introduced in this section.

Usage of PTIWB and Smart Board Software

In the second case school, the PTIWB were established by YEGITEK at the all of the classroom, labs and even at the staff room. For that reason, all teachers had same opportunities unlike the teachers in the first case school. In addition, YEGITEK supplied a special software for each PTIWB (StarBoard) in the second case school. This smart board software (SB software) included the interactivity property for the usage of PTIWB. Most of the teachers (N=10) in the second case school stated that they run the SB software at least one time. 4 out of these 10 teachers declared that they used the contents in it like images, photos and maps. A Geography teacher said that

> *I may say that I utilize the smart board and [SB software] in my lessons. I teach my lessons on it. For example, I can show maps from the gallery of the SB software [on the PTIWB]. Because, I can reach lots of maps about the topic of our subjects, although I could bring physically (on paper) only 1 or 2 maps. That is, I can show which maps I want to show my students. (C2_G2)* Q94

Some teachers stated that they utilized the SB software transferring the contents on the PTIWB and drawing and writing on it and making changes on the contents. Additionally, a teacher expressed that *"I took advantage of the PTIWB making changes on the content by aid of the SB software"* (C2_C1). There were also the other usages of the PTIWB that teachers could reach the contents on the PTIWB even if they deleted the contents.

On the other hand, only three out of 15 teachers expressed that they never used this interactive software (SB software) on the PTIWB in their lessons. The common feature of these three teachers was that their ages were at the 51-65 age interval. In addition, these teachers asserted that students could learn the subjects of their lessons if teachers used the chalk on the blackboard and if students wrote on their notebook or on paper with pencil.

Besides, the PTIWB were used mostly by the teachers as a projector in their lessons. In the observations, it was determined that more than half of the teachers (N=12) run the PTIWB when they want to show a presentation or a video to students. Two teachers explained that

> *Generally, I used the smart board [PTIWB] as a projector. I open my presentations on it and then we were following the pages of the presentations on it. When I need to write a drawing, I wrote my drawings on the whiteboard beside of the smart board. I used the SB software of it only when I want to show available pictures or images. (C2_P1)* Q95

> *Now, I used the technologies at the 9th and 10th grades. How do I use them? I mean, I used a software for the opening my presentations. Its name is 'Libreoffice'. I was presenting subject to students with the aid of this software. In the last weeks, I taught two subjects on the [PTIWB]. I might be easier for us. However, if any drawing on it was necessary, I would draw on the white board. Because, the SB software was difficult to prepare the contents for the usage. (C2_G2)* Q96

Also, the Computer Teacher (C2_SAFT1) of the school declared that some teachers having difficulties to use the SB software and interactivity feature of the PTIWB used them as only projectors.

In addition, only a teacher stated that *"I used the smart board (PTIWB) like a computer, because it was same of the computer"* (C2_H1). She emphasized that she could make most of the operations (like searching on the Internet, presenting a subject, opening a video, writing and drawing) with it in the classrooms.

For the English courses of 9th grades students, an e-content package of a private publisher were loaded by the Computer Teacher of the second case school and these e-contents were used by English course teachers. The Computer Teacher said that

> *These e-contents were supplied by a company (the private publisher) and they were suitable to the PTIWB. That is, these e-contents contained various interactive activities, listening activities, songs and example questions. I upload the package of these contents to the each PTIWB in the classrooms and English teachers are using them in their lessons (C2_SAFT1).* Q97

Moreover, there was an interesting usage of the PTIWB in the second case school. A Math Teacher had his own laptop computer and he connected his computer to the PTIWB. So, he could control the PTIWB from his computer and he could show the contents he prepared on his computer in advance. In this situation, the PTIWB could be used as the second monitor or projector of the computer, again.

The connection ports of the PTIWB were used by some teachers in the second case school. It could be used as a monitor of a computer wit aid of HDMI or VGA connection ports like at the previous part. In addition, USB connection ports of the PTIWB could be used so that teachers might transfer the contents they found or prepared. The Computer Teacher specified that some of the teachers utilized the connection ports of the smart boards for these aims.

Usage of the Internet

In the second case school, there were also wired-internet connections in the all classrooms. The PTIWB at the each classroom connected toughly to the wired-internet connection ports on the wall. Teachers specified that they used the Internet connections while they were reaching the contents. The main usage of the Internet connection might be accepted for reaching to EBA. Usage of the EBA will be explained at the next section. The other usage of the Internet was declared by some teachers (N=6) as they connected to the internet when they suddenly need to information about the subject. For instance, a teacher explained that

> *In fact, the Internet was a window for us to engage to the world from the classroom. When we were lecturing, we could reach to any information or image what we want. For example, I was talking about the geography of a country; we could find lots of information about that country from the Internet. Furthermore, we can open the maps of that country on the maps of some websites 'like Google Maps'. Most of the time, I utilized from the 'Google Maps'. (C2_G2)* Q98

In the observation, it was sighted that teachers profited by the Internet when they need the additional knowledge about the subject.

Usage of the EBA

In the second case school, there was a different application of the YEGITEK for providing various e-contents to the teachers and students. As mentioned before, this was a website named as 'www.eba.gov.tr' and its name consisted of the abbreviation of Education Information Network (Eğitim Bilişim Ağı – EBA). EBA contained

various e-contents of MoNE, the private publishers, and teachers. The types of the e-contents might be listed as videos, visuals, sounds, e-books, e-journals, maps and news forums. EBA had a dynamic structure and e-contents in it have been increasing day by day. Eight teachers in the second case school declared that they used at least one e-content at the EBA. While some teachers used the various contents of the private publishers, most of the teachers were following digital format of the textbooks in their lessons. A Biology Teacher stated that *"we used the only textbook at EBA, because some of our teachers did not bring their textbook"* (C2_B1). On the other hand, a Turkish Literature Teacher expressed that

> *I opened the contents at EBA which were suitable to the curriculum. For example, when we were mentioned about a writer and his/her works, I searched about the books of this writer. If I found a book of him in the e-books at EBA, we could read some from that book on the board (PTIWB). That is, I can say that I took advantage of the contents at the EBA when we need to find assistant source about the topic. (C2_T1)* Q99

Videos were also mostly used e-contents at the EBA website. In the observations, various videos were watched by the students in the Biology, Philosophy, History, Chemistry and Turkish Literature courses (Obs43, Obs44, Obs45, Obs50, and Obs53). In addition, Computer Teacher of the second case school specified that videos about the Historical events were used mostly in the History lessons. As other contents used at the EBA, the maps were frequently mentioned by History and Geography teachers. A Geography Teacher stated that

> *There are lots of maps at the EBA website. We selected them according to our subject and then we showed them in the lessons. Furthermore, I can say that there were various maps in the Geography lesson more than we need. (C2_G2)* Q100

In addition, Geography teachers explained that there were some shapes and animations about the geographic events and they utilized them in their lesson.

However, usage of these animations was not observed in the Geography lessons. It was also observed that a Chemistry Teacher solved the questions of private publishers from the EBA in her lessons (Obs50).

On the other hand, the Computer Teacher and a few teachers emphasized that although there were lots of e-contents at the EBA, most of these contents were not used by teacher because of the classification problems of these contents. These problems will be mentioned at the next sections.

Up to this point, general usage pattern of the SCT in the second case school were explained. In the observations, it was observed that most of the teachers and students were using SCT at different usage rate for different aims. Now, for what purposes the SCT were used and how long the usage rate of the SCT were in the second case school will be presented in the next two parts.

Usage Purposes of the SCT in the Second Case School

In the second case school, SCT (PTIWB, Internet access, and EBA) were used for different aims by different teachers and students. In the data analysis process, themes and sub-themes were formed as seen in Table 4.19. The usage purposes of the SCT in the second case school might be listed as (1) to use audiovisual materials, (2) to motivate students, (3) to reach the contents, (4) to use time efficiently, (5) to repeat what was learned (Repetition), (6) to activate students in class, (7) to prepare for the course, (8) to use the digital version of the textbooks, (9) to teach abstract concepts to students, (10) to save paper, and (11) to relieve the students. These themes and sub-themes for each theme will be explained in detail.

Table 4.19 Themes for the Usage Purposes of the SCT in the Second Case School

Usage Purposes of SCT	**Frequency of participants mentioned**
To use audiovisual materials	13
To motivate students	10
To reach the contents	8
To use time efficiently	5
To repeat what was learned (Repetition)	5
To activate students in class	4
To prepare for the course	3
To use the digital version of the textbooks	2
To teach abstract concepts to students	2
To save paper	2
To relieve the students	1

To Use Audiovisual Materials

As mentioned earlier, PTIWB were used in order to project various audiovisual contents. In the observations, almost all teachers running the PTIWB used it like a projector. The School Principal and the Computer Teacher emphasized that teachers generally used the smart board in this way. For example, the School Principal stated that *"Biology teachers in our school used these technologies for reflecting the figure of the subjects such as cell of a plant or skeletal system and they explained the subject showing on these items"* (C2_SA1). In addition, History and Geography teachers profited by the PTIWB for showing maps in their lessons. A History Teacher said that

> *I had searched the presentations on the Internet about the topics at my curriculum. There was a few website I trusted and these websites had well prepared presentations about most of the topics. I downloaded them at my home and brought them to the classroom with my USB memory. Sometimes, I tell the subject showing these presentations [on the PTIWB]. (C2_H1)* Q101

Also, a Geography Teacher stated that

> *In Geography courses, visuals and drawings were used frequently. For example, we drew a basic shape of the Earth and students could easily see continents on it. In the 10th grades, there was a topic named as 'the distribution of soil types in the world'. If I drew a map or figure for this topic on the whiteboard and if I wanted to indicate the types of the soils with a whiteboard pen (a boardmarker), students could not recognize adequately the meaning of the shapes I emphasized. Nevertheless, we can use prepared shapes of the SB software and I can easily emphasize the important points with different writing and drawing tools [on the PTIWB]. (C2_G2)* Q102

Additionally, teachers used these technologies for watching videos and animations with students on the PTIWB. It was observed that the PTIWB were used as a projector showing some educational films in the Philosophy, Turkish Literature, History, Geography, English and Physic courses. Lastly, English Teachers expressed that they utilized the SCT for listening activities in their lessons.

To Motivate Students

Motivating the students for better learning was declared by 10 teachers as another purpose of the SCT usage. Almost all of these 10 teachers explained that they took advantage of audiovisual materials so as to motivate their students for better understanding of the topics. They explained that they might show a picture, an animation or a video while they were starting to the lesson. For instance, the Philosophy Teacher (who was also the Computer teacher of the second case school) clarified that

> *At the beginning of the lesson, I might open interesting and funny caricature on the smart board [PTIWB] in order to get students' attention. These caricatures were generally interested in our subjects. I asked some leading questions and we talked about the occasion on the board. Then, I pass to the subject. Furthermore, I sometimes show*

a short video film to influence students for making a connection with the topic. (C2_SAFT1) Q103

In addition, a Turkish Literature Teacher mentioned his usage purpose for attracting students as

If we supported our lecture with the visuality on the [PTIWB], the lesson could be very fluent course and the participation of the students could be very high level. Because, an image or a point on the material on the board might attract the attention of students. They might say that it was good that s/he saw this picture because s/he did not know about the writer. So, students might wonder about the writer they saw her/his picture. For example, there was cover of the old books at the EBA. If we showed the cover of the book, students could be interested in what there were in the book. You also saw an example of this in the lesson you observed. (C2_T1) Q104

In the lesson the teacher mentioned about, the subject was 'Tanzimat Fermanı' (Series of Refforms in the Ottoman Empire) for 11th grade students. The teachers showed the photographs of the locations where the reforms actualized at. When the students saw those photographs, they asked about some question about the subject and the photographs. Then, the teacher (C2_T1) explained in detail how the 'Tanzimat Fermanı' actualized in the history (Obs42).

To Reach to Contents

Reaching contents for the lesson were also stated by participants (N=8) in the second case school as a purpose of their SCT usage. Especially, the EBA were utilized for obtaining required contents while using the PTIWB in the courses. These eight teachers declared that they could obtain some e-contents like activities, videos, animations and books from the EBA. For instance, the Computer Teacher of the second case school explained that

Some of teachers in our school looked to EBA in order to reach required contents for their usage [of the SCT]. For instance,

> *Geography, History and Chemistry teachers in the school could download lots of e-contents they liked and had stocked these e-contents in their USB memories. As far as my observations, they download maps and various videos about their subjects. So, I can say that they made use of EBA while they were reaching the contents. (C2_SAFT1)* Q105

Five teachers also indicated that they utilized the PTIWB and the Internet access in the classroom when they needed instantly information about the subject of the lesson. For example, a Turkish Literature Teacher explained that

> *When we were analyzing a literary text in the Turkish Literature course, we sometimes meet unknown words in the old texts. In such cases, we could reach the dictionary of different websites and we might learn the meaning of those words. (C2_T2)* Q106

The other Turkish Literature Teacher (C2_T1) also stated that he find information about the writers and their work on the various websites when students wondered about them. Therefore, he could answer the questions of the students even if he did not have enough knowledge about the writers. Additionally, a Physic Teacher (C2_P1) said that she used these technologies in order to find extra practice questions about the topic when they need to solve more questions.

To Use Time Efficiently

In the second case school, 5 out of 15 teachers mentioned about their aim as saving time in their lessons. These teachers emphasized that using the e-contents at the EBA with PTIWB could provide them extra time for showing more example in their lessons. A teacher stated that

> *If I mention about the time in a lesson, I could dispose better the 40 minutes lesson time when I would teach with the technologies. Because there was a something in the last year that I could solve only the evaluation questions in our lesson's time after I told the subject to the students. On the other hand, in this year, I could not only talk*

> *about the subject and solve the evaluation problems, but we could solve extra questions in the additional sources [at EBA]. That is, I may say that I can show more questions in the same interval of time. (C2_C1)* Q107

In addition, the Computer Teacher (C2_SAFT1) and Assistant Principal (C2_SA2) of the second case school expressed that most of the teachers could finish easier the subjects in their curriculum throughout this year.

On the other hand, there were other 5 teachers emphasized that using these technologies could cause time loss and they did not finish all subjects in the curriculum until end of the semester. A teacher asserted that

> *To tell the truth, we already finished the subjects in our curriculum at the existing condition (without the SCT). Now, if we try to use these technologies, we would not allocate time to open the smart board during a lesson time. That is, we could lose time if we use them in the lessons. (C1_B1)* Q108

To Repeat What was Learned (Repetition)

5 out of 15 teachers indicated the repeating the subject to the students as another usage purpose for the SCT. These teachers generally made use of practice questions of the e-sources at the EBA. A teacher stated that

> *As you observed in my classroom, last week before the exam, I have repeated the topics covered until that day solving practice questions at the EBA (instead of telling again the topics). At this point, we might use the lots of the questions of the private publishers at the EBA. So, we could easily retrace what I had lectured. (C2_C1)* Q109

The other teacher explained her usage purpose for the repeating topics as

> *When I need to repeat the subjects, I searched on the Internet in order to find e-contents (such as presentations, images and short topics summary). If I repeat the topics quickly, I investigated the webpages*

on the Internet (suggested by MoNE as suitable for our students) at my home before the lesson. Then, we would follow these e-contents with students in the classroom to repeat our topics. (C2_H1) Q110

Additionally, a property of the PTIWB and SB software was declared by teachers while they were repeating the topics in their courses. This property was accessing to contents again after showing them on the board. That is, the SB software could save the e-contents, writings and drawings of the teachers, and then teachers might re-show them even if they deleted or passes these contents in the lessons. Two teachers mentioned about these feature while they were repeating the topics

Sometime, our students might say that they did not understand the subject I explained. At that times like that, I opened the previous pages on my presentation with the aid of [SB software] and I explained again the topic them. After that, I would continue to my presentation from the last point I mentioned. So, I could easily repeat the concept in my lessons using these technologies. Moreover, if I draw any thing on the board, we could re-show these images even if we deleted them and drew other things instead of these images. (C1_G2) Q111

We could save and pass the pages on the SB software when there was not any empty space [on the PTIWB]. When we wanted to turn back and open these pages, we could easily open what page we wanted to show to the students on the smart board. However, on the white board, we could not show our writing and drawings after deleted them and writing other things. For that reason, I have taken advantage of the smart board when I want to reshow things (my writings) on the [PTIWB] again and again. (C2_T1) Q112

To Activate Students in Class

The other usage purpose of the SCT by teachers was emerged as to activate students at the end of the data analysis. 4 teachers specified that they used the PTIWB and

contents at the EBA so that their students could participate in the activities for better learning. The Computer Teacher emphasized that if she used these technologies with her students during the lesson, the students could interact with the content for querying about the subject and for researching more knowledge to better learning. In addition, a teacher stated that

> *When I open an activity from the EBA in my lessons (especially in the Turkish grammar issues), I encourage students to use actively the [PTIWB]. After I told the theoretical part of the subject, I asked practice questions in the activities and students could solve the questions on the smart board touching the board themselves. Therefore, students could see whether their answers were true or false and get feedback suddenly [from the PTIWB]. (C2_T1)* Q113

As a result, the interesting point for the purpose of the teachers using the SCT for activating students in the class might be summarized as to provide better learning of the students in their lessons using actively the SCT.

To Prepare for the Course

3 teachers declared that they took advantage of the SCT while they were preparing the content of their courses. They emphasized that they could reach a wide variety of contents about their courses with the aid of the internet. A few teachers also stated that they employed some contents at the EBA in order to prepare their courses. Moreover, a Geography Teacher explained that

> *Throughout this year, I tried to use these technologies in my courses as far as I could. However, I want to utilize them more next year. For that reason, in the summer holidays, I will analyze the e-contents at EBA and I will prepare my lessons according to these materials. That is, I use the EBA for generating the structure of my courses. (C2_G2)* Q114

To Use Digital Version of the Textbooks

Using the digital version of the textbook for students not having textbook with was appeared another usage purpose of the SCT. Only a few teachers (N=2) in the second case school expressed that they utilized the SCT in order to reflect the textbook of the lesson on the PTIWB. A teacher stated that

> *Most of our students do not bring their textbooks to the school with them. For that reason, I open the [digital version of] the textbook at the EBA and show topics of the lesson on the smart board. They can see the subject at least on the board (PTIWB). So, I can rivet students' attention on the subjects of our lesson. (C2_B1)* Q115

Other teachers in the second case school did not declared their usage purpose as using digital version of the textbook, because they mentioned that they used other sources at the EBA instead of using digital textbooks.

To Teach Abstract Concepts to Students

Teachers (N=2) of some fields (Biology and Turkish Literature) declared that they used the SCT showing visual materials in order to adequately teach abstract concepts in their courses to the students. A teacher emphasized that

> *In our courses (Turkish Literature), we are generally interested with abstract concepts like theoretical knowledge about literature at 13th or 14th century (writers and their works). The students sometimes might have difficulties while they were reviving these abstract concepts in their minds. For that reason, we had been using various materials (some of them were obtained from private publishers' e-contents and some others were found in our researches) with these technologies. Therefore, the students could have chance to see representative pictures of the writers or watch animations or videos about the writers and their works. As a result, they could easily imagine the conditions of that time and situation where the case accrued. (C2_T2)* Q116

To Save Paper

Only 2 out of 15 teachers in the second case school specified that they used these technologies for saving paper while they were making the students practice about the subjects. One of these two teachers stated that

> *When we had not had the smart board [PTIWB], we had given the activity papers to the students while providing them to examine the subjects and to solve example questions. I prepared these practice papers before the lesson. However, after photocopying the paper for each student in the classroom, I might notice some points that they must be changed or corrected. So, I corrected the paper and then I multiplied again the paper with photocopy machine. The previous papers were wasted. On the other hand, we had the smart boards now. I can reflect the activities that I prepared or found [on the PTIWB] and students can easily follow the activity. Moreover, if there must be any corrections on these activities, I can correct them on the smart board during the lesson without wasting any paper. For that reason, I generally benefit from these technologies in order to save paper during the activities. (C2_T1)* Q117

This situation the teacher mentioned was also sighted by the researcher during the observations of this teacher's lesson (Obs45). He opened a grammar activity in his lesson and students answered the each question one by one writing the correct answer on the PTIWB.

Additionally, a History Teacher (C2_H1) mentioned that she could save paper while showing different maps in her courses because she could reach countless number and variety of maps with using these technologies. She asserted that it is not necessary that there must be lots of printed maps even if a map must be used by two or more teachers at the same time in the different classrooms. That is, she emphasized that she could use same maps at the same time in different classrooms without wasting paper for these maps.

To Relieve the Students

Only a teacher stated that he let the students use the PTIWB so that they relax and they use the smart board for different aims other than lesson. He said that

> *The students could wonder how the smart board was used and what they might do [with the PTIWB]. In addition, they sometimes were bored during the lesson and they might think about applications of the smart board. For that reason, I sometimes let the students open the PTIWB and I said that they could do whatever they want with the smart board (especially at the last minutes of the lessons). Whereupon, they might listen songs or play some games on the board. So, they could relaxed for the next course. (C1_T1)* Q118

Usage Rates of the SCT in the Second Case School

Usage of the SCT in the second case school will be presented with the usage rate perspective in this section of the study. While determining the findings for this part, main data were acquired from the observations of the researcher and interviews conducted with teachers. Furthermore, the additional data for this part were provided in the interview with school administrator of the second case school. While presenting these findings, general usage rate of them will be presented firstly. Then, it will be detailed in terms of students' grade levels that teachers teach and field of the teachers. Lastly, usage rate will be analyzed according to effect of time.

General Usage Rates of SCT

Although each teacher in the first case school was observed twice at different time, teachers participated to the study were observed only once. Because, there were same technologies in the each classroom of the second case school, while there were different SCT in the classrooms of first case school. That is, the researcher had chance to see the usage rate of each participant during only 1 lesson time. However, the researcher asked to participants their usage rates for the SCT in the interviews in order to provide adequate results. When the usage rates of the SCT were analyzed generally, teachers usage rate were classified as 'often', 'seldom' and 'none'. In

Table 4.20, statements of teachers for the usage rate of SCT in the second case school were presented.

Table 4.20 Themes for the Usage Rates of the SCT in the Second Case School

Usage Rates of SCT	**Frequency of participants mentioned**
Often	7
Seldom	5
None	3

Firstly, 7 out of 15 teachers in the second case school declared their usage rate for the SCT as 'often'. They stated that they opened and used the PTIWB in the all classrooms and in the all lessons. For instance, a Geography Teacher said that *"I utilized these technologies for the lecture part of my courses in almost every lesson"* (C2_G2). In addition, a History Teacher stated that

> *I used actively these technologies during 40 minutes of each 45 minutes lesson (that is the time in each class without time that I was writing the class book). The smart board (PTIWB) in our classroom was always open during the lesson and we learn the unknown words on the SB software searching the meaning of them on the Internet. That is, the SB software and the Internet connection were always active during my courses. (C2_H1)* Q119

In addition, the Computer Teacher of the second case school emphasized that some of the teachers in that school used the SCT regularly. She explained that

> *Teachers using the technologies frequently were generally teachers who were dealing with the technologies and had enough knowledge and skills about them. In our school, there were such teachers (like Geography, History, Chemistry, Turkish Literature and English Teachers) utilizing them in the most of the lesson. (C2_SAFT1).* Q120

The researcher also observed lessons of the teachers that the Computer Teachers indicated them for teachers using the technologies often. During these observations, it was determined that these teachers had the habit of using the SCT regularly. The other point mentioned by the teachers about the usage rate of the SCT was that the students want to use these technologies during the lesson. A teacher (C2_T1) emphasized that the students wanted their teachers to use technology and to take advantage of the e-contents at EBA.

On the other hand, 5 teachers participated to the study in the second case school explained their usage rate of the SCT as 'seldom'. They specified that they did not open and benefit from the SCT in the all lessons. A teacher expressed that

> *I sometimes open the smart board in my courses. I can say that I wondered some contents at the EBA and I used some of these e-contents. However, I did not use frequently them during my lessons, because I could encounter various problems, especially on the SB software. For that reason, I used only the digital version of the textbook in the some of my lessons. (C2_B1)* Q121

In addition, School Principal specified that some teachers did not use these technologies so as to waste time while using them. For example, he explained that

> *Especially, Math Teachers of our school preferred to not use often the smart board. They said that there might be leeway for the following the curriculum if they used them in all of the lessons. They did not want to solve practice questions [on the PTIWB] in order to waste time. (C2_SA1)* Q122

Lastly, in the observations at the second case school, there were 3 teachers who did not use the SCT during the lesson. When the researcher asked to them about whether they used these technologies, they corrected that they never utilized them in their courses. In addition, the Computer Teacher stated that *"although there are teachers not using these technologies in our school, the number of them was too few"* (C2_SAFT1). The reasons of not using the SCT might be listed as lack of knowledge

and skills, inadequate of the e-contents and lack of support to the teachers. In addition, a teacher explained that *"I do not open these technologies because I do not want to lose classroom management during my lessons"* (C2_B1). These problems will be investigated at the further sections in detail.

The school administrators also declared that they did not used the SCT in the lesson they gave. Assistant School Principal stated that

> *To tell frankly, we did not use the smart board in any lessons. Because, we attended a few courses and we could not use them during these lessons. In addition, we did not take the in-service training our teachers attended as well. (C2_SA2)* Q123

When the usage of the SCT was analyzed separately, some teachers explained that they did not prefer to use various e-contents at EBA and the SB software, although they used the PTIWB with different sources in their courses. In the observations it was determined that most of the teachers did not use especially the SB software. A teacher explained that

> *Although I planned to utilize the SB software for various activities at the EBA, I do not use the SB software nowadays. Because, the SB software prevents to direct intervention to the content on the smart board. Instead, we have to arrange the content on the other devices. We can use these contents after we transfer the arranged contents from other devices. That is, to tell the truth, I have not used the SB software because of the usage difficulty of it. (C2_G2)* Q124

Usage Rates of the SCT in point of Teachers' Fields and Students' Grade Levels

Participants of the study mentioned about the usage rate of the SCT in the way of teachers' field (courses) and students' grade level. When the usage rate of these technologies were analyzed in the light of grade level of the students, most of the teachers (N=9) expressed that they were used more intensely at the 9^{th} grade students' courses, while they were almost never used at the 12^{th} grade students' courses. A teacher explained that

> *I generally open the smart board at the most of the lessons for the 9th grade students, because these students were selected for the Anatolian High School program and they were more qualified students from other students. Also, we could reach more contents for the subjects of 9th grade. On the other hand, I have never used these technologies at the senior class. Because they would enter university exams and they did not have enough time for different activities other than solving practice questions. (C2_M1)* Q125

The other teacher also stated that

> *I benefitted from the smart board and some e-contents at the EBA for only some subjects (like Periodic Table, and Materials and Materials' Properties) at the 9th grade students Chemistry courses. However, I can say that I have not used them hardly at the 11th grades. Because, I did not find enough e-contents at the EBA for the Chemistry courses of 11th grade. (C2_C2)* Q126

In addition, the Computer Teacher (C2_SAFT1) and School Principal (C2_SA1) of the second case school corrected that these technologies were mostly used in the lessons of 9th and 10th grade students. The Computer Teacher explained that the PTIWB have been used mostly at the 9th grade students' English courses utilizing the package contents of a private publisher on the PTIWB. On the other hand, there were a few teachers (N=2) which they had at the 9th, 10th, 11th and 12th grades stating they utilized these technologies at their courses.

Moreover, when the usage rate of the SCT were analyzed according to field of the teachers in the second case school, there were some differences at the usage rates of these technologies for the different courses. The Computer Teacher stated that some teachers like History, Geography, Chemistry English, and Turkish Literature used these technologies more than other courses. The Assistant School Principal also said that the Math Teachers in the school did not generally use the technologies because they did not think they were helpful for structure of the Math courses. In addition,

the Computer Teachers summarized her observations about the usage rate for each course as

> *I can say that Geography and History teachers profited maximum by these technologies in our school and the Biology teachers partially took advantage of them. In addition, English teachers mostly used these technologies because they had advantage of private publisher's contents. In the Math courses, Math teachers were not pleased for having these technologies in their lessons. They complained about the time while using them. (C2_SAFT1)* Q127

Furthermore, it may be said according to observations conducted by the researcher that the mostly used courses were Geography, History and Chemistry.

Effects of Elapsed Time on Usage Rate of SCT (Novelty Effect)

In the second case school, it was declared by 4 participants that usage rate of these technologies decreased over time. The Computer Teacher (C2_SAFT1) specified that there were some teachers did not use frequently the e-contents at the EBA while the data were collected, while they had used often some of these e-content when the PTIWB were established. She explained the reason of this as

> *Although they run the PTIWB during most of the lesson, nowadays, they did not want to show e-contents at the EBA. Because, they were curious about the PTIWB when they were established in our school. However, their curiosities for these technologies have decreased over time. In addition, they have encountered various problems while using them. Therefore, they did not prefer to use them as much as before they did. (C2_SAFT1)* Q128

The other teacher (C2_C2) also explained decline in the willingness to use them. He said that he got excited for the SCT and he bought the e-contents of a private publisher in a few USB memory stick. However, he did not open these USB memories on the PTIWB and he could not use these e-content during their lessons. Then, although he reached the various e-contents of that publisher over the EBA, he

did not want to use them in their lessons. He explained the reason of this as *"I did not show these contents to my students, because I lost my excitement for these technologies"* (C2_C2). That is, it may be concluded that these technologies could be used more when the technologies were established new at the second case school. On the other hand, there were 2 teachers stated that they did not think to use them before and now.

4.1.2.3 Challenges and Problems While Using the SCT in the Second Case School

In order to answer sub-question that what challenges the teachers in the second case school encountered while they were using the SCT in their lessons, the data obtained from the observations, interviews and documents were analyzed and 9 themes and sub-themes under each themes were formed by the researcher according to data analysis techniques. The themes and how many participants mentioned about them were presented in Table 4.21. These are (1) technical problems, (2) challenges at EBA, (3) inadequate in-service trainings, (4) lack of knowledge and skills, (5) challenges for classroom management, (6) difficulties to maintain motivation, (7) deficiency of support to teachers, (8) limited time, (9) inadequate content.

Table 4.21 Themes for the Challenges While Using SCT in the Second Case School

Challenges While Using SCT	Frequency of participants mentioned
Technical problems	14
Challenges at EBA	14
Inadequate in-service training	13
Lack of knowledge and skills	10
Challenges for classroom management	8
Difficulties to maintain motivation	8
Deficiency of support to teachers	7
Limited time	7
Inadequate content	6

Technical Problems

The problems cited by the participants of the study about hitches on the mechanic and software parts of the SCT and on the technical infrastructure in the second case

school were grouped as the technical problems. In the consequence of the data analysis, majority of the participants (N=14) in the second case school stated various technical challenges for the each of the SCT and technical infrastructure in the school. Hereby, technical problems and challenges for the PTIWB, SB software, EBA, and the Internet connection at the classrooms will be presented separately (as seen in Table 4.22). Then, the problems for the technical infrastructure will be mentioned. In addition, during the data analysis process, some additional technical problems were determined and they will be presented under the title of 'additional technical problems caused by students' and 'additional technical problems caused by teachers'.

Table 4.22 Sub-themes for the Technical Problems in the Second Case School

Technical problems	**Frequency of participants mentioned**
For PTIWB	14
Breakdowns	11
Usage difficulties	7
Restrictions	3
For the Internet connection	7
For EBA	6
For SB software	5
For technical infrastructure at school	4

Technical Problems for the PTIWB

Most of the participants (N=14) in the second case school mentioned various technical problems and challenges for the PTIWB. These problems and challenges may be grouped as breakdowns, usage difficulties and restrictions for the PTIWB. Firstly, teachers and school administrators specified that they encountered some breakdowns on the PTIWB while using it. The mostly cited breakdown problem was the hitch of the touch sensing on the PTIWB (N=8). Teachers stated that touch sensing properties of the some part or the PTIWB's entire screen did not work when they click or write on the screen. A teacher explained that

> *For instance, I could not just use the smart board in a classroom. That is, when I wanted to open a page on the smart board, I could not open that page, because the touch sensing [of the PTIWB] did not work. When I touch the screen, there would be nothing on the page. (C2_T2)* Q129

The problems on the touch screen of the PTIWB were also observed in the two observations (Obs42 and Obs49). The Computer Teacher indicated that there could be no sensation or self-perception on the PTIWB in some classrooms. That is, touch screen of the smart boards in the some classroom did not work, while there could be self-clicks on the PTIWB even if anyone did not click on them. She also explained these problems as

> *Hitches for the touch screen of the PTIWB could be accepted as one of the problems we encountered while using them. However, these problems are generally interested with the chalk dust. In addition, authorized service of the PTIWB said me that chalk dust prevents the receptor of the screen for sensing the location of the click. That is, I can explain this problem. Some teachers of our school use the blackboard part of the PTIWB with the chalk and these dusts might be placed on the receptor of the touch screen. So, these receptors could not sense the clicks. (C2_SAFT1)* Q130

The Computer Teacher also expressed that the authorized technic service warned them about this problem and they recommended that teachers should not use the chalk and blackboard in order to encounter these touch sensing problems. Some teachers stated that the Computer Teacher informed them for these problems. As a result, some problems on the touch screen might be interested with the usage of the chalk and blackboard. However, there were also some other problems on the touch screen of the PTIWB and the Computer Teacher specified that these problems were interested with hardware parts of the PTIWB.

Additionally, 4 teachers stated that connections ports of the PTIWB did not worked sometimes. The Computer Teacher of the second case school declared that USB connection ports and visual connection ports (VGA connection ports) of the PTIWB went out of order in a few classrooms. A Math Teachers mentioned problems on the connection ports as

> *In the one of the classroom, connection part of the smart board did not worked. So, I could not connect my own laptop to the smart board and could not show the examples of the private publishers on my laptop. At the other lessons, I connected my laptop [to the PTIWB] with another connection cable. (C2_M1)* Q131

In addition, the Computer Teacher stated that a few teachers informed her about the trouble on the USB connection parts when they want to transfer the contents they found from other resources.

On the other hand, only a teacher mentioned about the calibration problems for the PTIWB, but the Computer Teacher stated that they did not encounter the calibrations problems on the PTIWB. The teacher speaking about the calibration problems declared that there were mismatches on the smart board in only a classroom. He (C2_T1) explained that the location of the point he clicked and the location of the point the board perceived did not pair exactly. So, he adjusted the calibration of the PTIWB only one time in a lesson.

Secondly, usage difficulties of the PTIWB were declared as technical problems by 7 teachers in the second case school. Some teachers (N=4) encountered some difficulties while they were passing from one page to other pages, drawing shapes and intervening in the contents on the PTIWB. A teacher specified that

> *At first, I wanted to use the digital format of the textbooks. However, when I open the 'pdf file' of a textbook and I wanted to open the page I would show, I could not control the page transition. That is, when I want to pass 5 pages later and I pull down the page on the smart board, the pages passed too fast and I could stop it on the 10 or 20*

> *pages later. Furthermore, the page could stick even if I tried to change the page again and again. So, I had difficulties when I was opening the page which I want to show the students on the smart board. (C2_B1)* Q132

This problem was also observed in the observation while these teachers were using the PTIWB (Obs42). There was also another teacher (C2_C2) stating that he disused the digital version of the textbooks because of the inability to control the PTIWB while changing the pages of the digital textbooks on it. In addition, a teacher (C2_G2) asserted that drawing shapes on the PTIWB was difficult and he could not draw the shapes which he wanted.

The other usage difficulties for the PTIWB were declared by two teachers as issues using the smart board close. They asserted that the screen of the PTIWB was too big for using right in front of it. A teacher stated that

> *Now, because the screen [of the PTIWB] was big, our mind (which was used to using small computer screen) might have difficulties while using closely the smart board. Sometimes, we could not find the digital keyboard on the screen. Because, we were looking at the screen very closely, we could not see the where the keyboard was. At that moment, students could see the keyboard easily (because they could easily remote) ant they said loudly where the keyboard was. We had such experience while finding most of the things on the screen [of the PTIWB]. (C2_G1)* Q133

Thirdly, various restrictions on the PTIWB were indicated by teachers as technical problems. An administrator at the YEGITEK (PM2) explained that a list of software determined by YEGITEK was installed to the PTIWB and other software could not be set up to them. This situation was declared as a technic problem by the Computer Teacher and a Chemistry Teacher in the second case school. The Computer Teacher stated that

> *One of the Chemistry Teacher of our school gave me a USB memory of a private publisher for the uploading e-contents of the Chemistry courses. When I tried to install this e-content software on the USB memory, operating system or the anti-virus software of the PTIWB did not enable us to set up this software. Therefore, the Chemistry teachers have not used these e-contents on the PTIWB because of this constraint. (C2_SAFT1)* Q134

In addition, a teacher (C2_G2) expressed that there was a restriction problem for office package software on the PTIWB. She explained that there was an office package software on the smart boards but the teachers in the second case school were not used to utilize this software. For that reason, the Computer Teacher tried to install another office software on the PTIWB, but she could not install the new software because of the software protection of the PTIWB. Additionally, the Computer Teacher mentioned other restriction problem as

> *At the beginning, we could not open the each video file format on the PTIWB. When some of our teachers found various videos about the subject they would mentioned in their lessons, they came to me and ask why they could not open the video. After I analyzed the problem on the smart boards in the classrooms, I realized that the PTIWB did not support some video file types. (C2_SAFT1)* Q135

Consequently, the technical problems for the PTIWB in the second case school were presented above under three group as the breakdowns, usage difficulties and the restrictions.

Technical Problems for the Internet Connection

There were also technical problems for the Internet connection in the classroom stated by 7 participants of the study in the second case school. Especially, the School Principal emphasized the MoNE's restriction on the Internet connection at their school as the main problem about the internet access. He explained that

> *I and our teachers could not reach the various contents in the some websites [with the PTIWB], although we could open these contents with my computers at home. For instance, before the class at my home, I researched on the Internet in order to find good activities for using them in my lessons. However, after I came to the school, I could not open these activities because of the Internet restriction of the MoNE. (C2_SA1)* Q136

In addition, a teacher in the second case school told an example about the Internet restriction challenge as

> *I encountered a challenge about the Internet access in one of my lessons at the 'International Relations course'. Our subject was the 'Diplomacy' and I had mentioned about the policies of the states against each other. For that reason, I wanted to analyze the positions of the different state's governments about the situation in the Syria looking at the websites of the newspapers. However, we could not open the most of the websites of the newspapers and journals. We could reach too few news about the subject. For that reason (the Internet restriction), the students could not comprehend the difference of the positions of states. (C2_G2)* Q137

On the other hand, 3 teachers expressed that they worried about meeting unsuitable contents for the students while they were searching contents on the Internet. They stated that the restriction on the Internet connection should be increased in order to not encounter such unsuitable images and visuals.

In addition, 3 teachers and a school administrator specified that the Internet speed was too low for the Internet connection at the second case school. A teacher explained this situation as

> *Actually, I repeated all of the subjects at the end of the semester solving example and practice questions at the EBA. In this point, while we were passing a quiz to another quiz at the EBA or opening*

> *an activity at the EBA, we lost time because of the low Internet speed. That is, we waited lots of the time so that next quiz would open. Therefore, we could not finish the questions for the repeating the subjects during these lessons. (C2_H1)* Q138

The Internet restriction and low speed Internet problems were also determined during the some observations (Obs44, Obs46, Obs52 and Obs55) in the second case school by the researcher.

Technical Problems for the EBA

6 out of 15 teachers in the second case school mentioned some challenges for the interface of the EBA as technic problems. Firstly, they mentioned that there was design error on the home page of the EBA while they were entering their user name and password to the EBA. They complained that the students could see their user name and password while they were entering them with the digital keyboard on the PTIWB. A teacher expressed that

> *We had a big problem while we were entering the EBA system. We were using a user name and password of us for the entrance. I think there was a worry while entering the password. Because, our students could see easily our user name and password on the PTIWB. Moreover, we used our 'MEBBİS' password for these purpose. Consequently, students could use our 'MEBBİS' password and could change information of us on the 'MEBBİS' system. This was a big problem for us. (C2_G1)* Q139

The 'MEBBİS' system the teacher mentioned were the network system of the MoNE in order to organize personal affairs of the teachers and school administrators in the each school of the MoNE. Each teacher has a user name and password for these network systems (MEBBİS) of the MoNE. Therefore, MoNE defined the same user name and password for the teachers in order to use them for the EBA. In the most of the observations at the second case school, it was also observed that some teachers had risk so that their students could see their password and they could change

unbeknownst their information on the ‘MEBBİS’. So, these teachers might hesitate while they were entering their ‘MEBBİS’ user name and password to the EBA. The Computer Teacher also specified that

> *There were two options for the entrance to the EBA. While one was that teachers might use their ‘MEBBİS’ username and password, in the other option teachers might define a special password for the EBA system and they might use these password while they were entering the EBA system. We were experiencing most of the difficulties at this point. Because, teachers wrote their ‘MEBBİS’ password in front of the students and it could be problem if the students could see and learn the ‘MEBBİS’ password of the teachers. Moreover, our teachers did not define an EBA password different from ‘MEBBİS’ password. Because, this could be difficult for them. That is, I warned and informed teachers about the defining the EBA password, most of our teachers did not use the EBA password of them. Instead, they were used insistently their ‘MEBBİS’ password. (C2_SAFT1)* Q140

In addition, some teachers asserted that the interface and the system of EBA worked slowly. Two teachers stated that the entrance pages of the EBA required too many information and the pages providing e-contents was opening slowly. A teacher explained that

> *We might have problems when we were entering the EBA and downloading the contents. When we opened the EBA each time, we encountered the main page of the EBA and we had to enter our user name and password at each time. Then, we had to find the contents we wanted. Opening the page which had the contents could be difficult. Therefore, these processes could take too much time and this could slow down us. (C2_T1)* Q141

This problem put in the words differently by another teacher as the classification problem of the contents at the EBA. She (C2_G2) expressed that there were lots of

e-contents at the EBA (especially for the Geography courses), but there were not an adequate classification system for the teachers. In addition, she added that there might be a tracking system for each teacher in order to simplify selecting the e-contents the teachers wanted to use. The detailed information about this tracking system mentioned by teachers will be explained in the next sections.

Technical Challenges for the SB Software

The YEGITEK provided a special smart board software (SB software – 'StarBoard') to the each PTIWB in the second case school. The main challenge for this SB software was declared as usage difficulties of it during the lessons. The usage difficulties for the SB software were presented under the title of technic problems, because there were various deficiencies on the interface of the SB software stated by the participants. 5 teachers specified that they could not directly interfere in the contents on the screen using SB software. A teacher explained this challenge as

> *At the beginning, I thought that I might use the Power Point presentations of different publishers I had in advance. However, when I tried to transfer these presentations to the [SB software] on the smart board, I could not make any changes on the each object of the presentations. That is, it (the SB software) did not permit us to use each object separately. To do this, we have to separate the objects of the presentations, and then we can transfer these objects to the SB software. For example, there were an image and some text on the page of the presentation and I want to use these components with the SB software in order to emphasize them. However, I could not emphasized (making chances and writing on them) with the SB software. Instead of this, the software let me to change them separately. That is, I have to copy and paste them separately on a blank page for this. Nevertheless, these processes may take lots of time. Therefore, I can say that this necessity for the SB software may be accepted as a challenge for the SB software. (C2_G2)* Q142

In addition, the Computer Teacher of the second case school stated that teachers complained mostly about the redundancy processes for using the SB software. On the other hand, it was determined during the 15 observations in the second case school that only 2 teachers utilized the SB software on the PTIWB in their lessons. Moreover, most of the teachers explained the reason of this as the usage difficulties of the SB software.

Problems for the Technical Infrastructure at the Second Case School

Teachers did not mention too many challenges and problems about the technical infrastructure at the second case school. Most of the teachers were pleased technological structure at the school. They did not mention any deficiency for the establishment of the SCT and necessary infrastructure of them. However, 4 out of 17 participants in the second case school mentioned about deficiency of tablet/laptop computers. A teacher (C2_T1) emphasized that the teachers and students did not have any tablet or laptop computers and this deficiency restrict their PTIWB usage, because they (as teachers) and students did not have chance to e-contents out of the lessons. He also asserted that students could utilize from the PTIWB and EBA transferring e-contents to their tablet/laptop computers. In addition, the Computer Teacher of the second case school talked about this deficiency and she worried about how these tablets were used interactively with PTIWB in the classrooms.

On the other hand, the Computer Teacher reported the power cut as a challenge for the technical infrastructure. She specified that

> *When the disconnections on the electricity occurred during the lessons in our school, most of our teachers complained that their lessons were interrupted for the power cut. Moreover, some of the PTIWB were affected negatively. That is, software on the smart boards could go out of order because of these power cut. (C2_SAFT1)* Q143

In addition, the Computer Teacher stated that there was not a power unit or a generator at the second case school so that the power connection of the SCT was not cut during the lessons. In addition, she expressed that some teachers made complaint

about the shortage of enough space on the whiteboard or blackboard. That is, they asserted that they did not have enough space when they did not use the electronic part of the PTIWB.

Additional Technical Problems Caused by Students

Additional technical problems caused by students emerged as a sub-theme for the technical problems according to data obtained from the interviews of the teachers and of especially the Computer Teacher in the second case school. The mostly cited problem (N=8) caused by students was about the physical locking system of the PTIWB. There were two physical locking mechanism of the PTIWB. While one of these lock was for the usage of the electronic LCD part of it, the other lock mechanism for the intervention to the PTIWB when the technical intervention would be required. In the second case school, keys of the first lock for the usage of the PTIWB were distributed to the teachers for their usage in the classroom. That is, each teacher had a key and they could open the PTIWB in the all classroom with this key. On the other hand, only the Computer Teacher at the second case school had the key of other lock for the intervention to the PTIWB. Teachers declared that the school management warned them about the keeping the PTIWB locked out of the lessons. At that point, some teachers stated that students could unlock the PTIWB during the breaks and they might use them for different aims. A teacher stated that

> *Some students could open the lock of the smart board and they interfere in [the PTIWB] without the permission. That is, the locking system of the boards were not though and could be easily opened even they did not have the key. This might be big problem for us. Because students could open the smart board during the leisure courses and the breaks, and they could use the smart board for undesired aims like listening loudly music and entering the unsuitable websites. Then, [the PTIWB] might not be worked properly. (C2_T1)* Q144

In addition, the Computer Teacher indicated that students could load undesired software to the PTIWB and computers might permanently have these undesired programs like viruses. She added that

> *Students could reach the banned webpages on the restricted Internet connection of the MoNE. That is, they could enter the undesired websites and they load suspect software in order to play digital games. Therefore, the PTIWB might work slowly because of the undesirable usage of the students. (C2_SAFT1)* Q145

On the other hand, some teachers specified that opening the locks of the PTIWB was not a problem for them and they asserted that students should use them during the lessons and their free time.

Additional Technical Problems Caused by Teachers

As the technical problems caused by the students, there were also additional technical problems caused by the teachers in the second case school. In the same way, some teachers in that school might intervene to the PTIWB and could change the options of them. The Computer Teacher stated that *"some teachers changing the options of the smart boards may disturb the usage of other teachers on these smart boards"* (C2_SAFT1). She also gave some examples for this problem as changing home page of the browser, changing desktop background, and changing usage properties. In addition, another teacher expressed that

> *In the most of the classroom, I tried to re-arrange the options of [the PTIWB] and this could cause to lose my time in the lessons. The reason of this was that some teachers wanted to use the smart boards differently and they might change the options of them while they were using. Furthermore, they did not re-arrange these options after they finished their lessons. That is, we (as the teachers of the school) were unable to provide unity in the practice usage of the smart boards. [In the most of the PTIWB], I could not find the software which I wanted to utilize. Because, our teacher friends might change the location of them as they wished. These arrangements sometimes could be big problem for us so as to correct the options of them. (C2_T1)* Q146

In addition, the Computer Teacher (C2_SAFT1) declared that some teachers loaded some additional software to the PTIWB without permission. She also added that most of these software could be dangerous for the system of the PTIWB. For example, software for overcoming the restriction on the Internet access might be downloaded and these software could cause the security gaps for the system of the PTIWB. She expressed that re-arrangement of the system of the PTIWB in the all classrooms could create extra workload for her as the Computer Teacher of the school. The other challenge caused by the teachers was mentioned as physical intervention of some teachers to the PTIWB. She explained that

> *When there was a physical problem on the PTIWB, some teachers of our school could want to intervene physically to them. For example, one of our teachers wanted to open the lock of a PTIWB for intervention of the authorized people. Actually, teachers other than authorized personal do not have permission to open this lock. Nevertheless, this teacher was urgent about opening the lock and intervening the PTIWB. Of course, I did not permit that because of my responsibility. However, this caused confusion between us as a problem. (C2_SAFT1)* Q147

Lastly, usage of chalks on the blackboard part of the PTIWB was indicated as problem caused by teachers in the second case school. The Computer teacher stated that usage of chalks on the PTIWB could cause some problems for the touch screen of the PTIWB as it was mentioned before. However, some teachers specified that they had to use the chalks due to shortage of the free space on the board. On the other hand, school administrators and the Computer Teacher of the second case school specified that the authorized technic personal of the PTIWB companion warned them about the disadvantageous of the chalk usage for the PTIWB.

Challenges at EBA

In the second case school, teachers could reach various e-contents at EBA in order to use the SCT. As mentioned before, the EBA was designed and provided by YEGITEK in order to supply e-contents to the users of the SCT. 14 out of 17

participants in the second case school mentioned various problems and challenges for the e-contents at EBA and the structure of EBA. These problems and challenges were grouped in the some sub-themes. These were lack of contents in number and variety, classification problems and difficulties for reaching contents, lack of contents suitable to the SCT, to courses, to teachers' usage in the classrooms and to students' level, and no standardization of different publishers' contents (Table 4.23).

Table 4.23 Sub-themes for the Challenges at EBA

Challenges at EBA	**Frequency of participants mentioned**
Lack of contents in number and variety	14
Classification problems and difficulties for reaching contents	10
Lack of suitable contents	10
To SCT	5
To courses	4
To teachers' usage in the classrooms	4
To students' level	3
No standardization of different publishers' contents	2

Lack of Contents in Number and Variety

Almost all of the participants (N=14) in the second case school declared that there were very few contents at the EBA and most of them were same in point of variety. Especially, Turkish Literature, Math, Biology, Chemistry, Physic and Philosophy Teachers stated that there were not enough e-contents for them. Furthermore, a Biology Teacher specified that

> *I could find and use only [the digital version of] the textbooks. That is, I did not see various contents for Biology courses other than online textbooks. Even if there were various materials at EBA, I was not informed about them. (C2_B1)* Q148

In addition, a Philosophy Teacher (as well the Computer Teacher of the second case school) explained the lack of e-contents at EBA for the Philosophy Courses as

> *There was lack of e-content problem for the Philosophy courses. Actually, I did not check the contents at EBA recently, but there had*

> *been only a few biographies of some philosophers, a few videos about the some subjects and digital version of the textbooks (in pdf format). I used these materials, but we need more materials especially for our courses. (C2_SAFT1)* Q149

Again, two teachers indicated that when they could not get enough contents for the SCT, they had to search the contents on the Internet. In these situations, it was stated again that they could be encountered undesired images and contents for the students. In addition, one (C2_T1) of them expressed that if they brought some material with their USB memories, the virus software could harm the PTIWB.

Classification Problems and Difficulties for Reaching Contents

The other challenge declared by 10 participants was interested with difficulties for reaching e-contents at EBA. These teachers asserted that the classifications of e-contents at EBA were not arranged well. A teacher stated that

> *At EBA, we could reach various maps in the gallery of the SB software. Yes, there were lots of maps in this gallery. However, these maps were placed systemically at there. At present, these numerous maps were not classified according to their properties such as political map or physical map, country maps or continent maps, or special maps. Moreover, the maps for both of Geography and History classes were located same place together. Therefore, we could not select the maps which we wanted to use in our lessons. Also, selection process of the maps could be very time consuming. That is, students had to wait while I was selecting and reaching the map at EBA. For that reason, we sometimes might not use these maps because of the classification problem at EBA, although there were lots of maps. (C2_G2)* Q150

In addition, a History Teacher (C2_H1) mentioned about the maps at EBA and he told that they did not search a map within the numerous maps. She stated that she also might not utilize the maps, because there was not a searching system for them.

Furthermore, the Computer Teacher also emphasized that most of the teachers made complaint about the classification problems at EBA.

Lack of Contents Suitable to the PTIWB, to Courses, to Teachers' Usage in the Classrooms, and to Students' Level

Although YEGITEK have provided various e-contents to users of the SCT with EBA portal, 10 out of 15 teachers participated to the study in the second case school stated some problems and challenges for these e-contents as lack of contents suitable to the SCT, inconvenient contents for the courses, unsuited contents for usage of the teachers in the classrooms, and inappropriateness of the contents to the students' level. Firstly, 5 teachers declared that most of the contents at EBA were not developed specially for the PTIWB and SB software. As indicated above, a teacher (C2_G2) expressed that they could not easily utilize some of these contents with the SB software on the PTIWB because of the unsuitable contents at EBA for these technologies.

Secondly, 4 teachers emphasized that the structure and quality of some of the e-content were not enough for their courses. For example, a History Teacher explained that

> *In my lessons, I used some maps for History classes. However, I think that there should be various animated maps prepared for these technologies in order to show the districts of wars in the History. That is, we can show the movements of the armies of different nations and students can comprehend better by the aid of these animated maps. For that reason, I searched at EBA for the animated maps about some subjects in History courses. I could find only a few animated maps at EBA. In addition, these animated maps were not designed of high quality. The movements of the armies or other occasion were not featured well. (C2_H1)* Q151

In addition, a Physic Teacher (C1_P1) specified that some of the e-contents at EBA for the Physic courses were not prepared well and she expressed that interaction

properties of animated materials for experimentations was absent. Furthermore, a Geography Teacher gave an example about this issue as

> *There were various videos and photographs [at EBA] for Geography courses. That is, I entered the EBA and then I selected the Geography courses. However, some of these materials were not good quality in point of Geography subjects. For example, when I opened a visual object about 'customhouse' subject, it was not interested with the subject of my lesson. In this visual, there were other things (a women and a truck) irrelevant to the subject. We could not contact them with the subject. As a result, quality of e-contents at EBA was not enough for our courses and I did not used them because of that problem. (C2_G1)* Q152

Furthermore, one (C2_M2) of the Math Teachers in the second case school refused to use the SCT and e-contents at EBA. He showed reason of not using them as the quality of e-contents. He explained that he did not trust the accuracy of formulas and example questions in the contents at EBA.

Thirdly, 4 out of 15 teachers declared that the most of e-contents at EBA were unsuited for the usage of the teachers in the classrooms. A Chemistry Teacher (C2_C1) expressed that there were generally videos at EBA and these videos were prepared for students to watch by themselves on their personal computers. In addition, a Geography teacher stated that

> *When I opened the Geography part [of the EBA], most of the materials added by publishers were inadequate. That is, these materials were generally text based. Uploading text to there was meaningless. When I showed these text [on the PTIWB], there is no point in my reading these texts to students. I did not a good teacher for students because of this. Moreover, these texts were read aloud sometimes by the system. That is, the materials might teach to students. Therefore, students could participate to lessons at their*

> *home as distance education. However, I think we should not use these technologies in this way. These technologies should supply a difference to us as teachers. For that reason, I do not think that most of the e-contents at EBA did not prepare adequately for the usage of PTIWB by teachers in the classroom. For example, I opened the 'shape of the world' subject and there were the definition of the subject as texts at EBA. Should I read only these texts to students? No, I should not. That is, when I opened the EBA, there were headings about the subject, however there were not e-contents suitable to teachers' usage in their ingredients. The problem started at there. That is, when I read these texts to students, my job might not be a teacher. (C2_G2)* Q153

In addition, other teachers specified that there were not enough e-contents at EBA according to teachers' teaching methods.

Lastly, inappropriateness of the contents to the students' level was indicated by 3 teachers as a challenge about e-contents at EBA. Teachers emphasized that there were not enough contents for the 12th grade students and the e-contents at EBA had not enough qualification for preparing students to the university entrance exams. A teacher stated that

> *Students at 12th grade had been preparing for the university entrance exam and these students generally wanted to solve practice questions (test) during the most of the lessons. However, there were not enough practice questions at EBA for the 12th grade students. (C2_M2)* Q154

Two teachers expressed that most of the e-contents at EBA were too simple for high school students. Moreover, a teacher (C2_B1) asserted that these contents were suitable for the students at elementary students.

No Standardization of Different Publishers' Contents

As another challenge, only 2 teachers indicated that there was no standardization between e-contents of different sources. A teacher (C2_G1) declared that there were

e-contents at EBA developed by lots of private publishers and these e-contents had different structures. He said that using different contents having various structure might require different usage styles and these could be difficult for the teachers. Furthermore, a Turkish Teacher (C2_T1) stated that not controlling e-contents of different sources by a specific council might be problem for the teacher, because these e-contents could be very different from each other and teachers might have difficulties while using them. Therefore, it was emphasized by these teachers that although teachers could use e-contents of some sources, they could not use easily e-contents of different publishers.

Inadequate In-service Training

Unlike teachers in the first case school, the teachers in the second case school had attended to the in-service training sessions designed by MoNE/YEGITEK before the SCT were established to their schools. After the structure and the process of the in-service trainings will be briefly introduced in the light of information gained from the document analysis and interviews, the problems and challenges about the in-service training provided to the teachers in the second case school by the YEGITEK will be presented.

Actually, the in-service trainings were developed by a council which included researchers from the universities under the control of YEGITEK. According to 'Program of Events of In-service Training for FATİH Project' document (FATİH Projesi için Hizmetiçi Eğitim Etkinlik Programı), duration of the in-service training was 30 hours in 5 days. In addition, the program of the in-service training developed by the YEGITEK consisted of 6 components (APPENDIX L). These were (1) FATİH Project in education, (2) Installations and usage of the SCT, (3) Searching-finding-selecting e-contents, (4) Design and development of e-contents, (5) Planning and presenting a lesson using founded/developed e-contents, and (6) Evaluation of the e-contents and lesson presented by teachers (Table 4.24).

Table 4.24 Components of the In-Service Trainings for the FATİH Project and Durations of the Components

Components	**Duration**
FATİH Project in education	2 hours
Installations and usage of the SCT	2 hours
Searching-finding-selecting e-contents	6 hours
Design and development of e-contents	12 hours
Planning and presenting a lesson using founded/developed e-contents	6 hours
Evaluation of the e-contents and lesson presented by teachers	2 hours
TOTAL	**30 hours**

On the other hand, school administrators and teachers in the second case school stated that teachers had attended the in-service training programs as two groups. While the first group attended the 5 days trainings parallel to the in-service training program developed by the YEGITEK, second group attended two week periods trainings. One of the teacher from the second group explained that they firstly were trained about the basic ICT, and then they had attended to the original program of the in-service training of YEGITEK for 5 days like first group (C2_B1). The Computer Teacher of the second case school specified that

> *We determined level of the teachers about the ICT knowledge and skills with a survey. This survey sent us from the District Directorate of the Ministry of National Education (İlçe Milli Eğitim Müdürlüğü). According to results of this survey, approximately half of our teachers attended two weeks in-service trainings at the District Directorate of the Ministry of National Education. On the other hand, teachers having good results on the survey attended the 5 days (1 week) in-service training in our school. Both trainings were conducted by two different the computer trainers at the District Directorate of the Ministry of National Education. (C2_SAFT1)* Q155

The schedule of the in-service trainings was in the last 15 days of June 2012 after the academic year finished. That is, teachers attended the in-service trainings seminar weeks at the school and at the seminar room of the District Directorate of the Ministry of National Education. The interesting point for the timing of the in-service

trainings was that the SCT had not been established to the second case school until that time. The SCT were set up to the second case school beginning of the next academic year after the in-service trainings (September 2012).

In the second case school, most of the teachers and school administrators generally complained about the in-service training for teachers. 10 out of 15 teachers emphasized that not only 1 week in-service training but also 2 week trainings were inadequate so that the teachers could properly use the SCT in their courses. Majority of the participants (N=13) complained about the deficiency of practice, short duration, unsuitable level, insufficient content, and inconvenient structure of the in-service trainings provided by the YEGITEK as shown in Table 4.25.

Table 4.25 Sub-themes for the Inadequate In-Service Trainings

Sub-themes for the Inadequate In-service Trainings	**Frequency of participants mentioned**
Deficiency of practice	9
Unsuitable level	8
Short duration	8
Insufficient content	6
Inconvenient structure	4

Firstly, other mostly mentioned challenge for the in-service trainings was the deficiencies at the implementation part. 9 participants emphasized that the practice part of the training was only 1 day (6 hours) and this time for the practice was too little for them in order to learn how to use SCT in the lessons. A teacher also stated that

> *I can say that the in-service training programs was good in the beginning. But, we could not learn that how we might utilize these technologies in the each specific subjects of our courses. That is, we learned how these technologies works generally. On the other hand, we did not see the practice usage of them in our courses. (C2_B1)* Q156

In addition, School Principal of the second school declared that especially Math teachers could not use the SCT in the Math courses, because they did not learn the usage of them for the Math subjects during the in-service trainings. Moreover, the Computer Teacher also stated that there was a practice part at the last day of the in-service trainings (both of the 1 week and 2 weeks programs) and each teacher presented an e-content (which were they selected or prepared) interested with a subject in their courses using the SB software on the PTIWB. However, she (C2_SAFT1) added that this practice implementation were insufficient for the most of the teachers in the second case school. One of the reasons for the deficiency of the practice part of the in-service trainings teachers attended was declared by 4 participants as the timing of the in-service trainings. They asserted that they did not have any chance to implement what they learned during the in-service trainings, because the trainings were conducted just prior to the closing of the schools. A teacher explained that

> *In fact, we learned most of the things about the usage of these technologies during the training. However, we went on summer holiday immediately after the training and we could not practice on the smart boards. So, we forgot what we learned about the practice usage of the PTIWB and SB software. That is, this could be accepted as a challenge for the in-service trainings. (C2_H1)* Q157

This warning about the timing of the in-service trainings as a problem was also mentioned by the school administrators and Computer Teacher of the second case school.

Secondly, level of the in-service trainings for the teachers was discussed by the 8 teachers. They asserted that level of the trainings was not suitable for the teachers in the second case school. Especially, a teacher not having enough knowledge and skills about the SCT stated that

> *We [teachers not having enough knowledge and skills about the SCT] did not learn well the usage of the PTIWB and SB software in the*

trainings, because the training was difficult for us. I could not understand most of the subjects in the in-service training, because I had known a little about these technologies before. That is, they should tell us as starting the subjects from lower levels. (C2_T2) Q158

On the other hand, a teacher (C2_G2) participating the 1 week in-service training expressed that level of the in-service trainings was sufficient for teachers having enough knowledge and skills. The Computer Teacher emphasized that selection of teachers for the two types of in-service trainings (1 week or 2 weeks trainings) was not conducted adequately and teachers from different knowledge and skills levels might participate in the same training for that reason. She explained this situation that

Teachers at our school were directed to the 1 week period or 2 weeks periods of in-service trainings according to results of a survey conducted by the District Directorate of the Ministry of National Education in order to determine the level of the teachers about the technological knowledge and skills. Actually, this survey was not suitable for evaluating the level of the teachers about the SCT. In this survey, there were some questions about their experience for the technologies and how many technological trainings they attended. According to results of this survey, teachers having good answers participated 1 week period of training, while teachers having lower results were directed to 2 weeks period of in-service trainings. However, some teachers of our school had answered misleadingly the survey in order to participate shorter training in point of the periods. That is, determination of which trainings the teachers participated was allowed to teachers' own preference. For that reason, some teachers selected to participate 1 week training, although they did not have enough basic knowledge and skills about these technologies. (C2_SAFT1) Q159

Thirdly, the other negative view for the in-service trainings indicated by 8 teachers was that duration of the trainings was too short. Firstly, teachers attended 1 week-long training declared that they could not benefit sufficiently during the 1 week training. In addition, some teachers participated 2 week-long training also stated that the duration of the training was short for them. On the other hand, the Computer Teacher declared that most of the teachers wanted to go to the 1 week trainings, although they said that time of the in-service trainings should be longer.

Fourthly, some teachers (N=6) declared that contents of in-service trainings were not enough for them so that they could use the SCT in their lessons. For instance, a teacher (C2_M1) expressed that they gained basic information about the SCT during the trainings, but they could not utilize them the way they want to use them even if they attended the in-service trainings. Another teacher also mentioned about the problems for the contents of the in-service trainings as

> *Of course, we received a training at least, but that trainings could not be sufficient for us. I can say that our trainer [of the in-service trainings] taught most of the things about the hardware part of these technologies. However, we could not learn how to use SB software or how to overcome problems on the SB software while using it during our lessons. (C2_B1)* Q159

Lastly, 4 teachers indicated that conducting the training only once might reduce the advantage of the trainings for them. They asserted that they learned some knowledge about the SCT at the in-service trainings, but they could forget some of them in the process of time. A teacher (C2_P1) also stated that they did not gain necessary skills and knowledge about the SCT, because they participated in only one session of training and this training was at the beginning. Other two teachers (C2_G2 and C2_C1) specified that not providing periodic trainings throughout the academic year or a few times in a year could be accepted as a problem for the in-service trainings.

In addition, the one deficiency was indicated by the school administrators and the Computer Teachers in the second case school. They stated that the YEGITEK did not

provide the special in-service trainings for them. However, a project administrator (PM3) at YEGITEK specified that they were planning in-service trainings firstly for the administrators in the all organizations of MoNE and they would start to trainings from senior management of the organization to school administrators. He also said that they would provide the trainings to the teachers after the school administrators.

Lack of Knowledge and Skills for the SCT

In this title, teachers' lack of knowledge and skills will be mentioned. Most of the teachers (N=10) in the second school indicated that teachers not having enough knowledge and skills for the SCT could not adequately use them in their courses. They also asserted that this lack of knowledge and skills were one of the main problems for the usage of the SCT in their schools. Besides, three teachers asserted that this was the biggest problem in order to use the SCT in their courses. In addition, the Computer Teacher (C2_SAFT2) stated that teachers not having usage experience of the PTIWB did not prefer to utilize them in their lessons. A teacher represented the reason of this problem that these technologies were new for them. For instance, a Geography Teachers specified that

> *Although I think that these technologies are useful for us and they are good systems, I could not use them well in my courses. Because, these systems are too new for us. That is, we did not have enough experience for the usage of the smart board. As a result, I can say that not having enough information for these technologies is a problem for us. (C2_G1)* Q160

In addition, teachers' lack of knowledge and skills for overcoming the technical problems was represented another challenge for the usage of the SCT. 5 teachers stated that they did not resolve the basic technological problems because of lack of knowledge about these problems. A teacher stated that

> *Actually, I can use my computer for basic jobs like reading newspaper, searching something on the Internet and watching some videos. However, I do not have wide knowledge and skills for the*

computers. Moreover, the smart boards are too new for me. That is, even if I learn basic usage of [the PTIWB], I cannot solve the basic problems of not only computers but also the smart boards. For example, I could not overcome the problem about the USB memories of a private publisher. I could not run the activities [on the PTIWB], because I did not have enough information to run properly it. (C2_C2) Q161

Furthermore, most of the teachers in the second case school also declared that they could not develop their own e-contents for the PTIWB. They stated the reason of this as the lack of knowledge and skills for developing e-contents.

Challenges for Classroom Management

As in the first case school, 8 teachers declared that they encountered classroom management problems while they were using SCT in their courses. At this point, 4 teachers especially emphasized that students having more knowledge and skills about the SCT than the teachers could cause various classroom management challenges. A teacher (C2_E1) explained that some students might have more knowledge and skills about these technologies, and some teachers might receive support from them in order to overcome some problems on the PTIWB. She asserted that this could cause that teachers might lose their authority in the classrooms and the students easily could make undisciplined behaviors during those situations. Another teacher specified that this problem also could be happened when the teacher could not control well the PTIWB and she said that

One of the main reason of my disuse the smart board was that I could not control [the PTIWB] in front of the students in the classroom and our authority might decrease on the students because of inability to control these technologies. For that reason, we could not trust some students (especially 9th grade students) during inability to control them. When there was an unexpected situation like jam or uncontrolled movement on the smart board, I did not overcome the problem easily and students might cause classroom management

problems. As a result, various challenges in point of classroom management could emerge when I used these technologies and I did not control them. (C2_B1) Q162

A teacher (C2_C1) also expressed another point about the controlling the PTIWB as a challenge. She stated that when they were using closely the PTIWB, they could not control the all screen from very close distance and some students could abuse this situation for indiscipline behaviors, because they could see easily whole screen from distance. Additionally, the process of finding and selecting e-contents at EBA could cause the classroom management challenges. For example, a teacher (C2_G2) stated that students talked loudly when they were selecting the e-content at EBA. In parallel to this, it was detected during the some observations (Obs45, Obs46, Obs47, and Obs48) that some students were interested other things during the selection of the activities at EBA by the teachers and some teachers had difficulties while directing students to subject of the lesson again.

Difficulties to Maintain Motivation

Approximately half of the teachers (N=8) in the second case school indicated that maintaining the motivation of both teachers and students for the usage of the SCT was another challenge for them. Some factors were declared as affecting the motivations of teachers and students as shown in Table 4.26.

Table 4.26 Sub-themes for Difficulties to Maintain Motivation

Factors affecting motivations of teachers and students	**Frequency of participants mentioned**
Factors affecting motivations of teachers	8
Unexpected problems while using SCT	5
Effects of students behaviors	3
Disuse of other teachers in the school	2
Factors affecting motivation of students	2
Unexpected problems while using SCT	2
Selection of e-contents at EBA	1

Firstly, when these factors were analyzed for teachers, 3 factors came forward and these were effects of unexpected problems while using the SCT, effects of students'

behaviors, and effects of general disuse of other teachers in the school. 5 teachers specified that when they prepared to use the SCT and when they encountered with an unexpected problem (like breakdown on the touch screen of the PTIWB), their motivation to use the SCT were affected negatively and some teachers decided not to use the PTIWB in the most of their lessons. On the other hand, a teacher (C2_T1) and the Computer Teacher (C2_SAFT1) of second case school stated that most of the teachers did not completely give up to use these technologies because of unexpected problems but they agreed upon the opinion of negative effect of the unexpected problems to the motivation of some teachers for using these technologies.

In addition, 3 teachers especially emphasized that their motivation to use the SCT were affected negatively because of low profile students. A teacher explained this point that

> *Most of the students in our school have lower level academic achievement. For that reason, their interests to the courses are very low and they generally do not attend to courses and listen to subjects of the lessons. Frankly, we (as teachers) did not want to exert extra effort to teach these low-level students. For instance, if we tried to use these technologies, they wanted to disrupt the lesson and they benefited from the confusion while using the technologies. That is, my motivation to use these technologies was too low because of the characteristics of most of the students. (C2_B1)* Q163

Additionally, a teacher (C2_G1) in the second case school specified that his motivation to use the SCT were affected from the general disuse of other teachers in the school. He mentioned that some of the teachers in their school did not use the SCT in the most of their lessons and they talked about their reluctance to use them in the teacher staff room. He asserted that these undesirable talking of these teachers might negatively affect his willingness to use the SCT.

Secondly, although most of the teachers in the second case school did not mention directly the challenge of maintaining motivation of students while they were using

the SCT in their courses, actually, some problems about this were mentioned above like losing interest of students while selecting e-contents from EBA and difficulty of gaining students attentions after an unexpected problem occurred. In addition, these challenges to maintain attention of students were also detected during some observations by the researcher (Obs45, Obs46, Obs47, Obs50 and Obs55).

Deficiency of Support to Teachers

On the contrary to first case school, there was a Computer Teacher in the second case school. Before the establishment of these technologies in the second case school, this Computer Teacher (C2_SAFT1) had worked as Computer Teacher and Philosophy Teacher. During that period before the SCT, she had given the Computer courses and Philosophy courses. In addition, she had interested in issues about the Computer Lab and other computers in the school. However, when the SCT were established within the scope of FATİH Project, this Computer Teacher was assigned to support and help teachers by the school administrators in order to ease SCT usage of the teachers and solve the problems about the SCT in the school. 6 teachers declared that they have received support only from the Computer Teacher of the second case school. They expressed that they did not get directly support from the school administrators and YEGITEK administrators. In addition, the Computer Teacher stated that

> *I am interested alone the all issues [about the SCT] in the school. I can say that I write and send the correspondences about these technologies in our school. Furthermore, I communicate with the authorities at the YEGITEK/MoNE. If we encountered a problem about the SCT, I informed the authorities at the District Directorate of the Ministry of National Education or technical services of the PTIWB. That is, our school administrators were not interested in any situation. (C2_SAFT1)* Q164

She also added that she informed the school administrators and administrators of MoNE about the some problems such as locking problem of the PTIWB, deficiencies of in-service trainings, however she did not receive any support for these problems from them. She emphasized that especially the school management were not

interested in the SCT and their problems about the usage of the SCT. She also specified that she could not easily reach the authorities at YEGITEK. She expressed that she did not get an answer from the authorities when she wanted to inform administrators at YEGITEK in order to find out a solution to the problems. She tried to reach them with correspondences, e-mails or telephone, but she could not reach any authorized person at the most of the time.

In addition, receiving support from only the Computer Teacher in the school might cause another problem about the support to the teachers. Some teachers stated that they might hesitate to consult to the Computer Teacher when they encountered a challenge about the SCT, because the Computer Teacher might be very busy. A teacher explained that

> *When we had a problem about these technologies, there was an only support point (the Computer Teacher). She was interested all problems and she informed the necessary contacts about the problems. However, there were more than 40 smart boards in our school and interesting the problems of all boards could be very time consuming and very difficult for only one person. For that reason, when I encountered a problem on the PTIWB, reaching the Computer Teacher could take lots of time or we could not reach her. Because, she were very busy most of the time. Therefore, I could beware of conducting a problem to her because of their busy schedule. (C2_T1)* Q165

On the other hand, an administrator (PM1) at YEGITEK specified that some computer teachers in the school did not want to support the teachers and be interested the problems of the SCT in the schools. He stated that these computer teachers wanted only to teach computer courses in the schools and they asserted that supporting the usage of the SCT and solving the problems about them were not their duty as computer teachers.

The other problem was about the technical supports of the authorized technical service of PTIWB. The Computer Teacher (C2_SAFT1) of the second case school declared that when we encountered a serious technic problem on the PTIWB, I informed the technical service, nevertheless they did not came and intervene in the problem in time. She stated that she called by telephone the call center of the PTIWB's company and registered the problem of the PTIWB, however nobody came to the school from the technical service although it had been more than a month. In addition, a few teachers complained about the delay of the authorized technical service's support.

Limited Time

Lack of time was declared as challenge for usage of the SCT by 7 teachers in the second case school. 5 sub-themes emerged in this theme and these were lack of time to find content, to prepare content, to teach all subjects in the curriculum with using the SCT, to participate to in-service trainings, and the Computer Teacher's lack of time for supporting other teachers in the school (Table 4.27).

Table 4.27 Sub-Themes for Lack of Time

Sub-themes for lack of time	Frequency of participants mentioned
To find content	6
To prepare content	6
To teach all subjects in the curriculum with using SCT	5
To participate in-service trainings	2
Computer Teacher's lack of time for supporting other teachers	1

Firstly, 6 out of 15 teachers indicated that they did not have enough time for finding e-contents in order to use these technologies in their courses. A teacher (C2_G1) specified that they were not allowed time to search and find e-contents about the subjects at the out of the lesson time. Another teacher stated that

> *Actually, I could not use these technologies. Because, there were not enough e-contents at EBA and I did not have enough time to find several e-contents on the Internet. (C2_G1)* Q166

In addition, a teacher (C2_H1) emphasized that they did not have enough time during the lesson for selecting which content they would use. She explained that although there were lots of contents for History at EBA, she had difficulties while selecting the contents for their lesson, because the classification of these contents were not organized well and she could lose lots of time for searching in the contents at EBA.

Secondly, 6 teachers mentioned that there was lack of time in order to prepare for courses and to develop their own e-contents. 2 teachers emphasized that they did not have enough time to prepare their own e-contents they would use in the lessons even if they had enough knowledge and skills about developing e-contents. The other 2 teachers stated that they had to re-arrange the e-contents they found from different sources. A teacher explained this point that

> *Actually, I can find various materials for the Geography courses from different websites. However, these contents generally were not opened with the SB software [on the PTIWB]. For that reason, I have to re-arrange them at home in order to utilize them with SB software. However, I have different responsibilities at home about my personal life and I cannot allow time for this. That is, I can say that I did not have enough time for preparing to the courses. (C2_G2)* Q167

Thirdly, 5 teachers asserted that they might have difficulties to teach all subjects in the curriculum with using the SCT at the end of the semester. The Computer Teacher (C2_SAFT1) emphasized that most of the teachers complained that they could not teach all of the subjects to the students at the end of the year, if they would use the SCT in the most of their lessons. For example, a teacher stated that

> *Even in normal times, we could not finish all subjects in our lessons in a year. That is, our time is already limited. Besides this, we could not reach the last subjects, if we break down our course flow for using the technologies. For that reason, I did not use these technologies in order to waste time for this. (C2_B1)* Q168

In addition, a teacher (C2_M1) expressed that working on the SB software were difficult and very time consuming. He said that SB software required most of the processes to add objects on the screen and he did not use the SB software and PTIWB in such situations. Moreover, an English Teacher explained that

> *The slowdown on the Internet connection and hitches at the technologies might cause time loss for us during the lessons. Therefore, I sometimes did not finish the subject during a lesson when I opened the PTIWB. (C2_E2)* Q169

Although school administrators asserted that the teachers (especially Math teachers) could solve more questions during a lesson, a Math Teacher expressed that they could solve less questions in a lesson and they did not use these technologies in order to not lose time in the lessons.

Fourthly, lack of time for in-service trainings was indicated by a teacher and the Computer Teacher in the second case school. The Computer Teacher (C2_SAFT1) emphasized that some teachers did not want to participate in the in-service trainings for the lack of time. She also said that some teachers preferred to participate 1 week period in-service training even if they needed more trainings. A teacher (C2_M2) specified that he did not spend time for the in-service trainings when he was out of the school.

Lastly, there was a special challenge indicated by the Computer Teacher of the second case school. She (C2_SAFT1) did not have enough time for supporting other teachers in the school and interesting with the problems of all PTIWB in the classrooms. Moreover, she explained that she could not allocate time to help teachers for integrating technologies to their courses because of interesting technical problems of the PTIWB in all the time.

Inadequate Content

When presenting problems about contents for the SCT in the second case school, various challenges about the EBA were indicated previously under title of 'Challenges at EBA' according to the findings of the study. However, there were

some other problems stated by teachers about the contents used with the SCT other than contents at EBA. At this point, 4 out of 15 teachers declared that they could not find e-contents which were prepared specially for the usage on the PTIWB. A teacher stated that

> *Actually, e-contents were insufficient for the usage at the smart boards. That is, there were materials like printed materials including lots of text. Furthermore, text was sounded in some materials of private publishers. So, I can say that these materials were not suitable for the usage on the PTIWB in front of the students. (C2_G2)* Q170

In addition, e-contents of some private publishers did not work on the PTIWB. As mentioned before, a teacher wanted to use USB memory of a publisher in order to utilize e-contents in it, but he could not open this USB memory with the PTIWB because of constraint of it. The other challenge stated by 4 teachers was that finding or preparing e-contents for the SCT were difficult for most of the teachers. When the required e-contents were not provided to them, they did not prepare these e-contents with their own efforts. A teacher (C2_T1) expressed that they could be encountered undesirable contents for the students when they were searching the content of the lesson on the Internet.

4.1.2.4 Solutions to the Challenges and Problems While Using SCT in the Second Case School

In this part, what were done to overcome the challenges and problems (mentioned in the previous section) in the second case school will be presented in the light of data analysis for the second case school. Again, data obtained from the observations, interviews and document analysis for the second case school were used in data analysis process. Stated solutions by the participants in the second case school were grouped according to who deal with or solve them. Thus, 10 themes about the solutions to challenges and problems emerged at the end of the data analysis. As seen in Table 4.28, these themes were (1) teachers' own efforts, (2) getting help from another teachers, (3) getting help from students, (4) solutions and attempts of the computer teacher of the school, (5) supports of school management, (6) supports and

applications of YEGITEK/MoNE, (7) solutions of private publishers, (8) supports of authorized companies' technical service, (9) no solutions to the problems and challenges. The sub-themes for each theme will be presented in detail above.

Table 4.28 Themes for the How the Challenges were Solved in the Second Case School

How challenges were solved	Frequency of participants mentioned
Solutions and attempts of the computer teacher of the school	16
Teachers' own efforts	8
Supports and applications of YEGITEK/MoNE	7
Getting help from another teachers	6
Getting help from students	6
Solutions of private publishers	6
Solutions of authorized companies' technical services	6
Supports of school management	3
No solutions to the problems	11

Solutions and Attempts of the Computer Teacher of the School

The Computer Teacher in the second case school acted a part as the key factor for the usage of the SCT in that school. Most of the teachers and school administrators emphasized that main role of adequate usage of the SCT in the second case school belonged to the Computer Teacher of their school. At this point, almost all participants (N=16) in the second case school expressed that most of the challenges and problems teachers encountered while using the SCT were conducted to the Computer Teacher of the school. Assistant School Principal (C2_SA2) stated that their teachers generally informed the Computer Teacher about the all of the problems of these technologies. The Computer Teacher (C2_SAFT1) also stated that she was interested in all of the problems of the SCT informed by teachers and she tried to overcome these problems as far as she could. She summarized her attempts to overcome these problems as dealing with them, informing stakeholders about the problems, informing teachers about the solutions and usage of SCT, encouraging teachers to use SCT, and getting opinions and wishes of teachers in the school (Table 4.29). These attempts of Computer Teachers will be presented according to data of the study below.

Table 4.29 Attempts of Computer Teacher to Overcome Challenges

Attempts of Computer Teacher	**Frequency of participants mentioned**
Dealing with the problem	13
Informing stakeholders for solutions	4
Informing teachers about the solutions and usage of SCT	4
Encouraging teachers to use SCT	2
Getting opinions and wishes of teachers	2

Firstly, most of the teachers (N=13) stated that the Computer Teacher dealt with all the problems conducted by teachers in the second case school. The School Principal (C2_SA1) said that they (as school management) assigned the Computer Teacher to be interested in all of subjects about the SCT in their school. Again, the majority of the teachers (N=13) indicated that the only person who were interested in these technologies and their problems in the second case school was the Computer Teacher. A teacher explained that

> *We do not know who our collocutor was when we encountered any problem about [the PTIWB], who support us about the technologies, who informed us. At least, I do not know whether there is any person in our school. I know only thing about these topics that the only source for us when we need any support about the smart board was the Computer Teacher of our school. (C2_T1)* Q171

In addition, the Computer Teacher (C2_SAFT1) also declared that most of the teachers in the school informed her for the solution of the problems they encountered. She stated that she intervened in most of these problems (especially encountered during the lessons) going to the classroom which the problem occurred if she did not deal with another things.

On the other hand, 2 teachers specified that there were some problems that they did not inform the Computer Teacher because they could overcome these problems with their own efforts. In addition, a teacher (C2_M1) stated that the Computer Teacher was too busy and they did not inform her about some basic problems. In addition, the

Computer Teacher said that number of teachers informing her for the basic problems decreased as time pass by in the second case school.

Secondly, the Computer Teacher expressed that she got in contact with the responsible departments (various stakeholders) for the solutions of problems and challenges encountered while the usage of the SCT. She listed these responsible departments as the school management, District Directorate of the Ministry of National Education (İl/İlçe Milli Eğitim Müdürlüğü), YEGITEK/MoNE, and technical service of the SCT. She also stated that she was only person in the second case school communicating with interested institutions about the SCT. A school administrator (C2_SA2) also declared that the Computer Teacher have followed correspondences with the YEGITEK and MoNE about the SCT. On the other hand, the Computer Teacher specified that she informed the school management about the problems about the SCT in black and white in order to share the responsibility of the SCT.

Thirdly, 2 school administrators and the Computer Teacher indicated that the Computer Teacher informed all teachers in the second case school about the solutions of problems and challenges they encountered while using them. The computer Teacher stated that she warned the teachers in the teachers' council meeting and she gave extra information for the SCT to ease the usage of the SCT by teachers in their lessons. For example, she specified that she informed the teachers about the password problems while entering the EBA portal. She showed the teachers how they could change their 'MEBBİS' password and she informed them that they could define new EBA password.

Fourthly, the Computer Teacher expressed that she supported the teachers in the second case school encouraging them to use the SCT. She stated that

> *When these technologies were newly established at our school, some teachers did not want to use some software (like office programs) at the PTIWB. I explained them that these software were not different*

from other software they used in the computers at their home and I relieved them for using these technologies easily. (C2_SAFT1) Q172

She asserted that some teachers used these software after her encouragement to use the PTIWB and its software in their lessons.

Lastly, there was another point in terms of attempt of the Computer Teachers to overcome challenges while using the SCT. The Computer Teacher explained that she prepared a form in order to get opinions and wishes of teachers in the second case school. She planned that teachers represented their demands for adequate usage of the SCT in their school and she would send these demands to YEGITEK/MoNE. In these form, there were parts for the EBA, in-service training, and technical support to them. However, she said that most of the teachers did not specify their requests at this form. For that reason, she did not send the results of this form to YEGITEK/MoNE.

When the solutions and attempts of the Computer Teacher were grouped according to types of the problems they encountered, these attempts may be listed as for technical problems, for lack of e-contents and for informing teachers in the second case school (Table 4.30). Now, these solutions will be presented under 3 sub-titles.

Table 4.30 Solutions of Computer Teacher to Challenges

Types of the challenges the Computer Teacher solved	**Frequency of participants mentioned**
Technical problems	8
Lack of e-contents	4
Informing teachers	1

For Technical Problems

Approximately half of the participants (N=8) in the second case school indicated that the Computer Teacher deal with technological problems of the SCT in the school. These solutions may be listed as making maintenance of PTIWB, solving basic mechanic problems of PTIWB, dealing with problems about EBA portal, solving software problems, and installing necessary programs to the PTIWB. Firstly, 7

teachers stated that the Computer Teacher could repair basic technic problems on the PTIWB like breakdown at the connection parts, malfunction at touch screen, and calibration adjustments of the PTIWB. For example, the Computer Teacher stated that

> *One of our teachers informed me about the breakdown at the USB connection part on the wall in a classroom. Firstly, I went to that classroom and I tried to connect some devices to PTIWB, but these connection parts did not work adequately. Because of not having enough time, I could not intervene in the connection parts and the smart board. After the last lesson ended, I again went to that classroom again. I examined the problem in detail and I identified the reason of the problem. That is, the cable of the connection part dislocated and all USB connection parts did not worked adequately for that reason. Intervening the cable of connection part was difficult, because their location was under the small cover on the left side of the PTIWB. Therefore, I opened this cover like a technician and fixed the connection part problem in that classroom. (C2_SAFT1)* Q173

It was also observed in the one of the observation (Obs49) that a Math teacher wanted to use the PTIWB in order to show example questions to students. He opened the PTIWB and run the SB software to make changes on the question at PTIWB. However, the touch properties of the board did not active and the teacher did not write anything on the question. Then, he sent a student to the Computer Teacher for the solution of the touch screen problem. The Computer Teacher came to the classroom 3 minutes later. She investigated the problem and she said that I could not do anything for this problem now and I would deal with these problems later. Then, she went out from the classroom. Whereupon, the Math teacher continued the lesson using whiteboard to show example questions to students.

Additionally, the Computer Teacher (C2_T1) also specified that although she could overcome some of the technic problems about the PTIWB, there were also more serious technical problems at the PTIWB like malfunction of touch screen of them.

In that situation, she informed the authorized technical service of the PTIWB to overcome these problems.

Secondly, the Computer Teacher dealt with issues about software of the SCT. The Computer Teacher (C2_SAFT1) mentioned that the main mission of her might be accepted as maintaining the operating system and SB software of the PTIWB. She emphasized that she checked and controlled software systems of all PTIWB and she regulated necessary software on them. She exemplified that she installed a media player (which sent them by YEGITEK) to all PTIWB. She also expressed that she helped some teachers to use the SB software in their courses. Lastly, she stated that she installed various educational software to the PTIWB if these software were suitable to criterion determined by YEGITEK/MoNE.

For Lack of E-contents

4 out of 15 teachers in the second case school indicated that the Computer Teacher supported them to overcome lack of e-contents for using these technologies in their lessons. A Turkish teacher stated that

> *Sometimes, we could not find necessary materials at EBA. At those situations, the Computer Teacher of our school assisted us to reach these e-contents. That is, she showed us how to enter the EBA and where we could find the e-contents about our courses. (C2_T2)* Q174

Another teacher (C2_C1) also specified that the Computer Teacher directed and assisted them to enter the websites that they could find e-contents about the subjects of their courses so that they could use the SCT. In addition, the Computer Teacher of second case school stated that she installed various e-contents about some courses to the PTIWB. At this point, she emphasized that

> *I installed e-contents requested by teachers to all PTIWB in the classrooms, if the requested e-contents would be used by other teachers. That is, I did not set up some e-contents wanted by some teachers, because these e-contents would be used only a teacher. If I would install every e-contents requested by teacher, the PTIWB might*

> *be overloaded and their performance might decreased. In addition, teachers could not find their e-contents in the lots of e-contents installed to the smart boards. That is, I did not add so many e-contents to the smart board, if these contents would be used by only a teacher. For example, one of our Chemistry Teachers requested me to install a software of a private publisher to all PTIWB, but I said that I could not do this because of the reason that I mentioned. However, I installed this software to only the PTIWB at the Chemistry lab and this teacher has been using this software in her courses. (C2_SAFT1)* Q175

She also said that she uploaded the e-contents of a private publisher for English courses, because these contents were used by all teachers at the PTIWB in the all classrooms.

For Informing Teachers in the Second Case School

The Computer Teacher (C2_SAFT1) stated that most of the teachers in the second case school declared that they needed extra in-service trainings to use adequately the SCT in their courses. She expressed that she talked with the school management and they decided to arrange additional trainings about the usage of SCT. However, she said that most of the teachers in their school were not interested with this idea and she did not realize this training for teachers in the second case school.

Teachers' Own Efforts

It can be inferred in the second case school that the first way to solutions of the problems and challenges while using the SCT was the teachers' own effort to solve the problems. 8 out of 17 participants in the second case school declared that teachers firstly tried to overcome some basic challenges they encountered. The Computer Teacher stated that

> *Although some teachers did not strive to solve very basic problems on the PTIWB, there were some teachers trying to solve most of the*

problems on the PTIWB and EBA. If they could not overcome some of these problems, they inform me about the problem. (C2_SAFT1) Q176

In addition, 3 teachers emphasized that some teachers especially having enough knowledge and skills about these technologies could solve some basic problems during the lessons without taking any help from others. Another teacher indicated that *"we have got used to utilize these technologies and we could easily solve some basic problems in the process of time"* (C2_G1). When teachers' own attempts were analyzed, their efforts were grouped under 3 headings as for content problems, for technical problems, and for the usage difficulties of SB software and as in the Table 4.31.

Table 4.31 Solutions of Teachers with Their Own Efforts in the Second Case School

Types of the challenges teachers solved with their own efforts	**Frequency of participants mentioned**
Content problems	8
Technical problems	5
Usage difficulties of SB software	4

For Content Problems

On contrary to first case school, the YEGITEK provide lots of e-contents to users of SCT with EBA portal. However, some teachers stated some deficiencies about the e-contents to use with SCT. Approximately half of the teachers (N=8) indicated that they could overcome the lack of e-content providing from other sources like searching on the Internet during the lesson, using USB memories of different publishers, and using e-contents at their own computers. A teacher explained their solution for lack of e-content saying that

Now, there were not enough contents for especially students at 12th grades. Therefore, we tried to obtain necessary e-content from other sources. Generally, I searched on the Internet for required contents about our lesson. However, we could encounter with some undesirable contents like images or advertisement. That is, we could not plan this because we need extra information about the topic at

> *that time. In that time, we tried to hide this undesirable content so that students did not see them. As a result, I utilized from various websites for providing extra content in my lessons. (C2_T1)* Q177

In addition, the Computer Teacher in the second case school gives an example for teachers' own solution to lack of e-contents. She said that

> *Chemistry Teachers in our school requested from me to find extra contents for Chemistry courses. Although I could not provide e-contents to them, they found some e-contents of private publishers. They brought these contents with a USB memory and I installed these contents to the PTIWB in the Chemistry Lab. (C2_SAFT1)* Q178

There was also another solution of a teacher that mentioned in the solutions for technical problems. This solution was the re-arranging e-contents (which these teachers had in their computers) for using them with SB software. After they organized the e-contents according to SB software, they could use these e-contents and they also overcome the lack of e-content problems with these organized contents.

For Technical Problems

5 teachers in the second case school indicated that they could find various solutions to some technical problems while they were using the SCT in their courses. A teacher explained that

> *In a classroom, there was a problem at the some part of the smart board's screen. In this part, the touch screen property [of the PTIWB] did not work. That is, when I touched this part on the screen, the smart board did not give any reaction. However, I used the smart board in the entire classroom for a special activity about my lesson and I had to use this activity in this classroom. For that reason, I opened this activity [on the PTIWB] and I changed the location of the activity on the screen, if the activity required any touch for interactivity on passive part of the screen. That is, I moved the activity*

to active part of the smart board and we could complete the activity in that classroom. (C2_T1) Q179

The other solution of the teachers was about the password security problem of entrance to EBA system. As mentioned before, their 'MEBBİS' password were defined to each teacher in order to use it as password to enter EBA portal and students could easily see these passwords of teachers while they were writing on the PTIWB. The Computer Teacher (C2_SAFT1) declared that although most of the teacher did not define a new password for EBA other than their 'MEBBİS' password, a few teachers changed their EBA password and they could overcome worry about the students to see their 'MEBBİS' password.

Moreover, a teacher in the second case school brought his own laptop computer to the school and he used it with the PTIWB (Obs49). That is, he connected his laptop to the PTIWB and he utilized from the PTIWB as a projector. This teacher explained that

I used my laptop with the smart board in the all classrooms, so I did not have to use [the PTIWB] very closely and I could easily control the entire screen from my computer. In addition, I could use e-contents of various publishers even if they did not work on the smart board because of its restriction. (C2_M1) Q180

In addition, some teachers could interfere in the software of the PTIWB. For example, it was observed that a few teachers in the second case school could pass over restriction of the Internet connection (Internet filter of MoNE) with running a software in their USB memories. However, the Computer Teacher (C2_SAFT1) of the school expressed that this intervene of the teachers to software of the PTIWB could cause extra problems on the PTIWB and she had to overcome these problems caused by some teachers for most of the PTIWB in the classroom. Moreover, she specified that these interventions of teachers to the PTIWB could cause permanent problems and she could not solve these problems in the school.

Lastly, 2 teachers indicated that they did not want to lock the PTIWB during the breaks so that students could benefit from them. A teacher explained his suggestion as

> *Although I think that students may use the smart board during breaks, our school managements wanted the smart boards to lock out of the lesson time. I let them to use the smart board during the breaks between my lessons, but I locked the boards after my lessons. However, I suggested a solution to this problem (locking of the PTIWB) in the teachers' council. I said that the smart boards should be unlocked during the breaks and students could utilize from them. Nevertheless, my suggestion was rejected by school management in the teachers' council. (C2_C2)* Q181

As in this example, teachers tried to overcome some challenge and they could offer these solutions to other teachers and school administrators in the second case school.

For Usage Difficulties of SB Software

The usage difficulty of the SB software on the PTIWB was mentioned in the previous parts. This challenge was that the SB software did not let users add materials of other resources to the board of the SB software. That is, SB software did not detect the visuals separately as an object. For that reason, teachers could not easily use the e-contents (which they transferred to SB software from other resources) with SB software and they could not make any changes separately on an object. In order to overcome this problem, 4 teachers found several solutions. A solution indicated by a teacher was the organizing e-contents of different sources according to digital format SB software accepted. The teacher explained that

> *In order to use the SB software and [the PTIWB] in spite of restrictions of SB software, I arranged the visuals (which I found from others sources like PowerPoint presentations) according to SB software. That is, I separated the each object of visuals and then I transferred the board of the SB software. However, I have to make*

these arrangements at home before the lessons. For that reason, I could prepare a few activities for my lessons, but I would complete the arrangement of the visuals for my all subject during this summer holiday in order to utilize SB software in all of my lessons. (C2_G2) Q182

In addition, it was monitored during the observation (Obs42) that a teacher used SB software with another activity separating the screen of PTIWB as vertically. Then, he run the SB software in a part, and he opened other activity in the other part. So, he could utilize both SB software and activities. Moreover, 2 other teachers stated that they used the PTIWB with whiteboard, when they need to make change on the visuals. They said that they showed the visuals on the PTIWB and they might write or draw on the whiteboard when any drawing or writing required. In other words, these teachers used the PTIWB as only a projector because of usage difficulty of SB software.

Supports and Applications of YEGITEK/MoNE

The other theme for the solutions of problems and challenges the teachers encountered while they were using the SCT was emerged as the supports and applications of YEGITEK and MoNE. The solutions of YEGITEK and MoNE were grouped as for lack of e-contents, for lack of knowledge and skills (training the teachers), and for technical problems (See Table 4.32). Firstly, the support processes by YEGITEK and MoNE will be described, and then these solutions of YEGITEK/MoNE will be presented according to these groups.

Table 4.32 Attempts of YEGITEK/MoNE in the Second Case School

Challenge types	**Frequency of participants mentioned**
Lack of e-contents	6
Lack of knowledge and skills (training teachers)	5
Technical problems	4

Support Processes by YEGITEK/MoNE

In the second case school, the Computer Teacher has communicated with authorized people at YEGITEK and MoNE as mentioned earlier. The Computer Teacher expressed that there was not any specific ways to reach the authorized people at YEGITEK in order to get help for overcoming the challenges while using SCT. Additionally, some of the teachers (N=7) indicated that there was not any direct communication between them (as teachers in the school) and YEGITEK administrators. Moreover, the Computer Teacher emphasized that

> *The administrators at YEGITEK did not get in contact with me as the Computer Teacher of our school, although I am interested with all subjects about these technologies [in the second case school]. However, I sent written documents about the problems encountered in our school and our requests to YEGITEK. (C2_SAFT1)* Q183

On the other hand, if the communications between the YEGITEK/MoNE and the second case school were analyzed according to the results of document analysis and interviews, these communication channels might be summarized as by face-to-face meetings, by correspondences, questionnaires and forms, and by telephones and by e-mail. Firstly, the Assistant School Principal and the Computer Teacher indicated that some authorized staff at YEGITEK conducted a meeting once with school administrators and the Computer Teacher when the SCT were established in their school. However, the Computer Teacher (C2_SAFT1) said that another meeting between them and YEGITEK administrators would never be actualized with them again. Secondly, the Computer Teacher stated that YEGITEK administrators requested some information about their school and teachers official correspondences. She mentioned some of them as a written report about the physical structure of their school (like number of classes, labs and rooms), a questionnaire about e-contents at the EBA (for taking request of teachers), and a survey about the in-service trainings (for determining perceptions of teachers). Thirdly, she stated that she have kept in touch with the authorized people at District Directorate of the Ministry of National Education by means of telephone and e-mails. She told that she asked them for the

problems and challenges about the SCT the teachers encountered and these authorities could support her while solving the problems. In addition, she asserted that she sometimes helped them about some problems she solved herself. However, the Computer Teachers stated that she wanted to get into touch the YEGITEK administrators about these problems and challenges of the SCT. She called with telephone and sent e-mail but she could not reach any administrators at YEGITEK and they did not return to her e-mails. Consequently, it can be said that the support to the second case school for some problems and challenges about the SCT were given by authorized persons at District Directorate of the Ministry of National Education by means of telephone and e-mails, although there were not too many direct attempt of YEGITEK administrators to the second case school for the solutions of problems. After all, limited attempts of YEGITEK will be presented separately for technical problems, for lack of e-contents, for lack of knowledge and skills (training the teachers)

For Technical Problems

Solutions of YEGITEK/MoNE for the technical problems in the second case school were conveyed to the school by means of various organizations or institutions like technical services of the PTIWB, technicians of the Internet supplier company, and software of private organizations. 4 out of 15 teachers in the second case school expressed that some of technical problems while they were using the SCT were resolved through attempts of YEGITEK. For example, a teacher stated that

> *In a classroom, [PTIWB] did not work adequately. That is, touch screen of it functioned problematically and the calibration adjustment of it could not be fixed. We told this problem to our Computer Teacher about this problem and she informed the authorities at YEGITEK about our problem. A few weeks later, our calibration problem was resolved. I estimated that technical service of the smart boards overcame this problem with the redirection of YEGITEK [administrators], but I might accept this solution as the result of attempts of YEGITEK. (C2_T1)* Q184

Moreover, a teacher (C2_C1) mentioned that interruptions at the Internet connection decreased after they complained about them to YEGITEK. She asserted that authorities at YEGITEK dealt with the Internet connection problem in their school and they supplied more quality Internet access to them. Additionally, the Computer Teacher (C2_SAFT1) indicated that YEGITEK provided some software to their school so that they would overcome some of their problems like anti-virus software. She told also another solution of YEGITEK for the software problems that YEGITEK sent new video player software to their school so that they could show all videos in their classrooms.

For Lack of E-contents

The EBA portal was declared the solution of YEGITEK for the lack of e-content while the SCT were used. 6 teachers in the second case school stated that they utilized various e-contents at EBA in order to overcome lack of e-content for the usage of the SCT. In addition, the Computer Teacher of second case school said that *"EBA may be accepted as the support of YEGITEK for the providing contents to teachers"* (C2_SAFT1). Especially, digital versions of textbooks were indicated by 3 teachers as the attempt of YEGITEK in order to overcome lack of contents for using these technologies. In addition, a teacher stated that

> *We sometimes encountered various unsuitable contents for students while we were searching e-contents about our subject on the smart board during the lessons. In order to eliminate this risk (opening undesirable contents like images or advertisements), I searched the visuals in the gallery of SB software using the sources at EBA. Therefore, I could overcome the problem of showing undesirable contents with EBA generated by YEGITEK. (C2_H1)* Q185

On the other hand, the Computer Teacher (C2_SAFT1) specified that YEGITEK has not added more e-contents to EBA for the some courses (like Philosophy, Biology and Turkish Literature), although she indicated the lack of e-content for these courses to YEGITEK. However, a YEGITEK administrator (PM4) expressed that

they were uploading more e-contents for every courses to EBA portal so that teachers could reach e-contents for using the SCT in their courses.

For Lack of Knowledge and Skills (Training the Teachers)

In the second case school, although most of the teachers (N=12) asserted that in-service trainings did not eliminate their needs of knowledge and skills for using adequately the SCT in their lessons, 5 teachers stated that the in-service trainings provided necessity knowledge and skills about these technologies to them. The School Principal (C2_SA1) explained that teachers in the second case school were satisfied with in-service trainings about the usage of the SCT and they could learn basic usage of the PTIWB. In addition, a teacher mentioned that

> *In the in-service training I participated, our trainer taught general usage of the smart board and showed the presentation prepared by YEGITEK including the purpose of the training and how these technologies could be used. In addition, usage of SB software was told us in the in-service training. So, I can say that this in-service training of YEGITEK caused me to gain largely of necessity knowledge and skills for these technologies. (C2_G2)* Q186

The Computer Teacher declared that there was a practice part of training to show how the SB softwares were used in the lessons and some teachers could learn the usage of SB software on the PTIWB. She (C2_SAFT1) also asserted that most of the teachers in the second case school did not hesitate to use the PTIWB when they met first time in the classroom, because they had chance to use them in the in-service training. 2 teachers in the second case school also expressed that in-service training conducted by YEGITEK were useful for the teachers having basic knowledge and skills about the SCT. In contrast, 8 teachers and the Computer Teacher in the second case school specified that the in-service trainings were insufficient especially for teachers not having enough knowledge and skills about technology. In addition, a teacher indicated that these trainings were not beneficial for older teachers. Moreover, 10 teachers asserted that they could not solve most of their problems after they attended the in-service training as well. A teacher explained that

> *The practice part of the in-service training was inadequate for us, because we had had chance to practice with these technologies for only a day. Therefore, we did not remove our knowledge and skills needs for using these technologies. (C2_M2)* Q187

In addition, the Computer Teacher also emphasized that most of the teachers did not gain necessary practice knowledge and skills for the SCT in order to solve their problems themselves.

Lastly, an interesting point for the in-service training mentioned by the Computer Teacher (C2_SAFT1) was that teachers attending in-service training could find solutions to their problems about the SCT by means of social network group (Facebook group) formed by trainers of the in-service training for the teachers participated in the trainings. She asserted that teachers could share their solutions to other teachers for similar problems about the usage of the SCT. Moreover, she added that they could transfer their contents, knowledge and experiments to other teachers in this social network group.

Getting Help from another Teacher Who Had Technological Competency

In the second case school, 6 out of participants indicated that some of the teachers got help from another teacher having enough knowledge and skills about the SCT. The School Principal (C2_SA1) declared that teachers firstly consulted their teacher friends for overcoming basic problems about the SCT, because they wanted to reach the solution as soon as possible. On the other hand, a teacher stated that they could not easily consult any teacher in their school, because they might hesitate to be disgraced within other friends. This teacher explained that

> *Actually, in our school, there are some teachers who had technological competency for these technologies. However, I and some of my friends did not have enough knowledge and skill [for the SCT]. For that reason, we hesitated from them for being disgraced, because they could underestimate us when we consulted them*

frequently. That's why, I only got help from another teachers having technological competency who were my close friends. (C2_E2) Q188

The Computer Teacher (C2_SAFT1) of second case school also stated that most of the teachers have supported each other in order to overcome usage difficulty problem of SB software and some technical problems of the PTIWB. In addition, she specified that teachers had chance to find their problems from teachers in the other schools by means of social network group (Facebook group) created by trainers of in-service trainings. She said that they could ask questions to other teachers in the group about the problem they encountered while using the SCT and they could take some suggestions about the problem most of the time. However, no teacher in the second case school mentioned about these group for overcoming challenges of the SCT, although the Computer Teacher expressed this group were beneficial for teachers while solving their problems.

Getting Help from Students

Overcoming challenges during the lesson were considered important by the teachers and they wanted to teach the students without interruption during the lesson even if there was a problem about the SCT. At this point, 6 teachers stated that the students could solve some problems about the SCT and they did not have to split the flow of the lesson in order to find a solution to these problems. A teacher (C2_G1) specified that some students could solve some basic problems on the PTIWB, because they had more technological competency than some teachers. In addition, another teacher explained that

Although getting help from the students were not suitable for the authority of the teachers in the classroom, as far as I observed, students assisted some teachers to overcome various challenges while using these technologies during change process to usage of the technologies. Because, new generation (students) become more knowledgeable about the technologies and they are growing with the computers. So, they could know more about these technologies and they could easily solve some basic problems and they could assist

their teachers in the classroom. Actually, this is not a bad situation, but this could affect the authority of teachers negatively. (C2_G2) Q189

At this point, a teacher (C2_P1) emphasized that she did not get help from every students to overcome the problems about technology. She said that she got help from only students who she knew and trusted.

Solutions of Private Publishers

In the second case school, 6 out of 17 participants indicated that they made use of e-contents of private publishers in order to overcome lack of e-content for using SCT in their courses. A teacher (C2_T1) declared that they could find some additional sources for their lessons in order to teach subjects more effective to students. In addition, Assistant School Principal (C2_SA2) and the Computer Teacher (C2_SAFT1) specified that some teachers brought the e-contents of various publishers and used them in their lessons when they did not find enough resource at EBA. The Computer Teacher also emphasized that there were some qualified simulations prepared by universities for especially Physic and Chemistry subjects and some of their teachers benefited from these simulations in the Chemistry and Physic courses in order to compensate the lack of e-content suitable to the SCT in their school. Moreover, an English Teacher explained that

We (as teachers of English courses) have more advantage than other teacher in our school in point of using adequately these technologies, because a package software of a private publisher were installed [on the PTIWB] for English courses. Therefore, we did not meet lack of e-contents for our courses. So, I can say that we overcome this deficiency by means of private publishers. (C2_E1) Q190

Moreover, Assistant School Principal (C2_SA2) expressed that some staff of private publishers came their school and gave USB memories including e-contents to their teachers for using them with the SCT. He also asserted that some teachers used these e-contents so that they did not want to struggle to find and open e-contents at EBA.

Solutions of Authorized Companies' Technical Services

In the second case school, main technical supports have been taken from the technic service of the PTIWB's company. 6 participants in the second case school indicated that the Computer Teacher informed the company of the PTIWB when they encountered serious technical problems on the PTIWB in the classrooms. A teacher (C2_M1) expressed that if they as teachers in the school experienced a technical problems like breakdown of touchscreen property of a PTIWB, firstly they informed the Computer Teacher about the problem and she reported this breakdown to the technical service of the PTIWB if she could not overcome the problem with her own effort. In addition, the School Principal indicated that their Computer Teacher got in contact with the technical services if she needed technical supports. The Computer Teacher explained the support process of the technical services of PTIWB's companies that

> *A phone number for call center of technical service of the PTIWB were given to us (as the Computer Teacher of the school) by YEGITEK/MoNE. Actually, when we had an technical problem on the PTIWB necessitating intervention of authorized technical services, we could phone call to the call center of the PTIWB' company, we could enter for a fault about the problem we encountered at their system. That is, we could save our problems to their system. Then, they qualified the problems we informed and they would give directions on the phone if the problem could be solved with the support from distance. For example, they said us that we could use connection ports on the wall when we informed them about the breakdown of connection ports of the PTIWB in a classroom. However, if the problem was more serious or it required physical intervention of the technical service, they did not solve our problem on the line. At this point, there was a deficiency about the notification when they would come to our school and solve our problems. Moreover, the technical service would come our school so lately after we informed by telephone about the problem we encountered. I can say that they*

scarcely did not come and solve our problems after more than a month we informed them with the call center. (C2_SAFT1) Q191

The delay for the support of technical service of the PTIWB's company was indicated by 2 other teachers in the second case school. Although the participants in the second case school complained about the late arrival of technical service support, 3 teachers and the Computer Teacher indicated that authorized technical service of the PTIWB resolved some of their problems like calibration adjustment problem of a PTIWB and breakdown at touchscreen of some PTIWB. The Computer Teacher (C2_SAFT1) mentioned that the technicians from the PTIWB's company came to the school and they opened the cover of a PTIWB (which its touchscreen property did not work adequately) in order to repair it.

On the other hand, there were some problems and challenges that the technical service of the PTIWB could not solve. The Computer Teachers explained these problems as lock problem of the PTIWB and the effect of chalk dust on the sensors of PTIWB' touchscreen. She indicated that staffs of authorized technical service of PTIWB did not find any solution to the problem that students could open the lock of the PTIWB and they could use them for undesirable aims. In addition, she expressed that

Technical service only recommended us for not using chalk on the blackboard part of the PTIWB so that chalk dust did not prevent the sensors of touchscreen of the PTIWB. However, some of our teachers wanted to use the chalk on the blackboard part of the PTIWB with digital part of it and we could encounter the problem on the touchscreen of the PTIWB in some classrooms. So, they (technicians of authority service of the PTIWB) could not overcome that problem. (C2_SAFT1) Q192

In addition, a teacher (C2_T1) and the Computer Teacher in the second case school specified that they received technical support from the technicians of Internet supplier company for the problems on the Internet infrastructure at their school. The

teacher (C2_T1) stated that the interruptions on the Internet connection were eliminated after the technicians of the Internet supplier company interfere in the Internet infrastructure at the second case school.

Supports of School Management

In the second case school, participants did not mention much about the supports of school management. Totally 3 teachers indicated that school administrators at second case school supported them to use the SCT adequately. These supports may be listed as motivating and warning the teachers to use the SCT, following the usage of the teachers, and directing teachers to the Computer Teacher for any subject about the SCT. On the other hand, school administrator stated that

> *We assigned the Computer Teacher of our school for supporting our teachers for all issues about these technologies. We said to teacher that the Computer Teacher would help you when you needed assistance while using these technologies. (C2_SA1)* Q193

In addition, a teacher expressed that they could inform the school administrators about problems of the SCT only when they met with them accidentally in the aisle of the school.

In contrast, the Computer Teacher and most of the teachers stated that the school administrators of the second case school did not solve the problems they encountered and did not support them for using adequately the SCT. In addition, the Computer Teacher (C2_SAFT1) specified that she informed the school management about the problems and challenges while teachers using SCT, but there would not be any progress in those regards. She gave an example that

> *I conducted the school management about the lock problem of the PTIWB and I told them that these locks could be opened unauthorized by the students. Moreover, I said that most of the students entered the websites forbidden by MoNE during the breaks. Nevertheless, there would not be any progress in the problem of opening locks [of PTIWB by the students]. (C2_SAFT1)* Q194

On the other hand, School Principal (C2_SA1) of second case school expressed that they did not also have enough knowledge and skills, but also enough resource (material and moral) to support usage of the SCT.

Problems that could not Be Solved

As mentioned in the solutions of the problems above, there were some problems and challenges when the SCT were used by the teachers in their lessons and these problems could not be removed during the lesson. In addition, there were some problems that could not be solved by the stakeholders (like the Computer Teacher, school administrators, YEGITEK, MoNE, and technical services) throughout the academic year in the second case school. In this part, what teachers did when they encountered unsolved problems during their lessons will be presented. However, the unsolved problems while teachers using the SCT in the second case school will be shortly summarized at first.

In the second case school, the mostly cited problem that teachers could not overcome was the difficulty of use of SB software. That is, teachers declared that they could not use the smart board properties of PTIWB and interaction property by means of touch screen of the PTIWB. Secondly, they did not gain necessary knowledge and skills for using the SCT in their lesson. The Assistant School Principal stated that students could cause extra problems for teachers. That is, some students could load undesirable software to the PTIWB and they could easily change the option of them. Therefore, teachers not having enough knowledge and skills to arrange the PTIWB for their usage aims could encounter some difficulties. Thirdly, serious technic problems of the SCT could not be solved in a little while. Moreover, a teacher (C2_P1) expressed that these problems might be permanent in some classrooms. Lastly, the Computer Teacher specified that power cut in the second case school was one of the problems they encountered frequently. In addition, she added that the power cut problem could not be overcome because of bad electricity infrastructure of the second case school.

Now, when the results of interviews and observations conducted by researcher in the second case school were investigated in the light of what the teachers did when they

encountered unsolved problems during their lessons, continuing the lessons with traditional teaching methods instead of using the SCT was the mostly cited (N=11) way for the teachers in the second case school. In parallel with this, it was detected that 2 teachers finished their lessons with lecture methods when the touchscreen of the PTIWB did not work adequately (Obs49 and Obs53). A teacher expressed that

> *I experienced such a thing that I wanted to show a PowerPoint presentation, but the office package software of the PTIWB (provided by MoNE) did not let us show some visuals on the some pages. So, we could not open the presentation. What would we do when we could not open the presentation? I said to students that open your textbook and we switched to the lecture technique. Until the end of the lesson, we had continued the lesson with verbal expression. (C2_G2)* Q195

This teacher also emphasized that she did not interrupt their flow of the lesson and she did not finish the lesson if they encountered the problems on the SCT in the half of lesson time. However, 2 teachers stated that they could finish the lesson if they encountered such problems towards to end of the lesson.

Furthermore, 6 out of 15 teachers specified that they could demoralize when they were prepared to use the SCT in their lesson, but they encountered some problems preventing from using these technologies in their lessons as they planned before the lesson. A teacher explained that

> *When we were using the smart board, we encountered the breakdown of the touchscreen a few times and we could not utilize from [the PTIWB] at these lessons. At those times, I felt sorry for the problem of the technologies. That is, I planned to my lesson in order to teach students with best ways using the technologies and I concentrated to use them as I planned before. When we encountered an unexpected problem and we could not use the technologies because of these problems, we could lose time for finding new techniques to teach students as much as I planned before. Nevertheless, I did not give up*

using these technologies because of the problems we had. (C2_T1) Q196

2 other teachers also emphasized that although some unexpected problems while using the SCT could disappoint them, they did not think that they should not use the SCT in their courses. On the other hand, the Computer Teacher (C2_SAFT1) of the second case school stated the existence of some teachers thought not using SB software anymore because of usage difficulty of that software.

4.1.2.5 The Needs to Overcome the Challenges and Problems While Using SCT in the Second Case School

In the second case school, although some of the problems and challenges presented in the previous sections were eliminated by teachers, students, school administrators, YEGITEK administrators and other stakeholders, there were some unsolved problems and challenges about the usage of the SCT. To detect the requirements for overcoming these unsolved problems and challenges in the second case school, the data obtained from of the interviews with the teachers, school administrators and YEGITEK administrators, from various documents like surveys and reports, and from observations conducted by the researcher were analyzed. 7 main themes in connection with the needs for the effective and efficient usage of the SCT in the second case school emerged according to data analysis. These themes and how many participants mentioned about them were presented in Table 4.33. They were (1) more beneficial in-service trainings, (2) e-contents at EBA, (3) durable and regular technological infrastructure, and (4) accessible and sufficient support, (5) unproblematic Internet access.

Table 4.33 Themes for the Needs for the Effective and Efficient Usage of the SCT in the Second Case School

Needs for the usage of the SCT	**Frequency of participants mentioned**
More beneficial in-service trainings	14
E-contents at EBA	10
Durable and regular technological infrastructure	7
Accessible and sufficient support	7
Unproblematic Internet access	2

More Beneficial In-service Trainings

In the challenges and problems part of the second case school, lack of knowledge and skills for using the SCT were declared as main deficiency for the teachers in the second case school. Actually, YEGITEK had arranged two type in-service trainings for the teachers in that school so that they could gain required knowledge and skills for using the SCT. However, the school administrators, the Computer Teachers and 11 teachers (totally 14 participants) in the second case school mentioned various requests about these in-service training processes in order to have more knowledge and skills for using the SCT adequately in educational environments. When their demands about the in-service trainings were investigated, these demands were grouped as structure, duration, and content of the trainings as seen in Table 4.34. Now, these requests for each group will be presented under new subtitle.

Table 4.34 Demands about In-service Trainings in the Second Case School

Demands about in-service trainings	**Frequency of participants mentioned**
Structure of trainings	13
More practice-based training	8
Different level trainings	8
Separate (special) trainings for each course	4
Special trainings for computer teachers and school administrators	3
Obligatory or optional trainings	3
Duration of trainings	8
Longer training	8
Continuing training (more than once)	6
Content of trainings	5

Structure of the In-service Trainings

Majority of participants (N=13) in the second case school mentioned various arrangements for the structure of in-service trainings. These arrangements requested by participants in the second case school might be listed as more practice-based training, different level trainings, separate trainings for each course, separate trainings for computer teachers and school administrators, and obligatory or optional trainings.

Firstly, 8 out of 15 teachers specified that they needed more practice-based trainings in order to use the PTIWB in their courses. A teacher said that *"we took 1 week training, but we should take additional 1 week training for only practice with these technologies"* (C2_M1). In addition, another teacher stated that

> *I think that this training should be more practice based. That is, they should show us how to use these technologies in our lessons. They could prepare small usage example to show usage of them. (C2_G2)* Q197

Secondly, although 2 different in-service trainings were conducted for teachers having different level knowledge and skills about the SCT in the second case school, 8 teachers stated that there must be different level trainings for especially teachers not having enough knowledge and skills. In addition, 6 teachers in the second case school expressed that YEGITEK should determine the deficiencies of teachers and they should organize different in-service trainings according to deficiencies of teachers about the usage of the SCT. At this point, the Computer Teacher explained that

> *In our school, YEGITEK applied a survey in order to determine competency of teacher about the technology. According to results of this survey, teachers having low results attended 2 weeks period in-service training, while other teachers having higher results participated only one week training. However, some teachers needed at least two weeks period training could participate in the shorter training according to results of the survey. That is, this survey could not determine knowledge and skills level for the SCT exactly. For that reason, YEGITEK should measure more accurate the technological level of the teachers, and then teachers should participate in the training suitable to their level. (C2_SAFT1)* Q198

Thirdly, 4 out of 15 teachers represented that special trainings should prepare separately for each course and teachers should participate in the trainings according to their fields. A teacher stated that

> *YEGITEK should arrange the in-service trainings on the basis of fields of the teachers. They could show what we do in our courses for each course. That is, Geography teachers could join the in-service training in their own group, while History teachers, Math teachers and Science teachers could learn specific usage of these technologies for their courses in their own group. For instance, they could show to History teachers that how History teachers could teach 'Conquest of Istanbul' topic with using these technologies. (C2_G2)* Q199

Fourthly, the Computer Teacher and the school administrators requested in-service trainings specially developed for them. At this point, the Computer Teacher (C2_SAFT1) stated that she attended the 1 week in-service training with other teachers in the second case school and she did not learn different topics than other teachers. She also said that she could not gain enough knowledge and skills about how she could support and help other teachers in order to integrate the SCT to their courses. For that reason, she wanted particular in-service trainings for computer teachers from YEGITEK in order to take part into integration of the SCT in the schools. In addition, although an administrators at YEGITEK (PM1) had said that structure of in-service trainings were planned to start trainings firstly for school administrators and then for teachers, School Principal (C2_SA1) expressed that they as school administrators did not receive any in-service training about the usage of SCT for school administrators. Moreover, he indicated that they wanted to participate in-service training prepared for school administrators in order to help teachers in their school.

Lastly, there were two different opinions among teachers in the second case school about the structure of in-service trainings. While a teacher (C2_B1) specified that in-service trainings must be enforced for all teachers, another teacher (C2_T1) said that in-service trainings could be optional for teachers who wanted to attend them. On the

other hand, the Computer Teacher (C2_SAFT1) of second case school explained that in-service trainings should be obligatory for all teachers, because most of the teachers may not want to participate in-service trainings although they need to receive additional trainings to use adequately these technologies.

Duration of the In-service Trainings

8 teachers indicated that the time of the in-service trainings was short for them and they wanted more training about the usage of the SCT. Hereof, not only teachers participating 1 week period in-service training, but also teachers joined to 2 weeks period in-service training stated that they needed longer training for using these technologies in their courses. For instance, a teacher explained that

> *I think that 1 week training was not enough for us. Because, when we just had got used to use the PTIWB and when we said that we just worked out the usage of them, the in-service training finished without making enough practice for the usage of it. For that reason, this training might be longer. For example, it might be at least two weeks and we could practice with using them for our courses. (C2_P1)* Q200

In addition, some teachers (N=5) specified that duration of in-service training should be 1 month. 2 teachers also emphasized that teachers not having enough knowledge and skills about the technology might participate more than 1 month period in-service training.

The other point about the time of the in-service trainings was only once training for the teachers. Two school administrator, the Computer Teacher and 3 teachers expressed that in-service trainings should be provided to them continuously. They emphasized that in-service trainings should be renewed periodically according to changing conditions about the technological developments. A teacher stated that

> *The in-service trainings about the FATİH Project were not enough for us especially not having enough knowledge and skills about these technologies. Because, these technologies were too new for us, when we attended the in-service trainings. For that reason, we did not*

> *benefit from the trainings. That is, we did not know so much about these technologies yet and we did not know what we could do with these technologies. Therefore, these trainings should be repeated according to changing conditions and developments and we should participate a few times to these periodic in-service trainings. I think that this will be very important for us as teachers using these technologies and these technologies can be more useful for our education system. (C2_G1)* Q201

The Computer Teacher also expressed that the in-service trainings should be updated according to changing developments at software and hardware about the SCT installed into schools. Moreover, a teacher indicated that

> *We attended the in-service training before the summer holiday and we could not have chance to practice with SB software [on the PTIWB]. For that reason, we forgot most of the subjects we had learned. YEGITEK should arrange additional trainings to us so that we will not be able to forget the usage of them and we will have chance to use these technologies shortly after the in-service trainings. (C2_H1)* Q202

As a result, most of the participants in the second case school demanded from YEGITEK/MoNE that longer and more in-service trainings about the usage of SCT instead of only once and only before the establishments of SCT.

Content of In-service Trainings

Although most of the teachers in the second case school participated in the in-service trainings prepared by YEGITEK and they took lessons about the usage of SCT, 5 participants mentioned that teachers would be able to learn adequately some topics about the usage of SCT in the in-service trainings. Mainly, teachers complained that they could not easily use SB software. Two teachers (C2_SAFT1 and C2_C1) specified that there should be more practice-based lessons and applications for the example usage of the SB software in their lessons. A teacher (C2_G2) emphasized

that their trainers should tell more about the usage of SB software, because they had difficulties mostly while using SB software on the PTIWB. In addition, the Computer Teacher of the second case school said that they could learn another software in the in-service trainings instead of SB software installed on the PTIWB, because SB software was too difficult for most of the teachers in the second case school. She also emphasized that there should be some additional applications for the teachers about how they could integrate these technologies to their courses. Furthermore, Assistant School Principal (C2_SA2) mentioned some additional points about the e-contents for the SCT. He stated that

> *There should be subjects in the in-service trainings about not only how teachers could reach e-contents at EBA, but also how teachers could develop their own e-contents for these technologies. (C2_SA2)* Q203

Lastly, the Computer Teacher expressed that YEGITEK should receive opinions of teachers while they were determining the contents of in-service trainings about the usage of SCT in educational environments.

E-contents at EBA

When demands of participants in the second case school were investigated in the light of e-contents for using SCT in their courses, 10 out of 15 teachers specified various requests about the e-contents. At this point, all requirements mentioned by teachers were interested with EBA and these requirements might be grouped as quantity and variety of e-contents at EBA, quality of e-contents at EBA, and structure of EBA portal (as shown in Table 4.35). Demands of teachers in the second case school will be presented separately for these groups.

Table 4.35 Demands about E-contents at EBA

Demands about e-contents at EBA	Frequency of participants mentioned
Quantity and variety of e-contents	10
More e-contents	10
Different e-contents	4
Quality of e-contents	9
Suitable e-contents to use with students during lessons	6
Suitable e-contents to properties of courses and students	6
E-contents not requiring too much technological competency	2
E-contents having same standards	2
Structure of EBA portal	8
Adequate classification of e-contents at EBA	8
E-content sharing system for teachers at EBA	3
EBA password to enter EBA portal	3

Quantity and Variety of E-contents at EBA

10 teacher in the second case school expressed that they needed more e-contents at EBA in order to use SCT in their courses. A teacher stated that there must be more e-contents at EBA day by day. A Turkish Literature teacher explained that

> *We did not find enough resources at EBA and we tried to reach these contents at some websites on the Internet. However, we could encounter some undesired contents like images and advertisement on these websites. For that reason, we should reach these contents at EBA portal without a concern that students might see undesired contents on the sources. YEGITEK should add more contents especially for Turkish Literature Course. (C2_T1)* Q204

In addition, 4 teachers specified that although there were enough e-contents numerically for some subjects at EBA, there should be different e-contents like simulations, videos, interactive videos and alternative sources at EBA. For instance, a History Teacher stated that

> *We used lots of maps on the smart board, but most of these maps were only digital version of printed maps. Although there were some animated maps, animation property of them were not enough. That is, there should be different e-contents like good animated maps. In these maps, wars could be showed better. For example, location of armies and their movements might be animated according to story of the war they attended. In addition, there should be videos about the topics in History courses at EBA. (C2_H1)* Q205

Moreover, the Computer Teacher in the second case school said that

> *I heard that YEGITEK would prepare 'Enriched E-books' for the SCT and they would contain interactive activities, videos and questions. I think that these 'Enriched E-books' should be uploaded to the EBA portal as soon as possible. (C2_SAFT1)* Q206

In terms of variety of e-contents at EBA, a Physic, a Chemistry and a Turkish Literature Teachers specified that there should be more audiovisual e-contents at EBA portal. Especially, Turkish Literature Teacher (C2_T2) expressed that he could use the PTIWB if they could have more visual contents about the topics of his courses.

Quality of E-contents at EBA

9 out of 15 teachers in the second case school indicated various demands about the quality of e-contents at EBA. These demands might be summarized as e-contents suitable to use with students during the lesson in the classroom, e-contents prepared suitable to properties of courses and students, e-contents that not requiring too much technological competency, and e-contents having same standards. Firstly, 6 teachers emphasized that most of the e-contents at EBA could not be used with students during the lessons and they specified that YEGITEK should provide them e-contents to use them interactively with students during the lessons. For instance, a History teacher explained that

> *Actually, there were lots of videos about the topics of History courses, but these videos were not suitable to usage of teachers in the classroom. Because, in the most of these videos about the History courses, a professor from a university talked about the historical events and students could only see the face of this professor. If the videos would be like that, I could tell the subject to students like in the videos. Moreover, when I told the subject orally to students in the classroom, I might have chance to give immediately feedbacks to students if they asked a question. However, when we watched these videos (only a professor were talking in the video), I (as a teacher in the classroom) could not stop frequently the video if students did not understand any topic. Furthermore, expressions of the professors might be hard to understand the topic. For that reason, YEGITEK should prepare more suitable e-contents like videos, animations, simulations and practice questions for the using them with students during the lesson in the classrooms. (C2_H1)* Q207

She also expressed that this type videos might cause some contradictions about what was the role of the teacher in the classroom while a lecturer would tell the subject to students in these videos. In addition, a Physic Teacher and a Chemistry Teachers stated that there could be more animations and simulations about the experiments in their lessons. The Chemistry Teacher (C2_C1) specified that they could not do some experiments in the classroom or lab environments, because these experiments might be so dangerous for students and impossible to conduct them in the school. So, she wanted that there could be animations and simulations of some experiments at EBA portal in order to conduct them with students in the classrooms or in the labs without any dangerous situations.

Secondly, as a History Teacher mentioned above, 6 teachers stated that level of e-contents at EBA should be arranged more carefully according to students' academic level. Although some teachers expressed that level of e-contents was too basic for

their students in the high school, some other teachers said that some of the e-contents at EBA were hard for their students. A Biology Teacher indicated that

> *Administrators [at YEGITEK/MoNE] should provide more suitable e-contents to students' level. I used some e-contents for the Biology courses at EBA, but most of these e-contents were too basic. That is, I can say that these e-contents might be prepared for the students at elementary schools. We could not find enough e-contents for our students at EBA. So, more suitable e-contents for our students should be added to EBA portal. (C2_B1)* Q208

In addition, two teachers (C2_T1 and C2_M1) emphasized that there should be more resources at EBA for the students at 11^{th} and 12^{th} grades, because they had been preparing the university entrance exams and they wanted to solve questions for the university entrance exams. Another Math Teacher (C2_M2) also expressed that he did not trust the accuracy of the e-contents at EBA and he said that

> *There must be more reliable example and practice questions at EBA. That is, I opened a few questions from Math part of EBA and showed them to students. However, I identified that some of these questions were wrong. After that, I gave up to use e-contents at EBA, because I had to control accuracy of the questions before showing to students. Instead of questions at EBA, I have been using questions which I had. As a result, there should be more accurate and suitable e-contents at EBA. (C2_M2)* Q209

Moreover, two teachers (C2_H1 and C2_C1) stated that YEGITEK should provide more suitable e-contents for their courses. As mentioned above, the History Teacher wanted to well-prepared (animated) maps for the History lessons. In addition, Chemistry Teacher (C2_C1) wanted some simulations for the experiments in the Chemistry lessons.

Thirdly, two teachers expressed that there should be e-contents at EBA which they did not require too much technological competency. A teacher (C2_G1) declared that

they could have difficulty in using some e-contents with SB software on the PTIWB and she wanted some e-contents at EBA from YEGITEK in order to use them easily with their own effort. In addition, the Computer Teacher (C2_SAFT1) of second case school specified that teachers having less knowledge and skills about the SCT have demanded simpler e-contents at EBA in order to use them in their lessons.

Lastly, 2 out of 15 teachers specified that although there were lots of e-contents at EBA, these e-contents were prepared by different private publishers and they had different structure. Therefore, they wanted that there should be e-contents at EBA having same standards. A teacher explained this point as

> *Most of the e-contents at EBA had been developed by different publishers and their structure was different. So, we could not get used to use these different e-contents. That is, I utilized adequately some activities of a private publisher, but when I wanted to open the activities of another publisher, I could have difficulties while using these different e-contents. Because, the structure of these activities prepared by different publisher could had completely different logic. So, I could not use them, because I did not get used to their logic. For that reason, e-contents at EBA should have same standards and we could use all of them easily. (C2_G1)* Q210

At this point, six teachers had another demand about the determining the standards of e-contents at EBA. They suggested that YEGITEK could assign a commission consisting of experienced teachers, academicians and administrators from school and organization of MoNE in order to determine the standards of e-contents which would be uploaded to EBA. Moreover, a teacher (C2_T2) stated that all of the e-contents for EBA should be developed by this commission. In addition, the Computer Teacher (C2_SAFT1) of the second case school declared that the opinions of teachers, students and students' parents should be considered while determining the standards of e-contents at EBA. She also asserted that YEGITEK conducted an application in order to get opinions and demands of teachers in their school about the e-contents at

EBA. Again, she said that most of the teachers did not complete the form about the EBA.

Structure of EBA Portal

8 out of 17 participants in the second case school mentioned various demands for the structure of EBA portal. These demands were about classification of e-contents at EBA, e-content sharing system for teachers at EBA, and EBA password to enter EBA portal. Firstly, as presented in the challenges and problems that teachers encountered, teachers in the second case school complained that they could not find the e-contents at EBA they wanted to use in their lessons. Hereof, 8 teachers expressed that e-contents at EBA system should be classified well and teachers should reach e-contents about their subject of the lessons. For instance, a teacher (C2_T2) suggested that classification of e-contents at EBA should be organized mainly according to courses and subjects in the courses instead of arranging them which private publisher prepared them. In addition, a Geography Teacher in the second case school explained that

> *About the classification of maps on the SB software, we could reach countless maps in the gallery of SB software on the smart board. Yes, these maps were added to the EBA and we utilized some of our lessons. However, finding the maps which I searched could be difficult in the countless of maps for History and Geography courses. While we were selecting a map from these maps, we might lose too much time during the lesson. Instead, these maps could be classified according to courses, types of maps (physical or political maps), scales of maps, and location of maps (continent or country).* (C2_G2) Q211

In addition, School Principal of second case school suggested that e-contents at EBA should be more accessible. He said that

> *The structure of EBA portal was too complex for our teachers and the EBA portal could process slowly because of this complexity. So, our teachers could get e-contents from USB memories and websites of*

> *other private publishers. However, another problem (like virus and undesirable contents) could arise. For that reason, e-contents at EBA should be more accessible and EBA system should be operated faster. (C2_SA1)* Q212

In addition, like in the first case school, a tracking system for e-contents at EBA was declared as another request by two teachers. A teacher (C2_T1) explained that they could determine which contents were used before and they could easily remember what subjects were taught in each class by the help of this tracking system at EBA. Furthermore, a teacher (C2_P1) stated that search section for e-contents at EBA portal should be improved and they could reach the e-contents at EBA using this search section.

Secondly, a Geography Teacher (C2_G2), a Turkish Teacher (C2_T1) and Computer Teacher (C2_SAFT1) in the second case school requested an e-contents sharing system for the teachers. They declared that teachers could share the e-contents they found or they prepared themselves with other teachers in Turkey with using the e-content sharing system at the EBA portal. An administrator of YEGITEK (PM2) also said that they were planning an e-content sharing system for teachers and they could share their e-contents with other teachers.

Thirdly, the Computer Teacher recommended that the password for the entering the EBA portal should be completely new passwords for all teachers. She explained the reason of this that

> *Although it was said in the in-service training that teachers could define new EBA password for EBA instead of their 'MEBBİS' password, some teachers in our school did not define their new EBA password. Moreover, they complained to me that they were using their 'MEBBİS' password and students could see their 'MEBBİS' password. In addition, they worried that students could use their 'MEBBİS' password and they could change their options on the 'MEBBİS' system of MoNE. Actually, I remind frequently them that*

they could define new EBA password on the EBA portal and students could not use their 'MEBBİS' password after that. However, they have continued to use their 'MEBBİS' password instead of new EBA password. For that reason, YEGITEK could define new password for each teacher other than their 'MEBBİS' password in order to prevent their worries. (C2_SAFT1) Q213

Two teachers also expressed that the EBA password should be different than other passwords, because most of the teachers could not change their passwords.

Durable and Regular Technological Infrastructure

Approximately half of the teachers (N=7) indicated some demands about the SCT and technological infrastructure in the second case school. These demands will be presented firstly in point of each SCT (Table 4.36), and then requests for the technological infrastructure in the second case school will be mentioned.

Table 4.36 Demands for Each SCT in the Second Case School

Demands for each SCT	Frequency of participants mentioned
PTIWB	7
SB software	4
Tablet or Laptop PC	4

When demands of teachers were analyzed with regard to the SCT, firstly, all of these seven teachers talked about some improvements for the PTIWB. A permanent solution for the negative affection of chalk dust (used on the blackboard part of the PTIWB) to touch sensing property of PTIWB were expected by 3 teachers. Especially, the Computer Teacher (C2_SAFT1) of second case school emphasized that some teachers could be urgent about using chalk and blackboard part of PTIWB, although technical service of PTIWB, school administrators and her warned them about not using chalk on the PTIWB because dust of chalk could cause to not working of touch screen of PTIWB. For that reason, she wanted to real solution for this problem. Moreover, she said that YEGITEK administrators stated PTIWB might be produced as not including blackboard part and they might include only

whiteboard part and digital screen part for the other school not having them. Besides, there was various suggestions of teachers for the lock problem of the PTIWB. While four teachers said that there should be more resistant lock mechanisms on the PTIWB in order to prevent undesired usage of students during the breaks time and no teacher in class, other two teachers suggested that the PTIWB in the classrooms might not be locked during the lessons and other time. One of these two teachers explained that

> *In the teachers' council meeting, I recommended a solution for this lock problem. I said that I thought the locks of boards should not be locked at out of the lessons because students could easily open these lock even if we locked them. That is, you banned anything, you could make it more attractive for students. However, we may not lock the boards and we may give permission to students to use them during the lessons and breaks. Moreover, we may assign one or two responsible students in each class for the usage of them and they can control the usage of them in order to prevent undesirable usage of students. Therefore, student can reach to contents about the lessons during breaks and lessons. (C2_T1)* Q214

In addition, a teacher (C2_G2) suggested that either lock of PTIWB should be more resistant to not unlock easily by students or the locks (with current situation) should not be on the PTIWB.

Secondly, 4 teachers requested a new SB software for the PTIWB because of the usage difficulties of current SB software on the PTIWB. A teacher (C2_M1) declared that they could not interfere in contents on the PTIWB with SB software and they could not use interaction property of the PTIWB, because the SB software did not facilitate directly changing the objects on the screen. For that reason, he said that there should be another software on the PTIWB and they could more easily change and draw contents with using this new SB software. The Computer Teacher (C2_SAFT1) in the second case school also stated that most of the teachers could not

use SB software and this software should be arranged for easy usage or it should be changed with another SB software.

Thirdly, tablet or laptop computers were declared as another demand in the second case school. The Computer Teacher (C2_SAFT1) expressed that teachers, students and school administrators should have personal tablet or laptop computer in order to utilize more adequately PTIWB in the classrooms. In addition, a teacher (C2_B1) stated that she heard about that YEGITEK would give a tablet computer to each student and teacher in the FATİH Project and she has looked forward to take the tablet computer. Another teacher explained his tablet computer demand as

> *We as teachers and students should have tablet computer (mentioned in the FATİH Project) in order to use smart board more useful. That is, students could follow e-contents [on the PTIWB] and we could transfer these contents to their own tablet so that they would be able to work these contents at their home after the lessons. (C2_M2)* Q215

On the other hand, there were also requests of the Computer Teacher (C2_SAFT1) for the technological infrastructure in the second case school. She especially emphasized that arrivals of authorized technical service of PTIWB were too late. For that reason, she recommended that *"there should be an obligation for the maximum arrival time of the technical services and YEGITEK should get this obligation accepted by the company of PTIWB"* (C2_SAFT1). In addition, she wanted that company of PTIWB should supply the technical service support for the problems of PTIWB with wide technical service networks. That is, she stated that there should be more authorized technicians for PTIWB and they should interfere in the problems they encountered as soon as possible. Moreover, she mentioned the power cut problems on the electric infrastructure at second case school and she said that electricity infrastructure of schools should be empowered for the usage of the SCT.

Accessible and Sufficient Support

There were also demands of teachers, the computer teachers and school administrators about the necessary supports while using the SCT in their school.

These demands about the necessary supports were grouped according to source who should support them. In Table 4.37, these sources might be listed as YEGITEK/MoNE as senior management, school administrators and computer teacher of the school. Now, these expectations will be presented under these sub-titles.

Table 4.37 Demands for Supports in the Second Case School

Demands for supports	**Frequency of participants mentioned**
Support from YEGITEK/MoNE	6
Communication channels	5
Adapting curriculums of courses	4
Remote assistance systems	4
Support from school management	4
Support from computer teacher	3

Demands from YEGITEK/MoNE

In the second case school, not only teachers but also the Computer Teachers and school administrators (N=6) had various demands from administrators of YEGITEK/MoNE. Some of these demands were mentioned at the previous sections like new SB software, tablet computers, more practice-based in-service training, and audiovisual e-contents. In this part, their demands about the support of senior management will be presented. Firstly, the Computer Teacher (C1_SAFT1) emphasized that YEGITEK should supply them communication channels. As mentioned before, she complained that she could not reach the administrators at YEGITEK or MoNE in order to inform them about a problem or demands of teachers. For that reason, she recommends that YEGITEK could supply a phone number for especially the computer teacher in the schools. On the other hand, School Principal expressed that *"YEGITEK administrators should deal with problems about these technologies which school management could not solve with possibilities of school management"* (C1_SA1). In addition, 4 teachers stated that the curriculum for each course should be updated according to usage of the SCT in order to help teachers how they could use these technologies in their courses. At this point, an administrator (PM4) at YEGITEK specified that they constituted a commission in

order to update curriculum of all courses in the school about how the SCT could be used. The other issue for the support of YEGITEK was about the remote assistance system. Although an administrator (PM1) at YEGITEK said that there was a call center of YEGITEK so as to help teachers while they were using the SCT, most of the teachers in the second case school did not know that they could take assistance by means of a call center. For example, a teacher (C2_C2) mentioned that there should be a call center in order to provide assistance to them for solving their problems and challenges while they were using these technologies. Moreover, a teacher explained that

> *A remote assistance system can be developed and we can reach the solution on this assistance system with [the PTIWB]. Furthermore, it can be on the EBA portal and we can find solutions from other teachers at everywhere in TURKEY. I think that it may be very useful for all teachers. Because, we sometimes did not reach the solutions of some problems and we might lose time for that reason. However, if we could find solution to this problem by means of this remote assistance system and an authorized person at YEGITEK or a teachers knowing solution of the problem helped us from distance, we might not lose time. (C2_T1)* Q216

This teacher also emphasized that they could share e-contents with other teachers in the country by means of this system on the EBA.

Demands from School Management

4 out of 15 teachers in the second case school declared that school administrators should help teachers while they were using the SCT in their lessons. The Computer Teacher (C2_SAFT1) said that she was the only person dealing with problems and challenges of teachers while using the SCT and she did not have enough time for all these problems. For that reason, she demanded that school administrators of their schools should follow usage of teachers and they should be interested with their problems and requests about these technologies. Another teacher also expressed that

> *There was not any enforcement and encouragement from school administrators so that we as teacher would use more these technologies. For example, in a class of 9th grade students, when I was teaching in the lesson, the School Principal participated to my lesson. I did not utilize [the PTIWB] until end of the lesson. At the end of the lesson, the School Principal did not say anything about why I did not use these technologies in my lessons. Actually, if he asked me why I did not use [the PTIWB] during the lesson, this could be more beneficial. Because, I could feel an enforcement for using them in my lessons. That is, school management should enforce and encourage us so as to use these technologies. (C2_B1)* Q217

As a result, support of school administrators was requested by not only Computer Teacher of the school but also other teachers in the school.

Demands from Computer Teacher

Although most of the teachers were pleased with support of the Computer Teacher in the second case school, two teachers stated that she could load additional e-contents to PTIWB in the classrooms. A teacher said that *"she could ask us what e-contents we needed and she could load the e-contents we founded and gave her to the all smart boards in the classrooms"* (C2_T1). On the other hand, the Computer Teacher explained that

> *I did not load all contents demanded by teachers to all PTIWB, because too many e-contents could cause slowdown on the PTIWB. For that reason, I could load only e-contents if these contents would be used by all teachers of that course. Furthermore, I loaded some contents requested by a Chemistry teacher to the PTIWB in the Chemistry Lab of our school, because she would use these contents on only a smart board. (C2_SAFT1)* Q218

In addition, she emphasized that she wanted to support teachers so that they integrated the SCT to their courses, nevertheless she could not have enough time for

this, because she had to be interested with other technological problems of SCT in the second case school.

Unproblematic Internet Access

Only 2 out of 17 participants in the second case school specified requests for the Internet access in their school. Firstly, School Principal (C2_SA1) emphasized that there should not be restriction for the Internet connection provided by MoNE. He explained that

> *Some teachers in our school might not want to use e-contents on the internet when they could not open a website for showing some content because of restriction of internet connection at their school. For that reason, MoNE should allow teachers and students to reach all resources on the Internet. Because, they can decide which websites are useful for them and which websites are harmful for them. Therefore, they will not open the websites which include undesirable contents especially for students. (C2_SA1)* Q219

Secondly, a teacher (C2_G2) complained about the speed of the Internet connection at second case school and she expressed that MoNE should supply faster Internet connection to their school.

4.2 Attempts of YEGITEK/MoNE as Senior Management to Provide Adequate Usage of SCT in the Schools (R.Q.2)

What attempts did the YEGITEK/MoNE as senior management conduct to provide adequate usage of the SCT in the schools in regard to;

- *How did they determine which technologies would be used?*
- *How did they determine by whom, how and where these technologies would be used?*
- *How did they receive opinions of users and inform them?*
- *How the usage of SCT would be maintained?*

In order to analyze attempts of the senior management side for the adequate usage of the SCT, the 2 theories in the literature were used as foundations for the study. These theories as 'Environment Analysis' by Tessmer (1990) and 'User Oriented Instructional Development (UOID) Process' by Burkman (1987). In these theories, it was emphasized that during the diffusion of an innovation process, it was not only important point as the technology which were supplied to the users, but the opinions and properties of the users should also be taken into consideration. In this study, the integration of the SCT in educational environments was investigated in the light of these theories. Therefore, attempts of the administrators of FATİH Project were analyzed in terms of the process of determination of which SCT were installed to the schools, determination of usage process of these technologies, receiving the opinions of users about the SCT in the schools, and lastly maintaining and supporting the usage of SCT in the schools. In order to answer second research questions, interviews with 6 authorities at YEGITEK were used main data source. In addition to these, results of document analysis were taken into consideration for the second research question. Sometimes, interviews with teachers and school administrators in both case schools provided additional data for this question. However, it could be said that main data for this question were obtained from the interviews with especially two administrators at YEGITEK (PM1 and PM2).

Now, before the presenting results for the second research questions in the light of sub research questions, some data will be presented which resources the administrators at YEGITEK/MoNE utilized while they were deciding the points for the usage of SCT.

4.2.1 Data Sources the administrators at YEGITEK/MoNE utilized

While determining all issues in the FATİH Project for the second research question of this study, administrators (N=3) of YEGITEK stated that they took advantage of various researches' results. An administrator (PM1) of FATİH Project listed the resources that they utilized as

- Some projects about technology usage in educational environments,
    - A project of using technologies as tools (in Antalya, Turkey)
    - Researches performed by European Union
- Applications that various smart boards were used in the schools,
- Projects of MoNE carried out,
    - Innovator Teachers Project (Yenilikçi Öğretmenler Projesi)
    - Leader Teachers Project (Lider Öğretmenler Projesi)
    - EMEPYA (Eğitim Metodları ve Materyalleri Proje Yarışması)
- Academic researches about technology usage in educational environments,
- Applications in the first pilot school of the FATİH Project.

He also said that they took into consideration the bad applications in which smart boards were used in the schools. Another administrator PM2 emphasized that they designed the PTIWB according to information in these bad smart board applications. That is, they tried to eliminate disadvantages of these applications for the SCT in two case schools. In addition, another administrator (PM4) at YEGITEK indicated that they conducted some applications and surveys in the first pilot school of FATİH Project (it was also first case school of this study) in order to determine which SCT would be established in the other school and to provide support to users. Parallel to this, most of the participants (N=13) in the first case school stated that project staffs set up different SCT in to their school and they tried to develop better applications for all schools in Turkey.

4.2.2 Selection and development of SCT (User friendly product)

In the selection of which SCT would be used in the school, there was the difference in two case schools. Because the first case school was the first pilot school of the FATİH Project, YEGITEK established different SCT as many as into the first case school. These technologies might be listed as different type and brands smart boards, projectors, laptop computers and speakers. Three administrators at YEGITEK stated that they sent as many as SCT to the first pilot school of the FATİH Project so as to compare the positive and negative properties of each SCT. In addition, 7 out of 18 participants in the first case school of the study declared that there were various SCT

and these technologies had different brands and types. A teacher in the first case school explained that

> *I think that project managers have been trying to determine which technology should be established other school in all country. For that reason, they installed different technologies like different smart boards and projectors. In order to select one of these technologies, they continuously asked us what good and bad things about the technologies in our classrooms were. (C2_T1)* Q220

In addition, an administrator of YEGITEK mentioned about this process as

> *We took feedback from teachers in the first pilot school of the project in order to find out advantageous and disadvantageous of different technologies. Actually, we decided to establish only projector in the most of the classrooms at the schools. We would install only one or two smart boards to each school in Turkey according to our plan at the beginning of the project. However, we changed our plan considering teachers' views in the first pilot school of the project. For that reason, we wanted to try most of the technologies in this school. In other words, we can say that this school might be accepted as experiment school of the FATİH Project. Therefore, we determined so many technologies for this school. (PM1)* Q221

YEGITEK determined the PTIWB as the selected SCT for other school in Turkey. Two administrators (PM1 and PM2) at YEGITEK summarized the designing process of the PTIWB in the interviews. They listed what they took into consideration during this process as (1) opinions of teachers and school administrators in the first pilot school of the FATİH Project, (2) positive and negative properties of existing smart boards in the other schools, (3) results of the analysis they conducted (such as possible harms that students could cause), and (4) results of other study of MoNE. An administrator explained that

> *We benefited from the results of bad experiments of using smart boards in the schools. That is, we searched why these smart boards were not used in these schools. We determined some reasons for these smart boards. In addition, we utilized some surveys in the first pilot school and we designed the PTIWB according to views of teachers in these surveys. For example, we used the LCD panel in the PTIWB so as to prevent the shadow and calibration problems which were mentioned by teachers in the first pilot school. (PM1)* Q222

The surveys and the results of them conducted by YEGITEK in the first case school were presented to the researchers. The contents of these surveys will be analyzed under the title of measuring potential users' perceptions. In addition to eliminate the usage problems of the other smart boards installed in the first case school and other schools, administrators at YEGITEK tried to design the user friendly product for the teacher. An administrator (PM2) at YEGITEK specified that they integrated to PTIWB not only digital board (LCD panel), but also whiteboard and blackboard parts (as seen in Figure 4.1). Moreover, he explained that

> *We added a computer mainboard into PTIWB so that teachers could use the smart board without connecting another PC to the PTIWB. So, we supplied them to easier and more convenient technology. That is, they would be able to open their boards when they entered to the classroom and the board could be ready without any intervene to it. Therefore, we have provided more useful technology to our teachers. (PM2)* Q223

On the other hand, although some of the teachers (N=5) in the first case school stated that a survey was conducted to them about these technologies, the YEGITEK did not change the technologies in their classrooms according to their requests.

When the technologies in the second case school were analyzed, YEGITEK determined the PTIWB as only technology in that school unlike other technologies in the first case school. As mentioned before, YEGITEK/MoNE designed and selected

the PTIWB as determined technology for the other schools in Turkey according to experiments in the first case school (first pilot school of the FATİH Project). For that reason, the PTIWB were established in the second case school by YEGITEK/MoNE. So, the projectors and speakers were not installed in the second case school. Moreover, an administrator at YEGITEK stated that

> *Because there were a computer mainboard in the PTIWB, we as YEGITEK will not give a laptop computer to each teacher in the schools and these teachers can use the PTIWB as not only smart board or projector, but also as computers. (PM5)* Q224

Although YEGITEK administrators asserted that they designed the PTIWB as a user friendly product for the teachers, teachers in the second case schools stated that the PTIWB had various usage problems like damage of chalk dust. These problems were mentioned in the first research question in detail.

4.2.3 Determination and analysis of users

When the attempts of YEGITEK/MoNE as senior management were analyzed in point of how they determined the users of SCT in the schools, they stated that they had planned the users of these technologies were covered as teachers, students and school administrators. Two administrators at YEGITEK stated that they considered teachers, students and school administrators in the all schools for who use the SCT in the classrooms. Firstly, almost all of the administrators (N=6) at YEGITEK who participated to the study specified that most of the teachers in the schools connected to MoNE were young and they were interested in technology. An administrator (PM2) at YEGITEK declared that they considered the general properties and expectations of teachers in the schools about the SCT. Moreover, another administrator specified that

> *We conducted some researches about the teachers and we analyzed various properties of teachers in the schools affiliated to our ministry (MoNE). That is, I can say that more than half of the teachers were assigned in last 10 years and most of them were young. For that*

> *reason, they may be accepted as teachers interested with these technologies. Besides, we took into consideration of medical condition of the teachers like pharyngitis problem for their voice in the classrooms. Furthermore, we have made some discussions according to teachers' political views, philosophy of life, and pedagogical concerns. (PM1)* Q225

He also stated that they knew most of the teachers in the first pilot school of the FATİH Project (also first case school of the study) and they took into consideration this information. School Principal (C1_SA2) of the first case school also expressed that administrators at YEGITEK received detailed information about their teachers after the technologies were established in their school. On the other hand, most of the teachers and school administrators in the second case school might not be accepted as young. Assistant School Principal (C2_SA2) said that most of the teachers in their school were not so interested with SCT, because they were older age. A teacher (C2_G2) in the second case school specified that some teachers in their school had difficulties while using especially PTIWB, because they were elderly and they did not use these technologies before. In addition, the Computer Teacher (C2_SAFT1) of the second case school indicated that any authorities did not request detailed information about the teachers in their school, but only District Directorate of the Ministry of National Education demanded free time of the teachers for participating in-service trainings. They sent an e-mail containing a form for getting free time of the teachers. As a result, although administrators at YEGITEK determined the all teachers in the schools as users for SCT and they analyzed generally these teachers, it may be concluded that these analyzes were not conducted adequately according to results of the interviews with teachers in the two case schools.

Secondly, an administrator (PM4) at YEGITEK stated that they analyzed also school administrators and most of the school administrators in Turkey could be accepted as people not interested with SCT and they did not have enough knowledge and skills about these technologies. Although the school administrators at the first case school were generally identified as interested with SCT by most of the teachers in the first

case school and by YEGITEK administrators, school administrators at the second case school were described as not interested with SCT by most of the teachers in that school like in the analysis of YEGITEK about the school administrators in Turkey. The administrator (PM4) at YEGITEK also said that *"we are also planning in-service trainings for school administrators because of their lack of knowledge and skills"* (PM4). However, school administrators and computer teacher in the both of two case schools specified that there were not any in-service training programs for the school administrators or computer teachers.

Thirdly, students were also determined as users for the SCT in the schools by YEGITEK. An administrator (PM1) at YEGITEK declared that they took into consideration of students like their comprehension level, levels of separating virtual worlds from real world, and level of psychomotor skills. He explained that they profited by the results of some projects conducted by MoNE while determining the properties of students who would use the SCT in the schools. As a result, administrators at YEGITEK determined the users of SCT as teachers, school administrators and students and they conducted some researches so as to analyze various properties of them.

4.2.4 Analysis of places where the SCT would be used

The classrooms, laboratories, and staff rooms at the schools in Turkey were determined by YEGITEK/MoNE as where the SCT were used. An administrator of the FATİH Project expressed that

> *We requested the physical condition of classrooms, labs, and staff rooms in the school in order to make arrangement suitable to establishment of PTIWB in these classrooms. After this analysis, we planned necessary regulations for some of the classrooms not having enough physical condition. In addition, we examined the current Internet infrastructure in the schools and we determined the situations of all schools in point of the Internet access. Therefore, we grouped these schools according to their infrastructure of the Internet access as terrestrial, satellite (Turksat), fiber infrastructure and GSM*

> *infrastructure. Then, we determined the needs of Internet infrastructure at the schools with respect to these groups about the Internet access. (PM2)* Q226

Additionally, another administrator (PM1) at YEGITEK emphasized that they did not only analyze the physical situations of the current classrooms, but they also would plan the developments about these technologies and they prepared the current classrooms and classrooms to be built in the future for these developments. For example, he said that they determined the necessary dimensions of the classrooms for the PTIWB.

When the usage areas of the SCT in the first case school were analyzed, it was indicated that there were different types and brands SCT in the classrooms as mentioned before. However, there were not any projectors or smart boards in the staff room of first case school, although administrators of the YEGITEK said that there would be a SCT in the staff rooms of the schools. Instead, there were only two PCs in the staff room of that school. Moreover, a teacher (C1_PT10) stated that these PCs were established long before the establishments of SCT in the FATİH Project. As expressed by project administrators, School Principal (C1_SA2) of first case school specified that some arrangements were made by YEGITEK in their classrooms and also the Internet infrastructure was installed in their school during the project. However, a Music Teacher (C1_MU1) specified that there should be specific arrangements according to properties of each course, because he had usage difficulties while using the computers and projectors during the Music lessons in his classroom, because wall of the classroom could cause echo and student could not hear the sounds adequately.

On the other hand, the Computer Teacher (C2_SAFT1) of second case school specified that YEGITEK made some arrangements for the suitability of electrical system of the school and the Internet infrastructure. Moreover, she said that

> *They (authorities at YEGITEK) demanded from us information about how many classrooms, labs and other rooms there were in our school.*

According to the information we gave, they installed the PTIWB to all classrooms, labs and staff room in our school. In addition, during to semester, they asked us to whether we needed more SCT for our school. (C2_SAFT1) Q227

Consequently, it can be said that administrators at YEGITEK conducted the physical situation and number of the classrooms in the schools in order to determine where the SCT would be used, however the some additional arrangements did not conduct for the special properties of different courses.

4.2.5 Analysis of processes how the SCT would be used

When the attempts of the YEGITEK as senior management were analyzed, there was a component of the FATİH Project named as 'Effective Usage of the SCT in Teaching Programs' so as to determine how the SCT would be used by teachers and students during the courses. An administrator (PM3) at YEGITEK responsible for this component (Effective Usage of the SCT in Teaching Programs component) explained that

We planned the commissions for each course in order to determine how these technologies could be used in these courses and to prepare curriculum for these courses suitable to usage of SCT in these courses. Actually, there was a superior board to coordinate the commissions for each course. We constituted this board and the board consisted from the top directors of general management of MoNE like Talim ve Terbiye Kurulu Başkanlığı, Temen Eğitim Genel Müdürlüğü, Ortaöğretim Genel Müdürlüğü and Mesleki ve Teknik Eğitim Genel Müdürlüğü. In addition, some administrators at YEGITEK participated to these superior boards. Nowadays, we are trying to establish commissions of each course. After these commissions will be formed, each commission will organize the curriculums of these courses for each grade so as to determine how these technologies would be used in these courses. (PM3) Q228

Furthermore, as mentioned before, the SCT was not only established in the classrooms of the school, but also in the labs and staff rooms of the school. An administrator (PM1) at YEGITEK stated that they supplied the PTIWB in the staff rooms of the schools so that teachers could prepare the usage of the material before the lessons and they could share their problems and solutions with other teachers in the staff room. He also expressed that they took into consideration the usage of the SCT during the lessons and after the lessons by teachers and students and he said that they planned to supply through EBA portal so that students and teachers used the SCT out of the lessons.

4.2.6 Receiving Potential Users' Perceptions

While presenting how administrators at YEGITEK/MoNE (as senior management) received users' perceptions about usage of SCT in the schools, results obtained from first and second case school will be presented separately. The attempts of administrators at YEGITEK/MoNE were different at two schools, because the first case school was the first pilot school of the FATİH Project while the second case school was one of the schools having PTIWB in the classrooms and the Internet infrastructure in the classrooms. That is, it can be inferred that main difference for two case schools was that authorities of YEGITEK/MoNE went the first case school frequently and they communicated with teachers and school administrators face to face in the first case school while they did not get direct contact with teachers and school administrators in the second case school.

Receiving Perceptions of Teachers in the First Case School

Most of the participants (N=13) in the first case schools and almost all administrators (N=5) at YEGITEK declared that authorities of YEGITEK had visited continuously to the first pilot school of the FATİH Project in order to get opinion and perceptions of teachers and school administrators about the usage of SCT in the school. An administrator (PM1) at YEGITEK said that *"our authorities (at YEGITEK) conducted social-impact analysis about the usage of various technologies in that school"*. In addition, 6 teachers and School Principal in the first case school stated that YEGITEK followed the usage of different SCT in their school and they asked

that which technology were better, easier and more useful for the teachers and students. For example, a teacher in the first case school explained that

> *YEGITEK installed different technologies to our school. I think that they tried to determine these technologies with us in order to determine best technologies for the teachers and students. For that reason, some staff from the YEGITEK came to our school and they asked us which technology was better. They said that they would make arrangements on these technologies according to our answers. (C1_T1)* Q229

Besides, an administrator at YEGITEK specified that

> *We have followed the usage of different technologies such as projectors, different smart boards and the PTIWB. Then, our authorities talked with teachers and school administrators in the first pilot school of our project (FATİH Project). That is, I can say that we received the perceptions of teachers about the usage of various technologies in this school. Moreover, most of the teachers indicated that the PTIWB was better and most useful technology among the technologies we established into the first pilot school. (PM1)* Q230

In addition, although school administrators expressed that their perceptions were obtained by project administrators, the teacher (C1_PT10) assigned by school management to interest the technological problems in the first case school stated that the perceptions of teachers were not received by the YEGITEK before the establishment of the SCT in their school. He said that authorities of YEGITEK received the perceptions and opinions of teachers about the positive and negative properties of these technologies when these technologies were used in their classrooms (not before the technologies had been established in the classrooms). At this point, an administrator (PM2) at YEGITEK declared that although they did not get perceptions of teachers about the SCT they sent to the first pilot school of the

project, they took into consideration of perceptions of teachers which they used these technologies at previous implementations for the SCT.

The other attempt of YEGITEK for receiving perceptions of users about the SCT in the first case school was the survey about the FATİH Project. The survey was named as FATİH Project Survey (FATİH Projesi Anketi) and it consisted of 5 parts and 34 items. These parts were (1) infrastructure-hardware, (2) the teaching-learning processes, (3) e-content, (4) in-service training, and (5) teaching programs. There was also a demographic information part for the participants in the survey. Participants could answer each item as yes or no and they could write comment for each item. An administrator at YEGITEK (PM1) declared that they implemented this survey so as to receive perceptions of teachers and school administrators in the first case school about the SCT. He explained that

> *The survey we conducted at the first pilot school of the FATİH Project contained some items about advantageous and disadvantageous of the technologies in the classrooms, ease of use of the technologies, usefulness of the technologies, and contents for the technologies. (PM2)* Q231

In addition, a teacher (C1_E2) expressed that there were questions in the survey about the effectiveness of the SCT, their expectations about the SCT, and their needs for using SCT in the classrooms. However, an administrator at YEGITEK, some teachers (N=5) and Assistant School Principal (C1_SA1) in the first case school emphasized that the survey was not enough for receiving perceptions of the users and it could be more comprehensive. Furthermore, the Assistant School Principal (C1_SA1) declared that demands mentioned in the surveys by teachers in the first case school were not met by YEGITEK. He also suggested that face-to-face meetings or interviews might be more beneficial instead of surveys in order to receive perception and needs of SCT users.

On the other hand, more than half of the participants (N=11) in the first case school asserted that authorities of YEGITEK did not get sufficiently perceptions and needs

of teachers in their school. As mentioned before, two teachers (C1_PT8 and C1_SS2) specified that project administrators did not conduct any research to receive perceptions of the teachers as users of the SCT before the establishment of the SCT in the first case school. Moreover, one (C1_PT8) of these teacher said that they could not transfer their perceptions and expectations about the usage of SCT to the YEGITEK. In addition, both of two school administrator stated that perceptions of teachers and school administrators were obtained by YEGITEK staffs before the establishment of the SCT into their school.

Receiving Perceptions of Teachers in the Second Case School

In the second case school, the main point mentioned by the most of the teachers (N=10), school administrators and Computer Teacher was that perceptions of SCT users were not received by YEGITEK/MoNE before the establishment of the SCT into the second case school. Although this point was indicated in the second case school, there were some attempts of YEGITEK/MoNE to obtain opinions and needs of teachers about the SCT when these technologies were used in that school. These attempts might be listed as attempts of staffs at District Directorate of the Ministry of National Education, applications of the Computer Teacher in the school, and various forms about the opinions and need of teachers for the EBA and in-service trainings.

Firstly, he Computer Teacher (C2_SAFT1) in the second case school expressed that staffs in the District Directorate of the Ministry of National Education tried to receive the perceptions of teachers and school administrators generally by phone. In addition, she said that

> *I think that they called me for taking information about what teachers think about these technologies, because YEGITEK administrators wanted the perceptions of the teachers in our school. That is, my friends in the District Directorate of the Ministry of National Education said to me that administrators at YEGITEK continuously asked them about what teachers think about these technologies. (C2_SAFT1)* Q232

Secondly, 3 teachers in the second case school declared that the Computer Teacher developed and gave them a form about their usage of SCT. However, the Computer Teacher declared that most of the teacher did not complete this form and she could not collect the opinions of teachers about these technologies with this form.

Thirdly, YEGITEK sent a form to second case school in order to determine opinions and needs of teachers about e-contents at EBA portal. In this form, there were part for the information about the course and information of how e-contents teachers demanded in the EBA. In addition, there was a part for the detailed information about the e-contents demanded by teachers.

The School Principal (C2_SA1) also stated that they received the perceptions of teachers about the SCT and e-contents at EBA by aid of these written forms. Although some teachers expressed that they specified their perceptions and needs about these technologies and e-contents at EBA on these forms, the Computer Teacher (C2_SAFT1) of the second case school declared that most of the teachers in their school did not complete these forms adequately.

Lastly, a teacher (C2_G2) and the Computer Teacher (C2_SAFT1) in the second case school expressed that the trainer of in-service training sent an e-mail to teachers participated in-service training in order to get perceptions and opinions of teachers about the in-service training. The Computer Teacher said that

> *There was a survey in e-mail sent by trainer of in-service training to measure satisfaction of teachers. Moreover, in this survey, there were items about the adequacy of in-service training and the trainer wanted to receive feedback for the training. (C2_SAFT1)* Q233

As mentioned before, although there were not any attempt for receiving perceptions of teachers about the in-service trainings, staffs in the District Directorate of the Ministry of National Education demanded the free time of teachers in their school in order to determine timetable for in-service trainings. On the other hand, 6 out of 15 teachers stated that there were not any attempts for receiving their perceptions before the in-service trainings. Furthermore, a teacher (C2_T1) specified that they

participated in the in-service training doubtfully, because they were not informed about the in-service trainings.

In spite of these attempts of YEGITEK/MoNE, school administrators, the Computer Teacher, and majority of the participants (N=13) in the second case school declared that project managers as senior management did not receive sufficiently perceptions of teachers and school administrators about the usage of the SCT. A teacher specified that

> *I can say that only technicians came to our school and established these technologies. Other than these technicians, any other authorities have not come to our schools and anyone as project managers did not communicate with us to learn what we think about these technologies. (C2_T1)* Q234

In addition, 5 teachers stated that their opinions and thoughts about these technologies did not take into consideration by administrators at YEGITEK before the establishment of the SCT and while they were using these technologies. Moreover, a teacher (C2_B1) asserted that YEGITEK administrators did not consider the teachers as interlocutor while they made a decision about the usage of the SCT in the schools. The Computer Teacher (C2_SAFT1) of the second case school also expressed that most of the perceptions of the teachers about the usage of the SCT were not received by YEGITEK/MoNE without forms for the EBA and in-service trainings.

4.2.7 Informing users about the usage of SCT

In terms of informing users about the usage of SCT, there were some differences in two case schools of the study. While staffs and administrators of YEGITEK visited continuously the first case school in order to inform teachers and school administrators about the SCT and FATİH Project, administrators of YEGITEK added a part in the in-service training so as to inform teachers in the second case school.

In the first case school, 6 out of 18 participants declared that authorities of YEGITEK had come to their school frequently throughout the semester and they organized a few meetings for informing teachers and school administrators. The School Principal (C1_SA2) stated that YEGITEK administrators emphasized the importance of the using these technologies in their school as the first pilot school of the FATİH Project. In addition a teacher explained that

> *Some staff from the YEGITEK came to our school monthly. They told us the importance of our usage for them as project management. They supplied some additional information about each technology in our school and took our opinions about these technologies. Moreover, technicians of these technologies gave introductory seminars about their technologies. (C1_MU1)* Q235

Another teacher (C1_PT8) also mentioned that there were some seminars in their school about the usage of these technologies organized by YEGITEK and companions of technologies in their classrooms. On the other hand, approximately half of the participants (N=8) in the first case school expressed that attempts of YEGITEK administrators for informing teachers and school administrators were not enough. 5 teachers asserted that they did not inform so much them about the why these technologies were established in their classrooms and they had some problems while using the SCT because of inadequate notification about them. Moreover, a school administrator (C1_SA1) and a teacher (C1_T2) asserted that communication of YEGITEK authorities with teachers and school administrators in the first case school was problematic and they did not inform them sufficiently, although they visited their school continuously. Furthermore, a teacher (C1_SS1) stated that these visits sometimes could be disturbing for them.

When this point was analyzed for second case school, there were some sessions in the in-service trainings which teachers participated. Half of the administrators (N=3) at YEGITEK declared that the informing users about the usage of the SCT were planned as a part of in-service trainings. When the program of in-service trainings were analyzed in the documents (like Program of Events of In-service Training for

FATİH Project document - FATİH Projesi için Hizmetiçi Eğitim Etkinlik Programı dökümanı), there were 6 parts named as (1) FATİH Project in education, (2) Installations and usage of the SCT, (3) Searching-finding-selecting e-contents, (4) Design and development of e-contents, (5) Planning and presenting a lesson using founded/developed e-contents, and (6) Evaluation of the e-contents and lesson presented by teachers. Especially, information of the users about the process of the installation of SCT was supplied in the first two parts of the in-service trainings. 5 teachers in the second case school specified that they learned some information about the PTIWB in the in-service trainings before the establishment of these technologies. Additionally, a school administrators (C2_SA2) in the second case school stated that a few authorities of District Directorate of the Ministry of National Education organized a meeting for the administrators of the second case school for informing them about the FATİH Project before the establishment of the SCT. In spite of these attempts of YEGITEK/MoNE in the second case school, 7 teachers in the second case school specified that YEGITEK did not inform sufficiently about the usage of SCT. A teacher said that

> *I think that project managers did not enough communicate with teachers in the schools. For example, we did not have any information about the in-service trainings before the trainings. That is, I did not know why this training was arranged, what we would learn in this trainings. I can say that I have some fears about the in-service training while I was attending the training. (C2_G2)* Q236

Another teacher (C2_T1) expressed that although they attended in-service trainings, there was not information about the SCT while the installation of these technologies in the second case school. He said that only technicians came to their school and they set up the PTIWB in their classroom without any information.

Consequently, there was an important difference between two case schools that information of users were supplied in the in-service trainings before the installation of the SCT in the second case school, while YEGITEK staffs informed teachers and school administrators in the first case school after the establishments of SCT.

4.2.8 Providing post adoption support

When the attempts of YEGITEK as senior management were analyzed in point of support to users, there were various supports of YEGITEK in order to maintain the usage of the SCT in the educational environments. In the two case school of this study, these supports might be listed as (1) training support (in-service trainings), (2) computer teacher, (3) content support (EBA), (4) technical support, (5) tracking and reward system, and (6) necessary hardware and durable infrastructure (as seen in Table 4.38).

Table 4.38 Attempts of YEGITEK for Maintaining the Usage of SCT

Attempts of YEGITEK	Number of participants mentioned
Training support (In-service training)	10
Computer teacher	8
Content support (EBA)	6
Technical support	6
Tracking and reward system	5
Necessary hardware and durable infrastructure	4

Training Support

Training support was planned by YEGITEK as in-service trainings to all teachers in the schools of Turkey. An administrator (PM1) at YEGITEK stated that they were developing an in-service training for all administrators and staffs at District Directorate of the Ministry of National Education, trainers of in-service trainings, school administrators, computer teachers and all teachers in the schools. As mentioned in the previous sections, these trainings were planned as 5 days – 30 hours duration and it covered the usage of the SCT, preparing e-content for the SCT and example usage applications for using SCT. However, teachers and school administrators in the first case school did not participate in the planned in-service trainings by YEGITEK. Instead of this, School Administrator (C1_SA2) specified that teachers in the second case school got some information about each technology in the short seminars given by technicians. He also declared that

> *Although we demanded more in-service trainings from the staffs of YEGITEK when they came to our school, our requests did not meet by YEGITEK. I think that in-service trainings for our teachers can supply huge support to usage of these technologies by teachers in their lessons. (C1_SA2)* Q237

In the second case school, the Computer Teacher expressed that almost all of the teachers participated one or two weeks in-service trainings. Two teachers (C1_G2 and C1_C2) in the second case school also specified that these trainings were useful for them to support their usage in their courses. However, another two teachers (C2_H1 and C2_T1) indicated that not taking view of teachers about the in-service training restricted the benefits of the in-service trainings to support their usage, although the Computer Teacher of the second case school said that there were some attempts of trainer of the in-service training for receiving opinions of teachers participated the training. The other problems about the in-service trainings supports were mentioned in research question 1.

Computer Teachers

Supports of Computer Teachers were also other attempts of YEGITEK for maintaining the usage of SCT in the schools. Two administrators at YEGITEK declared that Computer Teachers in the schools would be assigned as 'Educational Technologist' to support the teachers and school administrators while usage of the SCT. At this point, 'Educational Technologist' was described by a YEGITEK administrator (PM4) as staff in the schools interesting with all issues about the SCT like technical or software problems of the SCT, e-content problems, training of the teachers, and assisting teachers while designing their courses for using these technologies. However, the Computer Teacher in the second case school stated that

> *Actually, I did not have enough time to support the teachers for training them and assisting them while designing their courses for using the SCT adequately, because I was generally interested with technical problems of these technologies like a technician. However, I think that I as Computer Teacher (Educational Technologist) should*

> *be interested with supporting teachers about how they could integrate these technologies into their courses. That is, YEGITEK should employ us to help teachers for how they could use these technologies in their lessons instead of repairing these technologies in the schools. (C2_SAFT1)* Q238

This consideration of the Computer Teacher in the second case school was also declared by an administrator (PM1) at YEGITEK as most of the Computer Teachers in the schools did not want to be interested with technical and software problems of the SCT and they did not interfere in these problems. However, a teacher (C2_B1) in the second case school specified that Computer Teacher in their school was the main supporter for their technical and software problems on the PTIWB.

Content Support

EBA Portal was another attempt of YEGITEK in order to support teachers' usage of the SCT. An administrator (PM2) at YEGITEK expressed that they uploaded e-contents of most of the private publishers in addition to own contents of MoNE. Moreover, he said that they were planning to a system for teachers so that they could share their e-contents with other teachers. This system for sharing e-contents was also demanded by some teachers in the two case schools as mentioned in the first research question. In the first case schools, there were some attempts of private publishers although EBA portal was not yet supplied by YEGITEK for teachers. A teacher (C1_T2) explained that some staffs of private publishers came to their school and they distributed user name and password for entering their webpages and using their e-contents freely. Moreover, two teachers in the second case school stated that they obtained e-contents of some private publishers in a USB memory in order to use them on the PTIWB, but they could not open these USB memories on the PTIWB. To sum up, e-content supports of private publishers distributing e-contents in USB memories and in their web sites might be accepted as an attempt as well as EBA portal of YEGITEK for maintaining usage of the SCT in the schools.

Technical Support

Authorized technical service emerged another support of senior management for maintaining usage of SCT in educational environments. Three administrators (PM1, PM2 and PM4) at YEGITEK emphasized that technical support network of the companies having technologies in the schools would be supplied to the schools for the solution of the hardware problems in the schools. In addition, they stated that there were some items at the contract between MoNE and these companies about the insurance and warranty of SCT and supplying technical service supports to SCT in the schools. In the first case schools, there was not a specific technical support process for the technical problems of the SCT. A teacher (C1_PT4) declared that they did not know how they had the SCT repaired, where the SCT were repaired, and who repaired them. An administrator at YEGITEK explained the reason of this as

> *In the first pilot school of the project, there were too many technologies of different companies. For that reason, some problems about the technical support occurred in that school. However, we determined the PTIWB as the main technology in the schools and we concluded an agreement with the company of the PTIWB for the technical service support to the PTIWB in the schools. Therefore, we will not encounter such problems like in the first pilot school of the project at other schools. (PM2)* Q239

On the other hand in the second case schools, although technical service support for solving technical problems of the PTIWB was determined by YEGITEK/MoNE, there were some problems about the technical service supports mentioned in the first research question.

Tracking and Reward System

Four teachers in the two case schools specified that there could be a tracking and reward system for the teachers' usage of SCT in their lessons. Hereof, an administrator (PM1) at YEGITEK said that they were planning such a system for following the SCT usage of teachers and for rewarding the teachers using the SCT efficiently and effectively in order to encourage other teachers to use the SCT in their

courses. However, he emphasized that there must be some legislative changes by government for the implementation of this tracking and rewarding system. In addition, any tracking and rewarding system were not observed in two case studies by the researcher.

Necessary Hardware and Durable Infrastructure

While each two teachers in the first case school had a laptop computer provided by YEGITEK/MoNE addition to another SCT in the classrooms, the teachers in the second case school did not have any personal computer without computer system in the PTIWB. In both schools, most of the teachers and school administrators demanded a laptop or tablet computer for each user of the SCT in the classrooms. At this point, two YEGITEK administrators (PM1 and PM2) expressed that they were planning to supply tablet computers to not only teachers and school administrators but also the students in the schools. Therefore, they aimed to motivate teachers for maintaining the usage of the SCT in the classrooms. Moreover, a YEGITEK administrator (PM2) said that they started to implement pilot study about the usage of tablet computers in the 52 schools in Turkey.

Lastly, out of these six attempts of YEGITEK/MoNE, there was another factor for maintaining usage of SCT in the schools. This factor was only declared by an administrator (PM1) at YEGITEK and it was the political support of government for the FATİH Project. This administrator explained that they encountered various problems while integrating the SCT into school at Turkey, but they did not give up installing these technologies into the schools, because installation of the SCT were used as a political issue by the government in Turkey.

4.3 Teachers' and School Administrators' Opinions about Conditions in the Process of implementation of Usage of SCT (R.Q.3)

How do teachers and school administrators define the conditions/barriers namely "dissatisfaction with the status qua; time; resources, knowledge and skills, rewards and incentives, participation, commitment and leadership" in the process of implementation of change/or use of smart classroom technologies? (Donald P. Ely: 8 conditions)

In the third research question, eight conditions determined by Ely (1990) were used as basic for revealing what teachers think about the factors affecting their SCT in the educational environments. These factors were (1) dissatisfaction with status qua, (2) time, (3) resources, (4) knowledge and skills, (5) rewards and incentives, (6) participation, (7) commitment, and (8) leadership. For the third research question, data were collected from the teachers and school administrators in the both of two case schools with the interviews. The results for each condition will be presented above.

4.3.1 Dissatisfaction with status quo

The findings showed that most of the teachers and school administrators (N=20) highlighted the problems of current situation in educational environment as the factor for the integration of ICT into school. Especially, some teachers stated that there were lots of problems while they teach like intensive curriculum, crowded classrooms, difficulties for motivating students and deficiencies of traditional teaching methods. They asserted that most of these problems of current situation could be solved with the integration of these technologies into schools in the scope of FATİH Project. For example one of the teachers said that

> *The curriculums of Math course for 9th, 10th, 11th grades are too intense, and many Math teachers could not finish the subjects in the curriculum in the whole year. After installation of these technologies,*

> *Ministry of National Education might revise the Math curriculums, and would rearrange subjects according to these technologies*. (C2_M2) Q240

In addition, a Math teacher from the first case school expressed that

> *While I can solve only a few questions in a lesson, now, with aid of smart board, I can solve more questions in a lesson, and I will be able to follow the curriculum regularly.* (C1_M1) Q241

Usefulness and ease of use provided by SCT to teachers were declared by approximately half of the teachers as factors to integrating the SCT into educational environments. Nevertheless, 4 teachers in the second case school expressed that some teachers did not want to use these technologies in their lessons in spite of usefulness and ease of use of the SCT. Moreover, a teacher (C1_PT10) in the first case school explained that installation of these technologies should not cause extra problems and workloads for teachers while they were using them. He gave some example for these extra problems and workloads as preparing and searching e-content for the SCT, preparing SCT for the usage and calibration adjustment problem.

On the other hand, school administrators stated that the age of the teachers was the determinant for the teachers' dissatisfaction with the current situation of the schools. The administrator of the second case school explained that

> *Although young teachers are dissatisfied with the traditional school environments and want to use ICT in their lessons, the older and more experienced teachers are generally pleased with their conditions and they said that they would not use them.* (C2_SA1) Q242

In addition, the Computer Teacher (C2_SAFT1) of the second case school specified that there were a few teachers refusing to use SCT in their lessons. She said that they were pleased with the previous situation and they never use any SCT in their courses.

4.3.2 Adequate time

As mentioned in the part for problems for using SCT, some teachers (N=6) stated that they did not have enough time in order to prepare e-content about the subjects to use these technologies in their courses. Also, although some teachers declared that they could not use these technologies in their lessons because of the limited time and intense curriculum, a few teachers emphasized that smart board and e-contents helped them use the time effectively during their lessons. Related with time issue, a teacher in the second case school said that

> *If I use them in my lessons, I have to prepare my e-contents before the lessons. Nevertheless, I do not have enough time neither at school nor at home. Because, I am responsible for my housework and my baby while I am at home. For that reason, even if I want to use them initially, I would prefer to teach with traditional ways in my courses.* (C2_G2) Q243

Moreover, school administrators at second case school stated that if the teachers stayed at school after their lessons finished, they could plan their lessons and prepare e-contents in order to use and integrate ICTs into their courses. As a consequence, having enough time for using the SCT in their courses was declared by 14 participants in two case schools as one of the main factors affecting integration of the SCT into educational environments.

4.3.3 Resources

While project coordinators declared that they provided enough e-contents in the EBA and they finalized the arrangements with the private publishers to add their contents to EBA, teachers stated that e-contents at EBA were not enough both in quantity and quality. One Biology teacher from second case school said that

> *E-contents in EBA are inadequate. For example, I can reach only digital copy of the Biology book, and this book is prepared for the hard copy. At the beginning I tried to use this digital book in my lessons, but I could not take advantage of this book as I expected. For*

that reason, I gave up using this digital book, and I do not prefer to use smart board again in my course, because I could not find other type of e-contents other than only digital form of regular books. (C2_B1) Q244

On the other hand, a History teacher stated that

There are lots of map for the History courses in EBA, and I use them frequently. By this means, I do not have to carry the History maps from one classroom to another anymore. Furthermore, there are too many e-contents about History in EBA, however classifications of these e-contents, especially for History maps, were not made properly. For that reason, I could not find the map I want to use sometimes. (C2_H1) Q245

At this point, most of the teachers emphasized that having enough e-content for using the SCT was effective factor for the integration of the SCT into educational environments. The teacher (C1_PT10) assigned by school management of first case school for dealing with the technological problems in the school stated that provision of durable and adequate infrastructure and SCT to teachers was effective for efficient usage of these technologies in the schools.

4.3.4 Knowledge and skills

Almost all of the teachers and school administrators in both case schools stated that knowledge and skill required for using these technologies were the important factor at integration of the SCT into schools. In regard to this issue, most of the teachers (N=20) stated that they did not have enough knowledge and skills to integrate the new technology. In this point, project coordinators said that they were providing in-service trainings to teachers in order to help teachers with necessary skills and knowledge. However, some teachers in the second case school (participated to the in-service trainings of FATİH Project) declared that the in-service trainings were deficient and they could not use ICT because of these inadequate trainings. For example, one teacher said that

In-service training was only one shot and for one hour. It did not have enough practice applications. I think they may provide us additional repeated trainings throughout the year and some of these trainings may be about the specific to subject area. That is, they may arrange some training for Chemistry teachers about the special usage of them in the Chemistry lessons. (C2_C1) Q246

Also, all teachers in the first case school stated that they did not attend any specific in-service training and they joined only one day training given by various SCT technicians about how these technologies worked. Consequently, having satisfactory knowledge and skills about the usage of the SCT was declared as essential factor by the participants and they emphasized that in-service trainings organized by YEGITEK should provide enough knowledge and skills about practical usage of SCT to the users in the educational environments.

4.3.5 Rewards and Incentives

In regard to rewards and incentives, there were differences between teachers' viewpoints in the two case schools of the study. Whereas most of the teachers in the first case school stated that inner (moral) incentives could be more efficient than material incentives, teachers in the second case school emphasized the importance of material incentives for teachers to integrate these technologies into education. Opinions of some teachers were

Moral rewards may be more efficient for the teachers. For example, Provincial Directorate of National Education may give plate rewards to teachers who are using these technologies successfully in their lessons. Also, these rewards may be presented in a ceremony. (C1_E3) Q247

Moral rewards do not make a sense for me and most of the teachers in this country. Salaries of teachers are low. For that reason, most of the teachers do not prefer to use these technologies without getting

additional payment for using them. That is, if project coordinators want me to use them, they have to pay extra fee to me. (C2_C2) Q248

In addition, a teacher in the second case school said

If YEGITEK give me the aforementioned laptop or tablet computer in the project, it may encourage me to use these technologies in my courses. (C2_M2) Q249

Also, project coordinators indicated that, in future, usage rates of teachers might be evaluated, and an evaluation and material reward system could be developed.

On the other hand, there was another opinion of the teachers in the both of two case schools that inner or material incentives could not be effective for further usage of the SCT in the schools. 5 teachers asserted that if the other needs (like e-contents, trainings, technical support) of the teachers were provided by YEGITEK, no more incentives would be necessary for the usage of the SCT by the teachers. Additionally, a teacher (C1_PT8) in the first case school stated that willingness of the teachers for using the SCT was necessary factor and this factor could not be changed by other easily. He emphasized that users should want to use them and they should need to use them instead of the incentives of out sources.

As a result, unlike the previous factors, there were different opinions among the teachers in the both of the two case schools. The reasons of these differences will be mentioned in the discussion.

4.3.6 Participation

Approximately half of the teachers (N=16) in the both case schools of the study declared that project coordinators at YEGITEK did not respond to most of the opinions and requests of the teachers and school administrators at any stage of the project (before the establishment, during the establishment and during the usage stages). Additionally, they stated that they did not consider themselves as a part of the FATİH Project, and they did not prefer to use these technologies in the school

because of not being able to convey their ideas to YEGITEK. For example, a teacher said

> *Administrators at YEGITEK did not ask any opinions of us and they determined everything not according to us but among themselves. They said that we were establishing these technologies in your school and you must use them. That's all.* (C1_M2) Q250

There are differences between opinions of administrators of two case schools about the participation point. While the administrator of the first case school stated that the project coordinators were taking into considerations their opinions about the project, administrators of the second school indicated that they did not take their views in all phases. However, it was emphasized that teachers might use the technologies

4.3.7 Commitment

Most of the teachers and school administrators (N=22) at both two case schools declared that they should use these technologies because they thought that using them was the requirement of being a teacher at this age. A teacher explained that

> *In the age of technology, we as teachers should utilize these new technologies in our lessons. I mean, teachers should know how to use these technologies and we should use these technologies while we are teaching. Moreover, we should teach students how to use them. Therefore, I can say that using new technological tools is one of the most important necessities for teachers.* (C1_E2) Q251

On the other hand, a teacher (C1_M1) in the second case school specified that financial problems could prevent their professional commitment for being teachers and some teachers could not want to use these technologies for decline at the professional commitments of the teachers.

In addition, approximately half of the teachers in the both of two case schools stated that they did not have adequate commitment with project coordinators or managers at MoNE. They expressed that upper level administrators did not consider their

thoughts about the project and they did not want to use them because of this. A teacher stated that

> *Directors at MoNE have been conducting this project in order to be able to say that they established new technologies to the classrooms in Turkey. They were not aware of our problems and demands about these technologies. For that reason, I do not want to use these technologies.* (C2_T2) Q252

Furthermore, teachers in the second case school and the School Principal specified that some teachers did not perceive themselves as the important part of the FATİH Project and these teachers refused to use these technologies in their classrooms. To sum up, professional commitments of teachers were shown as factor for the integration of the SCT into schools.

4.3.8 Leadership

Most of the teachers and school administrators (N=24) emphasized that school administrators as leaders at schools had very important roles in the technology integration processes in educational institutions. Also, 10 out of 16 teachers in the first case school declared that approaches of school management affected their technology usage rate positively, although 4 teachers in the second case school expressed that attempts of school administrators did not affect their usage of the SCT in their lessons. Some teachers (N=14) in the second case school stated that one or two teachers at each school could motivate other teachers as being role models for other teachers in the integration processes of ICT into schools.

CHAPTER 5

DISCUSSION, CONCLUSION AND IMPLICATIONS

This chapter presents the discussions and implications regarding the findings of the current study. Firstly, the results appeared in this study will be discussed with regard to their consistency with national and international research studies. Secondly, the implications for practice and further research will be presented in this chapter.

5.1 Discussion of the Results

The purpose of the current study was to investigate the existing usage of SCT by teachers at K-12 schools in Turkey, the problems that teachers encounter while using the SCT and the solutions for these problems; the management process of the YEGITEK/MoNE as senior management for integration of SCT into schools; and the conditions/barriers to usage of these technologies in the schools. Discussions for 3 research questions will be mentioned comparing the first and second case schools together. Firstly, current usage of SCT in the two case schools will be discussed.

5.1.1 Current Usage of SCT in the Schools

After discussing the general usage of SCT in the schools, the usage aim and usage rate of them will be discussed under new headings. As presented in the results, there was a main difference between the established SCT in the two case schools. In first case school's classrooms, there were one of the four different smart boards (PTIWB, Smart Board with Touch Panel, Magnet Frame Based Smart Board, and Signal Based Smart Board) or a projector and cable Internet connection, while there were only a PTIWB and cable Internet connection in the each classroom of second case school.

The reason of this difference was explained by FATİH project administrators at YEGITEK as the first case school of the study was assigned as the first pilot schoolof the FATİH Project in order to try and determine which SCT would be established at other school in the FATİH Project. This process was also explained in the report of YEGITEK (2011) and in the study of Alkan et al. (2011). Both declared that the PTIWB was selected as the technology to use in the classrooms among the all experienced smart boards and projectors.

However, the results of the study revealed that PTIWB and the other smart boards were generally used only as projector instead of using the interactivity property of them. This result is in line with the reported findings in the studies of Yüksel and Alemdar (2012), YEGITEK (2012), Kıranlı and Yıldırım (2013), and Pamuk et al. (2013). They declared that teachers utilized from the PTIWB to reflect their presentation materials towards the wall in order to demonstrate the lecture presentations (some of them which the teachers prepared) to students. Pamuk et al. (2013) defined this type of usage as using the PTIWB as *"Internet-Supported Projection Device"* (p.1817). The reasons of this restriction regarding the usage of PTIWB may be explained as teachers' lack of knowledge and skills, and lack of suitable e-contents for the PTIWB, because it was emerged in the present study that most of the teachers did not know how to use the PTIWB specifically in their lessons and they did not have enough e-contents including interactivity property for the smart boards. In addition, another result found in the current study was that some teachers used projectors like a smart board; reflecting images on the whiteboard and writing on the image with board marker. On the other hand, teachers not having PTIWB in their classrooms at the first case school wanted the PTIWB in their classrooms as selected SCT. At this point, it was concluded that selection of the PTIWB and projectors for the SCT in the schools may be reviewed in point of financial dimensions.

In addition, each two teachers in the first case school had a laptop computer for using together in their lessons, while the laptop computers were not provided to teachers in the second case school. The reason of this was explained by project staffs as PTIWB

could be used like a personal computer in the classroom since a computer main board was included to them. Therefore, the laptop computers were not supplied to teachers in the schools having the PTIWB in the classrooms. However, some teachers specified that they did not use the PTIWB because they did not have a tablet or laptop computer to practice for their course before the lessons. This situation was also emphasized in the literature that the deficiency of the technologies were stated as barrier for the integration of the ICT into educational environments (Beggs, 2000; Pelgrum, 2001; Newhouse, 2002; Göktaş, 2006; Akbaba-Altun, 2006; Göktaş, Yıldırım & Yıldırım, 2009; Buabeng-Andoh, 2012). To sum up, providing tablet or laptop computers to teacher, school administrators and students may affect positively the integration of the PTIWB into schools. Moreover, tablet computers have been provided to teachers and students by YEGITEK in the second phase of the FATİH Project.

Usage Aim of the SCT

The results for the usage aim of the SCT established in the schools within the scope of FATİH Project were generally consistent with the findings in 'Movement of Enhancing Opportunities and Improving (MEOIT) Project Pilot Practice Assessment Report (MEOIT-PPA Report) (Fırsatları Arttırma Teknolojiyi İyileştirme Hareketi – FATİH- Projesi Pilot Uygulama Değerlendirmesi Raporu) of YEGITEK (2012). In the current study, the mostly cited usage aims by teachers emerged as to show audiovisual materials, to reach contents, to motivate and activate students, and to use time efficiently. Parallel with the present study, usage purpose of the PTIWB was listed in the MEOIT-PPA Report as to enrich lessons with audio visual materials (%85), to involve in the learning process (%81), to motivate students (%79), and to reach various contents (%75) (YEGITEK, 2012). Similarly, Schmid (2008) and Jang and Tsai (2012) specified that smart board could be used for many aims like enriching teaching and learning process, supplying interaction between students and contents, and motivating students.

However, some negative opinions were declared about the aims of using time efficiently and motivating students in the present study. The negative views might be

originated from teachers' opinion about the SCT usage in their lessons and unsuitable e-contents for using SCT in the lessons. In the literature, various researchers also emphasized that the perceptions of teachers were one of the main indicator for ICT integration into schools (Russell & Bradley, 1997; Sugar, 2002; Karaman & Kurfallı, 2008; Göktaş, Yıldırım, & Yıldırım, 2008; Yüksel & Alemdar, 2012). That is, the teachers who stated that themselves as not using the SCT in order to use time efficiently and to activate students were also generally not reflected positive perceptions about the usage of SCT in their lessons. Göktaş (2006) indicated in his dissertation that one of the main reasons for disuse of the ICT by teachers was negative perception that ICT could be time consuming during their lessons. Although some teachers indicated that they use these technologies for motivating and activating students, such usage of the SCT were not detected frequently during the observations in the two case schools. When this difference was asked to teachers and school administrators, they indicated the reason of this as lack of in-service training and lack of suitable e-contents to the SCT. The other issues about the lack of in-service training and lack of e-content will be discussed in next sections.

Moreover, the aim of the SCT usage of teachers was varied based on their major. Especially, Turkish, English, and Math teachers in the first case school used these technologies so as to activate students in their lessons. In addition, Social Studies and English teachers in the first case school utilized these technologies for using more audiovisual materials in their courses. On the other hand, History, Geography and Chemistry teachers in the second case school used the SCT so as to use audiovisual e-contents for motivating the students. However, Math and Physic teachers in the second case school did not use these technologies, because they did not have suitable e-content for their courses. These results were also in line with the MEOIT-PPA Report of YEGITEK (2012).

Usage Rate of the SCT

It was inferred in the current study that the PTIWB was the most used SCT in the two case schools. This result is corroborated by and the report of YEGITEK (2012). Similarly, in the study of Pamuk et al. (2013) it was declared that the PTIWB in the

schools were used by most of the teachers and students compared with the tablet PCs. In the current study, the PTIWB appeared to be the most used SCT in the first case school and most of the teachers wanted it at their own classrooms to integrate in their lessons. In the second school, on the other hand, the PTIWB was used often by half of the teachers participated to the study. The lower usage of the PTIWB by other teachers in the second case school might be attributed to teachers' age, properties of students and courses at the second case school as a high school. Firstly, most of the teachers in the first case school were generally young and middle aged, while most of the teachers in the second case school were elderly. These elderly teachers in the second case school may need more and broader in-service trainings than younger teachers. In this respect, Schiler (2003) and Buabeng-Andoh (2012) stated that the age of teachers is a factor that affected the ICT integration into schools. Therefore, the lack of knowledge and skills, and technical problems that these teachers encountered in the second case school might cause the lower usage rate. Secondly, the second case school was a high school (9^{th} to 12^{th} grades), while the first case school was an elementary school (kindergarten to 8^{th} grades). This factor may cause a difference between the schools in terms of properties of courses suggested in the curriculum and class management issues aroused from the age and characteristics of students. Some teachers in the second case school explained that students in the 11^{th} and 12^{th} grades had been studying for university entrance exams and they wanted to practice and solve questions or problems for this exam. For that reason, they did not prefer to use these technologies to enrich the learning processes instead they wanted to spend their time for solving practice questions. In addition, some teachers indicated that they could not ensure the classroom management at 9^{th} and 10^{th} grades students' classes. Consequently, while the PTIWB was the most used SCT in the first case school, it was not used often by some of the teachers at the second case school although every single class was equipped with PTIWB differently from the first case school.

In addition, in the first case school, the projectors were used more than smart boards except for the PTIWB. This situation was also reported by YEGITEK (2011). As it was stated by Pamuk et al. (2013), YEGITEK (2011) and YEGITEK (2012), the

PTIWB and other smart boards were used mostly as projector devices in order to present materials which teachers prepared or found, instead of using interactivity property of the smart boards. The possible reason of this is the lack of knowledge and skills about the usage of the smart boards as well as the technical problems that emerge during the use of the smart boards. Most of the teachers of the first case school stated that they used the projectors before the FATİH project, although they never used any smart board before the establishment of the smart board in their classrooms. Therefore, they could not have enough knowledge and skills about the usage of the smart boards in their schools, because they did not have any experience with them. Moreover, teachers having smart boards (except the PTIWB) in their classrooms stated that they encountered some technical problems like calibration adjustments, shadow on the screen, touch problems, and connection problems to laptop computers. These obstacles may cause to stop using the smart boards by teachers in their lessons.

Lastly, considering the majors of the teachers, the SCT was found to be used often during the Social Studies, Turkish, English and Math courses in the first case school, while it was History, Geography, Chemistry, English and Turkish Literature courses in the second case school. In their study, Pamuk et al. (2013) reported that the PTIWB were mostly used by Biology, Geometry, Geography and English teachers. In addition, although the school administrators in the second case school claimed that Math teachers used these technologies the most, the explanation of Math teachers illustrated the opposite. They declared that these technologies and e-contents supplied at EBA were not suitable to embed in Math courses. More specifically, a Math teacher specified that he did not trust the accuracy of practice questions in the Math course section at EBA and he did not use the e-contents and the PTIWB because of these reasons. The other issues about the e-contents at EBA will be discussed in the following sections.

5.1.2 Problems/Challenges While the Usage of SCT, Solutions, and Needs of Teachers

In this section, the results emerged in this study about the problems and challenges which the teachers encountered while using the SCT in the schools, solutions of these technologies by different sources, and needs of teachers for more efficient and effective usage of SCT will be discussed with regard to their consistency with national and international research studies. In the result chapters, main problems and challenges were listed as technical problems, lack of e-content and challenges at EBA, lack of knowledge and skills, inadequate in-service trainings, deficiency of support to teachers, challenges of classroom management and difficulties to maintain motivation, and limited time. In addition, solutions were grouped based on the source of solution as following; teachers' own efforts, assistance of computer teacher, help of another teacher, solutions of YEGITEK/MoNE, attempts of school management, help of students, solutions of private publishers, support of authorized technical services, and problems that could not be solved. Moreover, the needs to overcome the challenges and problems while using SCT were stated about the in-service trainings, e-contents and EBA, durable and regular infrastructure, accessible and sufficient support by senior management, and assistance of school management. Now, these findings will be discussed together under following headings separately (Technical Problems in the Technical Infrastructure, Technical Support, Lack of e-contents and EBA, Lack of Knowledge and Skills and In-service Trainings, Role of Computer Teachers, Role of School Management, Support of YEGITEK/MoNE).

Technical Problems in the Technical Infrastructure

In the literature, various challenges at accessing to ICT and technical problems at the technical infrastructure in the schools was declared as an influential barrier for the technology integration into schools (Beggs, 2000; Cuban, Kirkpatrick & Peck, 2001; Pelgrum, 2001; Newhouse, 2002; Jones, 2004; Akbaba-Altun, 2006; Judson, 2006; Yıldırım, 2007; Eteokleous, 2008; Plomp et al., 2009; Göktaş, Yıldırım & Yıldırım, 2009; Demir & Bozkurt, 2011; Buabeng-Andoh, 2012; Yüksel & Alemdar, 2012). Akbaba-Altun (2006) stated that physical settings, equipment, challenges, breakdowns, and technical problems and technical support for these problems were

identified as factors about the infrastructure at schools. In the results of the present study, various technical problems and some breakdowns were determined for each of the established SCT in both of case schools. However, some differences between two case schools in point of technical problems were appeared from statements of teachers. One reason of this may be that there were only the PTIWB and cable internet connection as the SCT in the classrooms of the second case school, while there were different SCT like projectors, laptop computers, other type smart boards in classrooms at the first case school. Besides, there was only one classroom equipped with PTIWB in the first case school. In addition, YEGITEK continued to make arrangements for the technological infrastructure in the schools according to experiences at the first pilot school of the FATİH Project (first case school of the present study). For example, in the first case school, there were visual clarity and screen saver problem for the projectors in the classrooms. Some teachers also complained about that their body could intervene between wall and projector while they wanted to get close to the image and it could overshare on the image. In addition, smart boards in the first case schools had calibration adjustment problems. Furthermore, teachers utilized from projectors and smart boards in the first case school had to connect the laptop computers to projectors and smart boards. Most of these teachers complained about the connection ports on the wall for the projectors, smart boards and laptop computer were not durable for using frequently. That is, these ports could go out of order and could not work properly. In addition, they stated that connecting the laptop computers to projectors or smart boards at each time was highly time consuming. At this point, administrators at YEGITEK determined the PTIWB as a SCT in the other schools and they designed and installed better infrastructure for the PTIWB and the Internet connection. Therefore, these mentioned problems for the projectors and smart boards were not specified for the PTIWB in the second case school. That is, visual clarity problem, shadow problem on the screen and calibration adjustment problem could be overcame by means of using the PTIWB in the second case school. In addition, the connection part problems were also minimalized with aid of though infrastructure in the second case school. However, the calibration problem was expressed in the MEOIT-PPA Report of YEGITEK (2012) and it was also mentioned by one of the teachers in the second

case school. As a result, it can be concluded that the PTIWB might minimalize most of the technical problems of the projectors and other type smart boards identified in the first case school.

Additionally, selection of the PTIWB by YEGITEK/MoNE eliminated another problem in the first case school. There was only one laptop for each two teachers which means that they had to use the laptop computer alternately. The responsibilities of these computers were up to the teachers and some teachers declared that they could not take laptop computers to their home. It was also stated by YEGITEK (2011) as most of the teachers (%78) did not preferred to take the responsibility of these laptop computers (e.g. security of these laptop computers). However, the PTIWB had a computer in them and the user did not require any other computer so that students and teachers could use them in the classrooms more easily. Therefore, YEGITEK administrators as project staffs had solved another problem of teachers by means of the PTIWB.

On the other hand, technical and software problems were found for the PTIWB in the second case school. These problems were summarized as breakdowns, usage difficulties, and restrictions for the usage of the PTIWB. The breakdown and sensitivity problem of the touch screen of the PTIWB were determined as main technical problems. These findings of the current study were consisted with results of the study conducted by Pamuk et al. (2013) and MEOIT-PPA Report of YEGITEK (2012). Especially, there is the same finding for the usage difficulty of the PTIWB in these studies and current study. For example, teachers and students reported that they had difficulty in changing pages on the PTIWB. Sometimes, pages did not change any or changed too fast although users attempted to pass to just the next page. The reason of this may be related with the sensitivity of the touch screen of PTIWB. The other consistent finding regarding the usage difficulty and restriction problem was about the smart board software of the PTIWB. This software restricted to usage of the teachers when they want to add other resources to screen. Using the additional contents with the SB software could require more steps or could be impossible for teachers. For that reason, it was suggested that the software on the PTIWB should be

changed or updated so that the teachers could use them more easily (Pamuk et al., 2013). The software and tools for using ICT in the teaching and learning processes were also stated as a necessity in order to integrate ICT into educational environment (Tondeur, Valcke & Van Braak, 2008).

Although the issues mentioned above are parallel with the findings of the studies in the literature (YEGITEK, 2010; Pamuk et al., 2013), there was a contradiction between the results of the current study and these studies. They reported that teachers and students could not write on the PTIWB because there was not any smart board pen for the PTIWB. However, it was appeared in the current study that some students had difficulties in writing on the smart board with smart board pen especially at the lower grade classrooms. The reason can be attributed to the physical property of students in the lower grades. Because, primary school students might not be able to hold smart board pen with their hands and they could not write on the smart boards with these pens. Consequently, property of smart board pens for the PTIWB and whether or not a pen should be for the PTIWB may be investigated in detail by researchers in future studies.

Technical Support

For the solutions of technical problems like breakdowns, technical support was declared as main request in the both of two case schools. This result is in congruence with the previously reported findings by Jones (2004), Tong and Trinidad (2005), Eteokleous, (2008), Göktaş, Yıldırım and Yıldırım (2009), Yılmaz (2011), Buabeng-Andoh (2012), and Kıranlı and Yıldırım (2013). In these studies, it was emphasized that technical support was one of the main factor for the ICT integration into educational institutions. It may be inferred from the results of the current study that there were some deficiencies in two case schools by means of technical support that provided to the teachers. In the first case school, it was asserted by teachers and school administrators that there was not a determined way for the technical support when they need assistance. Especially, they emphasized that they did not know what they should do when any of the SCT broke down. On the other hand, YEGITEK administrators expressed that technicians of SCT in the first case school provided the

technical support to teachers. However, teachers specified that these technicians only installed the SCT and they never received assistance from them after the installation. The reason of this may be the existence of various SCT in that school. More specifically, the presence of diverse technologies in the schools could cause confusion about who is the responsible to provide technical assistance. In contrast to first case school, there were only the PTIWB and wired Internet connection in the second case school as mentioned before. Although there were a technical support service of the PTIWB for the schools and there was a call center of PTIWB's technical service, some teachers and school administrators in the second case school explained that these supports were not enough and they serve to slow to come and solve the problems in the schools. At this point, the conditions for the technical support of technic service of the companies may be arranged to provide a better support to the schools such as maximum period to serve for schools, more efficient call center support, and widespread technician network throughout the country to reach all schools. On the other hand, YEGITEK administrators indicated another call center provided by YEGITEK/MoNE and these call center was used for supporting teachers about technological problems. They also stated that this call center would be improved so as to supply better technical support to teachers while using SCT established in the FATİH Project. However, most of the teachers in both case schools were not aware of this call center and they did not take any support from there. Only a few teachers called this support center, but they expressed that there was not a unit for helping teachers' problems about the SCT of FATİH Project. Deficiency of support for these technologies may cause the unawareness of the call center by teachers. Because, if teachers could take support from the call center of YEGITEK/MoNE, they would talk about this assistance with other teachers and encourage them to use this support. Therefore, usage of this call center might become widespread between the teachers in the schools. In addition, teachers wanted that computer teachers in their school could support them and solve their technical problems when they encountered some basic breakdowns on the SCT. This issue will be discussed in detail under the heading about the role of computer teacher. The importance of technical support to teachers for the integration of ICT into educational environments were also emphasized by Buabeng-Andoh (2012) as

teachers could give up using ICT in their courses if they encounter some breakdowns and if the technical support is not provided as soon as possible to them in those situations.

Conversely, Yıldırım (2007) reported that the technical support to teachers could not be enough unless pedagogical support was provided to teachers with it. Pedagogical support may be defined as assisting teachers so that they could teach with SCT in their lessons. Parallel with findings of Yıldırım (2007), this issue was also stated by teachers in both case schools as they needed to have more knowledge and skills for how to use these technologies in especially their courses and how to teach with them. The pedagogical support problem will be explained more in the following part about the lack of knowledge and skills and in service trainings.

Lack of knowledge and skills and in-service trainings

Lack of confidence was indicated as a barrier for using SCT into educational environments while the lack of technological knowledge and skills of teachers was stated as the reasons of lack of confidence in teachers (Jones, 2004; Balanskat et al., 2007; Buabeng-Andoh, 2012). In the current study, school administrators and most of the teachers in both of the case schools, mentioned the lack of knowledge and skills as one of the main problems and issues for using SCT efficiently and effectively in their courses and integration of these technologies in the schools. In addition, it was also stated that in-service training sessions within the scope of FATİH Project could not eliminate teachers' needs of knowledge and skills for using SCT. These findings of the current study were consisted with the results of study of Pamuk et al. (2013) in which they listed some of the probable reasons of lack of knowledge and skills in teachers. These are being in the initial stage of the establishment of SCT, ongoing in-service training regarding how to use them, and teachers with lack of practice the PTIWB in their lessons. In the current study, the reasons may be explained as new technologies for teachers, not knowing how to integrate the SCT in their lessons, insufficient in-service trainings and not being aware of potential ease of use, and usefulness of the SCT. Most of the teachers in the two case schools specified that they had difficulties mostly when they wanted to use

smart boards and PTIWB. Because, they have never used the smart board and the PTIWB before, although most of them have used the computer, projectors and printers more than once. In addition, teachers' other lack of knowledge and skills were appeared to be about preparing the e-contents for these technologies and solving technical problems about these technologies.

Teachers mostly stated that they did not know how to use these technologies in their lessons, even if they would learn how to run these technologies. Moreover, they demanded some additional training about how the SCT could be used especially in their curriculum. These point was also emphasized by Sandholtz and Reilly (2004) as how to use ICT with pedagogical methods, by Yıldırım (2007) as how to teach with technologies, by Buabeng-Andoh (2012) as how to apply ICT to support students' learning, and by Pamuk et al. (2013) as how to use the PTIWB in teaching. Moreover, Sandholtz & Reilly (2004) also asserted that although required knowledge and skills for teachers about usage of the ICT was one of the main determinant of ICT integration, the were not the only conditions for effective usage of ICT in the classrooms. They asserted that providing knowledge and skills for pedagogical usage of ICT (teaching with ICT) instead of technical issues and effective technical support could supply to integration of ICT in teaching and learning. At this point, it was stated that pedagogical support should be provided to teachers alongside the technical support in order to integrate technologies into educational environments (Yıldırım, 2007; Göktaş, Yıldırım & Yıldırım, 2009). In addition, there was another model for the effective technology integration to education, 'TPACK' (Mishra & Koehler, 2006; Koh et al., 2010; Harris & Hofer, 2011; An & Reigeluth, 2011; Abbitt, 2011; Yüksel & Alemdar, 2012). TPACK was consisted of abbreviations of 'Technological Pedagogical Content Knowledge' framework. In TPACK framework it was emphasized that the combined usage of technology, pedagogy and content knowledge was important for effective technology integration into educational environments (Koh et al., 2010). As a result, if lack of knowledge and skills of teachers for using SCT in their courses is satisfied by following TPACK framework, the pedagogical support may be provided to teachers in a structural way.

In the literature, trainings of teachers in order to provide required technological knowledge and skills to teachers were suggested for integrating ICT into schools (Rogers, 2000; Wilson et al., 2003; Franklin, 2007; Yıldırım, 2007; Lawless & Pellegrino, 2007; Mueller et al., 2008; Eteokleous, 2008; Göktaş, Yıldırım & Yıldırım, 2009; Buabeng-Andoh-2012). In addition, in the current study, teachers and school administrators in the both of two case schools were not pleased with in-service trainings they participated and they asserted that these in-service trainings did not provide them essential knowledge and skills for using the SCT in their courses. Actually, there were no planned in-service trainings for teachers in the first case school. Although FATİH Project at YEGITEK said that authorized staffs of some of the companies (which established the SCT in the first case school) give trainings to teachers, most of the teachers declared that these seminars were only for introducing SCT to them and these seminars lasted approximately only one hour. On the other hand, there were two types of in-service trainings (1 week and 2 weeks periodic) in the second case school and these trainings were developed by a commissions constructed with academicians that selected by YEGITEK. However, most of the teachers who participated these trainings expressed that these in-service trainings were not sufficient for them in order to use the SCT in the schools. Their complaints and expectancies about the in-service trainings were grouped as short duration of training, receiving the training only once, deficient practice part in the training, inadequate level of the in-service training, special trainings for teachers at different fields, trainings for giving knowledge and skills to prepare e-contents, more suitable trainings to teach with SCT, and not giving a training to computer teachers and school administrators. Some of these points about the in-service trainings provided teachers within the scope of FATİH Project were also mentioned by Pamuk et al (2012).

Mostly cited point for an adequate in-service training by teachers was that in-sevice trainings should provide them to learn how to teach with SCT in their courses. As mentioned above, this issue is related with pedagogical support to teachers for the integration of SCT into schools. Yıldırım (2007) also stated that *"teachers criticized in-service training programs for failing to demonstrate the new pedagogy of*

teaching with technology and ranked the lack of pedagogical support as one of the stern barriers" (p.181). Moreover, teachers participated in in-service trainings of FATİH Project in the second case school stated that they did not have enough practice chance to implement what they learned in the in-service trainings. They demanded that more practice-based applications in the in-service trainings instead of regular seminar type trainings should be provided to them. In the study of Pamuk et al. (2013), it was also reported that in-service teacher trainings of FATİH Project were not effective as much as estimated because of the limited access to SCT during the training programs. As emphasized by Buabeng-Andoh (2012) the practice part of the in-service trainings is significant so that teachers could use SCT effectively and efficiently in the schools. In addition, YEGITEK made in-service trainings happen in the second case school just before the summer holiday. Teachers receiving this training specified that they also could not implement what they learned and they forgot what they learned about the usage of the SCT during the in-service trainings because of timing of the in-service trainings. These findings were also comparable with the findings of Yıldırım (2007) and MEOIT-PPA Report (YEGITEK, 2012). However, administrators at YEGITEK were planning to carry out the in-service trainings during the seminars weeks at the beginning and end of the academic years. The timing of the in-service trainings may be re-arranged at more appropriate times and in longer periods so that teachers can practice what they learned during the trainings as well as during their lectures. In addition, in-service trainings may be organized continuously (a few times instead of once) according to changes in the technological developments and needs of teachers.

As mentioned before, there were two types of in-service trainings as 1 week period standard trainings for teachers having basic technological knowledge and skills and 2 weeks period trainings for teachers not having technological competency (e.g. not using computers in their daily life). However, most of the teachers stated that level of the in-service trainings were not suitable for them and they expressed that there should be different level of trainings for teachers having different technological backgrounds. In addition, teachers demanded different in-service trainings for their fields and courses in order to teach special usage of SCT in their lessons. Parallel

with the present study, Yıldırım (2007) also presented that teachers did not want to participate same training programs with all teachers and they wanted to learn usage of ICT for the subjects of their courses. In the MEOIT-PPA Report, the different trainings for different field teachers and teachers having different technological background were also reported by academicians (YEGITEK, 2012). In addition, Holland (2001) and Akbaba-Altun (2006) recommended that in-service trainings should provide the exact usage of ICT according to content areas of the teachers.

Consequently, in-service trainings are still considered as the solution of the lack of knowledge and skills of teachers for using ICT in the educational institutions (Ertmer et al., 2012; Pamuk et al., 2013). At this point, administrators of the educational institutions may take into consideration mentioned points above in order to integrate ICT into teaching and learning processes. Pellegrino (2007) asserted that qualified, more appropriate timing and duration, and including pedagogical aspect about the ICT could increase the effect of in-service trainings for efficient and effective usage of SCT in the schools. Lastly, Council of Higher Education and universities in Turkey may rearrange their teacher education programs so that pre-service teachers can have enough knowledge and skills in order to use SCT established in the schools within the scope of FATİH project.

Lack of E-contents and EBA

In the first case school, some e-contents were supplied to teachers with different ways like supplying e-contents on the website of YEGITEK and providing more e-contents on the website of private publishers. On the other hand, in the second case school, there was a web portal developed by YEGITEK (named as EBA - Education Information Network - Eğitim Bilişim Ağı) in order to supply e-contents to teachers from the only a source. YEGITEK/MoNE made agreement with most of the private publishers and transferred their e-contents to EBA. Supplying e-contents through the collaboration of educational institutions and private publisher companies were also suggested by Göktaş, Yıldırım and Yıldırım (2009) in their study. Therefore, this attempt of YEGITEK/MoNE may be useful in order to provide e-contents to users of SCT. In addition, some private publisher companies obtained various e-contents in

USB memories at face-to-face meetings with teachers in the second case school. However, although various e-contents were provided with EBA portal by YEGITEK, most of the teachers and school administrators in both of the two case schools declared that the lack and inappropriateness of e-contents were the main deficiencies for using SCT in the schools. The deficiencies about the e-contents and EBA portal may be listed as insufficient number and variety of e-contents, inappropriate e-contents for the usage of teachers during the lesson in the classroom, inconvenient e-contents to properties of SCT, unsuitable e-contents to level of students, difficulty of finding and reaching e-contents at EBA, difficulty of finding e-contents on the Internet and reaching undesired contents on the Internet. Most of these problems about the lack of e-contents were indicated as barriers for the integration of ICT into educational environments by many researchers (Casey, 1995; Ertmer, 2005; Akbaba-Altun, 2006; Hew & Brush, 2007; Eteokleous, 2008; Plomp et al, 2009; Buaebeng-Andoh, 2012; Göktaş, Yıldırım & Yıldırım, 2009; Kıranlı & Yıldırım, 2013; Pamuk et al., 2013). In some studies, lack of e-contents was stated together with lack of technology as lack of hardware and software (Casey, 1995) or lack of infrastructure and resources (Plomp et al., 2009; Buabeng-Andoh, 2012). On the other hand, some researchers indicated that lack of software and materials could be accepted as barrier for the integration of ICT into educational environments (Göktaş, Yıldırım & Yıldırım, 2009).

Most of the teachers and school administrators in both of the case schools declared that they did not have enough e-contents for using the SCT in their lessons and most of the e-contents at EBA were generally same type contents such as videos and electronic version of the textbooks. Similarly, Pamuk et al. (2013) stated that teachers complained that they could find only digital books at EBA. The more visual and interactive materials were demanded by teachers in both of the case schools. Moreover, although administrators at YEGITEK asserted that they were supplying enough contents, the teachers were seeking different type contents in order to integrate students to the subjects. This situation can be attributed to the teachers' unawareness of the e-contents presented at EBA. Because, some teachers asserted that there were some e-contents for using interactively with students. For that reason,

teachers may be informed in the in-service trainings about the e-contents at EBA. Furthermore, parallel with the present study, it was indicated in the MEOIT-PPA Report that teachers requested more e-contents and they wanted to select the contents which they wanted to use. Moreover, inadequate contents were indicated as main barrier for the using ICT in teaching and learning environments by Akbaba-Altun (2006) in her study. In addition, Pamuk et al. (2013) stated specified that "*it is believed that the content provided with the technology affects the attitudes of teachers and students towards the use of technology in the process of teaching and learning*" (p.1819).

The other issue about the inappropriateness of e-contents at EBA and e-contents supplied by private publishers was that the e-contents were not suitable for using them on these technologies (especially for the PTIWB) by teachers and students. Some teachers expressed that most of the e-contents were not prepared for using by teachers during the lessons and these contents were more suitable for the usage of students in their own personal computers at out of the schools. Moreover, another teacher specified that if they opened and showed the videos at EBA in the classroom, they could not control the flow of the video and lesson, because videos were not prepared according to usage of teachers during the lesson. These findings were also emphasized in the studies of Pamuk et al. (2013), and Kıranlı and Yıldırım (2013), and in the MEOIT-PPA Report (YEGITEK, 2012). For that reason, it was requested that new e-contents should be prepared which are suitable to the usage of teachers and students by interacting with contents during the lesson (Tondeur, Valcke & Van Braak, 2008; Eteokleous, 2008). This point may be supported with Clark's view (1994) that only technology or medium could not influence the learning of students without an instructional method for using the technology. To sum up, e-contents at EBA may be prepared with an instructional methodology for using them on the SCT in the classrooms. At this point, arrangements on the curriculum of the courses for the usage of the SCT were also demanded by teachers in both of two case schools. That is, 'Effective Usage of the ICT in Teaching Programs' component of the MEOIT project may take into consideration teachers' opinion while updating the curriculums.

Furthermore, there were some restrictions especially for the PTIWB and SB software on it when some e-contents were used with them. Some teachers declared that they wanted to open some e-contents of a publisher in their USB memories, but they could not run these contents because of the PTIWB's restrictions. In addition, parallel with the results of the MEOIT-PPA Report of YEGITEK (2012), SB software on the PTIWB did not provide easy usage of e-contents transferring images and texts on to screen of the PTIWB. That is, if a teacher wanted to transfer an image or text in the other sources, they had to split each object and then they could transfer them on the screen of the SB software. This procedure was considered as too exhausting by teachers when they wanted to use e-contents with SB software for interacting on the PTIWB. Therefore, e-contents and SB software may be reorganized for easily using them together on the PTIWB.

In addition, some teachers in the two case schools indicated that the e-contents provided them to using on the SCT were too easy for their students. Especially, a teacher in the second case school stated that the e-contents at EBA were not suitable for their students in high school level and these e-contents might be used in the elementary school levels. At this point, in order to prevent these problems for preparing contents suitable to students' grade level, Akbaba-Altun (2006) suggested that a need analysis might be conducted prior to providing e-contents to students and teachers.

The other problem mentioned mostly by participants was difficulty of finding and reaching to e-contents at EBA and in the Internet. Some of the teachers asserted that although there were enough e-contents (like maps for History and Geography courses) at the EBA, they could not find and reach e-contents which they wanted to use in their lessons. That is, deficiency of 'content tracking system' or 'contents search system' at EBA was emphasized. The necessity of these systems for reaching e-contents was also specified by Akbaba-Altun (2006) and YEGITEK (2012).

The other challenge about the reaching e-contents was the restriction on the Internet access at schools. That is, the internet filter applied by MoNE did not permit to reaching some webpages and sources on the Internet by teachers and students. Some

teachers expressed that they could not reach some e-contents which they wanted to use in their lessons because of the internet restriction of MoNE. On the other hand, some participants declared that they might encounter undesired contents (like advertisements, political figures, etc.) on the some webpages while searching e-contents on the Internet at schools. A teacher stated that they could not use the e-contents at the webpages containing undesired images and figures for their students. At this point, although some teachers were pleased with restrictions on the internet access at schools, some other teachers wanted the removing the internet filter at schools in order to reach e-contents about the topic of their lessons. As a result, the implementation of the internet restriction comes into prominence for supplying enough e-contents to teachers and students. That is, the banned webpages and sources on the Internet should be determined more carefully so as to provide more and suitable contents to users of the SCT in the schools. At this point, opinions of the teachers may be taken into consideration while determining which website should be banned or should be permitted. In addition to this, instructional content criteria (Smaldino et al., 2007) may be determined in detail according to literature and the e-contents used on the SCT may be selected considering these instructional content criteria.

Furthermore, although some teachers and school administrators stated that there were enough e-contents for using with the SCT in their schools, some other teachers declared as mentioned before that they did not have enough e-contents. The possible reason of this situation is not providing sufficient e-contents for every single course. Parallel with these results of the study, it was also suggested that there should be enough e-contents for each of all courses (Akbaba-Altun, 2006; YEGITEK, 2012; Pamuk et al, 2013; Kıranlı & Yıldırım, 2013). In the present study, especially English, Geography, Chemistry, History, and Math teachers indicated that there were more e-contents for their courses compared with other courses. Moreover, Music, Philosophy and Turkish Literature teachers expressed that they could not reach e-contents to using with SCT in their lessons.

The last issue about the lack of e-contents for using SCT in the schools was the preparation of e-contents. Although teachers' preparation of their own e-contents was expressed as another solution to lack of e-contents problem by YEGITEK administrators, the lack of knowledge and skills, lack of time, and lack of resources like tablet or laptop computers were declared as obstacles to development of e-contents by teachers. In addition, YEGITEK administrators stated that they would generate an environment at EBA for the sharing of e-contents between teachers. At this conjuncture, preparation and control of the e-contents at EBA may be conducted by commissions consisting of not only authorities at MoNE and academicians, but also experienced teachers in their fields. Because, some teachers declared that they had concerns about the accuracy of e-contents at EBA and they did not used SCT in their lessons because of this suspicion. Actually, the roles of experienced teachers (instead of only academicians) for the preparation of e-contents at EBA were also emphasized in the MEOIT-PPA Report (YEGITEK, 2012).

5.1.3 Role of Computer Teachers

The computer teachers at schools were appeared to be seen as one of the most important factors for the integration of SCT into schools by teachers, school administrators, and YEGITEK administrators in the current study. In Turkey, the computer teachers consisted of three different groups as computer teachers graduated from 'Computer Education and Instructional Technology Department' from faculty of educations at universities, computer teachers graduated from other computer-training programs of faculties at universities, and computer coordinators assigned by MoNE among the teachers at schools. In fact, computer coordinators were graduated from other departments of universities, but MoNE prepared some seminar programs to training computer coordinators for employing some teachers in the schools as computer teachers (Deryakulu & Olkun, 2007). In the literature, the missions of the computer teachers (or computer coordinators) may be listed as teaching computer courses, moderating technological resources at school, maintenance of ICT in the school, helping other teachers while using ICT in the school, and solving technical problems about the computers in the school (Akbaba-Altun, 2006; Deryakulu & Olkun, 2007; Baran, 2010; Yıldırım, Yalçınalp & Kılıç, 2010). According to results

of the present study, role of computer teachers for the integration of SCT in the schools may be summarized as dealing with technological and software problems of SCT, repairing basic breakdowns at SCT, supporting teachers while using SCT, communicating with school administrators, YEGITEK/MoNE and technical services of SCT companies for the issues about SCT in the schools, helping school administrators about the technological subjects at schools.

In the current study, although there was not any computer teacher in the first case school, while there was a computer teacher (computer coordinator) in the second case school. However, in the first case school, a teacher having enough knowledge and skills about the ICT was assigned by school administrators as a computer teacher for supporting the usage of SCT. On the other hand, the computer coordinator in the second case school worked as also the computer teacher of the school and she was interested with all issues about ICT in the second case school (e.g. solving some basic technical problems, and installing software and operating systems to computers and PTIWB). The absence of computer teacher in the first case school was declared as one of the main deficiencies in the school for the integration of the SCT. Expectancies of most of the teachers from computer teachers in both of the case schools were helping them for the solution of the technical problems. This result is in line with findings of Akbaba-Altun (2006), Baran (2010), Yıldırım, Yalçınalp and Kılıç (2010), YEGITEK (2012), and Pamuk et al. (2013).

However, there were some additional demands about the support of computer teacher in the second case school. One of the finding is that computer teachers should not only support them for the technological issues about the SCT, but they should also assist them for the pedagogical issues for the usage of SCT in their courses. Some teachers specified that the computer teacher was required to help them about how they integrate the SCT in their lessons. This point was also emphasized by Pamuk et al. (2013) especially for the pilot applications of FATİH Project. As also stated by Yıldırım (2007), teachers wanted that computer teachers should have more responsibilities more than just solving technical problems of computers rather they should act as technology leaders for integrating ICT in the schools. He also indicated

that lack of pedagogical support of computer teachers caused low frequency for the usage of ICT in the schools. In addition, according to results of the current study, YEGITEK administrators expected that computer teachers in the schools could take the role of interesting with technical and pedagogical issues about the SCT in the FATİH project. However, a YEGITEK administrator stated that they had some feedbacks about most of the computer teachers in the schools did not want to look after most of the technical and pedagogical problems about the SCT that teachers and school administrators confronted. The possible reason of this reluctance of computer teachers may be lack of knowledge and skills for solving technological and pedagogical problems about the usage of SCT in the schools. Akbaba-Altun (2006), Yıldırım (2007) and YEGITEK (2012) also reported that computer teachers did not have technological and pedagogical competency for repairing ICT and supporting teachers to use ICT in the educational environments. Moreover, they expressed that computer teachers should be trained theoretically and practically in the in-service trainings. In parallel with these issues, the computer teacher in the second case school of the present study specified that there was not a special in-service training program for the computer teachers in the FATİH Project and YEGITEK should organize the in-service trainings for the computer teachers so that they could adequately assist other teachers in the schools while using SCT.

On the other hand, most of the teachers in the second case school stated that the computer teacher of their school was their only source to deal with all issues about the SCT. Some teachers including the computer teacher in the second case school indicated that only one computer teacher could be insufficient for supporting all students, teachers and school administrators about the technical problems they encountered. Parallel with the current study, Akbaba-Altun (2006) stated that computer teacher did not have enough time to investigate all problems about the SCT because of their workload. At this point, it can be suggested that workload of computer teachers at school may be reduced with aid of school administrators, technical services of SCT companies, and YEGITEK/MoNE. Computer teachers may guide the students, teachers, and school administrators to where they could find solution to their problems. That is, computer teachers may be responsible to interest

only some defined problems in the schools and lead the users in help-seeking process for the others. Students, teachers and school administrators may communicate with responsible units directly or with the guidance of computer teacher.

5.1.4 Role of School Management

In the literature, attempts of school administrators were declared as another important factor for the diffusion of the ICT into schools (MacNeil & Delafield, 1998; Todd, 1999; Leigh, 2000; Dawson & Rakes, 2003; Yuen, Law & Chan, 2003; Akbaba-Altun, 2006; Yıldırım, 2007; Ertmer et al., 2012). In addition, Yuen, Law and Chan (2003) stated that school administrators could take a role as change agent for the integration on ICT in the schools. In the present study, when the attempts of school administrators at two case schools were investigated, it could be said that school administrators (especially the school principal) in the first case school were interested intensively with the issues about the SCT and problems of teachers about using SCT in the classrooms, although school administrators in the second case school did not deal with most of the issues about the SCT in the school and teachers' problems about these technologies. In the second case school, the computer teacher was trying to catch up all issues and problems about the SCT in the classrooms and laboratories. In addition, the school principal and other administrators in the first case school supported and encouraged the teachers for using SCT in their lessons, while the school administrators in the second case school were not aware of most of the issues about the SCT in their school. Therefore, it may be concluded that these differences in attitudes and attempts of school administrators in the two case schools affected the usage of SCT in the schools. That is, most of the teachers in the first case school expressed that they used SCT many times, because school principal followed their usage and was consider their problems so that these problems could be solved as soon as possible. On the other hand, most of the teachers in the second case school stated that they did not use these technologies frequently, because they confronted several problems and school administrators did not know which problems they encountered. Moreover, they added that problems they informed the school management to solve them were not resolved. The possible reason of the mentioned differences between attitudes and attempts of school administrators in two case

schools may be age of school administrators and the conducted visits of project administrators to the first case school. That is, the school administrators in the first case school might be accepted as middle aged, while the ones in the second case school were older. So, school administrators in the first case school might be more interested in SCT because of their ages compared with school administrators in the second case school. Schiller (2003) and Buabeng-Andoh (2012) stated the age of teachers and school administrators as one of the personal characteristics influencing the integration of ICT in the educational environments. The other possible reason is that the first case school was the first pilot school of the FATİH Project and project administrators at YEGITEK visited frequently the first case school in order to follow usage of the SCT. For that reason, the school administrators in this school might be more concerned with the issues and problems compared to the other school because of these inspections of project administrators.

Moreover, the lack of knowledge and skills about the SCT and lack of in-service training for school administrators may be accepted as another reason of reluctance of school administrators for considering the issues about SCT and supporting teachers to use SCT. In the present study, especially school administrators in the second case school emphasized that there were not any in-service training programs prepared for school administrators to use SCT and support teachers in the schools. Yıldırım (2007) also expressed that reluctances of school administrators for the integration of ICT might be caused by insufficient in-service training for school administrators and their tendency to protect the current situation in their schools. Parallel with the present study, Akbaba-Altun (2006) specified that lack of knowledge and skills, and unsatisfactory in-service trainings for the school administrators was the barrier for the ICT integration in the educational environments. Therefore, YEGITEK/MoNE may organize additional in-service trainings for school administrators so that they could easily follow the usage of SCT and assist the teachers while using SCT in their courses.

The other point for the lack of school administrators' supports to teacher about the usage of SCT was that school administrators did not have enough physical, financial,

and personal sources, and time to provide the integration of SCT in the schools. This finding is corroborated with the reported results by Akbaba-Altun (2006). In the present study, some teachers stated that they did not apply to school administrators for the solution of problems they encountered while using SCT, because they thought that school administrators could not overcome their problems due to lack of their knowledge, skills, budget, and time for solving these problems. In addition, the computer teacher in the second case school and a teacher in the first case school were assigned by school principals to be responsible for all issues and problems about the SCT in the schools. However, the computer teacher in the second case school stated that she also did not have enough time and resources to deal with all issues and she recommended that school administrators could assist them while communicating with related people and institutions (i.e. technicians, YEGITEK, and MoNE). As a result, school administrators may take a role in the integration process of SCT by supervising the usage of SCT by teachers in the schools so as to encourage teachers to use SCT, and also by establishing communications with related people and organizations for the solutions of the problems appeared in their schools.

5.1.5 Role of YEGITEK/MoNE

Regarding the role of YEGITEK/MONE, most of the teachers and school administrators in the both case schools stated that administrators at YEGITEK/MoNE had an important position for the diffusion of SCT in the schools. It was determined in the current study that administrators at YEGITEK/MoNE conducted some implementations in order to manage and provide adequate usage of the SCT in the schools. These attempts of YEGITEK/MoNE were investigated in the light of two theories from the literature. These theories are 'Environment Analysis' by Tessmer (1990) and 'User Oriented Instructional Development (UOID) Process' by Burkman (1987). The reason of selecting these theories for investigating the attempts of YEGITEK/MoNE as senior management was that micro-level theories generally might not be considered by educational leaders deeply, although educational leaders have some technology plans and change plans (as macro level theories) while they apply ICT to educational organizations (Miranda & Russell, 2011). In addition, Surry (1997) defined that micro theories for the technology

integration is more related with the widespread usage of ICT in the educational environments. He also emphasized that the Environment Analysis Theory of Tessmer (1990) and User Oriented Instructional Development (UOID) Process of Burkman (1987) might be conducted as micro theories in the ICT diffusion research in order to investigating in detail issues about especially usage dimensions of innovations. Moreover, he asserted that these theories were generally associated with the integration of an innovation by potential adopters instead of concerning with large scale such as systemic change. In these theories, it was specified that during the integration of an innovation, the important point that needs to be taken into consideration is not only the technology which were supplied to the users, but also the opinions and characteristics of the users. Therefore, attempts of the administrators of FATİH Project were analyzed in terms of the process in determination of which SCT were installed to the schools, determination of usage process of these technologies, receiving the opinions of users about the SCT in the schools, and lastly maintaining and supporting the usage of SCT in the schools. In the current study, it may be concluded that administrators of FATİH Project did not follow a specific theory or a defined strategic and project plan. This initial result for the attempts of project administrators is corroborated with the statements of Sarı (2011), Ekici and Yılmaz (2013). They mentioned that there was not any project plan announced by YEGITEK/MoNE for the development and implantation of the FATİH Project. On the other hand, some attempts of YEGITEK/MoNE were detected in the present study, despite the absence of a specific plan for the integration of the SCT in the FATİH Project. However, most of these attempts (e.g. developing e-contents at EBA and providing in-service trainings) were not planned neither at the beginning of the FATİH Project nor before the installation of SCT in the schools. Ensminger et al. (2004) also expressed that educational leaders should plan the steps in the micro theories before the design, development, and implementation of ICT usage in the educational institutions. Consequently, the attempts of YEGITEK/MoNE will be discussed in the light of 'Environment Analysis' by Tessmer (1990) and 'User Oriented Instructional Development (UOID) Process' by Burkman (1987) in this section.

Firstly, there were some differences about the selection and development of SCT processes in the two case schools. Indeed, the first case school was designed for trying and determining which SCT would be established in the other schools within the scope of FATİH Project by YEGITEK/MoNE. The project administrators stated that they utilized from the experiments of teachers while using different SCT in the first case school (first pilot school of the FATİH Project) and they determined the PTIWB for each classrooms in the schools instead of other type of smart boards and projectors. They emphasized that they tried to design and develop a user friendly product according to opinions and usage of teachers in the first case school. Burkman (1987) also emphasized in his 'User Oriented Instructional Development (UOID) Process' that user friendly products could be designed and developed with evaluating perceptions of potential users. However, most of the teachers in the first case school expressed that YEGITEK administrators took their opinion about the problems and other issues for the usage of different SCT in their classroom, but they did not take into consideration their opinions and they did not inform them about how they developed SCT according to their opinions. Moreover, there were some problems about the PTIWB in the second case school similar to the problems observed in the first case school (i.e. chalk dust problem, calibration adjustment problem, and touch screen problems). Therefore, it could be inferred that there were some deficiencies for developing user friendly product for the teachers and students. The possible reason of this may be not to take perceptions of teachers about the SCT before the development process of the PTIWB. Tessmer (1990) and Burkman (1987) also emphasized that measuring perceptions of potential users was main steps for the successful integration of ICT in the educational environments. The other deficiency for the usage problems of the SCT in the schools may be the lack of need analysis for the teachers and students. That is, the YEGITEK administrators selected and established same technologies without evaluating needs of teachers and students who have different backgrounds (e.g. properties of the fields, age of the students, and socio-economic status of the school). For that reason, SCT could not be used in some courses and classrooms, while some teachers and students used them frequently. In their study, Ekici and Yılmaz (2013) also specified that the project administrators did

not conduct enough analysis about the current situation in the schools and needs of teachers for the usage of SCT.

Secondly, determination of the users, receiving potential users' perceptions and informing users about the usage of SCT were other steps for the YEGITEK/MoNE as senior management in order to integrate SCT into schools. YEGITEK administrators stated that they defined all students, teachers and school administrators as potential users of the SCT because of planning to provide SCT to whole classrooms of all schools in Turkey. An administrator at the YEGITEK also indicated that they took into consideration the teachers' political views, philosophy of life, and pedagogical concerns while analyzing the properties of users. He expressed that they make decisions based on the complaints about the SCT stated by teachers according to source of complaints as whether the complaint were about the pedagogical view of the teacher or political view of the teacher. At this point, resolving the reason of the teachers' complaints by YEGITEK administrators may not be easy for the most of the problems stated by teachers.

In the present study, it was emerged that YEGITEK/MoNE did not conduct a general research to receive the perceptions of the users about the SCT before the establishment or design and selection processes of technologies. However, YEGITEK administrators stated that they took advantages of the results of some projects conducted by MoNE before the FATİH Project and asserted that they had information about the teachers and students for the usage of SCT. However, getting opinions of the teachers and students especially for the SCT in the schools may be more beneficial for the project administrators, instead of using findings of other previous projects. In addition, although they applied some surveys, forms and face-to-face meeting to receive users' perceptions, these attempts were not conducted before the establishment of the SCT in the schools. As emphasized by Tessmer (1990) and Ensminger et al. (2004), information about the usage of SCT should be analyzed before the design and development of SCT. Moreover, most of the teachers asserted that surveys and forms applied by YEGITEK were generally insufficient. Also, the authorities at the YEGITEK did not inform teachers about their

expectancies they stated in these forms and surveys. They stated that there were the same problems at the forms and surveys for the EBA an in-service training. In this respect, Ekici and Yılmaz (2013) also reported parallel results to the current study. For example, it was emphasized that communications with teachers and school administrators as stakeholders of the FATİH Project were not enough and they were perceived as mere implementers by the project administrators. Actually, the implementation and analysis of the surveys and forms and providing feedback to the participants regarding the conclusions of this research may be very important in order to perceive opinions of potential users for the integration of the SCT in the schools. Because, teachers and students may not write and state their opinions and thoughts about the SCT, if they think that project administrators as senior managers do not take into consideration their opinions about the SCT. For that reason, giving feedback to users about their opinions and expectancies for the integration of SCT in the schools may provide to receive real opinions of users about the SCT. The other point stated by some of the teachers in the study was that face-to-face meeting could be better to receive teachers' perceptions and opinions about the usage of SCT. Some teachers expressed that they could tell more about the problems they encountered if any authority came to school and talked to them. However, some teachers in the first case school said that frequent visits of authorities of YEGITEK to the school disturbed them and they did not used the SCT in their lessons with the way most of the teachers wanted. Therefore, face-to-face meeting methods may be used while getting opinions of teachers about the usage of SCT, but the frequency and timing of these meetings should be in optimum level to not disturb the general usage of teachers. Moreover, these meetings may be conducted in the seminar weeks before and after the academic years in the schools.

The same reservations may be declared for the information of the potential users about the usage of the SCT in the schools. Although there were some informing sections in the in-service training programs, teachers stated that these informatory sessions were not sufficient for them and more information sessions were required before the establishment of SCT in their school.

Thirdly, it was emerged in this study that YEGITEK/MoNE analyzed the physical infrastructure in the schools for the determination of suitable SCT and possible usage ways of SCT in the schools (e.g. usage by teachers and students in the classrooms and usage of teachers in the staff room before the lessons), although the detailed usage analysis were not conducted for the different courses and grade levels of students. That is, same technologies were supplied to all teachers and students without their expectancies, their needs, properties of courses, and grade level of students. For example, a Music teacher in the first case school specified that he could not use the SCT effectively in the Music courses, because the physical infrastructure of music classroom were not suitable for listening music and sounds. That is, the absence of acoustic environment in the classroom and sounds was disturbed because of the encaustic classroom environment. In addition, he demanded that special software for the Music courses in order to use SCT effectively. Akbaba-Altun (2006) also stated that providing physical settings and equipment was one of the main indicators for the integration of SCT in the schools.

As mentioned before, YEGITEK/MoNE firstly determined the SCT and then looked for answer about how these technologies would be used. For example, a YEGITEK administrator stated that there was a component of the FATİH Project named as 'Effective Usage of the SCT in Teaching Programs'. He also explained that some commissions would be constructed in order to determine how the SCT would be used by teachers and students during the courses. However, SCT were established most of the schools, although these commissions were not constituted and teaching programs could not updated according to usage of SCT in the courses. For that reason, it could be concluded that these deficiency may cause the reluctance of teachers to use SCT in their lessons. Consequently, the usage processes of SCT may be determined before the establishment of SCT in the schools.

Lastly, maintenance of SCT usage and providing post adoption support were emphasized by Tessmer (1990) and Burkman (1987) as the last step for the diffusion of innovations. In the current study, attempts of YEGITEK/EBA to provide post adoption support were listed as in-service trainings to teachers, computer teacher, e-

content support (EBA), technical service support, tracking and reward system, and providing hardware and software. These attempts of YEGITEK were discussed in the previous sections in detail.

5.1.6 Opinions of Teachers' and School Administrators' about the Conditions in the implementation process of Usage of SCT

In this study, the opinions and perceptions of the teachers and school administrators about what might affect the successful usage and integration of these technologies in the FATİH Project were investigated with the viewpoint of Ely's (1990) eight conditions. Findings were presented and these conditions were seemed by participants of the study as efficient factors for the integration of ICT into education. In the literature, these factors were stated as important determinants for diffusion of the instructional innovations in educational environments (Bauder, 1993; Ravitz, 1999; Ensminger et al., 2004; Turcotte & Hamel, 2008; Baert, 2012). In addition, Uluyol (2013) also emphasized that Ely's eight conditions for successful technology integration to educational worlds should be taken into consideration by the administrators of the educational institutions and especially by the administrators of the FATİH Project at YEGITEK/MoNE. Therefore, the findings of this study indicated important points in regard to the conditions and opinions of teachers and school administrators.

Firstly, most of the young and middle age teachers were not pleased with the current situation of classrooms, curriculum and traditional teaching techniques. However, older teachers were satisfied with the current situation and they do not want to change their ways of teaching. School administrators and project coordinator were aware of this issue, but they did not have any solution for this resistance coming from the older teachers. That is, age of the teachers or duration of professional experience might be other conditions for the integration of ICT into school as indicated in the study of Belland (2009). In terms of adequate time, teachers reported the limited amount of time for preparing e-content for their courses. To overcome this problem, project coordinators have been providing them various e-content in EBA portal. However, these e-contents are not suitable and flexible to use in current

curriculum and teaching methods as indicated by the teachers. For that reason, teachers' expectation about the curriculum change may solve these time and resource restrictions. Similarly, enough time and resources conditions were emphasized by the most of the researchers in the literature (Burkman, 1987; Pajo & Wallace, 2001; Ebersole & Vornddam, 2003).

Having knowledge and skills about ICT was stated in most of the related literature as an important factor in the integration process (Kotter, 1996, Okumus, 2001; Ensminger, Surry, Porter & Wright, 2004). In the FATİH Project, YEGITEK designed an in-service training for teachers in order to provide them with necessary knowledge and skills in using the interactive white board effectively in the schools. In the study, teachers at the second case school had attended this in-service training, while the teachers at the first case school did not. However, teachers at both schools stated that they did not have required knowledge and skills for using the related technology, and they requested more qualified and frequent trainings, even if they participated in this training. Therefore, YEGITEK might review the related training programs and plan additional in-service training according to opinions of teachers and school administrators.

When we look at the results from the rewards and incentives viewpoint, there are two types of rewards (intrinsic or extrinsic) as indicated by the teachers and the school administrators. Rogers (1995) stated different incentive types and discussed the role of them in their context. In this study, researchers reached the results similar to Roger's incentives. While teachers in the first case school preferred intrinsic or moral incentives, teachers in the second case school wanted extrinsic or material incentives. The reason of this difference may be opinions of teachers about professional idealism. That is, most of the teachers in the first case school were young and they were in the early years of their profession; however teachers in the second case school were generally older and they were more experienced. This age differences of teachers at two case schools may cause the differences of the teachers' opinions about the teaching profession. Therefore, they might want different incentives from the YEGITEK according to their socio-economic context. For that

reason, project coordinators may work on various incentives plans in corporation with teachers and school administrators.

Teachers at both schools did not think that they were the part of the project, and they did not have the sense of ownership of these technologies. In addition, they stated that YEGITEK administrators were not interested in their demands and problems about ICT in the schools. These findings were related with the participation and commitment conditions of Ely (1990). Lastly, for leadership conditions, there were again differences between teachers at two case schools. Teachers of second case school said that school administrators were not interested with their problems and they communicated with mentor teachers of the school in order to solve these problems. On the other hand, teachers of the first case school declared that school administrators were interested with their problems. This situation caused the difference at expectations of teachers from the school administration, and some of them decided not to use these technologies in their courses because of authoritative attitudes of school administrators. The findings indicated that, school administrators and some teachers in the schools might have a critical role as change leaders for the integration of ICT into schools.

5.2 Implications for the Practice

In the current study, current usage situation of SCT in the two case schools, challenges while using them, solutions to these problems encountered by teachers, and needs of teachers and school administrators for effective and efficient usage of SCT were investigated. In addition to these, management of the integration process of SCT by YEGITEK/MoNE was analyzed in point of two theories in the literature. And lastly, opinions of teachers and school administrators about the conditions for integration of SCT into schools were examined. Actually, some of the contributions inferred from the results of the study were specified in the discussion section above. In this part, the main points of the study's implications for the integration of SCT will be summarized.

Firstly, it could be inferred in the results of the current study that YEGITEK/MoNE (as senior management) have not conducted a well-defined strategic plan and did not

follow the steps of a theory (e.g. diffusion of innovation) for the successful integration of SCT. For that reason, administrators of FATİH Project may determine a theory and perform their attempts according to stages of this theory. For example, the attempts of YEGITEK/MoNE were investigated according to stages of Environment Analysis of Tessmer (1990) and User Oriented Instructional Development Process of Burkman (1987). Some suggestions can be made for the attempts of YEGITEK/MoNE in order to provide successful integration of SCT in the schools. First of all, need analysis of the FATİH Project should be conducted in order to determine which SCT would be used, who would use the SCT, and how the SCT would be used. That is, these might be determined according to requirements of the students, teachers, and schools. Moreover, because the YEGITEK/MoNE have planned to get SCT every public school in Turkey, there may be different requirements of students, teachers, school administrators and school in each different location. In addition, requirements of teachers and students for different courses and different levels should be identified so as to supply suitable SCT, training and content to them. In other words, YEGITEK/MoNE should conduct various need analysis in order to determine the demands of them within the scope of FATİH Project. The other point is that YEGITEK/MoNE should share information about the process of the FATİH Project with the stakeholders (like academicians, teachers, students, parents of students, school administrators, and publishers) in order to determine attempts they would conduct. Especially, students, teachers and school administrators should be informed about the process of the usage of SCT so that they would take possession of the SCT and they would use them in the educational environment. Moreover, YEGITEK/MoNE should get perceptions of students, teachers and school administrators for the deciding what attempts they would make within the scope of FATİH Project. Furthermore, YEGITEK/MoNE should plan the post adoption support for the users of SCT. They should sustain ongoing training support, e-content, technical support, and pedagogical support to teachers, computer teachers, and school administrators as stakeholder of the diffusion of SCT into schools.

Although YEGITEK/MoNE organized the in-service trainings (1 week and 2 weeks period) for the teachers in the second case schools, most of the teachers and school administrators in the both case schools specified that they did not have enough knowledge and skills for using SCT in their courses, and they needed more and adequate in-service trainings for using SCT in the schools. In-service trainings for the FATİH Project should be arranged more than once and more practice-based according to needs of the teachers. The continuous in-service trainings may be prepared and these trainings may be updated according to technological developments and views of users. In addition, special trainings should be supplied to teachers of different courses and fields. YEGITEK/MoNE should determine the needs of teachers at each field, and then should prepare in-service trainings according to these demands of the teachers. In addition, example usage of the PTIWB for the some subjects of the courses may be shown to teachers in order to teach possible usage of them in their courses, because most of the teachers stated that they did not know how to integrate these technologies in to their courses, although they knew that how to run the SCT and software in it. Another important point for the in-service training was that YEGITEK/MoNE should organize special in-service trainings to computer teachers and school administrators so that they can take role at the successful integration of SCT in the schools.

The other point for the overcoming lack of knowledge and skills of teachers to use SCT in the educational environments is that pre-service teachers in the faculty of education in the universities may be trained for using SCT in the courses. MoNE and Higher Educational Council (HEC) may collaborate to prepare pre-service teachers for using SCT effectively and efficiently in the schools. At this point, pedagogical aspects of SCT usage may be supplied in the faculties of education. YEGITEK/MoNE may provide the PTIWB, contents at EBA and other SCT to faculties of education so that pre-service teachers can be educated about the usage of these technologies. Moreover, faculties of education (especially Computer Education and Instructional Technology Departments in these faculties) may supply special training programs to in-service teachers about the pedagogical usage of SCT in the

educational environments. Therefore, needed pedagogical support to teachers is supplied within the scope of FATİH Project.

YEGITEK/MoNE constructed a web portal so as to provide e-contents to teachers and students as users of SCT. However, most of the teachers specified that they needed more qualified and variety e-contents at EBA. Firstly, e-contents at EBA should be prepared suitable to usage of teachers on the SCT during the lesson in the classroom and they should have more interaction properties. The important point is that the e-contents should be prepared for the SCT in the schools according to usage of teachers. In addition, there should be additional e-contents at EBA for usage of the students at their own PCs, laptops or tablet computers. The level of the e-contents should be arranged according to characteristics and needs of the students. Therefore, need assessment of the teachers and students come into prominence within the scope of management of FATİH Project by administrators of the YEGITEK/MoNE. At this point, e-contents for all courses should be provided at EBA as some teachers (e.g. teachers of Music, Philosophy, and Scripture courses) emphasized. Although there were enough e-contents at EBA for some courses, the finding and reaching these contents might be difficult for teachers and students. For that reason, the structure of EBA may be organized for easy access to e-contents by students and teachers. A content tracking system may be developed at EBA by YEGITEK to assist users for reaching easily to e-contents and following usage of teachers so that they can see which e-contents they used. The other point for overcoming lack of e-contents for using SCT is that teachers can develop own e-contents and share them with other teachers. To supply this, YEGITEK/MoNE should firstly organize in-service trainings to teachers so that they can prepare their own e-contents and they may construct an environment for sharing these e-contents with other teachers. However, reliability of these e-contents prepared by teachers should be controlled by MoNE.

In the present study, most of the teachers and school administrators declared that they did not know when, where and how they used SCT in their courses. For that reason, MoNE should update the curriculum of the courses for the usage of SCT in the courses. In fact, YEGITEK constructed a component at the FATİH Project

(named as Effective Usage of the SCT in Teaching Programs). However, administrators of this component have not updated the curriculum of the courses for the usage of SCT, although SCT have been established in the schools. In addition, some teachers might give up using SCT in their courses because of uncertainty for the usage of the SCT in their courses. For that reason, regulations at teaching programs of the courses should be made as soon as possible by MoNE.

YEGITEK are continuing to establish the PTIWB and the Internet connections to all schools in Turkey. In addition, they have conducted pilot study giving tablet computers to teachers and students in the second stage of the FATİH Project. However, there were some hardware and software problems about the SCT installed in the schools. These problems were indicated in the results of the current study. YEGITEK may overcome some of these problems in order to ensure the integration of SCT in the schools. Firstly, the sensitivity problems for the touch screen of the PTIWB should be solved for ease usage of them. Because, teachers and students could not write easily and change screen as they wanted. In addition, connection ports of the PTIWB may be improved for more wide usage. Secondly, software installed on the PTIWB should be changed or updated, because most of the teachers could not transfer contents and objects onto this software and they could not use them easily. In addition, this software might restrict usage of private publishers' e-contents on them and teachers might give up using them anymore. As a result, YEGITEK should made necessary arrangements for the PTIWB and SB software on them. The other arrangement should be regulated for the Internet restrictions at the schools. Although, some teachers complained that they could encounter some undesired contents for students on the internet, some other teachers stated that they could not open some beneficial e-contents for students because of the Internet restriction. For that reason, the Internet filter at schools should be revised in order to prevent undesired contents for students and to provide more appropriate e-contents to students and teachers.

The solutions to the technical problems about the SCT at the schools and removing breakdowns at SCT were other important factor for the diffusion of SCT into

schools. For that reason, technical service supports of SCT companies should be supplied as soon as possible for the technical problems and breakdowns at SCT. At this point, technical service network throughout the country may be installed and remote assistance of technical service may be provided by means of the internet or telephone. In addition, technicians of technical service should be trained according to problems of the SCT in the schools. Moreover, social networks environments for teachers may be beneficial so that teachers can share the solutions of technical problems about the SCT in the schools.

For encouraging teachers to use the SCT in their courses, moral and material incentives may be utilized by YEGITEK/MoNE. Because, most of the teachers indicated that moral and material incentives could be effective for teachers to use SCT in the schools. Furthermore, some teachers stated that they wanted to use the SCT, however there was no difference between teachers using them and teachers not using. For that reason, they might give up to use the SCT because of lack of incentives to them. At this point, necessary legislative regulations for the providing material and moral incentives to teachers using SCT in their courses should be made by MoNE. A tracking and reward system may be developed by YEGITEK after the legislative changes.

According to findings of the current study, computer teachers were shown as main technical and pedagogical support source during the usage of SCT in the schools. However, job descriptions of the computer teachers were not specified within the scope of FATİH Project by YEGITEK/MoNE. Although computer teachers did not have enough time and they did not wanted to interest technical issues about the SCT, they had to be interested most of the issues about the SCT in the schools. In addition, they have not been trained for solving technical problems in the schools. For that reason, YEGITEK/MoNE should identify the job description of the computer teachers in the schools for interesting issues about the SCT and they should be trained according to this job description of them. At this point, the pedagogical role of computer teachers may be emphasized in this job description according to needs of teachers in the schools.

Lastly, school administrators have an important role for the integration of SCT into schools. According to results of the study, the attitudes and opinions of school administrators might affect the usage of SCT by teachers negatively and positively. For that reason, YEGITEK/MoNE should take into consideration the role of the school administrators for efficient and effective usage of SCT in the schools. School administrators should be supported to overcoming needs about the usage of SCT and they should be trained for the diffusion of SCT into schools. Moreover, administrators at YEGITEK/MoNE may emphasize to school administrators that they have important role for the usage of the SCT by teachers in the schools.

5.3 Recommendations for the Future Research

In the present study, the integration process of SCT established in the two case schools (one of them was first pilot school of the study) within the scope of FATİH Project were investigated in the light of opinions of teachers, school administrators, and YEGITEK administrators, observations of researcher, and document analysis. In addition, the usage of these SCT were deeply explored in the two case schools in point of challenges while using them, solutions to these problems encountered by teachers, and needs of teachers and school administrators for effective and efficient usage of SCT. This study may provide some detailed findings for the current situation of SCT established in the schools in Turkey as a part of FATİH Project. The further research should be conducted in different locations and part of Turkey in order to analyze the issues investigated in this study. Therefore, whether there was any difference between the usage of SCT and needs of teachers in different regions and different socio-economic areas may be researched.

The case schools in this study were pilot schools of the FATİH Project. As seen in the results of the study, there were lots of differences between two case schools about the installation of SCT and other attempts of YEGITEK. Moreover, administrators at YEGITEK/MoNE have made changes in the implementation of the FATİH Project. So, ongoing researches may be conducted in order to follow the integration process of SCT in the schools. In the second phase of FATİH Project, YEGITEK are planning to provide tablet computers to all teachers and students in

Turkey and they have carried out pilot implementations for the usage of the tablet computer in the schools. For that reason, usage of these tablet computers, what challenges and problems teachers and students encounter, how these problems are solved, what teachers and students need to use the tablet computers may be investigated by the researchers.

In this study, usage of SCT installed in the schools was inquired in the light of usage of teachers. In the further studies, usage and integration of process of these SCT may be explored in point of students in these schools. Furthermore, the impacts of the SCT established in the schools on the academic success of students may be investigated by the researchers. In addition, how the FATİH Project affected the social life of the students and technology usage of students may be examined. At this point, same issues for the parents of students may be analyzed in the further studies. The opinions of students' parents about the SCT established in the schools, how these technologies affect their children, whether they (parents) use the tablet computers or how they use them were the other possible topics for further research about the FATİH Project.

The novelty effect for the usage of technologies was stated in the literature as an important factor for the integration of ICT in the educational environments. For that reason, more researches should be conducted in the future in order to show whether there are any difference for the usage of SCT in the schools as time goes on. Therefore, necessary developments may be made according to result of these researches in the future.

In the current study, it was suggested that opinions of teachers should be received about the SCT installed in the schools. At this point, opinions of the teachers, school administrators, students, and parents may be investigated in the scope of 'Technology Acceptance Model' of Davis (1989). That is, what they think about usefulness (perceived usefulness) and ease of use (perceived ease of use) of the SCT may be determined in these studies. Moreover, these researches may be conducted with quantitative reaching larger sample sizes.

YEGITEK also developed a web portal named EBA to provide e-contents to teachers and students. However, some problems about the e-contents at EBA were presented in the current study. E-contents at EBA may be investigated by researchers to decide whether they are suitable to usage of teachers and students with these technologies in the classroom. In addition, the standards and conditions about the e-contents may be determined for the e-contents at EBA. Therefore, teachers can prepare their own e-contents according to these standards and conditions. In addition, usage methods of the SCT and e-contents at EBA may be defined for specifically each course.

Lastly, it was stated in the present study that the role of the computer teachers for the effective and efficient usage of SCT in the FATİH Project were not determined well by the administrators at YEGITEK/MoNE. Actually, data about the expectancies of computer teachers were collected from only a teacher in the current study. For that reason, job description of computer teachers, what they do about the SCT in the schools, what are their problems about the usage of SCT, and needs of them about the SCT may be investigated in the future studies with reaching more computer teachers in the schools.

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APPENDIX A

INFORMED CONSENT FORM

Gönüllü Katılım Formu

Bu çalışma Orta Doğu Teknik Üniversitesi, Eğitim Fakültesi, Bilgisayar ve Öğretim Teknolojileri Eğitimi Bölümünde araştırma görevlisi olan Ali GÖK tarafından yürütülen bir doktora çalışmasıdır. Araştırmanın amacı Fatih Projesi kapsamında Milli Eğitim Bakanlığı'na bağlı okullara kurulan akıllı sınıf teknolojilerinin kullanım durumu, karşılaşılan problemler ve uygulanan çözümler incelenerek daha etkin kullanım için neler yapılabileceğinin belirlenmesidir. Sizinle okullara kurulan bu teknolojiler ve kullanımlarıyla ilgili olarak bir görüşme yapmak istiyorum. Bu araştırmada ortaya çıkacak sonuçlar, bu projenin devamında kurulacak olan teknolojilerin daha verimli kullanılmasına katkıda bulunabilmesi için kullanılabilecektir. Bu nedenle sizin okullara kurulan bu teknolojilerle ilgili düşüncelerinizi ve beklentilerinizi öğrenmek istiyorum. Bu konudaki kişisel deneyimleriniz, görüş ve düşünceleriniz araştırma için büyük önem taşımaktadır.

Yapacağımız görüşmede elde edilen bilgiler sadece araştırma amaçlı kullanılacaktır. Görüşme sürecinde söyleyeceklerinizin tümü gizlidir. Bu bilgileri araştırmacıların (Araş. Gör. Ali Gök ve Danışmanım Doç. Dr. Zahide Yıldırım) dışında herhangi bir kimsenin görmesi mümkün değildir. Bu çalışma sonucunda oluşturulacak dokümanlarda isminiz doğrudan ya da dolaylı olarak kullanılmayacaktır. Görüşme yaklaşık 50 dakika kadar sürecektir. Görüşme sırasında sorulardan ya da herhangi başka bir nedenden ötürü kendinizi rahatsız hissederseniz görüşmeyi yarıda bırakıp çıkabilirsiniz. Böyle bir durumda görüşme yapan kişiye, ayrılmak istediğinizi söylemek yeterli olacaktır. Görüşme sonunda, bu çalışmayla ilgili sorularınız cevaplanacaktır. Bu çalışmaya katıldığınız için şimdiden teşekkür ederiz. Çalışma hakkında daha fazla bilgi almak için araştırma görevlisi Ali GÖK (Oda: EFC-105; Tel: 210 4196; E-posta: gokali@metu.edu.tr)ile iletişim kurabilirsiniz.

Bu çalışmaya tamamen gönüllü olarak katılıyorum ve istediğim zaman yarıda kesip çıkabileceğimi biliyorum. Verdiğim bilgilerin bilimsel amaçlı yayımlarda kullanılmasını kabul ediyorum. (Formu doldurup imzaladıktan sonra uygulayıcıya geri veriniz).

İsim Soyad Tarih İmza Alınan Ders

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APPENDIX B

APPROVAL FORM

KATILIM SONRASI BİLGİ FORMU

Bu çalışma daha önce de belirtildiği gibi ODTÜ Bilgisayar ve Öğretim Teknolojileri Eğitimi Bölümü araştırma görevlilerinden Ali GÖK tarafından yürütülen bir durum çalışmadır. Milli Eğitim Bakanlığı tarafından yürütülen Fatih projesi dahilinde akıllı sınıf teknolojilerinin kurulduğu okulları kapsayan bu çalışmada akıllı sınıf teknolojilerinin kullanım durumları, karşılaşılan problemler ve çözüm yollarını araştırarak bu teknolojilerin daha verimli kullanılmasını için neler yapılabileceği araştırılacaktır.

Elde edilen bulgular ışığında, bu teknolojilerin okullarda öğretmenler tarafından daha etkin olarak kullanılabilmesi için nelere ihtiyaç duydukları çeşitli boyutlarda (teknik destek, eğitim, teşvik gibi) belirlenerek, bu projeden sorumlu YEGİTEK yöneticilerine projenin ilerleyen aşamaları için öneriler sunulacaktır. Öğretmenlerin haricinde, okul yöneticilerinin de ihtiyaçları belirlenerek; onların da bu teknolojilerin daha etkin kullanılması için neler yapabilecekleri belirlenecektir. Ayrıca hem öğretmenlerin hem de okul yöneticilerinin bu teknolojilere yönelik algıları belirlenmeye çalışılacaktır.

Bu çalışmadan alınacak ilk verilerin Haziran 2014 sonunda elde edilmesi amaçlanmaktadır. Elde edilen bilgiler sadece bilimsel araştırma ve yazılarda kullanılacaktır. Çalışmanın sonuçlarını öğrenmek ya da bu araştırma hakkında daha fazla bilgi almak için aşağıdaki isimlere başvurabilirsiniz. Çalışma kapsamında ortaya çıkan bulgular katılımcılarla da paylaşılacaktır. Bu araştırmaya katıldığınız için tekrar çok teşekkür ederiz.

Arş. Gör. Ali GÖK (Tel: 2104196; E-posta gokali@metu.edu.tr)

APPENDIX C

INTERVIEW PROTOCOL FOR THE TEACHERS IN THE FIRST CASE SCHOOL

Okul: **Tarih ve Saat (Başlangıç- Bitiş)**

GİRİŞ

Merhaba, benim adım Ali Gök ve Orta Doğu Teknik Üniversitesi, Eğitim Fakültesi, Bilgisayar ve Öğretim Teknolojileri Eğitimi Bölümünde araştırma görevlisiyim. Fatih Projesi kapsamında kurulan teknolojilerin kullanım durumu üzerinde doktora çalışmamı yapıyorum ve sizinle okulunuza kurulan bu teknolojiler ve kullanımlarıyla ilgili olarak bir görüşme yapmak istiyorum. Bu görüşmede amacım okulunuzda kurulan bu teknolojilerin kullanılmasındaki çeşitli boyutlarla ilgili öğretmenlerin ne düşündüklerini ortaya çıkarmaktır. Öğretmenlerle görüşme yapıyorum, çünkü öğretmenleri bu teknolojileri kullanan ve yaşadıkları deneyimlerle bu teknolojiler hakkında geniş bilgi verebilecek bireyler olarak görüyorum. Bu araştırmada ortaya çıkacak sonuçların, bu projenin devamında kurulacak olan teknolojilerin daha verimli kullanılmasına katkıda bulunacağını ümit ediyorum. Bu nedenle sizin okulunuza kurulan bu teknolojilerle ilgili düşüncelerinizi ve beklentilerinizi öğrenmek istiyorum.

Öncelikle bu çalışmamda görüşlerinizi benimle paylaşmayı kabul ettiğiniz için teşekkür ediyorum. Bu konudaki kişisel deneyimleriniz, görüş ve düşünceleriniz araştırmam için büyük önem taşımaktadır. Başlamadan önce bazı noktaları vurgulamak istiyorum. Yapacağımız görüşme sadece araştırma amaçlı kullanılacaktır. Görüşme sürecinde söyleyeceklerinizin tümü gizlidir. Bu bilgileri araştırmacıların (Ben ve Danışmanım Doç. Dr. Zahide Yıldırım) dışında herhangi bir kimsenin görmesi mümkün değildir. Bu çalışma sonucunda oluşturulacak dokümanlarda isminiz doğrudan ya da dolaylı olarak kullanılmayacaktır. Görüşmenin yaklaşık 50 dakika süreceğini tahmin ediyorum. Araştırma tamamlandıktan sonra ilgili analiz, sonuç ve tavsiyelerimizi eğer isterseniz sizlerle paylaşabiliriz. İzin verirseniz görüşmeyi kaydetmek istiyorum. Sizce sakıncası var mı? Sormak istediğiniz bir soru var mı?

GÖRÜŞME SORULARI

1. Ne kadar süredir bu okulda öğretmenlik yapıyorsunuz?

2. Branşınız nedir?

3. Hangi üniversiteden, hangi bölümden ve kaç yılında mezun oldunuz?

4. Öğretmenlik üniversite sınavlarında kaçıncı tercihinizdi?

5. Daha önceden derslerde teknoloji kullanımına dair bir eğitim aldınız mı?

   Öğretmen eğitimi?

   Seminerler?

6. Teknolojik araç ve gereçlerin eğitimde kullanılması gerektiğine inanıyor musunuz? Ne gibi faydaları olabilir?

7. Branşınız açısından düşündüğünüzde okulunuza kurulan teknolojiler nasıl kullanılabilir ve derslerinize ne gibi katkılar sağlayabilir?

8. Okulunuza kurulan akıllı sınıf teknolojilerini (akıllı tahta, projeksiyon, diz üstü bilgisayar gibi) kullanıyor musunuz? (RQ-1)

   Kullanıyorsanız;

      Hangilerini?

      Ne zaman?

      Ne kadar süreyle?

      Hangi amaçla?

Hangi yöntemle?

Nasıl?

Kullanmıyorsanız;

Neden kullanmıyorsunuz? Açıklar mısınız?

9. Akıllı sınıf teknolojilerini kullanırken ne gibi problemlerle karşılaşıyorsunuz? (RQ-1)

Teknik problemler?

Araçların çalışmaması?

Arıza?

...

Yazılım problemleri?

Yetersiz materyal?

Programların hata vermesi?

...

Teknolojinin yeni olmasından kaynaklanan problemler?

Bilememe?

Yetersiz bilgi?

...

10. Akıllı sınıf teknolojilerini kullanırken karşılaştığınız problemleri nasıl çözüyorsunuz? (RQ-1)

Kendi çözümü?

Okulun bilgisayar öğretmeninden yardım isteme?

Etkinliği yarıda kesme?

Dersi bitirme?

Sınıf kontrolü açısından oluşan sakıncalar?

Proje yöneticilerinden destek alma?

11. Bu teknolojilerin okulunuza kurulmasından önce ve kurulum sırasında bu teknolojilerle ilgili düşüncelerinizi sordular mı? Sordularsa ne tür sorular sordular? (RQ-2)

    Bu teknolojileri kullanmada öncü rol alabileceğinizi?

    Bu teknolojilere yönelik algılarınızı?

    Kullanımı açısından fikirlerinizi?

    Kullanım sırasındaki ihtiyaçlarınızı?

12. Okulunuza kurulan akıllı sınıf teknolojilerini kullanabilmeniz için okul yönetiminden destek alıyor musunuz? Eğer alıyorsanız ne tür destekler alıyorsunuz ve bu destekler yeterli mi? (RQ-1)

    Derslerinizi tasarlarken aldığınız destekler nelerdir? Açıklar mısınız? Aldığınız bu destekler ne kadar işinize yarıyor? Açıklar mısınız?

    Teknik problemlerle karşılaştığınızda aldığınız destekler nelerdir? Yeterli olduğunu düşünüyor musunuz? Neden? Açıklar mısınız?

    Bu teknolojileri kullanmanız için teşvik edildiğinizi düşünüyor musunuz? Neden? Nasıl? Örnek vererek açıklayabilir misiniz?

    Bu teknolojileri kullanabilmeniz için okulunuzda ne gibi kaynaklar (ders materyali ve diğer gereksinimler) sağlanıyor ve bunlar yeterli mi?

13. Okulunuza kurulan akıllı sınıf teknolojilerini kullanabilmeniz için Fatih projesi yürütücüsü olan Milli Eğitim Bakanlığı, Eğitim Teknolojileri Genel Müdürlüğü'nden (YEGİTEK) nasıl destekler alıyorsunuz ve bu destekler yeterli mi? (RQ-2)

    Derslerinizi tasarlarken aldığınız destekler neler ve ne kadar işinize yarıyor?

    Teknik problemlerle karşılaştığınızda aldığınız destekler neler ve yeterli mi?

    Bu teknolojileri kullanmanızın teşviki açısından nasıl destekler alıyorsunuz ve bu destekler yeterli mi?

    Bu teknolojileri kullanabilmeniz için ne gibi kaynaklar (ders materyali ve diğer gereksinimler) sağlanıyor ve bunlar yeterli mi?

    Bu teknolojileri etkin bir şekilde kullanabilmeniz için hangi eğitimler sağlanıyor ve bunlar yeterli mi?

    Kurulan teknolojinin daha etkin/verimli kullanımı için YEGİTEK'in nasıl bir destek sağlaması gerektiğini düşünüyorsunuz?

14. Bir öğretmen olarak; bu teknolojilerin öğretmenler tarafından daha verimli kullanılabilmesini etkileyen engeller ve koşullar size göre nelerdir? (RQ-3)

    Geleneksel eğitimin yıllardır uygulana gelmesi; öğretmenlerin bu yeni teknolojilere yönelik tutumunu nasıl etkilemektedir?

Bu teknolojileri kullanabilmek için gerekli bilgi ve yetenekleri kazanma süreçleri; öğretmenlerin bu yeni teknolojilere yönelik tutumunu nasıl etkilemektedir?

Bu teknolojileri kullanabilmek için gerekli kaynaklar (ders materyali ve diğer gereksinimler) var mıdır ve sağlanmakta mıdır? Bu öğretmenlerin yeni teknolojilere yönelik tutumunu nasıl etkilemektedir?

Bu teknolojileri kullanabilmek için derse hazırlık ve ihtiyaç duyulan eğitimler açısından gerekli olan zaman sağlanmakta mıdır? Bu öğretmenlerin yeni teknolojilere yönelik tutumunu nasıl etkilemektedir?

Bu yeni teknolojileri etkin şekilde kullanan örnek öğretmenler; diğer öğretmenlerin bu yeni teknolojilere yönelik tutumunu nasıl etkilemektedir?

Bu yeni teknolojilerin daha etkin şekilde kullanılması için verilen maddi ve manevi teşvikler var mıdır? Bu öğretmenlerin yeni teknolojilere yönelik tutumunu nasıl etkilemektedir?

Bu teknolojilerin kullanılması için Milli Eğitim Bakanlığı'nın yapacağı gerekli düzenlemeler var mıdır? Bu öğretmenlerin yeni teknolojilere yönelik tutumunu nasıl etkilemektedir?

Bu teknolojilerin kullanılması için okul yönetiminin destek ve tutumları; öğretmenlerin bu yeni teknolojilere yönelik tutumunu nasıl etkilemektedir?

15. Sormadığım ama bu konuştuğumuz konularla ilgili eklemek istediğiniz bir şey var mı?

APPENDIX D

INTERVIEW PROTOCOL FOR THE SCHOOL ADMINISTRATORS IN THE FIRST CASE SCHOOL

Okul: **Tarih ve Saat (Başlangıç- Bitiş)**

GİRİŞ

Merhaba, benim adım Ali Gök ve Orta Doğu Teknik Üniversitesi, Eğitim Fakültesi, Bilgisayar ve Öğretim Teknolojileri Eğitimi Bölümünde araştırma görevlisiyim. Fatih Projesi kapsamında kurulan teknolojilerin kullanım durumu üzerinde doktora çalışmamı yapıyorum ve sizinle okulunuza kurulan bu teknolojiler ve kullanımlarıyla ilgili olarak bir görüşme yapmak istiyorum. Bu görüşmede amacım okulunuzda kurulan bu teknolojilerin kullanılmasındaki çeşitli boyutlarla ilgili okul yöneticilerinin ne düşündüklerini ortaya çıkarmaktır. Okul yöneticileri ile görüşme yapıyorum, çünkü okul yöneticilerini bu teknolojilerin kullanılmasında yaşadıkları deneyimlerle bu teknolojiler hakkında geniş bilgi verebilecek bireyler olarak görüyorum. Bu araştırmada ortaya çıkacak sonuçların, bu projenin devamında kurulacak olan teknolojilerin daha verimli kullanılmasına katkıda bulunacağını ümit ediyorum. Bu nedenle sizin okulunuza kurulan bu teknolojilerle ilgili düşüncelerinizi ve beklentilerinizi öğrenmek istiyorum.

Öncelikle bu çalışmamda görüşlerinizi benimle paylaşmayı kabul ettiğiniz için teşekkür ediyorum. Bu konudaki kişisel deneyimleriniz, görüş ve düşünceleriniz araştırmam için büyük önem taşımaktadır. Başlamadan önce bazı noktaları vurgulamak istiyorum. Yapacağımız görüşme sadece araştırma amaçlı kullanılacaktır. Görüşme sürecinde söyleyeceklerinizin tümü gizlidir. Bu bilgileri araştırmacıların (Ben ve Danışmanım Doç. Dr. Zahide Yıldırım) dışında herhangi bir kimsenin görmesi mümkün değildir. Bu çalışma sonucunda oluşturulacak dokümanlarda isminiz doğrudan ya da dolaylı olarak kullanılmayacaktır. Görüşmenin yaklaşık 50 dakika süreceğini tahmin ediyorum. Araştırma tamamlandıktan sonra ilgili analiz, sonuç ve tavsiyelerimizi eğer isterseniz sizlerle paylaşabiliriz. İzin verirseniz görüşmeyi kaydetmek istiyorum. Sizce sakıncası var mı? Sormak istediğiniz bir soru var mı?

GÖRÜŞME SORULARI

1. Ne kadar süredir bu okulda idarecilik yapıyorsunuz?

2. Branşınız nedir?

3. Hangi üniversiteden, hangi bölümden ve kaç yılında mezun oldunuz?

4. Öğretmenlik üniversite sınavlarında kaçıncı tercihinizdi?

5. Daha önceden derslerde teknoloji kullanımına dair bir eğitim aldınız mı?

   Öğretmen eğitimi?

   Seminerler?

6. Teknolojik araç ve gereçlerin eğitimde kullanılması gerektiğine inanıyor musunuz? Ne gibi faydaları olabilir?

7. Branşınız açısından düşündüğünüzde okulunuza kurulan teknolojiler nasıl kullanılabilir ve derslerinize ne gibi katkılar sağlayabilir?

8. Okulunuza kurulan akıllı sınıf teknolojilerini (akıllı tahta, projeksiyon, diz üstü bilgisayar gibi) kullandınız mı? (RQ-1)

   Hangilerini? Ne zaman?

   Ne kadar süreyle?

   Hangi amaçla?

   Hangi yöntemle?

   Nasıl?

9. Okulunuzdaki öğretmenler akıllı sınıf teknolojilerini nasıl kullanıyorlar? (RQ-1)

    Hangilerini? Ne zaman?

    Ne kadar süreyle?

    Ne sıklıkta?

    Hangi amaçla?

    Hangi yöntemle?

10. Akıllı sınıf teknolojilerini kullanırken ne tür problemlerle karşılaştınız? (RQ-1)

    Teknik problemler?

        Araçların çalışmaması?

        Arıza?

        ...

    Yazılım problemleri?

        Yetersiz materyal?

        Programların hata vermesi?

        ...

    Teknolojinin yeni olmasından kaynaklanan problemler?

        Bilememe?

        Yetersiz bilgi?

        ...

11. Akıllı sınıf teknolojilerini kullanırken karşılaştığınız problemleri nasıl çözdünüz? (RQ-1)

    Kendi çözümü?

    Okulun bilgisayar öğretmeninden yardım isteme?

    Etkinliği yarıda kesme?

    Dersi bitirme?

    Sınıf kontrolü açısından oluşan sakıncalar?

    Proje yöneticilerinden destek alma?

12. Okulunuzdaki öğretmenler akıllı sınıf teknolojilerini kullanırken ne tür problemlerle karşılaşıyorlar? (RQ-1)

    Teknik problemler?

        Araçların çalışmaması?

        Arıza?

        ...

    Yazılım problemleri?

        Yetersiz materyal?

        Programların hata vermesi?

        ...

    Teknolojinin yeni olmasından kaynaklanan problemler?

        Bilememe?

        Yetersiz bilgi?

        ...

13. Okulunuzdaki öğretmenler akıllı sınıf teknolojilerini kullanırken karşılaştıkları problemleri nasıl çözüyorlar? (RQ-1)

    Kendi çözümü?

    Okulun bilgisayar öğretmeninden yardım isteme?

    Etkinliği yarıda kesme?

    Dersi bitirme?

    Sınıf kontrolü açısından oluşan sakıncalar?

    Proje yöneticilerinden destek alma?

14. Okulunuzdaki öğretmenlerin bu teknolojileri kullanım süreçlerinde ve kullanırken karşılaştıkları problemlerin çözümü için okul yönetimi olarak neler yapıyorsunuz? (RQ-1)

    Öğretmenlere bu teknolojileri tanıtma?

    Öğretmenlerin bu teknolojileri kullanması için destekleme?

    Bilgisayar öğretmenini görevlendirme?

    Proje yürütücüleri ile irtibata geçme?

    ...

15. Proje yöneticileri bu teknolojileri okulunuzda kurmadan önce ve bu teknolojilerin kurulum sürecinde sizin ve öğretmenlerin; bu teknolojiler hakkındaki düşüncelerinizi sordular mı? Aldılarsa hangi boyutlarını sordular? (RQ-2)

    Bu teknolojileri kullanmada öncü rol alabileceğinizi?

    Bu teknolojilere yönelik algılarınızı?

    Kullanımı açısından fikirlerinizi?

    Kullanım sırasındaki ihtiyaçlarınızı?

16. Okulunuza kurulan akıllı sınıf teknolojilerinin kullanılabilmesi için okul yönetimi olarak öğretmenlerinize destek sağlıyor musunuz? Eğer sağlıyorsanız, nasıl destekler sağlıyorsunuz ve bu destekler yeterli mi? (RQ-1)

    Öğretmenler derslerini tasarlarken sağladığınız destekler neler?

    Teknik problemlerle karşılaştıklarında sağladığınız destekler neler?

    Bu teknolojilerin kullanımını teşvik etmesi bakımından ne tür destekler sağlıyorsunuz?

    Bu teknolojilerin kullanabilmesi için okulunuzda ne gibi kaynaklar (ders materyali ve diğer gereksinimler) sağlıyorsunuz?

17. Okulunuza kurulan akıllı sınıf teknolojilerinin kullanılabilmesi için okul yönetimi olarak öğretmenlerinize sağladığınız destekler hakkında okulunuzdaki öğretmenler ne düşünüyorlar? Bu destekleri yeterli buluyorlar mı? (RQ-1)

    Derslerini tasarlarken sağladığınız destekler için?

    Teknik problemlerle karşılaştıklarında sağladığınız destekler için?

    Bu teknolojilerin kullanımını teşvik etmek amacıyla sağladığınız destekler için?

    Bu teknolojilerin kullanımını yaygınlaştırmak için sağladığınız destekler için?

18. Okulunuza kurulan akıllı sınıf teknolojilerini kullanabilmesi için Fatih projesi yürütücüsü olan Milli Eğitim Bakanlığı, Eğitim Teknolojileri Genel Müdürlüğü'nden (YEGİTEK) nasıl destekler alıyorsunuz ve bu destekler yeterli mi? (RQ-2)

    Derslerin tasarlanması için alınan destekler neler?

    Teknik problemler için alınan destekler neler?

    Bu teknolojilerin kullanımının teşviki için alınan destekler neler?

    Bu teknolojilerin kullanımında gerekli kaynaklar (ders materyali ve diğer gereksinimler) için alınan destekler neler?

Bu teknolojilerin etkin bir şekilde kullanabilmesi için sağlanan eğitimler neler?

Kurulan teknolojinin daha etkin/verimli kullanımı için YEGİTEK'in nasıl bir destek sağlaması gerektiğini düşünüyorsunuz?

19. Okulunuza kurulan akıllı sınıf teknolojilerini kullanabilmesi için Fatih projesi yürütücüsü olan Milli Eğitim Bakanlığı, Eğitim Teknolojileri Genel Müdürlüğü'nden (YEGİTEK) sağlanan destekler hakkında okulunuzdaki öğretmenler ne düşünüyorlar? Bu destekleri yeterli buluyorlar mı? (RQ-2)

    Dersler tasarlanırken alınan destekler için?

    Teknik problemler çözümünde alınan destekler için?

    Bu teknolojilerin kullanımının teşvikinde alınan destekler için?

    Bu teknolojilerin kullanımında gerekli kaynaklar (ders materyali ve diğer gereksinimler) için alınan destekler için?

    Bu teknolojilerin etkin bir şekilde kullanabilmesi için sağlanan eğitimler için?

    Kurulan teknolojinin daha etkin/verimli kullanımı için YEGİTEK'in nasıl bir destek sağlaması gerektiğini düşünüyorlar?

20. Okulunuzdaki öğretmenler akıllı sınıf teknolojilerini kullanırken karşılaştıkları problemleri Milli Eğitim Bakanlığı, Eğitim Teknolojileri Genel Müdürlüğü'ne (YEGİTEK) nasıl iletiyorlar? Hangi aşamalardan geçerek öğretmenlerin problemleri YEGİTEK'e ulaşıyor? (RQ-2)

21. Okul yöneticisi olarak; size göre bu teknolojilerin öğretmenler tarafından daha verimli kullanılabilmesini etkileyen engeller ve koşullar nelerdir? (RQ-3)

    Geleneksel eğitimin yıllardır uygulana gelmesi; öğretmenlerin bu yeni teknolojilere yönelik tutumunu nasıl etkilemektedir?

Bu teknolojileri kullanabilmek için gerekli bilgi ve yetenekleri kazanma süreçleri; öğretmenlerin bu yeni teknolojilere yönelik tutumunu nasıl etkilemektedir?

Bu teknolojileri kullanabilmek için gerekli kaynaklar (ders materyali ve diğer gereksinimler) var mıdır ve sağlanmakta mıdır? Bu öğretmenlerin yeni teknolojilere yönelik tutumunu nasıl etkilemektedir?

Bu teknolojileri kullanabilmek için derse hazırlık ve ihtiyaç duyulan eğitimler açısından gerekli olan zaman sağlanmakta mıdır? Bu öğretmenlerin yeni teknolojilere yönelik tutumunu nasıl etkilemektedir?

Bu yeni teknolojileri etkin şekilde kullanan örnek öğretmenler; diğer öğretmenlerin bu yeni teknolojilere yönelik tutumunu nasıl etkilemektedir?

Bu yeni teknolojilerin daha etkin şekilde kullanılması için verilen maddi ve manevi teşvikler var mıdır? Bu öğretmenlerin yeni teknolojilere yönelik tutumunu nasıl etkilemektedir?

Bu teknolojilerin kullanılması için Milli Eğitim Bakanlığı'nın yapacağı gerekli düzenlemeler var mıdır? Bu öğretmenlerin yeni teknolojilere yönelik tutumunu nasıl etkilemektedir?

Bu teknolojilerin kullanılması için okul yönetiminin destek ve tutumları; öğretmenlerin bu yeni teknolojilere yönelik tutumunu nasıl etkilemektedir?

22. Sormadığım ama bu konuştuğumuz konularla ilgili eklemek istediğiniz bir şey var mı?

APPENDIX E

INTERVIEW PROTOCOL FOR THE YEGITEK ADMINISTRATORS

Okul: **Tarih ve Saat (Başlangıç- Bitiş)**

GİRİŞ

Merhaba, benim adım Ali Gök ve Orta Doğu Teknik Üniversitesi, Eğitim Fakültesi, Bilgisayar ve Öğretim Teknolojileri Eğitimi Bölümünde araştırma görevlisiyim. Fatih Projesi kapsamında kurulan teknolojilerin kullanım durumu üzerinde doktora çalışmamı yapıyorum. Sizinle okullara kurulan bu teknolojiler ve kullanımlarıyla ilgili olarak bir görüşme yapmak istiyorum. Bu görüşmede amacım okullara kurulan bu teknolojilerin kullanılmasındaki çeşitli boyutlarla ilgili; Milli Eğitim Bakanlığı Eğitim Teknolojileri Genel Müdürlüğü (YEGİTEK) yöneticilerinin ne düşündüklerini ortaya çıkarmaktır. YEGİTEK yöneticileri ile görüşme yapıyorum, çünkü YEGİTEK yöneticilerini bu teknolojilerin kurulmasında ve kullanılmasında yaşadıkları deneyimlerle bu teknolojiler hakkında geniş bilgi verebilecek bireyler olarak görüyorum. Bu araştırmada ortaya çıkacak sonuçların, bu projenin devamında kurulacak olan teknolojilerin daha verimli kullanılmasına katkıda bulunacağını ümit ediyorum. Bu nedenle sizin okullara kurulan bu teknolojilerle ilgili düşüncelerinizi ve beklentilerinizi öğrenmek istiyorum.

Öncelikle bu çalışmamda görüşlerinizi benimle paylaşmayı kabul ettiğiniz için teşekkür ediyorum. Bu konudaki kişisel deneyimleriniz, görüş ve düşünceleriniz araştırmam için büyük önem taşımaktadır. Başlamadan önce bazı noktaları vurgulamak istiyorum. Yapacağımız görüşme sadece araştırma amaçlı kullanılacaktır. Görüşme sürecinde söyleyeceklerinizin tümü gizlidir. Bu bilgileri araştırmacıların (Ben ve Danışmanım Doç. Dr. Zahide Yıldırım) dışında herhangi bir kimsenin görmesi mümkün değildir. Bu çalışma sonucunda oluşturulacak dokümanlarda isminiz doğrudan ya da dolaylı olarak kullanılmayacaktır. Görüşmenin yaklaşık 50 dakika süreceğini tahmin ediyorum. Araştırma tamamlandıktan sonra ilgili analiz, sonuç ve tavsiyelerimizi eğer isterseniz sizlerle paylaşabiliriz. İzin verirseniz görüşmeyi kaydetmek istiyorum. Sizce sakıncası var mı? Sormak istediğiniz bir soru var mı?

GÖRÜŞME SORULARI

1. Ne kadar süredir bu YEGİTEK'de çalışıyorsunuz?

2. YEGİTEK'deki göreviniz nedir?

3. Okullara kurulan akıllı sınıf teknolojileri nelerdir? (Özellikle pilot uygulamanızdaki okullar için) (RQ-1)

   Özellikleri

   Sayıları

   Maliyetleri

   ...

4. Kurulan teknolojilerin okullardaki kullanım durumları hakkındaki gözlemleriniz ve düşünceleriniz nelerdir? (RQ-1)

   Öğretmenler bu teknolojileri nasıl kullanıyorlar?

   Kullanırken ne gibi problemlerle karşılaşıyorlar?

   Karşılaştıkları problemler karşısında neler yapıyorlar?

5. Proje yöneticileri olarak, bu proje kapsamında okullara akıllı sınıf teknolojilerini kurmaya başlamadan önce ve kurulum sırasında, bu teknolojileri kullanacak grup olan öğretmen, öğrenci ve okul yöneticilerini bu teknolojilere yönelik özellikleri bakımından incelediniz mi? İncelediyseniz nasıl bir inceleme yaptınız? Örnek vererek açıklar mısınız? Bu inceleme sonucunda ne gibi sonuçlara ulaştınız ve bu sonuçlar uygulamalarınızı nasıl etkiledi? Neler yaptınız? (RQ-2)

6. Proje yöneticileri olarak, bu proje kapsamında okullara akıllı sınıf teknolojilerini kurmaya başlamadan önce ve kurulum sırasında, bu teknolojilerin nasıl kullanılabileceğini araştırdınız mı? Araştırdıysanız nasıl bir araştırma yaptınız? Örnek vererek açıklar mısınız? Bu araştırma sonucunda ne gibi sonuçlara ulaştınız ve bu sonuçlar uygulamalarınızı nasıl etkiledi? Neler yaptınız? (RQ-2)

   Hangi derslerde?

   Hangi amaçlar için?

   Hangi yöntemlerle?

   Hangi kaynaklarla?

7. Proje yöneticileri olarak, bu proje kapsamında okullara akıllı sınıf teknolojilerini kurmaya başlamadan önce ve kurulum sırasında, bu teknolojilerin kurulacağı okulları incelediniz mi? İncelediyseniz nasıl bir inceleme yaptınız? Örnek vererek açıklar mısınız? Bu inceleme sonucunda ne gibi sonuçlara ulaştınız ve bu sonuçlar uygulamalarınızı nasıl etkiledi? Neler yaptınız? (RQ-2)

   Okulların fiziki yapısı?

   Teknik altyapısı?

   Okulun bulunduğu sosyal çevre?

8. Proje yöneticileri olarak, bu proje kapsamında okullara akıllı sınıf teknolojilerini kurmaya başlamadan önce ve kurulum sırasında, projenin kurulma aşaması bittikten sonra bu teknolojilerin etkin bir şekilde kullanımını ve proje kapsamında tasarlanan uygulamaları devam ettirebilmek için ne tür destekler ve stratejiler kullanabileceğiniz konusunu araştırdınız mı? Nasıl? Örnekler vererek açıklar mısınız? (RQ-2)

   Kullanım konusunda maddi ve manevi teşvik edici destekler?

   Kurulan teknolojilerin zamana karşı güncelliğini koruması?

   Kullanım için tasarlanan eğitimler?

   Kullanım için hazırlanan içerikler?

9. Proje yöneticileri olarak bu teknolojileri kurmadan önce ve kurulum sırasında; bu proje başlamadan önce akıllı sınıf teknolojilerinin kullanıldığı okullardaki okul yöneticilerinin, öğretmenlerin ve öğrencilerin bu teknolojiler hakkında ne düşündüklerini sordunuz mu? Sorduysanız nasıl? Açıklar mısınız? Hangi konularda söz konusu grubun düşüncelerini sordunuz? (RQ-2)

    Bu teknolojileri kullanmada öncü rol alabilecekleri belirleme?

    Bu teknolojilere yönelik algılarını?

    Kullanımı konusundaki düşüncelerini?

    Kullanım sırasında olabilecek ihtiyaçlarını?

10. Proje yöneticileri olarak bu teknolojileri kurmadan önce ve kurulum sırasında; akıllı sınıf teknolojilerinin kurulması planlanan okullardaki öğretmen ve okul yöneticilerinin bu teknolojiler hakkında ne düşündüklerini sordunuz mu? Sorduysanız nasıl? Açıklar mısınız? Hangi konularda söz konusu grubun düşüncelerini sordunuz? (RQ-2)

    Bu teknolojileri kullanmada öncü rol alabilecekleri belirleme?

    Bu teknolojilere yönelik algılarını?

    Kullanımı konusundaki düşüncelerini?

    Kullanım sırasında olabilecek ihtiyaçlarını?

11. Pilot uygulama okuluna kurulan akıllı sınıf teknolojilerinin verimli ve etkin bir şekilde kullanılabilmesi için YEGİTEK yönetimi olarak öğretmenlere destek sağlıyor musunuz? Eğer sağlıyorsanız, nasıl destekler sağlıyorsunuz? Örnek vererek açıklayabilir misiniz? Sizce bu destekler yeterli mi? Neden? Açıklar mısınız? (RQ-2)

    Öğretmenlerin derslerini tasarlamaları için sağladığınız destekler neler?

    Teknik problemlerle karşılaştıklarında, çözümü için sağladığınız destekler neler?

    Bu teknolojilerin kullanımını teşvik etmek amacıyla neler yapıyorsunuz?

Bu teknolojilerin kullanabilmesi için okullara ne gibi kaynaklar (ders materyali ve diğer gereksinimler) sağlıyorsunuz?

12. Pilot uygulama okuluna kurulan akıllı sınıf teknolojilerinin kullanılabilmesi için YEGİTEK yönetimi olarak öğretmenlere sağladığınız destekler hakkında pilot uygulama okulundaki öğretmenler ne düşünüyorlar bunu araştırdınız mı? Nasıl? Açıklar mısınız? Araştırdıysanız, öğretmenlerin bu konudaki önerileri nelerdir? Sağladığınız destekleri yeterli buluyorlar mı? (RQ-2)

    Öğretmenler derslerini tasarlarken sağladığınız destekler için?

    Teknik problemlerle karşılaştıklarında sağladığınız destekler için?

    Bu teknolojilerin kullanımını teşvik amacıyla sağladığınız destekler için?

    Bu teknolojilerin kullanabilmesi için sağladığınız kaynaklar için?

    Bu teknolojilerin etkin bir şekilde kullanabilmesi için sağlanan eğitimler için?

13. Pilot uygulama okuluna kurulan akıllı sınıf teknolojilerini kullanabilmesi için okul yönetimi öğretmenlere nasıl destekler veriyor ve bu destekler yeterli olduğunu düşünüyor musunuz? Neden? Açıklar mısınız? (RQ-1)

    Derslerin tasarlanması için verilen destekler neler?

    Teknik problemler için verilen destekler neler?

    Bu teknolojilerin kullanımının teşviki için verilen destekler neler?

    Bu teknolojilerin kullanımında gerekli kaynaklar (ders materyali ve diğer gereksinimler) için verilen destekler neler?

14. Pilot uygulama okulundaki öğretmenler akıllı sınıf teknolojilerini kullanırken karşılaştıkları problemleri Milli Eğitim Bakanlığı, Eğitim Teknolojileri Genel Müdürlüğü'ne (YEGİTEK) nasıl iletiyorlar? Hangi aşamalardan geçerek öğretmenlerin problemleri YEGİTEK'e ulaşıyor? (RQ-2)

15. Bu problemler için bulunan çözümler öğretmenlere nasıl iletiliyor? Hangi aşamalardan geçerek öğretmenlere ulaşıyor? (RQ-2)

16. Sormadığım ama bu konuştuğumuz konularla ilgili eklemek istediğiniz bir şey var mı?

APPENDIX F

INTERVIEW PROTOCOL FOR THE TEACHERS IN THE SECOND CASE SCHOOL

Okul: **Tarih ve Saat (Başlangıç- Bitiş)**

GİRİŞ

Merhaba, benim adım Ali Gök ve Orta Doğu Teknik Üniversitesi, Eğitim Fakültesi, Bilgisayar ve Öğretim Teknolojileri Eğitimi Bölümünde araştırma görevlisiyim. Fatih Projesi kapsamında kurulan teknolojilerin kullanım durumu üzerinde doktora çalışmamı yapıyorum ve sizinle okulunuza kurulan bu teknolojiler ve kullanımlarıyla ilgili olarak bir görüşme yapmak istiyorum. Bu görüşmede amacım okulunuzda kurulan bu teknolojilerin kullanılmasındaki çeşitli boyutlarla ilgili öğretmenlerin ne düşündüklerini ortaya çıkarmaktır. Öğretmenlerle görüşme yapıyorum, çünkü öğretmenleri bu teknolojileri kullanan ve yaşadıkları deneyimlerle bu teknolojiler hakkında geniş bilgi verebilecek bireyler olarak görüyorum. Bu araştırmada ortaya çıkacak sonuçların, bu projenin devamında kurulacak olan teknolojilerin daha verimli kullanılmasına katkıda bulunacağını ümit ediyorum. Bu nedenle sizin okulunuza kurulan bu teknolojilerle ilgili düşüncelerinizi ve beklentilerinizi öğrenmek istiyorum.

Öncelikle bu çalışmamda görüşlerinizi benimle paylaşmayı kabul ettiğiniz için teşekkür ediyorum. Bu konudaki kişisel deneyimleriniz, görüş ve düşünceleriniz araştırmam için büyük önem taşımaktadır. Başlamadan önce bazı noktaları vurgulamak istiyorum. Yapacağımız görüşme sadece araştırma amaçlı kullanılacaktır. Görüşme sürecinde söyleyeceklerinizin tümü gizlidir. Bu bilgileri araştırmacıların (Ben ve Danışmanım Prof. Dr. Zahide Yıldırım) dışında herhangi bir kimsenin görmesi mümkün değildir. Bu çalışma sonucunda oluşturulacak dokümanlarda isminiz doğrudan ya da dolaylı olarak kullanılmayacaktır. Görüşmenin yaklaşık 50 dakika süreceğini tahmin ediyorum. Araştırma tamamlandıktan sonra ilgili analiz, sonuç ve tavsiyelerimizi eğer isterseniz sizlerle paylaşabiliriz. İzin verirseniz görüşmeyi kaydetmek istiyorum. Sizce sakıncası var mı? Sormak istediğiniz bir soru var mı?

GÖRÜŞME SORULARI

1. Ne kadar süredir bu okulda öğretmenlik yapıyorsunuz?

2. Öğretmenliğe kaç yılında başladınız?

3. Branşınız nedir?

4. Hangi üniversiteden, hangi bölümden ve kaç yılında mezun oldunuz?

5. Öğretmenlik üniversite sınavlarında kaçıncı tercihinizdi?

6. Okulunuza kurulan akıllı sınıf teknolojilerini kullanıyor musunuz? (RQ-1)

    Kullanıyorsanız;

        Hangilerini?

        Ne zaman?

        Ne kadar süreyle?

        Hangi amaçla?

        Hangi yöntemle?

        Nasıl?

    Kullanmıyorsanız;

        Neden kullanmıyorsunuz? Açıklar mısınız?

7. Akıllı sınıf teknolojilerini kullanırken ne gibi problemlerle karşılaşıyorsunuz? (RQ-1)

    Teknik problemler?

        Araçların çalışmaması?

        Arıza?

        ...

    Yazılım problemleri?

        Yetersiz materyal?

        Programların hata vermesi?

        ...

    Teknolojinin yeni olmasından kaynaklanan problemler?

        Bilememe?

        Yetersiz bilgi?

        ...

8. Akıllı sınıf teknolojilerini kullanırken karşılaştığınız problemleri nasıl çözüyorsunuz? (RQ-1)

    Kendi çözümü?

    Okulun bilgisayar öğretmeninden yardım isteme?

    Etkinliği yarıda kesme?

    Dersi bitirme?

    Sınıf kontrolü açısından oluşan sakıncalar?

    Proje yöneticilerinden destek alma?

9. Daha önceden derslerde teknoloji kullanımına dair bir eğitim aldınız mı?

    Öğretmen eğitimi?

    Seminerler?

10. Fatih Projesi kapsamında YEGİTEK tarafından verilen hizmetiçi eğitimi aldınız mı? (RQ-1)

    Eğer aldıysanız;

        Eğitimi kim verdi?

        Nerede aldınız?

        Ne zaman ve ne kadar süreyle?

11. Fatih Projesi kapsamında kurulan Eğitim Bilişim Ağı'ndaki (EBA) kaynakları kullanıyor musunuz? (RQ-1)

    Eğer kullanıyorsanız;

        Hangilerini?

        Hangi amaçlar için?

        Ne kadar?

        Sizce yeterli mi?

12. Teknolojik araç ve gereçlerin eğitimde kullanılması gerektiğine inanıyor musunuz? Ne gibi faydaları olabilir?

13. Branşınız açısından düşündüğünüzde okulunuza kurulan teknolojiler nasıl kullanılabilir ve derslerinize ne gibi katkılar sağlayabilir?

14. Bu teknolojilerin okulunuza kurulmasından önce ve kurulum sırasında bu teknolojilerle ilgili düşüncelerinizi sordular mı? Sordularsa ne tür sorular sordular? (RQ-2)

    Bu teknolojileri kullanmada öncü rol alabileceğinizi?

    Bu teknolojilere yönelik algılarınızı?

    Kullanımı açısından fikirlerinizi?

    Kullanım sırasındaki ihtiyaçlarınızı?

15. Okulunuza kurulan akıllı sınıf teknolojilerini kullanabilmeniz için okul yönetiminden destek alıyor musunuz? Eğer alıyorsanız ne tür destekler alıyorsunuz ve bu destekler yeterli mi? (RQ-1)

    Derslerinizi tasarlarken aldığınız destekler nelerdir? Açıklar mısınız? Aldığınız bu destekler ne kadar işinize yarıyor? Açıklar mısınız?

    Teknik problemlerle karşılaştığınızda aldığınız destekler nelerdir? Yeterli olduğunu düşünüyor musunuz? Neden? Açıklar mısınız?

    Bu teknolojileri kullanmanız için teşvik edildiğinizi düşünüyor musunuz? Neden? Nasıl? Örnek vererek açıklayabilir misiniz?

    Bu teknolojileri kullanabilmeniz için okulunuzda ne gibi kaynaklar (ders materyali ve diğer gereksinimler) sağlanıyor ve bunlar yeterli mi?

16. Okulunuza kurulan akıllı sınıf teknolojilerini kullanabilmeniz için Fatih projesi yürütücüsü olan Milli Eğitim Bakanlığı, Yenilik ve Eğitim Teknolojileri Genel Müdürlüğü'nden (YEGİTEK) nasıl destekler alıyorsunuz ve bu destekler yeterli mi? (RQ-2)

Derslerinizi tasarlarken aldığınız destekler neler ve ne kadar işinize yarıyor?

Teknik problemlerle karşılaştığınızda aldığınız destekler neler ve yeterli mi?

Bu teknolojileri kullanmanızın teşviki açısından nasıl destekler alıyorsunuz ve bu destekler yeterli mi?

Bu teknolojileri kullanabilmeniz için ne gibi kaynaklar (ders materyali ve diğer gereksinimler) sağlanıyor ve bunlar yeterli mi?

Bu teknolojileri etkin bir şekilde kullanabilmeniz için hangi eğitimler sağlanıyor ve bunlar yeterli mi?

Kurulan teknolojinin daha etkin/verimli kullanımı için EGİTEK'in nasıl bir destek sağlaması gerektiğini düşünüyorsunuz?

17. Akıllı sınıf teknolojilerini kullanırken karşılaştığınız problemleri Milli Eğitim Bakanlığı, Yenilik ve Eğitim Teknolojileri Genel Müdürlüğü'ne (YEGİTEK) nasıl iletiyorsunuz? Hangi aşamalardan geçerek karşılaştığınız problemler YEGİTEK'e ulaşıyor? (RQ-2)

18. Bir öğretmen olarak; bu teknolojilerin öğretmenler tarafından daha verimli kullanılabilmesini etkileyen engeller ve koşullar size göre nelerdir? (RQ-3)

Geleneksel eğitimin yıllardır uygulana gelmesi; öğretmenlerin bu yeni teknolojilere yönelik tutumunu nasıl etkilemektedir?

Bu teknolojileri kullanabilmek için gerekli bilgi ve yetenekleri kazanma süreçleri; öğretmenlerin bu yeni teknolojilere yönelik tutumunu nasıl etkilemektedir?

Bu teknolojileri kullanabilmek için gerekli kaynaklar (ders materyali ve diğer gereksinimler) var mıdır ve sağlanmakta mıdır? Bu öğretmenlerin yeni teknolojilere yönelik tutumunu nasıl etkilemektedir?

Bu teknolojileri kullanabilmek için derse hazırlık ve ihtiyaç duyulan eğitimler açısından gerekli olan zaman sağlanmakta mıdır? Bu öğretmenlerin yeni teknolojilere yönelik tutumunu nasıl etkilemektedir?

Bu yeni teknolojileri etkin şekilde kullanan örnek öğretmenler; diğer öğretmenlerin bu yeni teknolojilere yönelik tutumunu nasıl etkilemektedir?

Bu yeni teknolojilerin daha etkin şekilde kullanılması için verilen maddi ve manevi teşvikler var mıdır? Bu öğretmenlerin yeni teknolojilere yönelik tutumunu nasıl etkilemektedir?

Bu teknolojilerin kullanılması için Milli Eğitim Bakanlığı'nın yapacağı gerekli düzenlemeler var mıdır? Bu öğretmenlerin yeni teknolojilere yönelik tutumunu nasıl etkilemektedir?

Bu teknolojilerin kullanılması için okul yönetiminin destek ve tutumları; öğretmenlerin bu yeni teknolojilere yönelik tutumunu nasıl etkilemektedir?

19. Sormadığım ama bu konuştuğumuz konularla ilgili eklemek istediğiniz bir şey var mı?

APPENDIX G

INTERVIEW PROTOCOL FOR THE SCHOOL ADMINISTRATORS IN THE SECOND CASE SCHOOL

Okul: **Tarih ve Saat (Başlangıç- Bitiş)**

GİRİŞ

Merhaba, benim adım Ali Gök ve Orta Doğu Teknik Üniversitesi, Eğitim Fakültesi, Bilgisayar ve Öğretim Teknolojileri Eğitimi Bölümünde araştırma görevlisiyim. Fatih Projesi kapsamında kurulan teknolojilerin kullanım durumu üzerinde doktora çalışmamı yapıyorum ve sizinle okulunuza kurulan bu teknolojiler ve kullanımlarıyla ilgili olarak bir görüşme yapmak istiyorum. Bu görüşmede amacım okulunuzda kurulan bu teknolojilerin kullanılmasındaki çeşitli boyutlarla ilgili okul yöneticilerinin ne düşündüklerini ortaya çıkarmaktır. Okul yöneticileri ile görüşme yapıyorum, çünkü okul yöneticilerini bu teknolojilerin kullanılmasında yaşadıkları deneyimlerle bu teknolojiler hakkında geniş bilgi verebilecek bireyler olarak görüyorum. Bu araştırmada ortaya çıkacak sonuçların, bu projenin devamında kurulacak olan teknolojilerin daha verimli kullanılmasına katkıda bulunacağını ümit ediyorum. Bu nedenle sizin okulunuza kurulan bu teknolojilerle ilgili düşüncelerinizi ve beklentilerinizi öğrenmek istiyorum.

Öncelikle bu çalışmamda görüşlerinizi benimle paylaşmayı kabul ettiğiniz için teşekkür ediyorum. Bu konudaki kişisel deneyimleriniz, görüş ve düşünceleriniz araştırmam için büyük önem taşımaktadır. Başlamadan önce bazı noktaları vurgulamak istiyorum. Yapacağımız görüşme sadece araştırma amaçlı kullanılacaktır. Görüşme sürecinde söyleyeceklerinizin tümü gizlidir. Bu bilgileri araştırmacıların (Ben ve Danışmanım Prof. Dr. Zahide Yıldırım) dışında herhangi bir kimsenin görmesi mümkün değildir. Bu çalışma sonucunda oluşturulacak dokümanlarda isminiz doğrudan ya da dolaylı olarak kullanılmayacaktır. Görüşmenin yaklaşık 50 dakika süreceğini tahmin ediyorum. Araştırma tamamlandıktan sonra ilgili analiz, sonuç ve tavsiyelerimizi eğer isterseniz sizlerle paylaşabiliriz. İzin verirseniz görüşmeyi kaydetmek istiyorum. Sizce sakıncası var mı? Sormak istediğiniz bir soru var mı?

GÖRÜŞME SORULARI

1. Ne kadar süredir bu okulda idarecilik yapıyorsunuz?

2. Öğretmenliğe kaç yılında başladınız?

3. Branşınız nedir?

4. Hangi üniversiteden, hangi bölümden ve kaç yılında mezun oldunuz?

5. Öğretmenlik üniversite sınavlarında kaçıncı tercihinizdi?

6. Daha önceden derslerde teknoloji kullanımına dair bir eğitim aldınız mı?

   Öğretmen eğitimi?

   Seminerler?

7. Fatih Projesi kapsamında YEGİTEK tarafından verilen hizmetiçi eğitimi aldınız mı? (RQ-1)

   Eğer aldıysanız;

      Eğitimi kim verdi?

      Nerede aldınız?

      Ne zaman ve ne kadar süreyle?

8. Teknolojik araç ve gereçlerin eğitimde kullanılması gerektiğine inanıyor musunuz? Ne gibi faydaları olabilir?

9. Branşınız açısından düşündüğünüzde okulunuza kurulan teknolojiler nasıl kullanılabilir ve derslerinize ne gibi katkılar sağlayabilir?

10. Okulunuza kurulan akıllı sınıf teknolojilerini kullandınız mı? (RQ-1)

    Hangilerini? Ne zaman?

    Ne kadar süreyle?

    Hangi amaçla?

    Hangi yöntemle?

    Nasıl?

11. Okulunuzdaki öğretmenler akıllı sınıf teknolojilerini nasıl kullanıyorlar? (RQ-1)

    Hangilerini? Ne zaman?

    Ne kadar süreyle?

    Ne sıklıkta?

    Hangi amaçla?

    Hangi yöntemle?

12. Akıllı sınıf teknolojilerini kullanırken ne tür problemlerle karşılaştınız? (RQ-1)

    Teknik problemler?

        Araçların çalışmaması?

        Arıza?

        ...

    Yazılım problemleri?

        Yetersiz materyal?

        Programların hata vermesi?

...

Teknolojinin yeni olmasından kaynaklanan problemler?

Bilememe?

Yetersiz bilgi?

...

13. Akıllı sınıf teknolojilerini kullanırken karşılaştığınız problemleri nasıl çözdünüz? (RQ-1)

Kendi çözümü?

Okulun bilgisayar öğretmeninden yardım isteme?

Etkinliği yarıda kesme?

Dersi bitirme?

Sınıf kontrolü açısından oluşan sakıncalar?

Proje yöneticilerinden destek alma?

14. Okulunuzdaki öğretmenler akıllı sınıf teknolojilerini kullanırken ne tür problemlerle karşılaşıyorlar? (RQ-1)

Teknik problemler?

Araçların çalışmaması?

Arıza?

...

Yazılım problemleri?

Yetersiz materyal?

Programların hata vermesi?

...

Teknolojinin yeni olmasından kaynaklanan problemler?

Bilememe?

Yetersiz bilgi?

...

15. Okulunuzdaki öğretmenler akıllı sınıf teknolojilerini kullanırken karşılaştıkları problemleri nasıl çözüyorlar? (RQ-1)

Kendi çözümü?

Okulun bilgisayar öğretmeninden yardım isteme?

Etkinliği yarıda kesme?

Dersi bitirme?

Sınıf kontrolü açısından oluşan sakıncalar?

Proje yöneticilerinden destek alma?

16. Okulunuzdaki öğretmenlerin bu teknolojileri kullanım süreçlerinde ve kullanırken karşılaştıkları problemlerin çözümü için okul yönetimi olarak neler yapıyorsunuz? (RQ-2)

Öğretmenlere bu teknolojileri tanıtma?

Öğretmenlerin bu teknolojileri kullanması için destekleme?

Bilgisayar öğretmenini görevlendirme?

Proje yürütücüleri ile irtibata geçme?

17. Fatih Projesi kapsamında kurulan Eğitim Bilişim Ağı'ndaki (EBA) kaynakları kullanıyor musunuz? (RQ-1)

Eğer kullanıyorsanız;

Hangilerini?

Hangi amaçlar için?

Ne kadar?

Sizce yeterli mi?

18. Okulunuzdaki öğretmenler Fatih Projesi kapsamında kurulan Eğitim Bilişim Ağı'ndaki (EBA) kaynakları kullanıyor mu? (RQ-1)

Eğer kullanıyorlarsa;

Hangilerini?

Hangi amaçlar için?

Ne kadar?

Sizce yeterli mi?

19. Proje yöneticileri bu teknolojileri okulunuzda kurmadan önce ve bu teknolojilerin kurulum sürecinde sizin ve öğretmenlerin; bu teknolojiler hakkındaki düşüncelerinizi sordular mı? Aldılarsa hangi boyutlarını sordular? (RQ-2)

Bu teknolojileri kullanmada öncü rol alabileceğinizi?

Bu teknolojilere yönelik algılarınızı?

Kullanımı açısından fikirlerinizi?

Kullanım sırasındaki ihtiyaçlarınızı?

20. Okulunuza kurulan akıllı sınıf teknolojilerinin kullanılabilmesi için okul yönetimi olarak öğretmenlerinize destek sağlıyor musunuz? Eğer sağlıyorsanız, nasıl destekler sağlıyorsunuz ve bu destekler yeterli mi? (RQ-1)

Öğretmenler derslerini tasarlarken sağladığınız destekler neler?

Teknik problemlerle karşılaştıklarında sağladığınız destekler neler?

Bu teknolojilerin kullanımını teşvik etmesi bakımından ne tür destekler sağlıyorsunuz?

Bu teknolojilerin kullanabilmesi için okulunuzda ne gibi kaynaklar (ders materyali ve diğer gereksinimler) sağlıyorsunuz?

21. Okulunuza kurulan akıllı sınıf teknolojilerinin kullanılabilmesi için okul yönetimi olarak öğretmenlerinize sağladığınız destekler hakkında okulunuzdaki öğretmenler ne düşünüyorlar? Bu destekleri yeterli buluyorlar mı? (RQ-1)

    Derslerini tasarlarken sağladığınız destekler için?

    Teknik problemlerle karşılaştıklarında sağladığınız destekler için?

    Bu teknolojilerin kullanımını teşvik etmek amacıyla sağladığınız destekler için?

    Bu teknolojilerin kullanımını yaygınlaştırmak için sağladığınız destekler için?

22. Okulunuza kurulan akıllı sınıf teknolojilerini kullanabilmesi için Fatih projesi yürütücüsü olan Milli Eğitim Bakanlığı, Yenilik ve Eğitim Teknolojileri Genel Müdürlüğü'nden (YEGİTEK) nasıl destekler alıyorsunuz ve bu destekler yeterli mi? (RQ-2)

    Derslerin tasarlanması için alınan destekler neler?

    Teknik problemler için alınan destekler neler?

    Bu teknolojilerin kullanımının teşviki için alınan destekler neler?

    Bu teknolojilerin kullanımında gerekli kaynaklar (ders materyali ve diğer gereksinimler) için alınan destekler neler?

    Bu teknolojilerin etkin bir şekilde kullanabilmesi için sağlanan eğitimler neler?

    Kurulan teknolojinin daha etkin/verimli kullanımı için YEGİTEK'in nasıl bir destek sağlaması gerektiğini düşünüyorsunuz?

23. Okulunuza kurulan akıllı sınıf teknolojilerini kullanabilmesi için Fatih projesi yürütücüsü olan Milli Eğitim Bakanlığı, Eğitim Teknolojileri Genel Müdürlüğü'nden (EGİTEK) sağlanan destekler hakkında okulunuzdaki öğretmenler ne düşünüyorlar? Bu destekleri yeterli buluyorlar mı? (RQ-2)

    Dersler tasarlanırken alınan destekler için?

    Teknik problemler çözümünde alınan destekler için?

    Bu teknolojilerin kullanımının teşvikinde alınan destekler için?

    Bu teknolojilerin kullanımında gerekli kaynaklar (ders materyali ve diğer gereksinimler) için alınan destekler için?

    Bu teknolojilerin etkin bir şekilde kullanabilmesi için sağlanan eğitimler için?

    Kurulan teknolojinin daha etkin/verimli kullanımı için YEGİTEK'in nasıl bir destek sağlaması gerektiğini düşünüyorlar?

24. Okulunuzdaki öğretmenler akıllı sınıf teknolojilerini kullanırken karşılaştıkları problemleri Milli Eğitim Bakanlığı, Eğitim Teknolojileri Genel Müdürlüğü'ne (EGİTEK) nasıl iletiyorlar? Hangi aşamalardan geçerek öğretmenlerin problemleri EGİTEK'e ulaşıyor? (RQ-2)

25. Okul yöneticisi olarak; size göre bu teknolojilerin öğretmenler tarafından daha verimli kullanılabilmesini etkileyen engeller ve koşullar nelerdir? (RQ-3)

    Geleneksel eğitimin yıllardır uygulana gelmesi; öğretmenlerin bu yeni teknolojilere yönelik tutumunu nasıl etkilemektedir?

    Bu teknolojileri kullanabilmek için gerekli bilgi ve yetenekleri kazanma süreçleri; öğretmenlerin bu yeni teknolojilere yönelik tutumunu nasıl etkilemektedir?

Bu teknolojileri kullanabilmek için gerekli kaynaklar (ders materyali ve diğer gereksinimler) var mıdır ve sağlanmakta mıdır? Bu öğretmenlerin yeni teknolojilere yönelik tutumunu nasıl etkilemektedir?

Bu teknolojileri kullanabilmek için derse hazırlık ve ihtiyaç duyulan eğitimler açısından gerekli olan zaman sağlanmakta mıdır? Bu öğretmenlerin yeni teknolojilere yönelik tutumunu nasıl etkilemektedir?

Bu yeni teknolojileri etkin şekilde kullanan örnek öğretmenler; diğer öğretmenlerin bu yeni teknolojilere yönelik tutumunu nasıl etkilemektedir?

Bu yeni teknolojilerin daha etkin şekilde kullanılması için verilen maddi ve manevi teşvikler var mıdır? Bu öğretmenlerin yeni teknolojilere yönelik tutumunu nasıl etkilemektedir?

Bu teknolojilerin kullanılması için Milli Eğitim Bakanlığı'nın yapacağı gerekli düzenlemeler var mıdır? Bu öğretmenlerin yeni teknolojilere yönelik tutumunu nasıl etkilemektedir?

Bu teknolojilerin kullanılması için okul yönetiminin destek ve tutumları; öğretmenlerin bu yeni teknolojilere yönelik tutumunu nasıl etkilemektedir?

26. Sormadığım ama bu konuştuğumuz konularla ilgili eklemek istediğiniz bir şey var mı?

APPENDIX H

OBSERVATION FORM

GÖZLEM FORMU

Amaç

Bu gözlemin amacı okullara kurulan akıllı sınıf teknolojilerinin kullanım durumlarını ortaya koyarak, eğitim-öğretim süreçlerinde etkili ve etkin bir biçimde kullanılmasını ve yönetilmesini sağlayabilmek için öğretmenlerin bu teknolojileri kullanım boyutlarının ve ihtiyaçlarının belirlenmesidir.

Araştırma Soruları

1. Okullara kurulan akıllı sınıf teknolojilerinin kullanım durumu nasıldır?
    a. Öğretmenler akıllı sınıf teknolojilerini derslerinde nasıl kullanıyorlar?
    b. Öğretmenler bu teknolojileri kullanırken ne gibi problemler ve zorluklarla karşılaşıyorlar?
    c. Öğretmenler karşılaştıkları problemler karşısında neler yapıyorlar?
    d. Öğretmenler bu teknolojileri kullanmak için nelere ihtiyaç duyuyorlar?

2. Akıllı sınıf teknolojileri kurulan okullardaki öğretmen ve okul yöneticilerinin bu teknolojilerle ilgili değişim sürecindeki koşullar ve karşılaştıkları engeller ile (*mevcut durumla alakalı memnuniyetsizlik, zaman, kaynaklar, bilgi ve beceriler, ödül ve teşvikler, katılım, ve adanmışlık ve liderlik* başlıkları altında) ilgili düşünceleri nelerdir? (Donald P. Ely, 2004: Eight conditions)

Veri Toplama

FATİH projesi kapsamında pilot okul olarak belirlenen okulda, kurulan teknolojilerin derslerde nasıl kullanıldığını, ne gibi problemlerle karşılaşıldığını ve bu problemler

karşısında neler yapıldığını belirlemek için çeşitli branşlarda ve çeşitli kademelerde dersler gözlenecektir. Gözlem sürecinde belirlenen ve belirlenecek boyutlara ilişkin notlar alınarak, ders öğretmeninin izni dahilinde ses kaydı ile de gözlem verileri desteklenecektir.

Ortamın Tanımı: Sınıf Türkçe-2 sınıfı olarak tahsis edilmiş olup; Sınıfta 1 adet dizüstü bilgisayar, 1 adet projeksiyon cihazı, 2 adet hoparlör, 19 adet 2 kişilik sıra, 1 adet öğretmen masası ve sandalyesi, 2 adet dolap, 1 adet beyaz tahta, duyuru ve etkinlik panoları, çeşitli resimler, öğrencilerin hazırladıkları etkinlik şekilleri bulunmakta. Sınıf mevcudu 16'si kız 17'i erkek toplam 33 öğrenciden oluşmakta. 2 öğrenci gelmemiş.

Tarih: Saat: Öğretmen: Sınıf Mevcudu:

Sınıf: Derslik: Ders: Konu:

Zaman	**Kullanılan Teknoloji**	**Kullanım Amacı**	**Kullanım Şekli - Karşılaşılan Problem - Problem Karşısında İzlenen Yol**

Fiziki Ortam:

APPENDIX I

PERMISSIONS OF ETHICAL COMMITTEE OF THE MIDDLE EAST TECHNICAL UNIVERSITY FOR THE FIRST CASE SCHOOL

O.DT.Ü
FEN BİLİMLERİ ENSTİTÜSÜ
YÖNETİM KURULU KARARI

Tarih: 05.05.2011
Sayı: FBE: 2011/23

GÖREVLENDİRME VE İZİN

Bilgisayar ve Öğretim Teknolojileri Eğitimi EABD doktora programı öğrencisi Ali Gök'ün Mayıs-Temmuz 2011 tarihleri arasında "*Milli Eğitim Bakanlığı'na Bağlı Okullarda Akıllı Sınıf Teknolojilerinin Kullanım Durumları ve Yönetimi*" başlıklı araştırmasına ilişkin hazırlanan anketi MEB İlköğretim Okulları ve MEB Eğitim Teknolojileri Genel Müdürlüğünde uygulama yapmak için görevlendirilme başvurusu incelenmiş; ilgili danışman görüşüne dayanarak adı geçen öğrencinin isteği doğrultusunda görevlendirilmesine oybirliği ile karar verilmiştir.

Prof. Dr. Canan Özgen
FBE Müdürü

Prof. Dr. Gürsevil Turan
FBE Müd. Yard.

Doç. Dr. Nil Uzun
FBE Müd. Yard.

Prof. Dr. Vedat Toprak
Üye

Prof.Dr. Haluk Sucuoğlu
Üye

Doç. Dr. Ayşe Berkman
Üye

APPENDIX J

PERMISSIONS OF ETHICAL COMMITTEE OF THE MIDDLE EAST TECHNICAL UNIVERSITY FOR THE SECOND CASE SCHOOL

O.D.T.Ü
FEN BİLİMLERİ ENSTİTÜSÜ
YÖNETİM KURULU KARARI

Tarih: 03.01.2013
Sayı: FBE: 2013/ 3

GÖREVLENDİRME VE İZİN

Bilgisayar ve Öğretim Teknolojileri Eğitimi EABD lisans sonrası doktora programı öğrencisi Ali Gök' ün Aralık 2012-Şubat 2013 tarihleri arasında "*Milli Eğitim Bakanlığına bağlı okullarda akıllı sınıf teknolojilerinin kullanım durumları ve yönetimi*" başlıklı araştırmasına ilişkin hazırlanan anketi, MEB Ankara Bahçelievler Deneme Lisesi ve MEB Eğitim Teknolojileri Genel Müdürlüğünde uygulama yapmak için görevlendirilme başvurusu incelenmiş; ilgili danışman görüşüne dayanarak adı geçen öğrencinin isteği doğrultusunda görevlendirilmesine oybirliği ile karar verilmiştir.

Prof. Dr. Canan Özgen *FBE Müdürü*	**Prof. Dr. Gürsevil Turan** *FBE Müd. Yard.*	**Prof. Dr. Gülbin Dural** *FBE Müd. Yard.*
KATILAMADI **Prof.Dr. Haluk Sucuoğlu** *Üye*	**Prof. Dr. Zeki Kaya** *Üye*	KATILAMADI **Y.Doç.Dr.Buğra Koku** *Üye*

APPENDIX K

TURKISH VERSIONS OF QUATATIONS USED IN THE STUDY

Q1. Öğrenciler akıllı tahta üzerinde dokunarak test ve eşleştirme sorularını çözüp içerik ile etkileşime geçebiliyorlar. Mesela, öğrenciler test sorularını çözerken doğru düşündükleri seçenek üzerine tıklayabiliyorlar, sonrada sesli ya da animasyon olarak verdikleri cevabın doğruluğuna göre dönüt alabiliyorlar. (C1_T2)

Q2. Ben interneti konularla alakalı sunum bulmak için kullanıyorum. Yani, 'sosyalbilgiler.biz' adında bir site var, çok iyi bir Sosyal Bilgiler öğretmeninin yüklediği sunumlar var bu sitede. Sınıfımda onun hazırladığı sunumları indiriyorum ve derslerimin %90'nında bu sunumları kullanıyorum. (C1_SS1)

Q3. Okulumuzda 150 kişilik bir konferans salonumuz var, fakat 2000 öğrenci var okulda. Biliyorsunuz, öğrenciler ve öğretmenler aktiviteler hazırlıyorlar ve biz okuldaki tüm öğrencilerin bunları izleyebilmesini istiyoruz. Tüm öğrencilerin bu aktiviteleri aynı zamanda izlemesi çok önemli tabi ki de. Bu yıl biz 'Dost Gönüller, Mucit Beyinler' adında bir proje yürütüyoruz ve önemli Türk büyüklerini tanıtmak istiyoruz. Projemizin bir diğer amacı da bu insanlar hakkında tüm öğrencileri bilgilendirmek aslında. Bundan dolayı bu projedeki aktivite ve sunuları öğrencilere sınıflardaki teknolojiler aracılığıyla canlı yayınlamaya karar verdik. Çünkü konferans salonumuzun kapasitesi okuldaki tüm öğrenciler için yetersiz durumda. Bir web kamerası ve bilgisayar ayarlayarak konferans salonundan yayın yaparak sınıflara internet bağlantısı aracılığıyla görüntü sağladık. Yani, etkinlikleri yüksek kalitede görüntülü olarak sınıflardaki akıllı tahtalara ve projeksiyon cihazlarına internetten aktardık. Bu şekilde sınıflarda tüm öğrenciler sıralarından aynı zamanda gösterileri izleyebildiler ve biz de projenin amacına ulaşabilmiş olduk. Dahası, veliler de evlerinden bu gösterileri internet aracılığıyla izleyebildiler. (C1_PT10)

Q4. 1.sınıflarda harfleri öğretirken interaktif animasyonlardan laptop ve projektör sayesinde faydalandım. Öğrenciler her harfin tam sesini duyabildiler ve aynı zamanda harfin şeklini de görebildiler. Sonuçta harf ve okunuşunu aynı anda alarak ilişkilendirebildiler. (C1_PT3)

Q5. Görsel ve işitsel duyu organlarından faydalandığımızda öğrenciler daha kalıcı öğrenebiliyorlar. Bunun için okulumuzdaki öğretmenler genellikle bu teknolojileri görsel ve işitsel aktivitelerde kullanıyorlar. (C1_SA1)

Q6. Teknolojiler aracılığıyla öğrencilere şarkıları ve konuşma parçalarını dinletiyorum, çünkü İngilizce kelimelerin okunuşlarını duymak İngilizce öğrenmek için çok önemli. (C1_E2)

Q7. Öğrenciler Tarih ve Coğrafya derslerindeki soyut kavramları öğrenirken zorlanıyorlar. Çünkü bazı soyut kavram ve olayları görmedikleri için bilmiyorlar. Yani, bazı kelime ve olayları kafalarında kuramıyorlar, hayal edemiyorlar. Bunun için öğrenciler daha kolay öğrenebilsinler diye soyut kavramlarla alakalı video, animasyon ve resimleri kullanıyorum derslerimde. (C1_SS1)

Q8. Dersle alakalı içerik aramak ve konu ile alakalı sunumları indirmek için internetten eğitim sitelerini araştırıyorum. Sonra da bulduğum kaynakları derslerimde kullanıyorum. (C1_SS1)

Q9. Türkçe derslerinde bilinmeyen kelimelerin anlamlarını bulmada internetteki sözlüklerden faydalanıyoruz. Bilmediğimiz bir kelime ile karşılaştığımızda 'Türk Dil Kurumu'nun veya diğer elektronik sözlüklerin websitelerini açıyoruz ve kelimenin anlamını öğreniyoruz. Yani, konu ile alakalı gerekli bilgiye kısa zamanda ulaşabiliyoruz. (C1_T2)

Q10. Müzik dersinde şarkıları ve sözlerini indirmek için internetten faydalanıyorum. Bu şekilde öğrenciler şarkıları ve marşları daha iyi öğreniyorlar. Aslında, sınıfta ulaşmak istediğimiz tüm bilgileri istediğimiz zaman bulabiliyoruz. (C1_MU1)

Q11. Beyaz tahtaya soruları tek tek yazmak yerine akıllı tahta üzerinde direk açıyorum. Sonra da akıllı tahta üzerinde kalemi ile soruları çözüyorum. Bu şekilde aynı zaman zarfında daha fazla matematik sorusu çözebiliyoruz dersimizde. Yani,

daha fazla soru çözebilmek ve zaman kazanmak için bu teknolojileri kullanmayı tercih ettiğimi söyleyebilirim açıkçası. (C1_M1)

Q12. Öğrencilerin etkileyebilmek için laptoplarla ve akıllı tahtalarla birlikte resimleri, animasyonları ve videoları kullanıyoruz derslerimizde. (C1_T2)

Q13. Akıllı tahtaları derslerimizde kullanıyoruz, yani öğrencilerimizin tamamını derse katabilmek için aslında. Bir de öğrencilerin konu ile bağlantı kurabilsinler diye akıllı tahtayı kullanmalarını sağlıyoruz. Çünkü eğer akıllı tahtayla dersi işlersek daha çok öğrenmek istiyorlar. Yani, akıllı tahta üzerine tıklıyorlar, bir animasyon ya da ses duydukları zaman ders süresince sıkılmıyorlar. (C1_T2)

Q14. Öğrencilere ödev verdiğimizde onları kağıt üzerinde topluyorduk. Ama şimdi öğrencilere ödevlerini dijital formatta yapmalarını söylüyoruz ve USB bellek ile getirdikleri ödevlerini alabiliyoruz. Hatta bazen öğrenciler sınıfımızdaki teknolojilerden faydalanarak ödevlerini arkadaşlarına sunabiliyorlar. Böylelikle öğrenciler ödevlerini arkadaşlarıyla paylaşacakları için heyecan da duyuyorlar. Bunun için de ödevlerini daha iyi hazırlayabiliyorlar. (C1_PT4)

Q15. Biz matematik kitabının dijital olarak ‘pdf’ formatını kullanıyoruz. Çünkü bazı öğrencilerimiz sorumluluk sahibi değiller ve kitaplarını okula getirmiyorlar. Böylelikle kitaptaki soruları çözerken soruları akıllı tahtaya yansıtarak kitap getirmeyen öğrencilerin de soruyu görmelerini ve diğer öğrenciler gibi soruyu çözmelerini sağlıyoruz. (C1_M2)

Q16. İngilizce derslerinde bu teknolojiler sayesinde daha iyi ve kapsayıcı sorular hazırlayabiliyoruz. Yani, her şeyi ölçebiliyoruz. Mesela ben laptopu kullanarak ‘listening’ soruları ekledim bir sınava. (C1_E2)

Q17. Normalde ben dersimi klasik yöntemle işliyordum. Ama bundan sonra video ve animasyon gösteriyorum, ya da öğrencilere animasyonlu aktivite yaptırarak konu tekrarı yapıyorum. (C1_PT3)

Q18. Benim teknoloji konusunda yeterliliğim olduğu için yoğunlukla bu teknolojileri kullandım. Her gün sınıfa girdiğimde panel tip akıllı tahtayı açıyorum ve o günün sonuna kadar hep açık kalıyor. Demek istediğim, öğrencilerle birlikte ama benim

kontrolümde kullanıyoruz akıllı tahtayı. Hatta teneffüslerde de panel tip akıllı tahta açık oluyor ve öğrenciler kalemi iler birlikte kullanıyorlar onu. Kullanım oranımı anlatabileceğim şeyler bunlar. (C1_PT10)

Q19. Ben sınıfları turladığımda hemen hemen tüm teknolojilerin açık olduğunu ve öğretmenlerin sıklıkla kullandığını görüyorum. Bazı öğretmenlerimizin yaşlı oldukları ve bilmedikleri için kullanamadıklarını düşünmeme rağmen, bu öğretmenlerin de kullandıklarını gördüm. (C1_SA2)

Q20. Genelde bu teknolojileri kullanmıyorum, çünkü ben dersimi anlatıyorum zaten. Yine de konu ile alakalı ekstra bilgiye ihtiyacım olduğunda veya tekrar yapacağım zaman faydalanıyorum diyebilirim. (C1_PT8)

Q21. Eğer 1.sınıflarda bu teknolojileri sıklıkla kullanırsam öğrenciler için sıkıcı olabiliyor. Aslında ben harfleri verirken bazı animasyonları projeksiyonla tahtaya yansıtarak kullandım. Ama diğer konularda da bu teknolojileri kullanmaya devam ettiğimde öğrenciler yansıttığım aktivite ile ilgilenmediler. (C1_PT3)

Q22. Geometri konularını işlerken matematik dersinde kullandım. Panel tip tahtada geometrik şekilleri program sayesinde kolayca çizebildik. Bunun için bu teknolojiler ve yazılımlar matematik ve geometri dersleri için daha uygunlar. (C1_PT10)

Q23. Genel olarak yeni teknolojiler okulda kullanılıyor. Örneğin akıllı tahtalar okula yeni geldiğinde öğretmenlerimiz özellikle onları kullanmayı tercih ettiler. (C1_SA2)

Q24. İlk başlarda öğrenciler bu teknolojilere alışamadılar ve kullanmamayı tercih ettiler. Ama ben dizüstü bilgisayarı ve projektörü dönemin sonuna doğru yoğunlukla kullanmaya başladım. Çünkü öğrenciler teknolojilere alıştılar. (C1_SS1)

Q25. Projeksiyon cihazları akıllı tahtalara göre daha fazla kullanıldı. Mesela derslerimizde akıllı tahtaların bile projeksiyon özelliğini 1 saat kullanıyorsak, akıllı tahta özelliğini sadece 15 dakika kullanmışızdır. (C1_T2)

Q26. Projektör kullanan öğretmenler tahtada bir şey yazmak, işaretlemek yada yazmak için yaklaştıklarında gölgelerinin görüntü üzerine düştüğünden yakınıyorlar. Yani projektörlerde gölge problemi oluyor ve içerikler tahtaya aktarılırken kullanışlı olmuyor. (C1_PT10)

Q27. Akıllı tahtalarda bazı eksiklikler var. Mesela biliyorsunuz akıllı tahtların kalibrasyonunu ayarlıyoruz. Akıllı tahtaların projektörlerinde 1mm'lik bile bir kayma olsa akıllı tahtanın ekranında 1cm'lik veya 0,5cm'lik farklılıklar oluyor. Hatta biz sınıfın penceresini açtığımızda bile kalibrasyon ayarı bundan etkilenebiliyor. Yani akıllı tahtaların kalibrasyonunu sıklıkla geri ayarlamak zorunda kalıyoruz. Sonuçta bu da bir kullanıcı bizim için sıkıntı oluyor. (C1_PT8)

Q28. Öğrenciler akıllı tahtanın projektör kısmına değdiklerinde kalibrasyon ayarı bozulabiliyor. Çünkü benim sınıfımdaki akıllı tahtanın projektörü çok aşağıda olduğu için öğrenciler kolaylıkla erişebiliyorlar. (C1_T2)

Q29. Benim sınıfımda laptopu projeksiyon cihazına bağladığımız duvardaki bağlantı ve kablolar birkaç gün önce arızalandı, çalışmıyor. Bir de laptopun bağlantı kablosu kayboldu. Bundan dolayı elimdeki aktiviteleri yapamıyorum. Eğer bilgisayarla akıllı tahta arasındaki bağlantılar sağlam yapılsaydı, bu problemle karşılaşmazdım. (C1_E2)

Q30. Sınıflardaki teknolojiler sınıflarda sabit olarak kurulmadığı için bağlantı noktalarında arızalar oluşabiliyor. İşte her gün dersin başında laptopu akıllı tahtaya bağlarken ve dersin sonunda tekrar sökerken bağlantı noktaları zaman geçtikçe kolaylıkla bozulabiliyor. (C1_PT10)

Q31. Sınıf başına bir laptop verildi ve biz bu bilgisayarları bir diğer öğretmenle dönüşümlü olarak kullanmak zorundayız. Ben bu sorumluluğu almak istemiyorum. Bir de okulda laptopları koyabileceğimiz bir yer yok. Bundan dolayı laptopları eve götürmek zorunda kalıyoruz bunu yapmak istemesek de. Bunun sorumluluğu beni sıkıyor aslında. Ama bu laptoplar sınıfta sabit olarak monte edilselerdi biz bu sorumluluğu yüklenmeyecektik. (C1_E2)

Q32. Akıllı tahta üzerinde örnek bir soru çözerken elektrikler kesildi ve sorunun çözümü yarım kaldı. O ana kadar tahtaya yazdıklarım silindi ve ben ne yapacağımı bilemedim o an. Biz de elektriğin gelmesini bekledik, çünkü okulumuzda jeneratör yok. (C1_M1)

Q33. Bir konuyla alakalı herhangi bir animasyon yada sunum indirmek istediğimde onu internette arıyorum ve indirmek için bazı sitelere bağlanıyorum. Ama bu siteler güvenlik sebebiyle bazen Milli Eğitim Bakanlığı tarafından yasaklanmış olabiliyor ve bu içerikleri indiremiyorum. Bu şekilde bir problemlerle karşılaştım açıkçası. (C1_SS1)

Q34. YEĞİTEK bizim kullanmamız için internet sitesine bazı içerikler koymuş. Ama ben onları kontrol ettim ve gördüm ki her konu ile alakalı sadece 1 yada 2 tane aktivite var. Bunların bazılarını derslerimde kullandım, fakat bizim derslerimiz için öğrencilere yeterli olmuyorlar. (C1_PT8)

Q35. İçerikler açısından, öğretmenlerimiz daha iyi içeriklere sahip olmaları halinde veya Milli Eğitim Bakanlığı'nın onlara bir siteden daha fazla içerik sağlaması durumunda (ki ben yakında böyle olacağını düşünüyorum) bu teknolojilerden daha iyi faydalanacaklarını söylediler. Fakat biz bu sene bu içeriklere sahip değildik ve içerikleri değişik kaynaklardan bulmak zorunda kaldılar. Çünkü bu teknolojiler için içerik de hazırlayamadılar. (C1_PT10)

Q37. Öğrenciler konu ile alakalı bir soru sorduklarında bazen bilemeyebiliyorum veya derste anlık ektra bilgilere ulaşmamız gerekebiliyor. Bu gibi durumlarda sorunun cevabını veya konu ile alakalı ekstra bilgiyi internette arıyorum. Maalesef ulaştığım bazı sitelerde öğrencilerimiz için bazı sakıncalı içerikler olabiliyor. İşte bu sitelerde öğrencilere zararlı reklam, siyasi veya cinsel içeriklerle karşılaşabiliyoruz. Bu siteleri açtığımızda bizim için ciddi bir problem oluşturuyor. (C1_MU1)

Q39. Burada teknolojilerin eğitimde kullanılması noktasında yetersiz olan arkadaşlar sorun yaşayabiliyorlar. Buna bağlı olarak bu teknolojileri kullanmamayı tercih edebiliyorlar. (C1_SA1)

Q40. Sınıfıma akıllı tahtayı kurak teknisyenler tahtayı kurduklarında akıllı tahtanın nasıl çalıştığını anlattılar ve kısa bir tanıtım yaptılar. Aynı şekilde diğer arkadaşlarımda teknisyenlerden en fazla 1 saatlik bir eğitim aldıklarını ve bu teknolojilerin nasıl çalıştığı ile ilgili çok fazla bir şeyler öğrenemediklerini söylediler. (C1_S2)

Q41. Bilgisayar ve projeksiyon cihazı için yeterli olduğumu söyleyebilirim. Lakin akıllı tahtalar benim için yeni. Yani daha önce hiç karşılaşmadım ve henüz kullanmamıştım. Açıkçası derslerimde nasıl kullanılacağımı bilmiyorum. (C1_PT4)

Q43. Laptopta herhangi bir yazılımsal veya virüs problemi olduğunda okul yönetiminin görevlendirdiği bilgisayar konusunda birikimi olan öğretmenimiz yardımımıza koşuyor. Ama yine de bir bilgisayar öğretmeni desteğine ihtiyacımız var. (C1_E3)

Q44. Karşılaştığımız problemlerle ve sorunlarla alakalı danışabilmemiz için Milli Eğitim Bakanlığı veya YEĞİTEK tarafından atanmış bir görevli yok okulumuzda. YEĞİTEK yöneticileri bir görevli atayabilirler veya bağlantı kurabileceğimiz bir yetkiliyi okulumuza atayabilirler. Bu çok iyi olurdu aslında. Yani sorunları çözmek için YEĞİTEK'e ulaşmak sıkıntılı olabiliyor. Bizimle iletişime geçecek bir görevli yok mesela. (C1_PT10)

Q47. İnternet sitelerinde içerik ararken yada seçerken sakıncalı resimlerle karşı karşıya gelebiliyoruz. Her ne kadar resimleri tahtada vücudumla kapatsam da öğrenciler onları görebiliyorlar ve gürültü yapabiliyorlar. (C1_MU1)

Q48. Arkadaşlarımla konuştuğumda FATİH Projesi ile ilgili insanların okulumuza yaptıkları sık ziyaretlerden rahatsız olduğumuzu fark ettim. Dersimize müfettiş mi geldi diye endişeleniyoruz açıkçası. Belki de bazı yetkililer ayda bir yada iki kere gelseler biz de onlar ne zaman gelecekler diye düşünmeden onları bekleriz okulumuza. Hangi sınıf izlenecek, niye geldiler, ne istiyorlar diye endişeleniyoruz sözün doğrusu. Bu endişelerimiz de teknolojileri derslerimizde kullanmamızı olumsuz etkiliyor. (C1_M1)

Q49. Bazen klasik yöntem yerine dersimizde bu teknolojileri kullanmak öğrencilerin motivasyonlarını derse yöneltmek açısından daha kötü olabiliyor. Çünkü teknolojilerde işleyen bir süreç oluyor. Mesela öğretmen öğrencilere video izlettiğinde video uzun olabiliyor. Burada siz sürece dahil olamıyorsunuz. Yani siz videonun dışındasınız ve öğrenciler videoya odaklanmış durumda. Ama öğrencilerin dikkatleri dağılabiliyor. Böyle olunca da sürece müdahale etme şansınız olmuyor. Yani bilgisayar "sessiz olun" veya lütfen videoyu izleyin" diyemiyor. Eğer siz

öğrencileri dışarıdan uyarırsanız, diğer öğrencilerin video ile olan bağlantılarını koparabiliyorsunuz. Sonra da öğrencileri tekrar videoya odaklamak daha zor olabiliyor. (C1_SA1)

Q50. Okulumuzdaki öğretmenler derslerinde oluşan problemleri genellikle kendileri çözebilmeyi deniyorlar bana danışmadan önce ve bazıları laptoplardaki ve akıllı tahtalardaki bazı problemleri kendileri giderebildiklerini söylüyorlar. (C1_PT10)

Q51. Problemleri yardım kendin almadan halletmeyi seviyorum. Şöyle ki sorunla ilgili olarak benim yapabileceğim bir şey varsa kesinlikle kendim çözerim. Mesela bir kablo değişecekse ve kablo da varsa değiştirebilirim. (C1_PT8)

Q54. Tahtada bir sunumu takip ederken bir problem vardı. Bilgisayarımda sunumu açtım ve projeksiyonla duvara yansıttım. Problem sunumda herhangi bir sayfadaki bir resim yada cümle hakkında konuştuktan sonra bir sonraki slayda geçebilmek için tekrar öğretmen masasına dönmem zorunda kalmamdı. Her seferinde öğretmen masasına geri döndüğümde sunumda gösterdiğim yerle olan bağlantımı kaybediyorum ve öğrenciler de olumsuz etkileniyorlardı. Bunu aşmak için ne yapabilirim diye düşündüm ve bir çözüm buldum. Evden bir kablosuz mouse getirerek kaç metre uzaklıktan çektiğini test ettim. Bu fareyi sınıfın her yerinde bir sonraki slayda geçebilmek için kullanabileceğimi belirledim. Böylelikle sayfaları yada slaytları öğretmen masasına gitmek zorunda kalmadan geçebildim. Aslında bu çözümü tamamen kendim buldum. Hatta arkadaşlarıma da bu şekilde bir kullanım yolu olduğunu anlattım sınıflarında akıllı tahtaları olmasa da. (C1_SS1)

Q55. İçerik eksikliği ve çözümüm ile ilgili bir şeyler söyleyebilirim. Mesela internetten bir sunum yada animasyon indiriyordum. Bu durumlarda farklı web sitelerine bağlanıyordum ama bu siteler okulda yasaklı olabiliyordu ve ben içerikleri indiremiyordum. Bu yüzden de ben gerekli materyalleri bir gün öncesinden evden bulum indirmek zorunda kalıyordum. Açıkçası materyallerin çoğunu bu şekilde evde ayarlıyordum. (C1_E3)

Q56. Projektörden yanlış resimleri yansıtmayayım diye dersten önce internetten arayıp kontrol ediyorum. Yani sakıncalı içerik içermeyen siteleri belirleyip onları derste gösteriyorum. (C1_MU1)

Q57. Derste internetten bulduğum bir içeriği önce kendi laptopumda projeksiyon cihazında yansıtmadan açıyorum. Sakıncalı bir içerik var mı diye incelediğime sonra eğer problemli bir kısım varsa ama yine de o sitedeki yararlı içeriği göstermem gerekiyorsa iki yol izliyordum. Öncelikle sayfada göstereceğim kısmı büyüterek sakıncalı kısımların görünmemesini sağlıyorum. Aslında sadece web sayfasının uygun kısmını yansıtıyorum. İkinci yol olarak ise siteyi tahtada açıyordum ve sakıncalı kısmı vücudumla kapatarak öğrencilerin görmesini engelliyordum. (C1_T2)

Q58. Konu ile ilgili yeterli aktivite bulamadığımda elimdeki basılı materyalleri kullanıyorum. Yani aktiviteyi tahtaya yansıtıp, öğrencilere de fotokopi olarak öğrencilere dağıtıyordum. Böylece hem tahtada hem de kağıtta öğrencilerin alıştırma sorularını çözmelerini sağlıyordum. (C1_E2)

Q59. Matematik dersi için yeterli içeriğimiz olmadığı için kitabın taranmış halini kullanmaya karar verdim. Bunun için de dönemin başında her sınıf için Matematik kitabının tüm sayfalarını kendim taradım ve dönem boyunca da akıllı tahta üzerinde kullandım. Kitabın 'pdf'ini laptopumda derslerimde açarak alıştırma kısmını akıllı tahtaya yansıtıyorum. Sonra da akıllı tahta kalemi ile soruları tahta üzerinde çözüyorlardı. Böylece bu teknolojilerden etkileşimli olarak faydalanmış oluyorduk. (C1_M2)

Q61. Öğretmenlerin ilettikleri teknik problemleri gidermeye çalışıyorum. Mesela projeksiyonun görüntüsünün tahtaya ters yansımasını düzeltmek için bazı uygulamalar yaptırdım. Ayrıca basit teknik problemlerin çözümü için yazılı yönergeler verdim öğretmenlere. Öğretmenler bu yönergeleri kullanarak bazı problemlerini çözebildiler. (C1_PT10)

Q62. İngilizce dersi için bir programın kurulması için yanına gittiğim yetkili öğretmenimiz programı kurdu. Hatta iki kere de virüs temizledi. Bu yardımları için teşekkür ediyorum. (C1_E2)

Q63. Biliyorsunuz okulumuz büyük bir okul. Bir dönemde sabahçılarda 40-45 öğretmen var. Bu öğretmenler benden çok küçük bir şeyler isteseler bile benim çok fazla zamanımı alıyor. İşte okuldaki tüm yük benim üzerimde ve bundan dolayı da çok yoğun çalışıyorum. Yine de elimden geleni yapmaya çalışıyorum. (C1_PT10)

Q64. Okulumuzda bilgisayar öğretmenimiz olmadığı için karşılaştıkları problemleri çözebilen öğretmenlerimiz diğer öğretmenlere de yardımcı oluyorlar. Bu şekilde üstesinden gelmeye çalışıyoruz diyebilirim. (C1_SA1)

Q66. Bir teknisyen değil o, aslında okulumuzda memur. Biz de onu teknolojiler okulumuza kurulmadan önce okulumuzdaki elektrik problemleriyle ilgilensin diye teknisyen olarak görevlendirdik. Aslında bu teknolojilerle alakalı her hangi bir görevi yok. Yine de ondan kablolama ile ilgili problemlerde yararlanıyoruz. İşte sadece arızalı kabloları değiştiriyor ve bağlantı noktalarını da tamir ediyor. (C1_SA2)

Q67. Sınıfımdaki projeksiyonun görüntüsünde bir problem oldu. Bunu idarecilere ilettiğimde öncelikle teknisyeni gönderdiler. Teknisyen de duvardaki kabloda problem olduğunu tespit etti ve elinde kablo olmadığı için değiştiremeyeceğini söyledi. Sonra idarecilerle bu konu hakkında tekrar konuştum, onlar da YEĞİTEK'e bilgi verdiklerini söylediler. (C1_E2)

Q69. YEĞİTEK yetkililerine akıllı tahtanın projeksiyon kısmına aşağıya monte edildiği için öğrencilerin kolaylıkla temas edebildiğini aktardım. Ayrıca sıklıkla kalibrasyon ayarı yapmak zorunda kaldığımız konusunda da yakındım. Onlar da bana dikkate alacaklarını ve bir çözüm yolu bulacaklarını söylediler. (C1_T2)

Q70. Arkadaşlarımız öğretmenlerin görüş ve isteklerini almak için ziyaretlerde bulundular. Karşılaştıkları problemler hakkında konuştular. Diğer okullara göndereceğimiz teknolojilerde onların görüşlerine göre güncelliyoruz. Mesela yeni geliştirdiğimiz panel tip etkileşimli tahtalarda kalibrasyon problemini engellemek istiyoruz, çünkü artık projeksiyon parçası yok. (PM1)

Q71. Kurumumuzda bir çağrı merkezimiz var, biliyor musunuz bilmiyorum. Şuanda öğretmenlere yardımcı olması için 'Alo YEĞİTEK' diye bir destek hattımız var. Bence bunlar tüm okullarda bu teknolojilerin kurulmasında rol alabilir. Sayılarını da arttırmayı planlıyoruz. Böylece öğretmenlerin bu teknolojilerle alakalı problemlerini giderebiliriz. (PM1)

Q74. Ankette ve proje yetkilileri ile yaptığımız toplantılarda kablo problemleri gibi sorunları veya arızaları belirttik ama bu problemlerimiz giderilmedi. Hatta bu

teknolojiler için içerik talebinde bulunduk ama akıllı tahtalar için çeşitli animasyonlar ve aktiviteler sağlamadılar. Bunun için de ders kitaplarının 'pdf'lerini kullandık. Akıllı tahta ile ilgili eğitim konusunda ise YEĞİTEK iyi bir eğitim vermedi bize. (C1_M2)

Q75. Bazı yayınevlerinin elemanları ürünlerini tanıtmak için okulumuza geldiler. Her dersin öğretmenleri ile ayrı ayrı görüştüler ve her öğretmene kullanıcı adı ve şifre tanımladılar. Fakat öğrenciler bu e-içerikleri kullanmak isterlerse kendilerine kullanıcı adı ve şifresi satın almak zorundalar. Yani yayınevleri öğretmenlerin içeriklerini ücretsiz olarak kullanmalarını sağlamaya çalışıyorlar. Sonuçta biz de bu içerikleri kullanarak içerik eksiğimizi gidermeye çalışıyoruz. (C1_PT8)

Q76. Bir kaç hafta önce sınıfımdaki akıllı tahtanın algılamasında bozukluk olmuştu. Bunu öncelikle okul yönetimine anlattım. Sonra da tahtanın teknik servisini çağırdık. Servis kısa zamanda gelmese de sınıfta tamir ettiler. Yine de birkaç hafta kullanamadık tahtamızı. (C1_S2)

Q78. Kablo problemlerini veya dokunmatik algılamama problemlerini çözemediğimiz zaman normal ders anlatış şeklimize geçerek devam ediyoruz. İşte öğrencilere kitabınızdaki şu sayfayı açın diyerek örnek bir soruyu beyaz tahta üzerinde çözüyorum. (C1_PT4)

Q79. Tarih konuları için sağlanan içerikler öğrenciler için yetersiz. Çünkü sadece birkaç video ve kitabın dijital hali var elimizde. Bunları da kullandık ama öğrencilerimiz sıkılıyor. Bunların yerine YEĞİTEK her konu ile alakalı daha kaliteli videolar ve animasyonlar gönderebilir. Mesela 'İstanbul'un Fethi'ni anlatırken ben etkileşime geçebileceğimiz animasyonlu haritalar kullanmak istiyorum. İşte, bu animasyonlu haritalar sayesinde hangi ordu nereden ve nasıl gelmiş gösterebilirim ve öğrenciler de savaşın nasıl geliştiğini kafalarında rahatlıkla kurabilirler. Evet, bazı özel konular için daha uygun içerikler istiyoruz. (C1_SS1)

Q80. Sınıfımda akıllı tahta var ama bu tahtaları kullanmak için uygun içeriklerimiz yok. Sadece bazı aktiviteleri kullanabiliyoruz açıkçası. Bu aktivitelerde öğrencilerin evde ekendi bilgisayarlarında kullanabilecekleri türde hazırlanmışlar. Bunları kullanmak istediğimizde ise öğrenciler sıkılabiliyorlar doğrusu. Çünkü bunlar sınıfta

uygulamak için hazırlanmamış. Bu içeriklerin yerine özellikle akıllı tahtalar için geliştirilmiş e-içerikler istiyoruz. Hem öğrenciler de bu içerikleri sınıf içerisinde rahatlıkla kullanabilirler belki. (C1_PT8)

Q83. Türkçe öğretmenleri olarak bu teknolojilerin Türkçe derslerinde nasıl kullanılabileceğini içeren örneklerin anlatıldığı özel eğitimlere katılabiliriz mesela. Bize akıllı tahtaların kullanıldığı örnek Türkçe dersleri gösterebilirler. Bu şekilde her ders için farklı eğitim programları olabilir. (C1_T2)

Q84. Aslında bazı ülkelerde başarılı şekilde kullanılıyor. Bu bağlamda her okuldan belirli öğretmenler yurtdışına gönderilerek bu teknolojilerin etkin ve verimli olarak nasıl kullanıldığını gözlemleyebilirler ve okullarındaki öğretmenlere en iyi kullanım şekillerini aktarabilirler. Bence bu teknolojilerin kullanımı açısından çok yararlı olur bu. (C1_PT10)

Q85. Okulumuzdaki her öğretmen teknolojileri olan şirketlerin eğitimlerine katıldı. Aslında bu eğitimler teknolojilerin temel kullanımlarını içeren tanıtıcı seminerlerdi. Yine de bu teknolojileri derslerimizde kalaylıkla kullanabilmemiz için yetkililerin uzun süreli eğitimler ayarlaması lazım. (C1_E2)

Q86. Bize bu teknolojileri verseler de sınıf içerisinde nasıl kullanılacaklarını bilmiyoruz aslında. Bunların nasıl çalıştığını ve özelliklerini bilsek de derslerimize nasıl entegre edeceğimizi bilemiyoruz açıkçası. Bu teknolojilerin hangi konuda nasıl kullanılabileceği bize verilecek eğitimlerde anlatılabilir. Böylelikle biz de bazı ünitelerde nasıl kullanıldıklarını görmüş oluruz. Her ders için uygun örnek kullanımları gösterilebilir mesela. (C1_T2)

Q88. Bilgisayarı ve akıllı tahtayı kullanırken bizimle ilgilenecek bir görevli olabilir bizimle en azından. Bence yöneticiler ona okuldaki teknolojik problemlerle ilgilenmesini ve çözmesini söylemeliler. Yani bu teknolojilerin olduğu her okulda bir çalışan olmalı. Bu teknolojilerle alakalı ihtiyaç duyacağımız bilgileri ondan alabiliriz veya o da bize seminer yada eğitim verebilir. (C1_PT12)

Q89. Kabloları duvardaki bağlantı noktalarına defalarca takıp çıkarttıkça arızalanabiliyorlar. Bunun için bunlar sınıflarda sabit olmalılar. (C1_PT11)

Q90. İnternetten şarkı indirmek istediğim zaman sadece bir şarkıyı indirmek bile çok uzun zaman alabiliyor. Bundan dolayı sınıflardaki internet hızı arttırılmalı. (C1_MU1)

Q91. Derslerimden birinde bir konu hakkında bir video izlerken internet birden kesildi ve ne yapacağımı bilemedim o an. Bu gibi durumlar derslerimde laptopu ve projeksiyon cihazını kullanmamı engelleyebiliyor. İşte eğer bu teknolojileri kullanmamız isteniyorsa internet bağlantısı düzgün olmalı. (C1_PT4)

Q93. YEĞİTEK'in anketinde sınıfımdaki kablo probleminden bahsettim açıkçası, ama gördüğünüz gibi YEĞİTEK'ten kabloyu yada bağlantıları değiştirmekle ilgili bir hareket yok. Bunun için de proje yöneticilerinin anketlerde belirttiğimiz taleplerimizle ilgilenmelerini ve bizim problemlerimizi desteklemelerini öneriyorum ben. (C1_E2)

Q94. Akıllı tahtayı derslerimde kullandığımı söyleyebilirim. Derslerimi onda işliyorum ben. Örneğin akıllı tahta yazılımının galerisinden haritaları gösteriyorum. Çünkü sınıfa sadece 1-2 harita getirebilirken konumuz ile alakalı birçok haritaya ulaşabiliyorum artık. Doğrusu öğrencilere göstermek istediğim her haritayı gösteriyorum şuan. (C2_G2)

Q95. Genellikle akıllı tahtayı projektör olarak kullanıyorum. Sunumlarımı onda açıyorum ve üzerinde de takip ediyorum. Herhangi bir işaretlemeye ihtiyaç duyduğumda ise akıllı tahtanın yanındaki beyaz tahtaya çiziyorum. Akıllı tahta yazılımını da sadece var olan resim ve şekilleri gösterirken kullanıyorum. (C2_P1)

Q97. Bu içerikler bir firma tarafından sağlandı ve panel tip etkileşimli tahtaya uygunlardı. Yani bu içerikler çeşitli interaktif aktivitelerden, dinleme aktivitelerinden, şarkılardan ve örnek sorulardan oluşuyordu. Her tahtaya bu içerik paketini yükledim ve İngilizce öğretmenleri de derslerinde kullanıyorlar. (C2_SAFT1)

Q98. İnternet sınıftan dışarıya açılmamızı sağlayan bir pencere bizim için. Ders anlatırken istediğimiz her türlü bilgiye ulaşabiliyoruz. Mesela ülkeler coğrafyası hakkında konuşurken internetten ülkeler hakkındaki birçok bilgiyi bulabiliyoruz.

Dahası ‘Google Maps’ gibi sitelerden ülkelerin haritalarını açabiliyoruz. Çoğu zaman da ‘Google Maps’den faydalanıyorum zaten. (C2_G2)

Q100. EBA’nın web sitesinde çok fazla harita var. Konuya göre oradan seçiyorum ve dersimde gösteriyorum. Hatta Coğrafya dersi için ihtiyacımızdan çok fazla harita var. (C2_G2)

Q101. Müfredattaki konularla alakalı internette sunum aramıştım. Güvendiğim birkaç site var, bir çok konuyla alakalı iyi hazırlanmış sunumları da var aslında bu sitelerin. Evde bunları indiriyorum, sonra da USB belleğimle sınıfa getiriyorum bunları. Yeri geldiğinde de bu sunumları göstererek konuyu anlatıyorum. (C2_H1)

Q102. Coğrafya derslerinde görselleri ve çizimleri sıklıkla kullanıyorum. Örneğin dünyanın basitçe şeklini çizip öğrenciler üzerinde kıtaları açıkça görebiliyorlar. 10.sınıflarda ‘Dünyadaki toprak türlerinin dağılımı’ adında bir ünite var. Eğer beyaz tahtaya bu konu için bir harita yada şekil çizsem ve toprak türlerini tahta kalemi ile göstermek istesem öğrenciler benim belirttiğim şekillerin anlamını tam olarak fark edemiyorlar. Ama akıllı tahta yazılımı şekiller hazırlayabiliriz ve önemli noktaları değişik araçlarla vurgulayabiliriz. (C2_G2)

Q103. Öğrencilerin dikkatlerini çekebilmek için akıllı tahta üzerinde dersin başında ilgi çekici ve komik karikatürler açabiliyorum genellikle. Bu karikatürler de çoğunlukla konumuz ile bağlantılı oluyor. Öğrencileri konuya yönlendirecek sorular sorarak tahtadaki durum hakkında konuşuyoruz. Sonra da konuya geçiyorum. Bazen de kısa bir video yada film gösterip öğrencilerin konu ile bağlantı kurmalarını sağlıyorum. (C2_SAFT1).

Q104. Eğer anlatımımızı tahta üzerinde görsellikle desteklersek daha akıcı bir ders oluyor ve öğrenciler daha fazla katılabiliyorlar derse. Çünkü tahtadaki bir resim yada herhangi bir nokta öğrencilerin dikkatini etkileyebiliyor. Bunun resmini gördüğümüz iyi oldu çünkü yazarı tanımıyoruz diyebiliyorlar. Böylece resmini gördükleri yazarı merak edebiliyorlar. Mesela EBA’da eski bir kitabın kapağının resmi vardı. Biz bu kapağı gösterdiğimizde öğrenciler kitapta neler var diye ilgilenebiliyorlar. Siz de girdiğiniz derste böyle bir şeye şahit olmuştunuz. (C2_T1)

Q105. Okulumuzdaki bazı hocalarımız içerikleri kullanmak için EBA'ya bakıyorlar. Yani okulumuzdaki Coğrafya, Tarih ve Kimya öğretmenlerimiz beğendikleri birçok içeriği indiriyorlar ve USB belleklerine atıyorlar bunları. Benim gözlemleyebildiğim kadarıyla konularla alakalı haritaları ve çeşitli videolar indiriliyor en fazla. İşte içerik için EBA'dan faydalanıyorlar diyebilirim size. (C2_SAFT1)

Q106. Edebiyat dersinde edebi metinleri incelediğimizde eski metinlerde bazen bilemediğimiz kelimelerle karşılaşabiliyoruz. Bu gibi durumlarda farklı sitelerin sözlüklerine bakıp bu kelimelerin anlamlarını öğrenebiliyoruz. (C2_T2)

Q108. Doğruyu söylemek gerekirse biz zaten müfredattaki konularımızı ancak bitiriyoruz şuanda. Şimdi bu teknolojileri kullanalım desek bir derste akıllı tahtayı açmaya zamanımız yok. Yani bunları kullanırsak zaman kaybediyoruz. (C2_B1)

Q110. Konuları tekrar etmem gerektiğinde internette sunum, resim yada konu özetleri gibi içerikleri bulmak için arama yapıyorum. Konuları hızlı bir tekrar yapmam gerektiğinde de daha önceden evde incelediğim Milli Eğitim Bakanlığı'nın öğrencilerimize uygun olarak önerdiği sitelerden içerikleri açarak öğrencilerle birlikte takip edip tekrar yapıyorum. (C2_H1)

Q111. Bazen öğrenciler anlattığım konuyu anlayamadıklarını söylüyorlar. Bu gibi durumlarda akıllı tahta programı aracılığıyla sunumda daha önce gösterdiğim sayfaları açıyorum ve konuyu tekrar açıklıyorum. Sonra da kaldığım yerden tekrar devem ediyorum. İşte bu teknolojiler sayesinde derslerimdeki kavramları rahatlıkla tekrar verebiliyorum. Hatta tahtada bir çizim yaparsam sonra silip başka bir şey yazmış olsam bile tahtaya tekrar tekrar önceki çizimlerimi gösterebiliyorum. (C1_G2)

Q113. Dil bilgisi ile ilgili bir aktiviteyi EBA'dan açtığım zaman öğrencileri aktiviteye katılmaları için yönlendiriyorum. Teorik bilgiyi verdikten sonra aktivitelerdeki pratik amaçlı soruları sorup öğrencilerin tahtaya dokunarak çözmelerini sağlıyorum. Sonuçta öğrencilerde cevaplarının doğru mu yanlış mı olduğunu görüyorlar tahtadan gelen seslere göre. (C2_T1)

Q114. Yapabildiğim kadarıyla yıl boyunca bu teknolojileri kullanmaya çalıştım. Ama gelecek yıl daha fazla faydalanmak istiyorum. Mesela yaz tatilinde EBA'daki içerikleri inceleyeceğim ve dersime uygun olanları hazırlayacağım. İşte EBA'ya göre dersimi düzenleyeceğim. (C2_G2)

Q115. Birçok öğrencimiz kitaplarıyla gelmiyorlar okula. Bunun için de EBA'dan kitabı açıyorum konuları akıllı tahtada gösteriyorum. En azından tahtadan görmüş oluyorlar. Böyle de derste konuyla ilgilenmelerini sağlamış oluyorum. (C2_B1)

Q118. Öğrenciler akıllı tahtanın nasıl kullanıldığını ve neler yapılacağını merak edebiliyorlar. Hatta derste bazen sıkılıp akıllı tahtadaki uygulamaları düşünebiliyorlar. Bu yüzden öğrencilerin panel tip etkileşimli tahtayı açmasına müsaade ediyorum bazen ve akıllı tahtada yapmak istediğiniz her şeyi yapabilirsiniz diyorum dersin sonunda özellikle. Bunun üzerine ya şarkı dinliyorlar yada oyun oynuyorlar akıllı tahtada. Bir sonraki ders için rahatlamış oluyorlar bu şekilde. (C2_T1)

Q119. 45 dakikalık her dersin 40 dakikasında aktif olarak kullanıyorum bu teknolojileri, yani sınıf defterini imzaladığım süre haricinde tamamen. Sınıfımızda akıllı tahta ders boyunca açık oluyor ve akıllı tahta aracılığıyla bilmediğimiz kelimelerin anlamlarını öğreniyoruz internetten. İşte akıllı tahta programı ve internet sürekli aktiftir benim dersimde. (C2_H1)

Q120. Teknolojileri sıkça kullanan öğretmenler genellikle teknoloji ile ilgili olup da yeterli bilgi-becerisi olan öğrenmenler. Okulumuzda derslerinin çoğunda kullanan öğretmenlerimiz var, Coğrafya, Tarih, Kimya, Edebiyat ve İngilizce öğretmenlerimiz gibi. (C2_SAFT1)

Q121. Derslerimde akıllı tahtayı bazen açıyorum. EBA'daki bazı kaynakları merak ettiğimi ve bazılarını kullandığımı söyleyebilirim. Fakat ders işlerken çok fazla kullanmıyorum çünkü özellikle akıllı tahta yazılımında birçok problem yaşıyorum. Bunun için de bazı derslerimde sadece kitabın taranmış halini kullanıyorum. (C2_B1)

Q122. Okulumuzda özellikle Matematik öğretmenleri akıllı tahtayı çok sık kullanmamayı yeğliyorlar. Eğer tüm derslerde kullanırlarsa müfredatı takip etme açısından zaman kaybı olduğunu söylediler. Zaman kaybetmemek için bunlarla soru çözmek istemiyorlar. (C2_SA1)

Q123. Samimi olmak gerekirse biz derslerimizde akıllı tahtayı hiç kullanmadık. Çünkü zaten çok az derse giriyoruz ve bu derslerde de kullanamıyoruz açıkçası. Bir de biz öğretmenlerin aldığı eğitimi de almadık zaten. (C2_SA2)

Q124. EBA'daki bazı aktiviteler için akıllı tahta yazılımını kullanmayı planlasam da bu programı kullanmıyorum artık. Yani akıllı tahta yazılımı tahtadaki içeriklere direk müdahale etmemizi engelliyor. İşte bu cihazlar için içerikleri yeniden düzenlemek zorunda kalıyoruz. Ancak bu cihazlara göre düzenleyip aktardıktan sonra kullanabiliyoruz elimizdeki içerikleri. Yani doğrusunu söylemek gerekirse kullanım zorluğundan dolayı akıllı tahta yazılımını kullanmıyorum bir süredir. (C2_G2)

Q125. 9.sınıflarda çoğu dersimde açıyorum akıllı tahtayı. Çünkü bu öğrenciler Anadolu Lisesi öğrencileri olarak seçildiler ve diğer öğrencilere göre daha iyiler. Hem de 9.sınıflar için daha fazla içeriğe ulaşabiliyoruz. Zaten son sınıflarda hiç kullanmadım ben bu teknolojileri. Çünkü üniversite sınavına girecekler zaten, farklı şeylerle uğraşmak için yeterli zamanları da yok, ancak soru çözüyorlar. (C2_M1)

Q126. Akıllı tahtadan ve EBA'daki içeriklerden sadece 9.sınıfların Kimya dersinde 'Periyodik Tablo', Madde ve Madde Özellikleri'gibi konularda faydalandım. Ama 11.sınıflarda çok kullandığımı söyleyemem. Çünkü 11.sınıflarda Kimya dersi için düzgün içerik bulamadım. (C2_C2)

Q128. Panel tip etkileşimli tahtayı birçok derste çalıştırsalar da EBA'daki içerikleri göstermek istemiyorlar son zamanlarda. Çünkü zaman geçtikçe bu teknolojilere olan ilgileri azalıyor. Üstüne kullandıkça da çeşitli problemlerle karşılaşıyorlar. Yani eskisi kadar kullanmayı tercih etmiyorlar artık. (C2_SAFT1)

Q130. Panel tip etkileşimli tahtanın dokunmatik ekranındaki aksaklıklar kullanırken karşılaştığımız sorunlar arasında gösterilebilir. Ama bu problemler çoğunlukla tebeşir kullanımından kaynaklanıyor. Hatta tahtaların teknik servisi de tebeşir

tozunun tahtanın algılayıcılarını engellediğini söylediler. İşte bu problemi şöyle açıklayabilirim. Okulumuzdaki bazı hocalarımız panel tip etkileşimli tahtanın karatahta ve tebeşir kısmını kullanıyorlar, bu tebeşir tozları da alıcıların üzerine konuyor. Sonra da alıcılar tıkladığımızı algılamıyor. (C2_SAFT1)

Q131. Sınıfın birinde akıllı tahtanın bağlantı kısmı bozuldu. Böyle olunca da laptopumu akıllı tahtaya bağlayamadım ve bilgisayarımda bulunan özel bir yayınevinin örnek sorularını gösteremedim. Sonraki derslerde laptopumu başka bir kabloyla bağladım. (C2_M1)

Q132. İlk önceleri ders kitaplarını dijital olarak kullanmak istedim. Ama kitabın 'pdf' dosyasını açtığımda ve göstereceğim sayfaya geçmek istediğimde sayfaları değiştirirken kontrolü sağlayamadım. Yani 5 sayfa sonraya geçmek istediğimde akıllı tahtaya dokunarak aşağıya çektiğimde sayfalar çok hızlı geçti ve ancak 10 yada 20 sayfa geçtikten sonra durdurabildim. Bir de sayfayı değiştirmek istediğimde sayfa değişmiyor tekrar tekrar denesem de. Böyle olunca da akıllı tahta üzerinde bir şey göstermek için bir sayfa açmak istediğimde zorluk yaşıyorum açıkçası. (C2_B1)

Q133. Şimdi ekran çok büyük olduğu için (biz de küçük ekran başında alışık olduğumuzdan) akıllı tahtanın yanında sorun yaşayabiliyoruz. Bazen ekranda klavyeyi bulamıyoruz mesela. Çünkü ekrana çok yakından bakıyoruz ve klavye nerede göremiyoruz. Bu anlarda öğrenciler de klavyeyi uzaktan rahatlıkla görebiliyorlar ve bize yüksek sesle klavye orada hocam diyorlar. Ekranda birçok şeyi bulamadığımız durumlar oluyor yani. (C2_G1)

Q134. Okulumuzdaki Kimya öğretmenlerinden biri bana özel bir yayınevinin USB belleğini Kimya derslerine özel içerik yüklemem için verdi. USB bellekteki yazılımı kurmaya çalıştığımda panel tip etkileşimli tahtalardaki işletim sistemi veya anti-virüs programı bu yazılımı kurmamı engelledi. İşte şimdi Kimya öğretmenleri bu kısıtlamadan dolayı panel tip etkileşimli tahtada bu içerikleri kullanamıyorlar. (C2_SAFT1)

Q135. İlk başlarda her video formatını panel tip etkileşimli tahtalarda açamıyorduk. Öğretmenlerimiz derslerinde göstermek için video bulduklarında bana geliyorlardı ve hocam biz bunları niye açamıyoruz diye soruyorlardı. Sınıflardaki tahtalarda

problemi incelediğimde panel tip etkileşimli tahtaların bazı video dosyalarını desteklemediğini fark ettim. (C2_SAFT1)

Q136. Ben ve arkadaşlarım evimizdeki bilgisayarımızda açabilmemize rağmen bazı sayfalardaki içeriklere ulaşamıyoruz. Mesela dersten önce evde dersimde kullanılabilecek iyi aktiviteler bulmak için araştırma yapıyorum. Ama okula geldiğimde Milli Eğitim Bakanlığı'nın internet filtresi yüzünden bu aktiviteleri açamıyorum. (C2_SA1)

Q137. Uluslararası İlişkiler dersinde internet erişimi ile alakalı bir problem yaşadım. Konumuz 'Diplomasi'ydi ve ülkelerin birbirlerine karşı politikalarından bahsediyordum. Bunun için de farklı ülkelerin hükümetlerinin Suriye'deki durum hakkındaki pozisyonlarını gazetelere bakarak analiz etmek istedim. Ama birçok gazetenin ve derginin sitesini açamadık. Konuyla alakalı sadece birkaç habere ulaşabildik. İşte öğrenciler ülkelerin pozisyonları arasındaki farklılıkları kavrayamadılar. (C2_G2)

Q138. Aslında dönem sonunda EBA'daki örnek ve alıştırma sorularını çözerek tüm konuların tekrarını yaptım. Orada EBA'daki bir testten diğerine geçerken veya başka bir aktivite açarken internet hızının yavaş olmasından dolayı baya zaman kaybetmiştik. Yani bir sonraki testin açılabilmesi için çok fazla bekliyoruz. Bunun için de konu tekrarı yaptığımız derslerde soruları bitiremiyoruz. (C2_H1)

Q139. EBA sistemine girerken baya bir problem yaşıyoruz açıkçası. Bir kullanıcı adı ve şifresi kullanıyoruz girişte. Bence şifreyi girerken bir endişe oluşuyor. Şöyle ki, öğrencilerimiz kullanıcı adımızı ve şifremizi rahatlıkla panel tip etkileşimli tahtada görebiliyorlar. Aslında biz genellikle 'MEBBİS' şifremizi kullanıyoruz bunun için de. Sonuçta öğrenciler bizim 'MEBBİS' şifremizi görebilir ve 'MEBBİS' sistemindeki bilgilerimizi değiştirebilirler. Bizim için ciddi bir problem bu. (C2_G1)

Q140. EBA'ya girişte iki seçenek var. İlk olarak öğretmenler kendilerine tanımlı 'MEBBİS' kullanıcı adlarını ve şifrelerini kullanabiliyorlar, bir de EBA için özel kullanıcı adı ve şifre tanımlama seçenekleri var ve bu bilgileri sadece EBA'da kullanabilirler. Bu noktada baya sorunla karşılaştık açıkçası. Hocalarımız öğrencilerin önünde 'MEBBİS' şifrelerini yazıyorlar ve öğrenciler bu şifreleri

öğrenirlerse de sorunlar yaşanabilir. Öğretmenlerimiz de 'MEBBİS' şifresi yerine farklı bir EBA şifresi belirlemiyorlar. Bu onlara zahmetli geliyor çünkü. Yani onları EBA şifresi belirlemeleri hususunda uyararak bilgilendirdim ama çoğu öğretmenimiz yine de EBA şifresi kullanmadılar. Bunun yerine ısrarla 'MEBBİS' şifrelerini kullanmakta ısrar ediyorlar. (C2_SAFT1)

Q142. İlk başlarda elimdeki farklı yayınevlerinin sunumlarını kullanabilirim diye düşünmüştüm. Ama bu sunumları akıllı tahtaya aktarmayı denediğimde sunum üzerindeki nesnelerde değişiklik yapamadım. Yani nesneleri ayrı ayrı kullanmamıza izin verilmiyordu. Bunu yapabilmek için ise sunumdaki her nesneyi ayrı ayrı aktarmak zorundaydık ve sonra akıllı tahta yazılımına aktarabiliyorduk. Mesela sunum sayfasında bir yazıyla bir resim varsa ve ben akıllı tahta üzerinde onlarda her hangi bir vurgulama yapacaksam akıllı tahta yazılımı bunları ayrı olarak vurgulamama izin vermiyordu. Bunun yerine ben de her bir nesneyi ayrı ayrı boş bir sayfaya kopyalamak zorunda kalıyordum. Ama bu süreç de çok zaman alıcı oldu. İşte akıllı tahta yazılımının bu kısıtlaması bir zorluk olarak kabul edilebilir diye söyleyebilirim. (C2_G2)

Q143. Ders esnasında okulda elektrikler kesildiğinde öğretmenlerimiz elektrik kesintisinin derslerini aksattığı hakkında şikayetçi oluyorlar. Hatta bazı panel tip etkileşimli tahtalar hasar gördü. Yani akıllı tahtalar elektrik kesintileri yüzünden arızalandılar. (C2_SAFT1)

Q144. Bazı öğrenciler akıllı tahtaların kilitlerini açabiliyorlar ve izinsiz olarak tahtalara müdahalede bulunabiliyorlar. Açıkçası tahtaların kilitleri sağlam değil ve anahtarsız bile açabiliyorlar öğrencilerimiz. Bu bizim için sorun oluşturabiliyor. Çünkü öğrenciler boş derslerde ve teneffüslerde tahtaları açarak yüksek seste müzik dinlemek ve sakıncalı sitelere girmek gibi istenmeyen şekilde kullanabiliyorlar akıllı tahtaları. Bazen de akıllı tahtlar düzgün çalışmıyorlar bu kullanımlardan dolayı. (C2_T1)

Q145. Öğrenciler Milli Eğitim Bakanlığı'nın internet filtresinin yasakladığı sitelere ulaşabiliyorlar. İşte sakıncalı sitelere girerek oyun oynayabilmek için problemli

programlar kuruyorlar tahtalara. Öğrencilerin bu kullanımları da panel tip etkileşimli tahtların yavaşlamasına sebep olabiliyor. (C2_SAFT1)

Q147. Panel tip etkileşimli tahtalarda fiziksel bir problem olduğunda bazı hocalarımız fiziksel müdahalelerde bulunmak isteyebiliyorlar. Mesela öğretmenlerimizden birisi yetkili kişilerin müdahalesi edebilmesi için kilitli olan bir kısmı açmak istedi. Doğrusu bu kilidi yetkililer haricinde bir kimsenin açması yasak. Fakat bu öğretmen kilidi açıp tahtaya müdahale etmek için çok ısrarcı oldu. Tabi ki sorumluluğum gereği buna izin vermedim ama bu aramızda bir tartışmaya yol açtı da. (C2_SAFT1)

Q148. Ben sadece ders kitabını dijital halini bulabildim ve kullandım. Yani dijital kitap haricinde Biyoloji dersleri için başka bir içerik görmedim. EBA'da materyal varsa bile benim haberim yok açıkçası. (C2_B1)

Q149. Felsefe dersleri için içerik eksikliğimiz var. Aslında EBA'yı kontrol etmedim son zamanlarda ama bazı felsefecilerin biyografisi, bazı konularla alakalı birkaç video ve ders kitabının 'pdf'formatlı dijital versiyonu haricinde çok da bir şey yok. Bunları da kullandım ama derslerimiz için daha fazla kaynağa ihtiyacımız var. (C2_SAFT1)

Q151. Tarih dersleri için bazı haritaları kullandım derslerimde. Ama bence tarihteki savaşların bölgelerini göstermek için bu teknolojilerde açılabilecek animasyonlu haritalar hazırlanabilir. İşte farklı ülkelerin ordularının hareketlerini gösterebiliriz ve öğrenciler bu animasyonlu haritalar sayesinde daha iyi kavrayabilirler. Bazı tarih konuları için EBA'da böyle haritalar aradım. Sadece birkaç animasyon haritası buldum. Bu haritalar da lise öğrencileri için hazırlanmamıştı. Orduların hareketleri veya diğer olaylar iyi canlandırılmamış. (C2_H1)

Q152. Coğrafya dersleri için videolar ve fotoğraflar var. İşte EBA'ya giriyorum sonra da Coğrafya derslerini seçiyorum. Ama Coğrafya konuları bakımından bu materyaller çok kaliteli sayılamaz. Örneğin 'Gümrük' ile ilgili bir resim açmıştım ama çok alakasız çıktı doğrusu. Resimde konu ile alakasız şeyler vardı bir kadın ve kamyon gibi. Konu ile bağdaştıramadım ben onu. Sonuçta EBA'daki içerikler yeterli değil ve biz de kullanamıyoruz bunları. (C2_G1)

Q154. 12.sınıf öğrencileri üniversite sınavına hazırlanıyorlar ve çoğu derste de test çözüyorlar. Ama EBA'da bu 12.sınıflar için test yok yeteri kadar. (C2_M2)

Q155. Öğretmenlerimizin teknolojik seviyelerini bir anket ile ölçtük. Anketi İlçe Milli Eğitim Müdürlüğü gönderdi bize. Bu anketin sonucuna göre öğretmenlerimizin yarısı İl Milli Eğitim Müdürlüğü'ndeki iki haftalık hizmetiçi eğitme katıldılar. Diğer tarafta ankette iyi sonuç alanlar okulumuzda 5 günlük hizmetiçi eğitime katıldılar. Eğitimlerin ikisi de İlçe Milli Eğitim Müdürlüğü'ndeki 2 formatör öğretmen tarafından verildi. (C2_SAFT1)

Q156. Hizmetiçi eğitimler başlangıçta iyiydi diyebilirim. Ama derslerimizde bu teknolojileri nasıl kullanabileceğimizi öğrenemedik. Yani bu teknolojilerin genel olarak nasıl çalıştığını öğrensek de derslerde pratik uygulamalarını görmedik. (C2_B1)

Q157. İşin doğrusu eğitimlerde bu teknolojilerle alakalı birçok şey öğrendik. Lakin eğitimden hemen sonra yaz tatiline çıktık ve öğrendiklerimizi akıllı tahtalar üzerinde pratik edemedik. Bunun sonucunda da panel tip etkileşimli tahta ve yazılımı ile alakalı öğrendiklerimizi unutmuş olduk. Yani hizmetiçi eğitimler açısından bu bir sorun olarak kabul edilebilir. (C2_H1)

Q158. Eğitim bizim için zor olduğu için akıllı tahtanın ve programlarının kullanımını iyi öğrenmedik. Birçok konuyu anlayamadım doğrusu, çünkü çok az şey biliyorum zaten teknolojilerle alakalı. İşte daha düşük seviyelerde de anlatılmalı bence. (C2_T2)

Q159. Tabi ki en azından bir eğitim almış olduk ama eğitimler çok etkili olamadı. Öğretmenimizin bu teknolojilerle alakalı donanım açısından birçok şeyi öğrettiğini söyleyebilirim. Fakat özellikle akıllı tahta yazılımının nasıl kullanılacağını ve bu programla alakalı derslerde karşılaşabileceğimiz problemleri nasıl gidereceğimizi öğrenemedik. (C2_B1)

Q160. Bu teknolojilerin kullanışlı ve iyi olduğunu düşünsem de derslerimde kullanamıyorum bunları. Çünkü bizim için daha çok yeniler. Yani akıllı tahtaların

için henüz yeterli tecrübemiz yok. Son olarak yeterli bilgiye sahip olmamayı bir problem olarak söyleyebilirim. (C2_G1)

Q163. Okulumuzdaki çoğu öğrenci başarısız aslında. Bunun için de derslerle ilgili değiller, derse katılmıyorlar ve dersi dinlemiyorlar. Samimi olmak gerekirse biz de başarısız öğrenciler için ekstra bir çaba göstermek istemiyoruz. Mesela bu teknolojileri kullanmaya kalkarsam dersi kaynatmak için teknolojileri kullanırken yaşadığım tereddütlerden faydalanıyorlar. İşte öğrencilerin bu yapısından dolayı bu teknolojileri kullanma konusunda motivasyonum düşüyor sürekli.

Q164. Okuldaki birçok konuyla tek başıma ilgileniyorum. Bu teknolojilerle alakalı birçok yazı yazıp gönderdim diyebilirim. Hatta YEĞİTEK yetkilileri ile de görüştüm. Bu teknolojilerle alakalı bir problem olursa İl Milli Eğitim Müdürlüğü'ndeki yetkilileri bilgilendirdim. Yani okulumuzun yöneticileri çok ilgilenmiyorlar diyebilirim size. (C2_SAFT1)

Q165. Bu teknolojilerde bir problemimiz olduğunda sadece bir destek noktamız var. O da okulumuzdaki tüm problemlerle ilgilenip gerekli bilgilendirmeleri yapıyor. Fakat okulumuzda 40'tan fazla akıllı tahta var ve tüm bu tahtaların problemleri ile ilgilenmek çok zaman alıcı ve zor sadece bir insan için. Bu yüzden panel tip etkileşimli tahtada bir problemle karşılaştığımda Bilgisayar Öğretmenine ulaşmak çok uzun sürebiliyor yada ona ulaşamayabiliyoruz. Çünkü çok meşgul hocamız. Ben çok yoğun olduğu için ona danışacağım zaman bunun farkında oluyorum. (C2_T1)

Q166. Açıkçası bu teknolojileri kullanamıyorum ben. Zaten EBA'da yeteri kadar içerik de yok ve içerik aramaya zamanım da yok internette. (C2_G1)

Q167. Doğrusu farklı internet sitelerinden Coğrafya dersi için bazı materyaller bulabiliyorum. Ama bunlar çoğu zaman akıllı tahta programında açılmıyorlar. Ben de evde bunları programa uygun hale getirmeye uğraşıyorum. Ama evde de bir insan olarak farklı yükümlülüklerim var ve buna zaman ayıramıyorum ben. Yani derslere içerik hazırlanmak için yeterli zaman bulamadığımı söyleyebilirim. (C2_G2)

Q168. Normalde biz sene boyunca konuları yetiştiremiyoruz zaten. Yani zamanımız kısıtlı. Bir de teknolojileri kullanalım dersek son ünitelere geçemeyiz bile. Bunun için ben bu teknolojileri kullanmıyorum zaman kaybetmemek adına. (C2_B1)

Q169. İnternet hızının yavaşlaması ve arızalar derslerimizde zaman kaybetmemize yol açıyor. Panel tip akıllı tahtayı açtığımızda da derste konuyu bitiremiyoruz açıkçası. (C2_E2)

Q170. Baktığınızda akıllı tahtaları kullanabilmemiz için içerikler yetersiz. İşte birçoğu zaten basılı materyalden farklı değil. Hatta özel yayınevlerindeki metinlerin okunması şeklindeler çoğu. Öğrencilerin karşısında akıllı tahtayı kullanmamız için uygun değiller diyebilirim buradan yola çıkarsak.

Q171. Bir sorun yaşadığımızda muhatabımız kim, kim destek sağlayacak ve kim bizi bilgilendirecek bilmiyoruz. En azından ben okulumuzda biri var mı bilmiyorum. Tek bildiğim şey akıllı tahtalarla alakalı bir problemimiz olduğunda tek başvurabileceğimiz kişi formatör öğretmenimiz. (C2_T1)

Q173. Bir öğretmenimiz bir sınıfın duvarındaki USB bağlantı noktalarının çalışmadığını iletti. Öncelikle sınıfa gittim, panel tip etkileşimli tahtaya cihaz bağlamaya çalıştım ama bağlantı noktaları tam olarak çalışmıyordu. Yeterli zaman da olmadığı için tahtaya ve bağlantı noktalarına müdahale edemedim. Ders bittikten sonra sınıfa tekrar gittim ben de. Problemi detaylı olarak inceledim ve problemin sebebini buldum. Yani bağlantı noktalarının kablosu yerinden çıkmış, bunun için de tüm USB bağlantıları tam olarak işlem görmüyordu. Kablo bağlantıları panel tip etkileşimli tahtanın sol kısmındaki küçük kapağın altında olduğu için müdahale etmek zordu. İşte ben de aynı bir teknisyen gibi elde tornavida bu kapağı açtım ve bu sınıftaki bağlantı problemini tamir ettim. (C2_SAFT1)

Q174. Bazen de EBA'da aradığımız materyali bulamıyoruz. Bu gibi durumlarda bilgisayar öğretmenimiz içeriklere yönlendiriyor bizi. Mesela EBA sistemine nasıl gireceğimizi ve dersimizle alakalı içerikleri nerede bulabileceğimizi gösteriyor bize. (C2_T2)

Q176. Bazen öğretmenlerimiz çok basit problemler için uğraşmasalar da, panel tip etkileşimli tahta ve EBA ile ilgili çoğu problemini çözmeye uğraşan hocalarımız var. Eğer onlar da problemlerini çözemiyorlarsa beni bilgilendiriyorlar. (C2_SAFT1)

Q177. Şuanda 12.sınıflar için yeterli kaynak yok. Başka kaynaklardan temin etmeye çalıştık biz de. Genellikle ders için internette arama yaptım ben. Ama istemediğimiz resim ve reklamlarla da karşılaşabiliyoruz. İşte derste ekstra bilgiye ihtiyaç duyduğumuzda bunu planlayamıyoruz. Bu gibi durumlarda öğrenciler görmesinler diye sakıncalı kısmı gizlemeye çalışıyoruz. Yine de derslerimde ekstra bilgi verebilmek için çeşitli internet sitelerinden faydalanıyorum. (C2_T1)

Q178. Okulumuzun Kimya öğretmenleri Kimya dersleri için benden içerik talebinde bulundular. Onlara içerik sağlayamasam da onlar buldukları özel yayınevlerinin içeriklerini bana getirdiler. USB belleklerinde getirdikleri içerikleri Kimya laboratuvarındaki panel tip etkileşimli tahtaya yükledim ben de. (C2_SAFT1)

Q179. Bir sınıfta akıllı tahtanın ekranında bir sıkıntı olmuştu. Tahtanın bir bölgesinin dokunmatiği çalışmıyordu. Yani ekrana dokunduğumda akıllı tahta herhangi bir tepki vermiyordu. Fakat bu dersle ilgili özel bir aktiviteyi tüm sınıflardaki akıllı tahtalarda kullanıyordum ve bu sınıfta da kullanmam gerekiyordu. Bunun için de aktiviteyi açtım, sonra da ekranda yerini değiştirerek tıklamam gereken yere göre ayarladım. İşte tıklayacağım kısmı aktif yere çekerek o sınıfta da aktiviteyi tamamlayabildim. (C2_T1)

Q180. Ben tüm sınıflarda akıllı tahta ile birlikte laptopumu da kullanıyorum. Bu şekilde çok yakından kullanmak zorunda da kalmıyorum ve bilgisayarımdan ekranı rahatlıkla kontrol edebiliyorum. Bir de akıllı tahtanın kısıtlamasından dolayı çalışmayan yayınevlerinin içeriklerini bile kullanabiliyorum.(C2_M1)

Q181. Bence öğrenciler akıllı tahtaları teneffüslerde kullanabilirler, bunda bir sakınca yok. Ama okul idaresi ders dışında akıllı tahtların kilitli tutulmasını istiyor. Benim derslerim arasında ben öğrencilerin akıllı tahtaları kullanmasına müsaade ediyorum, dersten sonra da kilitliyorum. Yine de öğretmenler toplantısında bu problem için bir çözüm önerisinde bulundum. Akıllı tahtalar teneffüslerde kilitlenmemeli dedim ve öğrencilerin bunları kullanmasında bir sakınca olmadığını

vurguladım. Fakat önerim okul yönetimi tarafından kabul edilmedi öğretmenler toplantısında. (C2_C2)

Q183. Bu teknolojilerle alakalı her konuyla ilgilenmeme rağmen YEĞİTEK'teki yöneticiler okulun bilgisayar öğretmeni olarak benimle iletişime geçmiyorlar açıkçası. Ama okulumuzda karşılaştığımız problemleri ve taleplerimizi YEĞİTEK'e yazıyorum ben yine de. (C2_SAFT1)

Q184. Bir sınıfta akıllı tahta düzgün çalışmıyordu. Yani dokunmatik ekran özelliği ve kalibrasyonu problemliydi. Bu problemi Bilgisayar Öğretmenimize anlattık, o da YEĞİTEK yetkililerini bilgilendirdi. Birkaç hafta sonra kalibrasyon problemimiz çözüldü. Tahminimce YEĞİTEK'in yönlendirmesiyle teknik servis gelip çözdü. İşte bunu YEĞİTEK'in çözümü olarak sayabilirim. (C2_T1)

Q185. Derste akıllı tahtada konumuzla alakalı içerik ararken bazen öğrencilerimiz için sakıncalı olabilecek durumlarla karşılaşabiliyoruz. Uygun olmayan resim yada reklam açma gibi riskleri ortadan kaldırmak için de akıllı tahta yazılımının galerisinde EBA'dan arıyorum resimleri. Böylelikle de YEĞİTEK'in EBA'ya yüklediği içerikler sayesinde sakıncalı içeriklerle karşılaşmamış oluyorum. (C2_H1)

Q186. Katıldığım hizmetiçi eğitimde hocamız akıllı tahtanın genel kullanımını öğretti, eğitimin amacı ve bu teknolojilerin nasıl kullanılabileceği ile ilgili YEĞİTEK'in hazırladığı sunumları gösterdi. Bir de akıllı tahta programı anlatıldı eğitimlerde. Ben bu eğitimlerde bu teknolojiler için gerekli birçok bilgiyi edindiğimi söyleyebilirim. (C2_G2)

Q187. Hizmetiçi eğitimin uygulama kısmı bizim için yetersizdi, çünkü sadece bir gün pratik uygulama yapma fırsatı bulabildik. Böyle olunca da bu teknolojileri kullanmak için ihtiyaç duyduğumuz bilgi ve becerileri edinemedik. (C2_M2)

Q188. Aslında okulumuzda teknoloji açısından yeterli öğretmenlerimiz var. Ama ben ve bazı arkadaşlarım eksiğiz. Bunun için de rezil olmaktan çekindik, çünkü çok sık bir şeyler sorduğumuzda bizi küçümseyebiliyorlar diye düşünüyorum ben. İşte bu yüzden sadece yakın arkadaşlarımdan yeterli bilgi ve becerisi olanlardan yardım istiyorum. (C2_E2)

Q189. Öğrencilerden yardım almak sınıftaki öğretmenin otoritesi açısından uygun olmasa da, gözlemleyebildiğim kadarıyla öğrencilerimiz bazı öğretmenlere bu teknolojileri kullanırken karşılaşılan sorunlarda yardımcı oluyorlar. Çünkü yeni kuşaklar bu teknolojiler için daha bilgili oluyorlar, zaten bilgisayarla da büyüyorlar. İşte bu teknolojileri daha iyi biliyorlar ve basit sorunları çözerek sınıfta öğretmenlere yardımcı oluyorlar. Aslında bu kötü bir şey değil, fakat öğretmenin otoritesini olumsuz etkileyebiliyor. (C2_G2)

Q190. Bu teknolojileri iyi kullanmak için biz okulumuzdaki diğer öğretmenlere göre daha avantajlıyız, çünkü İngilizce dersler için özel bir yayınevinin paket yazılımı yüklendi. Böyle olunca da biz derslerimizde kaynak sıkıntısı yaşamadık. Yani özel yayınevleri sayesinde bu problemi aştık diyebilirim. (C2_E1)

Q191. Panel tip etkileşimli tahtanın teknik servisinin çağrı merkezi numarasını verdiler YEĞİTEK'ten. Aslında teknik servisin müdahalesinin gerektiği durumlarda bu numarayı arıyoruz ve sisteme bir arızayı bildiriyoruz. Yani teknik servis sistemine kayıt yaptırıyoruz sorunumuzu. Sonra problemimizi değerlendirip uzaktan çözülebilecek bir konu ise telefonda bizi yönlendiriyorlar. Mesela bir sınıftaki akıllı tahtanın bağlantı noktalarının çalışmadığını belirttiğimde duvardaki portları kullanabileceğimizi söylediler. Ama problemimiz daha ciddiyse veya teknik servisin fiziki müdahalesini gerektiriyorsa telefonda çözülmüyor problemimiz tabi ki de. Bu noktada okula ne zaman gelip problemi çözecekleri konusunda da bir belirsizlik var. Yani biz telefonla haber verdikten çok çok sonra geldiler okulumuza. Şunu söyleyebilirim ki ilettiğimiz hiçbir probleme bir aydan daha az sürede gelip çözmediler. (C2_SAFT1)

Q192. Panel tip etkileşimli tahtanın dokunmatik sensörlerinin tebeşir tozundan etkilenmemesi için teknik servis bize karatahtanın kullanılmamasını önerdi. Ama bazı öğretmenlerimiz dijital kısmı da karatahta kısmını da tebeşirle kullanmak istiyorlar ve bazı sınıflardaki akıllı tahtaların dokunmatik ekranında problem oluyor. İşte çözemediler bu problemimizi (tebeşir kullanımını). (C2_SAFT1)

Q193. Bu teknolojilerle alakalı tüm konularda Bilgisayar Öğretmenimizi öğretmenlerimize destekçi olması için görevlendirdik. Öğretmenlere de bu

teknolojileri kullanırken ne zaman desteğe ihtiyacınız olursa Bilgisayar Öğretmenimiz yardımcı olacak dedik. (C2_SA1)

Q195. Şöyle bir şey yaşamıştım, PowerPoint'te bir sunum göstermek istedim ama panel tip etkileşimli tahtadaki ofis programı bazı görselleri göstermeme izin vermedi. Yani sunumu açamadım. Açamadığımızda ne yapabiliriz ki? Öğrencilere kitaplarını açmalarını söyledim ve klasik yönteme geçtik. Dersin sonuna kadar da anlatarak devam ettik. (C2_G2)

Q196. Akıllı tahtayı kullanırken birkaç kere dokunmatik ekran arızalandı ve o derslerde akıllı tahtayı kullanamadık. Bu gibi durumlarda teknolojik problemler için moralim bozuluyor açıkçası. Yani tam öğrencilere bu teknolojilerle iyi bir ders anlatacağım diye plana yapıyorum, önceden de bu teknolojilerde hazırlanıyorum. Beklenmedik bir problemle karşılaşıyoruz ve teknolojileri kullanamıyoruz. Sonra da plan dışında dersi nasıl devam ettireceğim derken bir sürü zaman kaybediyoruz. Ama bu problemler yüzünden teknolojileri kullanmaktan vazgeçmeyeceği. (C2_T1)

Q197. Bence eğitim daha uygulamaya dönük olmalıydı. Yani bu teknolojileri derste nasıl kullanacağımızı gösterebilirlerdi. Bazı ufak örnek uygulamalar gösterebilirlerdi mesela. (C2_G2)

Q198. Öğretmenlerin teknolojik seviyelerini belirlemek için bir anket yaptı YEĞİTEK okulumuzda. Bu anketin sonucunda da yüksek sonuç alan öğretmenler bir haftalık eğitime katılırken düşük sonuç alan öğretmenler 2 haftalık eğitim aldılar. Eğitimin sonucunda 2 haftalık eğitim alması gereken bazı hocalar bile 1 haftalık eğitime katıldılar. Yani bu anket öğretmenlerin teknolojik bilgi ve becerilerini ölçemedi. Aslında YEĞİTEK öğretmenlerin teknolojik seviyelerini daha iyi belirlemeli ve öğretmenler kendi seviyelerine uygun hizmetiçi eğitime katılmalı. (C2_SAFT1)

Q199. YEĞİTEK öğretmenlerin branşlarına göre ayrı eğitimler hazırlamalı. Her ders için neler yapabileceğimizi gösterebilirler. İşte Coğrafya öğretmenleri ayrı bir eğitim, Tarih öğretmenleri ayrı, Matematik, Fizik gibi ayrı ayrı eğitimlere katılabilmeliler. Mesela Tarih öğretmenlerine 'İstanbul'un Fethi' konusunu bu teknolojilerle nasıl anlatabileceklerini gösterebilirler. (C2_G2)

Q200. Bence bir haftalık eğitim bizim için yeterli olmadı. Tam biz panel tip etkileşimli tahtayı kullanmayı öğrendik, nasıl çalışabileceğini kavradık derken çok fazla uygulama yapamadan hizmetiçi eğitim bitti. İşte bu yüzden eğitimler daha uzun sürebilir. İşte en az 2 hafta olabilir ve derslerimizde de nasıl kullanabileceğimizi öğrenebiliriz. (C2_P1)

Q201. FATİH Projesi hizmetiçi eğitimi özellikle kurulan teknolojilerle alakalı bilgi ve beceriler bakımından bize yeterli gelmedi açıkçası. Çünkü eğitimi aldığımızda bu teknolojiler bizim için çok yeniydi. Bundan dolayı da eğitimden yararlanamadık. Bu teknolojilerle neler yapabileceğimizi ve daha farklı şeyler bilmiyoruz. Bu yüzden değişen koşullara ve gelişmelere göre bu eğitimler tekrarlanmalı ve periyodik olarak hizmetiçi eğitimlere birkaç kere daha katılabiliriz. Bence bu teknolojileri kullanacak öğretmenler olarak bu eğitimler bizim için çok önemli, böylece bu teknolojiler eğitim sistemimiz için daha yararlı olabilir. (C2_G1)

Q202. Hizmetiçi eğitimi biz yaz tatilinden önce aldık ve akıllı tahta üzerinde yazılımı uygulama yapma imkanı bulamadık. Bunun için de öğrendiğimiz çoğu şeyi unuttuk. YEĞİTEK bize bunları unutmamamız için ek eğitimler vermeli ve bu eğitimden sonra da bu teknolojileri uygulama fırsatı bulabiliriz. (C2_H1)

Q203. Öğretmenlerin EBA'da içeriklere nasıl ulaşabileceği ve bu teknolojileri için kendi içeriklerini nasıl geliştirebilecekleri hizmetiçi eğitimlerde verilmeli. (C2_SA2)

Q205. Akıllı tahtada birçok harita kullansak da bu haritalar normal haritaların sadece taranmış versiyonu. Gerçi animasyonlu haritalar olsa da animasyonları çok yetersiz. Yani kaliteli animasyonlu haritalar gibi farklı e-içerikler olmalı. Bu haritalarda savaşlar daha iyi gösterilebilir. Mesela orduların yerleri ve nasıl hareket ettikleri savaşın oluşuna göre canlandırılabilir. Bir de EBA'da Tarih konularıyla alakalı daha fazla video olmalı. (C2_H1)

Q206. Akıllı sınıf teknolojileri için 'Zenginleştirilmiş e-kitaplar' hazırladığını duydum YEĞİTEK'in ve bunlar interaktif aktiviteler, videolar ve alıştırmaları kapsayacakmış. Bence bu 'Zenginleştirilmiş e-kitaplar' en kısa zamanda EBA'ya yüklenmeli. (C2_SAFT1)

Q208. Yöneticiler öğrencilerin seviyelerine daha uygun içerikler sağlamalı. EBA'daki Biyoloji dersi için olan içeriklerden de kullandım ama bunların çoğu çok basit şeyler. Yani bu e-içeriklerin ilköğretim öğrencileri için hazırlanmış olduğunu söyleyebilirim. Ama öğrencilerimiz için yeterli içerik bulamıyoruz EBA'da. İşte bundan dolayı EBA sitesine öğrencilerimize daha uygun e-içerikler eklenmeli. (C2_B1)

Q209. EBA'da daha güvenilir örnek ve alıştırma soruları olmalı. Yani EBA'da Matematik kısmından birkaç soru açtım, öğrencilere de gösterdim. Ama bu soruların bazılarının yanlış olduğunu tespit ettim. Bundan sonra da EBA'daki içerikleri kullanmaktan vazgeçtim. Çünkü öğrencilere göstermeden önce bu soruların doğruluğunu kontrol etmem gerekiyor. EBA'daki soruların yerine elimdeki soruları kullanıyorum. Sonuçta EBA'da daha uygun ve güvenilir kaynaklar olmalı. (C2_M2)

Q210. EBA'daki içeriklerin çoğu farklı yayınevleri tarafından geliştirilmiş ve farklı içerikler. Böyle olunca da bu farklı içerikleri kullanmaya alışmak zor oluyor. İşte tam bir yayınevinin içeriğini kullanmaya alıştım derken bir diğer yayınevinin içeriğini kullanmaya kalktığımda zorlanıyorum. Farklı yayınevlerini hazırladığı aktiviteler tamamen farklı bir mantıkla geliştirilmiş olabiliyor. Bu yüzden de kullanamıyorum birçoğunu. Çünkü çok farklı hazırlanmış olabiliyorlar. İşte EBA'daki içeriklerin standartları olmalı ki kolaylıkla kullanabilelim onları (C2_G1)

Q211. Akıllı tahta yazılımındaki haritaların sınıflandırması bakımından akıllı tahtlarda galeriden sayısız haritaya ulaşabiliyoruz. Evet, EBA'ya haritalar eklenmiş, bunların bazılarını derslerimizde kullanıyoruz. Ama Tarih ve Coğrafya dersleri için eklenen çok fazla harita arasından istediğim haritayı bulmak çok zor olabiliyor. İstediğimiz haritayı da seçerken derste çok fazla zaman kaybedebiliyoruz. Bunun yerine bu haritalar derslere göre, siyasi veya fiziki harita türlerine göre, haritaların ölçeklerine göre ve gösterilen yerlere göre ülkeler veya kıtlar şeklinde sınıflandırılabilir. (C2_G2)

Q212. Öğretmenlerimiz için EBA'nın yapısı çok karmaşıktı ve bu karmaşıklıktan dolayı da EBA çok yavaş işliyordu. Böyle olunca da öğretmenlerimiz genellikle USB belleklerinden getirdikleri içerikleri yada diğer sitelerin içeriklerini kullanıyorlar.

Ama bu da virüs, sakıncalı içerikler gibi problemlerle karşılaşılmasına yol açıyor. Bu yüzden EBA'daki içeriklerin ulaşılabilir olması lazım, bir de EBA sistemi hızlı çalışmalı. (C2_SA1)

Q214. Öğretmenler toplantısında kilit problemimiz için bir öneride bulundum. Zaten öğrenciler kilitli olan tahtaları kolayca açabildikleri için dersler dışında da akıllı tahtaları kilitlemek zorunda olmadığımızı düşündüğümü söyledim. Yani bir şeyi yasakladığınızda aslında onu öğrenciler için daha cazip hale getiriyorsunuz. Ama tahtaları kilitlemeyip öğrencilere bunları derslerde ve teneffüslerde kullanmaları için izin verebiliriz. Hatta her sınıfta bir veya birkaç öğrenciyi bu kullanımlardan sorumlu kılabilir ve diğer öğrencilerin sakıncalı kullanımlarını kontrol etmeleri için görevlendirebiliriz. Böylece öğrenciler derslerde de, teneffüslerde de içeriklere ulaşmış olurlar. (C2_T1)

Q216. Uzaktan destek sistemi oluşturulabilir ve bu destek sistemi üzerinden çözümlere ulaşabiliriz. Hatta bu EBA'da olabilir, Türkiye'nin her yerindeki diğer öğretmenlerin çözümlerine de ulaşabiliriz. Bence tüm öğretmenler için çok faydalı olur. Çünkü bazı problemleri çözemiyoruz ve zaman kaybediyoruz. Ama biz bir problemimize bu sistem sayesinde, yada bir YEĞİTEK yetkilisinden, yada bize yardımcı olabilecek uzaktaki bir öğretmenden çözüm bulabilirsek zaman kaybetmemiş oluruz. (C2_T1)

Q218. Panel tip etkileşimli tahtalarda çok fazla içerik olması yavaşlattığından her talep edilen içeriği panel tip etkileşimli tahtlara yüklemiyorum. Bunun için de sadece bir dersin tüm öğretmenleri tarafından kullanılacaksa yüklüyorum. Bir de bir Kimya öğretmenimiz Kimya laboratuvarındaki akıllı tahtaya bazı içerikler yüklememi rica etmişti, onu yükledim, çünkü o akıllı tahtayı zaten sadece o öğretmenimiz kullanıyor. (C2_SAFT1)

Q219. Okuldaki internet filtresinden dolayı gösterecekleri siteleri açamayınca, bazı öğretmenlerimiz artık internetten içerik göstermek istemiyorlar bu teknolojilerle. Bunun için Milli Eğitim Bakanlığı öğretmen ve öğrencilerin kaynaklara ulaşabilmelerini sağlamalı. Çünkü onlar hangi sitelerin zararlı yada yararlı olacağına

karar verebilirler. Eğer sakıncalı içerikler varsa açmazlar zaten siteleri onlar da. (C2_SA1)

Q220. Bence proje yöneticileri ülkedeki diğer okullar için hangi teknolojilerin kurulması gerektiğini belirlemeye çalışıyorlar. Bunun için de değişik akıllı tahtalar ve projeksiyon cihazları gibi farklı teknolojiler kurdular. Bunlarda birini seçebilmek adına da sürekli sınıflardaki teknolojilerin iyi ve kötü yanlarını sordular. (C2_T1)

Q221. Projenin ilk pilot okulundaki öğretmenlerden farklı teknolojilerin avantajlı ve dezavantajlı noktalarını öğrenmek için dönütler aldık. Aslında okullardaki sınıfların çoğuna sadece projeksiyon cihazı kurmaya karar vermiştik. Projenin başındaki planımıza göre her okulda sadece bir yada iki sınıfa akıllı tahta kuracaktık. Fakat projenin ilk pilot okulundaki öğretmenlerden aldığımız görüşler neticesinde planımızı değiştirdik. Bunun için de bu okulda deneyebildiğimiz kadar farklı teknolojiyi denemek istedik. Bir diğer deyişle bu okul FATİH Projesinin deneme okulu oldu açıkçası. İşte bu okul için birçok teknoloji belirlemiş olduk. (PM1)

Q222. Okullardaki kötü akıllı tahta kullanım tecrübelerinden de faydalandık. Yani bu okullardaki akıllı tahtalar niye kullanılmamış bunları araştırdık. Bu tahtalar için bazı sebeplere ulaştık. Bir de ilk pilot okulunda bazı anketler uyguladık ve panel tip etkileşimli tahtayı da öğretmenlerin bu anketlerde belirttikleri görüşlere göre tasarladık. Mesela ilk pilot okulunda öğretmenlerin belirttiği gölge ve kalibrasyon problemlerini engellemek için panel tip etkileşimli tahtada LCD panel kullandık. (PM1)

Q223. Öğretmenler panel tip etkileşimli tahtaya başka bir bilgisayar bağlamak zorunda kalmadan akıllı tahtayı kullanabilsinler diye panel tip etkileşimli tahtaya bir anakart entegre ettik. Yani, sınıfa girdiklerinde akıllı tahtayı açacaklar ve başka bir işlem gerektirmeden tahta kullanıma hazır hale gelecek. İşte, öğretmenlerimiz için daha kullanışlı bir teknoloji sağlamış olduk. (PM2)

Q224. Panel tip etkileşimli tahtada bir anakart olduğu için YEĞİTEK olarak her öğretmene bir laptop vermeyeceğiz ve öğretmenler panel tip etkileşimli tahtayı hem akıllı tahta hem de bilgisayar olarak kullanabilecekler. (PM5)

Q226. Sınıflara kurulacak panel tip etkileşimli tahtalara yönelik ayarlamalar yapmak için okullardaki sınıfların, laboratuvarların ve öğretmen odalarının fiziki durumlarını talep ettik. Bu analizler sonucunda da fiziki durumları yeterli olmayan sınıflar için bazı düzenlemeler planladık. Bir de okullardaki internet durumunu inceleyerek internet bağlantısı bakımından da mevcut durumlarını belirledik. Böylelikle internet altyapılarına göre okulları karasal, uydu, fiber bağlantı ve GSM altyapısı olarak gruplandırdık. Sonra da okullardaki internet altyapılarının eksikliklerini tüm altyapı durumları için belirlemiş olduk. (PM2)

Q227. Okulumuzda kaç sınıf, kaç laboratuvar ve başka hangi salonların olduğu bilgisini aldılar bizden. Verdiğimiz bilgilere göre de okulumuzdaki tüm sınıflara, laboratuvarlara ve öğretmen odasına panel tip etkileşimli tahta kurdular. Bir de bu dönem boyunca okulumuzda daha fazla teknolojiye ihtiyacımız olup olmadığını sordular. (C2_SAFT1)

Q229. YEĞİTEK okulumuza farklı teknolojiler kurdu. Bence öğrenciler ve öğretmenler için en iyi hangisi olacak onu belirlemeye çalışıyorlar. Bunun için YEĞİTEK'ten bazı yetkililer okula geldiler ve hangi teknolojilerin daha iyi olduğunu bizlere sordular. Cevaplarımıza göre de gerekli düzenlemeleri yapacaklarını söylediler. (C1_T1)

Q230. Projeksiyon cihazı, değişik akıllı tahtalar ve panel tip etkileşimli tahta gibi farklı teknolojilerin kullanımını takip ettik. Sonra da yetkililerimiz projemizin ilk pilot okulundaki öğretmen ve idarecilerle görüştüler. Yani bu okuldaki farklı teknolojilerin kullanımı hakkında öğretmenlerin algılarını ölçtük diyebilirim. İşte çoğu öğretmen bize panel tip etkileşimli tahtanın daha iyi ve okullarına kurulanlar arasında en kullanışlı teknoloji olduğunu belirttiler. (PM1)

Q231. FATİH Projesinin deneme okulunda uyguladığımız anket sınıflardaki teknolojilerin olumlu ve olumsuz yanlarını, kullanım kolaylıklarını, faydalarını ve içerikleri kapsıyordu. (PM2)

Q233. Hizmetiçi eğitimi veren hocamızın e-maille gönderdiği bir memnuniyet anketi vardı. İşte bu ankette hizmetiçi eğitimin yeterliliğiyle alakalı maddeler vardı. Hocamız da eğitim ile alakalı bilgi almak istedi. (C2_SAFT1)

Q234. Okula sadece teknisyenler gelip kurdular ve gittiler diyebilirim yani. Teknisyenlerden başka okula her hangi bir yetkili gelmediği gibi proje yetkilisi olarak da kimse bizimle iletişime geçip bu teknolojiler hakkında ne düşündüğümüzü sormadı. (C2_T1)

Q235. Aylık olarak YEĞİTEK yetkilileri okulumuza geldiler. Kendileri açısından bu teknolojileri kullanmamızın önemini aktardılar. Okuldaki teknolojiler hakkında bize ekstra bilgiler verdiler ve bu teknolojiler hakkındaki görüşlerimizi aldılar. Hatta bu teknolojileri kuran teknisyenler tanıtıcı seminerler verdiler. (C1_MU1)

Q236. Bence proje yöneticileri okullardaki öğretmenlerle yeteri kadar iletişime geçmiyorlar. Örneğin hizmetiçi eğitime katılmadan önce bize herhangi bir bilgi verilmedi. Yani bu eğitim niye düzenleniyor, ne öğreneceğiz eğitimde hiçbir şey bilmiyorduk. Eğitime katılmadan önce biraz endişelendim diyebilirim hani. (C2_G2)

Q237. Okulumuza gelen YEĞİTEK görevlilerinden daha fazla eğitim talebinde bulunsak da taleplerimiz karşılanmadı. Bence hizmetiçi eğitimler öğretmenlerimize bu teknolojileri derslerinde kullanmaları için çok büyük katkı sağlayabilir. (C1_SA2)

Q238. Aslında öğretmenlere eğitim vermek ve derste kullanmalarına yönelik desteklemek için yeterli zamanım yok. Çünkü aynı bir teknisyen gibi teknik problemlerle uğraşıyorum. Ama bence bir Bilgisayar Öğretmeni olarak öğretmenlere bu teknolojileri derslerine entegre etmeleri hususunda destek sağlamam gerekiyor. Yani YEĞİTEK bizi öğretmenlerin bu teknolojileri derslerinde nasıl kullanabileceklerine yardım etmemiz için görevlendirmeli, okuldaki teknolojileri tamir etmemiz yerine. (C2_SAFT1)

Q239. Projenin ilk pilot okulunda çok farklı firmanın değişik teknolojileri vardı. Bunun için de bu okulda teknik destek sağlamada bazı sorunlar yaşandı. Bundan sonra panel tip etkileşimli tahtayı okullara kurulacak teknoloji olarak belirledik ve yetkili firma ile de okullardaki panel tip etkileşimli tahtalara sağlanacak teknik servis desteği konusunda bir anlaşma sağladık. Böylelikle ilk pilot okulundaki gibi problemlerle karşılaşmayacağız. (PM2)

Q240. 9, 10 ve 11.sınıflarda Matematik dersi müfredatı çok yoğun ve Matematik öğretmenleri geçen sene konularını bitiremediler. Bu teknolojiler kurulduktan sonra Milli Eğitim Bakanlığı Matematik müfredatını gözden geçirerek konuların bu teknolojilere göre nasıl işlenebileceğiyle alakalı düzenlemeler yapabilir. (C2_M2)

Q241. Eskiden bir derste sadece birkaç soru çözebilirken, şimdilerde akıllı tahtanın yardımıyla bir derste daha fazla soru çözebiliyorum ve müfredatı daha düzenli takip edebiliyorum. (C1_M1)

Q242. Genç öğretmenler okulun geleneksel durumundan hoşnut olmayarak bilgi ve iletişim teknolojilerini derslerinde kullanmak isteseler de, yaş olarak daha ileri olanlar ve tecrübeli öğretmenlerimiz ise var olan durumdan memnunlar ve kullanmak istemediklerini söylüyorlar. (C2_SA1)

Q243. Eğer derslerimde kullanacaksam dersten önce e-içeriklerimi hazırlamalıyım. Amma velakin ne okulda ne de evde yeterli zamanım yok. Çünkü evdeyken de ev işleri ve bebeğimle ilgilenmek zorundayım. Bunun için de başlangıçta bu teknolojileri kullanmak istesem de derslerimi klasik yöntemlerle işlemeyi tercih ediyorum. (C2_G2)

Q244. EBA'daki içerikler doğru düzgün değiller. Mesela işte sadece Biyoloji kitaplarının dijital hallerine ulaşabiliyorum ve bu kitaplar da zaten normal kitaplarla aynı. Başlarda derslerimde kullanmaya çalıştım ama beklediğim gibi bir avantajını görmedim açıkçası. Bundan dolayı da kitapları kullanmayı da bıraktım ve akıllı tahtayı derslerimde kullanamamayı tercih ediyorum. Çünkü daha farklı içerikler yok zaten kitaplar dışında. (C2_B1)

Q245. EBA'da Tarih dersi için sayısız haritalar var, sıklıkla da kullanıyorum onları. Bu sayede bir sınıftan diğer sınıfa harita taşımak zorunda kalmıyorum artık. Aslında çok fazla içerik var EBA'da, özellikle de Tarih dersi için haritaları göze aldığımızda, ama sınıflandırma iyi yapılmamış. Bundan dolayı da bazen kullanmak istediğim haritaları bulamıyorum burada. (C2_H1)

Q246. Hizmetiçi eğitim sadece bir seferlik yapıldı zaten, o da bir saat. Pratik uygulama bakımından bir şey görmedik. Bence birbirini takip eden ve kapsayan

eğitimler verilebilir yıl boyunca. Hatta bu eğitimlerin bazıları çeşitli derslere özel olabilir. Örneğin Kimya öğretmenleri için Kimya konularının bu teknolojilerle nasıl öğretilebileceğinin gösterildiği eğitimler ayarlanabilir. (C2_C1)

Q247. Manevi ödüller ve teşvikler daha etkili olabilir öğretmenler için. Mesela İlçe Milli Eğitim Müdürlüğü bu teknolojileri derslerinde başarılı şekilde kullanan öğretmenlere plaket verebilir. Hatta bu plaketler düzenlenen bir törende verilebilir. (C1_E3)

Q248. Manevi ödüller benim için bir şey ifade etmiyor, bu ülkedeki çoğu öğretmen için olduğu gibi. Öğretmenlerin maaşları çok düşük, bu yüzden de birçok öğretmen ekstra bir ödeme alamadıkları için bu teknolojileri kullanmayı tercih etmiyorlar. Yani proje yürütücüleri benden bu teknolojileri kullanmamı talep ediyorlarsa bana ekstra ücret ödesinler o zaman (C2_C2)

Q249. Eğer YEĞİTEK daha önceden bahsedilen dizüstü bilgisayarları yada tabletleri verirse bu teknolojileri derslerimde kullanmam açısından teşvik edici olabilir bu. (C2_M2)

Q250. YEĞİTEK'teki yöneticiler bizim fikirlerimizi sormuyorlar hiç, sadece kendi aralarında kararlaştırıyorlar her şeye. Bu teknolojileri okulunuza kuruyoruz diyorlar ve bunları kullanmamız gerektiğini belirtiyorlar, hepsi bu. (C1_M2)

Q251. Bu teknoloji çağında öğretmenler olarak yeni teknolojileri kullanmamız gerekiyor zaten. Diyeceğim, öğretmenler bu teknolojilerin nasıl kullanacağını bilmeliler ve ders işlerken de kullanmalılar. Dahası öğrencilerimize de nasıl kullanacaklarını öğretmenliyiz. Böylelikle öğretmenlik için en önemli yeteneklerden birisinin yeni teknolojik aletleri kullanmak olduğunu söyleyebilirim. (C1_E2)

Q252. Milli Eğitim Bakanlığı yöneticileri Türkiye'de sınıflara yeni teknolojiler kurduk diyebilmek için bu projeyi yürütüyorlar. Bizim problemlerimizin farkında değiller, bu teknolojiler için nelere ihtiyacımız var bilmiyorlar. Böyle olunca da bu teknolojileri kullanmak istemiyorum ben. (C2_T2)

APPENDIX L

IN-SERVICE TRAINING PROGRAM

T.C.

MİLLÎ EĞİTİM BAKANLIĞI

Hizmetiçi Eğitim Dairesi Başkanlığı

HİZMETİÇİ EĞİTİM ETKİNLİK PROGRAMI

1-ETKİNLİĞİN ADI

FATİH Projesi – Eğitimde Teknoloji Kullanımı Kursu

2-ETKİNLİĞİN AMAÇLARI

Bu faaliyeti başarı ile tamamlayan her kursiyer;

- Eğitimde Fatih Projesinin amacını, kapsamını ve beklentilerini bilir,
- Proje kapsamında sağlanan BT ekipmanlarının kurulumunu, kullanımını, kalibrasyonunu yapar ve karşılaşılan temel problemleri çözer.
- Internet üzerinde yayımlanan, ders etkinliklerinde kullanabileceği materyalleri arar, bulur ve seçer.
    - Materyalleri arar,
    - Bulunan materyalleri kontrol listelerine göre eler,
    - Telif hakları kanuna uygun olarak kullanır.
- İhtiyaç duyduğu konularda materyal tasarlar ve geliştirir.
- Bulunan/hazırlanan e-İçeriği kullanarak bir dersi planlar ve plana uygun olarak sunar.
- Materyalin/e-İçeriğin etkililiğinin ve verimliliğinin değerlendirilmesi.

3-ETKİNLİĞİN SÜRESİ

Faaliyetin süresi 5 iş günü/ 30 saattir.

4-ETKİNLİĞİN HEDEF KİTLESİ

T.C. Milli Eğitim Bakanlığına bağlı tüm eğitim-öğretim kademelerindeki öğretmenler.

5-ETKİNLİĞİN UYGULAMASI İLE İLGİLİ AÇIKLAMALAR

1. Bu eğitimler "Eğitimde FATİH Projesi" kapsamında Pilot Uygulama olarak düzenlenecektir.
2. Bu faaliyet Milli Eğitim Bakanlığı Hizmetiçi Eğitim Dairesi Başkanlığı Yönetmelik hükümlerine göre yürütülecektir.
3. Mahalli eğitimlerde; merkezi eğitimler sonucunda "FATİH Projesi – Eğitimde Teknoloji Kullanımı Kursu"' nu ile bitiren eğitici öğretmenler görev alacaklardır.
4. Bu eğitimlerde; merkezi hizmetiçi eğitim faaliyetlerinde, fatihprojesi.meb.gov.tr ve hedb.meb.gov.tr adreslerinde isimleri yayınlanacak eğiticiler görevlendirilecektir.
5. Eğitimlerde oluşturulan ürünler eğitim görevlisi tarafından kurs sonunda ftp://fatihhie.meb.gov.tr adresine yüklenecektir.
6. Her sınıf için katılımcı sayısının 20 kişiyi geçmemesine özen gösterilecektir. Proje kapsamındaki BT donanımının olduğu sınıflarda, 20 kursiyer bilgisayarı, 1 öğretmen bilgisayarı ve en az 1Mb bağlantı hızıyla internete bağlı olması esas olacaktır.
7. Eğitime katılan kursiyerlere program içeriği ve ders materyalleri elektronik ortamda verilecektir.

6-ETKİNLİĞİN İÇERİĞİ

	KONULAR	SÜRE
A	**Eğitimde FATİH Projesi**	**2 Saat**
	1. Eğitimin Amacı 2. Eğitimin Kapsamı 3. Eğitimin proje içindeki yeri ve önemi	
B	**BT Ekipmanlarının kurulum ve kullanımı**	**2 Saat**
	1. Taşınabilir bilgisayar, internet bağlantısı, ağ yazıcısı bağlantısı, ses sistemi ve etkileşimli cihazların bağlantılarının kurulması 2. Etkileşimli cihazlarda kalibrasyon ayarları 3. Karşılaşılan temel problemleri çözme 3.1. SSS başvurma 3.2. Çağrı merkezlerine başvurma 3.3. Çözülemeyen teknik problemler için teknik destek kaynaklarına ulaşma	
C	**E-İçerik Arama Bulma Seçme**	**6 Saat**
	4. E-İÇERİK ARAMA VE BULMA 4.1. Kazanımlar 4.2. Etkinlikler 4.3. Arama ve Bulma 4.4. Arama Yaparken Dikkat Edilmesi Gerekenler 4.4.1. Uygun Anahtar Kelimeleri Belirleme 4.4.2. Özelleştirilmiş Anahtar Kelimeleri Kullanma 4.4.3. Uzantısı Bilinen Dosyaları Arama ve Bulma 4.4.4. Özelleştirilmiş Konu Tarama 4.4.5. Gelişmiş Arama 4.4.6. Nesne Ambarlarında Arama 4.4.7. Ön bellek (Cache) Arama 4.4.8. Arama Sonuçlarını Arama Diline Çevirme	

	4.5. Bulunan E-içerikleri Arşivleme 4.6. Konu Alanında Arama Stratejisi Belirleme 4.7. Yararlı Siteler 4.8. Kaynaklar 5. E-İÇERİK SEÇME 5.1. Bölüm Kazanımları 5.2. Etkinlikler 5.3. E-içerik Seçiminde Dikkat Edilmesi Gereken Temel Özellikler 5.4. E-içeriği Oluşturan Bileşenler 5.4.1. Görsel Bileşenler 5.4.2. Sözel Bileşenler 5.4.3. Öğrenci İlgisini Arttıran Bileşenler 5.5. E-içeriğin Biçimsel Yapısı 5.6. Farklı e-içerikleri Seçme 5.6.1. Simülasyon (Benzetim-Canlandırma) 5.6.2. Eğitsel Oyunlar 5.6.3. Çalışma Yaprağı 5.6.4. Sunular 5.6.5. Öğrenme Nesneleri 5.6.6. Öğretimsel Bloglar 5.6.7. Eğitsel Videolar 5.7. Kaynaklar 6. TELİF HAKLARI	
D	**E-içerik tasarlama ve geliştirme**	**12 Saat**
	1. E-İÇERİK ÜZERİNDE DEĞİŞİKLİK YAPMA VE YENİ E-İÇERİK TASARLAMA 1.1. E-içerik geliştirmede öğretimsel özellikler 1.1.1. Kavram 1.1.2. İşlem 1.1.3. Süreç 1.1.4. İlke 1.2. Tasarlamada dikkate alınacak faktörler 1.2.1. E-içerik geliştirme becerilerinde	

	kişisel farkındalık 1.2.2. Mevcut malzeme ve üretim imkân ve şartları 1.2.3. Kullanılabilir zaman 1.2.4. Materyal tasarım ilkeleri 1.3. Görsel tasarım öğeleri 1.3.1. Nokta 1.3.2. Çizgi 1.3.3. Şekil 1.3.4. Biçim 1.3.5. Renk 1.3.6. Yazı 1.3.7. Boşluk 1.4. Görsel tasarım ilkeleri 1.4.1. Bütünlük 1.4.2. Basitlik 1.4.3. Yerleştirme 1.4.4. Yakınlık 1.4.5. Hizalama 1.4.6. Denge 1.5. Sunu 1.5.1. Yazı karakterini ve büyüklüğünü değiştirmek 1.5.2. Renklerini değiştirmek 1.5.3. Sunu temasını değiştirmek 1.5.4. Ses video görüntü eklemek 1.5.5. Sunuya eylem, bağlantı ve köprüler eklemek 1.5.6. Animasyon efektleri eklemek 1.6. Resim, fotoğraf 1.6.1. Formatı değiştirmek 1.6.2. Büyütmek ve küçültmek 1.6.3. Kesme, kırpma ve birleştirme işlemleri 1.6.4. Resim arka planını değiştirmek	

	1.6.5. Resim üzerine şekiller ve çizimler ekleme-çıkarma 1.7. Video ve ses 1.7.1. Video ve ses geliştirmeye genel bakış 1.7.2. Video'ya yazı, ses ve geçişler ekleme 1.7.3. Bir video filmin düzenlenmesi 1.7.4. Birden fazla videonun birleştirilmesi 1.7.5. Birden fazla videonun düzenlenmesi	
E	**Bulunan/hazırlanan materyali kullanarak bir dersin planlanması ve sunulması**	**6 Saat**
	1. Materyal kullanımının genel ilkeleri 1.1. Genel Materyal kullanım ilkeleri 1.2. Materyallerin genel özellikleri 1.3. Materyal kullanım Kılavuzu 1.4. Materyal kullanım ölçeği 1.5. Etkinlik 1-1 1.6. Etkinlik 1-2 2. Metinlerin kullanımı 2.1. Metinlerin genel özellikleri 2.2. Metinlerin sınıf içinde kullanımı 2.2.1. Kısa tanımları ve örnekleri sunma 2.2.2. Benzerlik ve farklılıkları belirtme 2.2.3. Sıralama ve listelemeler 2.2.4. Sebep sonuç yapıları veya açıklamaları belirtme 2.2.5. Farklı materyalleri desteklemek 2.3. Örnek uygulama 2.4. Etkinlik 2-1 3. Eğitimde resim kullanımı 3.1. Resimlerin genel özellikleri 3.2. Resimlerin Kullanımı Amaçları 3.2.1. Dekor 3.2.2. Gösterim 3.2.3. Yorumlama 3.2.4. Organize etme 3.2.5. İlişkilendirme	

	3.2.6. Hatırlatma 3.2.7. Etkinlik 3-1 3.3. Resimlerin Ders İçinde Kullanımı 3.3.1. Etkinlik 3-2 3.3.2. Etkinlik 3-3 3.3.3. Etkinlik 3-4 3.3.4. Etkinlik 3-5 4. Eğitimde video kullanımı 4.1. Video kullanımı hakkında genel bilgiler 4.2. Eğitim ortamında video kullanımının faydaları 4.3. Öğretimde video kullanırken dikkat edilmesi gereken noktalar 4.4. Etkinlik 4-1 4.5. Dersi içinde video kullanımı 4.5.1. Giriş (a) Etkinlik 4-2 4.5.2. Sunuş aşamasında 4.5.3. Video türleri (a) Etkinlik 4-3 4.5.4. Kapanış (a) Etkinlik 4-4 4.6. Video kullanım kılavuzu 4.6.1. Ön hazırlık 4.6.2. Gösterim 4.6.3. Gösterim sonrası 4.7. Örnek uygulama 5. Eğitimde animasyon kullanımı 5.1. Animasyonların genel özellikleri 5.2. Eğitim ortamlarında animasyon kullanımının avantajları 5.3. Animasyon kullanırken dikkat edilmesi gereken noktalar 5.3.1. Etkinlik 5-1 5.4. Animasyonların ders içinde kullanımı 5.4.1. Etkinlik 5-2 5.4.2. Etkinlik 5-3 5.4.3. Etkinlik 5-4 5.5. Animasyon Kullanım Kılavuzu 5.6. Uygulama 5-1	

	5.7. Etkinlik 5-5 5.8. Uygulama 5-2 5.9. Örnek uygulama 5.10. Örnek animasyonlar 6. Eğitimde simülasyon kullanımı 6.1. Simulasyonların genel özellikleri 6.2. Simulasyonların ders içinde kullanımı 6.3. Simulasyon kullanım kılavuzu 6.4. Etkinlik 6-1 6.5. Örnek Uygulama 6.6. Örnek simülasyonlar 7. Eğitimde oyun kullanımı 7.1. Oyunların genel özellikleri 7.2. Oyunların türleri 7.3. Oyunların ders içinde kullanımı 7.4. Örnek uygulama 7.5. Etkinlik 7-1 8. Tasarlanan Dersin Sunumu 8.1. Ders Aşamaları 8.1.1. Ders Öncesi Hazırlık 8.1.2. Giriş 8.1.3. Sunuş / bilgi edinme 8.1.4. Sonuç/Özet 8.1.5. Etkinlik 8-1 8.2. Dersin değerlendirilmesi 8.3. Kaynak 9. Ders işleniş örnekleri	
F	**Teknoloji Kullanarak İşlenen Dersin ve Derste Kullanılan Materyalin Etkililiğini ve Verimliliğinin Öğretmen Tarafından Değerlendirilmesi**	**2 Saat**
	1. Materyalin/e-İçeriğin etkililiğinin ve verimliliğinin değerlendirilmesi 2. Materyal/e-İçerik kullanımı değerlendirme formu	
	TOPLAM	**30 Saat**

CURRICULUM VITAE

EDUCATION

- **2005-2014**: Ph.D. on B.Sc. Department of Computer Education and Instructional Technology, Faculty of Education, Middle East Technical University, Ankara
- **2011-2012**: Visiting Research Scholar, Graduate School of Education & Information Studies, University of California Los Angeles (UCLA), Los Angeles, CA
- **2004-2005**: English Preparation School, School of Foreign Languages, Department of Basic English Middle East Technical University, Ankara
- **1999-2003**: B.Sc. Computer Education and Instructional Technology, Ankara University, Ankara

WORKEXPERIENCE

- 2005-2014: Research Assistant, Computer Education and Instructional Technology, METU, Ankara
- 2003-2004: Information Technology and Computer Teacher, Ibrahim Calik High School, Kahramanmaras, TURKEY

RESEARCH PROJECT

- 2010-2011: Virtual Worlds Research Group, http://www.vw.metu.edu.tr
- 2010-2011: Faculty Development Needs of Research Assistants in METU
- 2006-2007: Use of Technology for Effective Learning at Middle East Technical University: Current Situation, Expectations and Suggestions. Middle East Technical University

TEACHING EXPERIENCE

- Assistantship, (CEIT 111), Information Technology in Education I, CEIT, METU. (Fall Semester, 2005 – 2006)
- Assistantship, (CEIT 112), Information Technology in Education II, CEIT, METU. (Spring Semester, 2010- 2011)
- Assistantship, (CEIT 207), Design and Use of Instructional Material, CEIT, METU. (Fall Semester, 2010- 2011; Fall Semester, 2009-2010; Summer Semester, 2009-2010; Fall Semester, 2008-2009; Fall Semester, 2007-2008)
- Assistantship, (CEIT 211), Programming Language II, CEIT, METU. (Spring Semester, 2009- 2010; Spring Semester, 2008-2009; Spring Semester, 2007-2008)
- Assistantship, (CEIT 225), Instructional Design, CEIT, METU. (Spring Semester, 2010-2011)
- Assistantship, (CEIT 300), Computer Applications in Education, FLE, METU. (Fall Semester, 2005 – 2006)
- Assistantship, (CEIT 314), Computer Networks and Communication, CEIT, METU. (Spring Semester, 2009- 2010)
- Assistantship, (CEIT 319), Instructional Technology and Material Development, ELE, METU. (Fall Semester, 2010 – 2011)
- Assistantship, (CEIT 320), Authoring Language in PC Environment, CEIT, METU. (Fall Semester, 2006 – 2007)
- Assistantship, (CEIT 321), Foundations of Distance Education, CEIT, METU. (Summer Semester, 2007 – 2008)
- Assistantship, (CEIT 380), Computer Education Teaching Methods I, CEIT, METU. (Fall Semester, 2010- 2011)
- Assistantship, (CEIT 410), Teaching Practice, CEIT, METU. (Spring Semester, 2005 – 2006; Spring Semester 2006 – 2007)
- Assistantship, (CEIT 414), School Experience II, CEIT, METU. (Fall Semester, 2006 – 2007; Fall Semester, 2007 - 2008)

SKILLS

- Image Editing: Adobe Photoshop, Macromedia Fireworks
- Animation: Adobe Captivate, Adobe Flash, Macromedia Authorware
- Web Design: Dreamweaver, FrontPage
- Video Editing: Adobe Premier
- Package Program: MS Office
- Programming Language: Visual Basic
- Statistical Analysis: SPSS 11-15

- Human Computer Interaction: Clearview Gaze Analysis Software
- CMS/LMS Management: Moddle

PUBLICATIONS

Journal Paper

- Erdoğan, M., Kursun, E., Şisman, G.T., Saltan, F., **Gök, A.** & Yıldız, İ. (2010). A Qualitative Study on Classroom Management and Classroom Discipline Problems, Reasons, and Solutions: A Case of Information Technologies Class. Educational Sciences: Theory & Practice, 10 (2), 853-891.

Conference Papers

- Cagiltay, K., Yildirim, S., Arslan, I., **Gok, A.**, Gürel, G., Karakus, T., Saltan, F., Uzun, E. Ulgen, E. & Yildiz, I. (2007). *Profile and Expextations of Instructional Technology Use in Higher Education: A Descriptive Study.* Paper presented at the Academical Computing 2007, Kutahya, Turkey
- Arslan Ari, I., **Gok, A**., Uzun, E., Yildiz, I., Cagiltay, K. & Yildirim, S. (2008). Students' 99 Suggestions about Technology Integration in Higher Education. In *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2008* (pp. 6236-6240). Chesapeake, VA: AACE. Retrieved from http://www.editlib.org/p/29246.
- **Gök, A.** & Gok, G. (2008). Usability Comparison of Three Navigation Designs in Hypermedia Environments. *In Proceedings of Conference on Academical Computing 2008* (pp. 715 – 721), 30 January -1 February 2008, Canakkale, Turkey.

- **Gök, A.**, Arslan, K. & Saltan, F. (2009). The Online Teacher Education Trends: A Research Review Study of Recent Years. In I. Gibson et al. (Eds.), *Proceedings of Society for Information Technology and Teacher Education International Conference 2009* (pp. 374-380). Chesapeake, VA: AACE. Retrieved from http://www.editlib.org/p/30621.
- Yildiz, I., Kursun, E., Saltan, F., **Gok, A**. & Karaaslan, H. (2009). Using Wiki in a Collaborative Group Project: Experiences from a Distance Education Course. In I. Gibson et al. (Eds.), *Proceedings of Society for Information Technology and Teacher Education International Conference 2009* (pp. 3044-3048). Chesapeake, VA: AACE. Retrieved from http://www.editlib.org/p/31110.
- Karakus, T., Arslan-Ari, I., Uzun, E., **Gok, A.**, Cagiltay, K. & Yildirim, S. (2009). An Investigation and Comparison of Students? and Instructors? Perspectives of ICT Use in Higher Education, Association for Educational Communications and Technology 2009 Convention, Louisville, KY, October 27-31, 2009.
- Arslan, K., **Gök, A**. & Saltan, F. (2010). Motivating Teachers To Use Learning Objects. In C. Crawford et al. (Eds.), Proceedings of Society for Information Technology & Teacher Education International Conference 2010 (pp. 2637-2644). Chesapeake, VA: AACE.
- Saltan, F., Arslan, K. & **Gök, A**. (2010). Teachers' Acceptance of Interactive White Boards: A Case Study. In C. Crawford et al. (Eds.), Proceedings of Society for Information Technology & Teacher Education International Conference 2010 (pp. 2360-2365). Chesapeake, VA: AACE.
- Yildirim, Z., **Gok, A.,** Erdogmus, F.U. & Duman, M. (2011). ICT Needs and Preferences of Early Career Academics. European Conference on Educational Research 2011 (p.1-1).
- Yıldırım, Z., Sevim, N., Duman, M. **Gök, A**. Tufan, D., Erdoğmuş, F. & Kara, N. (2013). Araştırma Görevlilerinin Öğretim Üyesi Olma Sürecindeki İhtiyaçları Nelerdir*?, 20. Ulusal Eğitim Bilimleri Kurultayı*, s.1-7.

- **Gok, A.** & Yildirim, Z. (2013). Fatih Projesi'nin Öğretmenler, Okul Yöneticileri ve YEĞİTEK Yöneticileri Görüşlei Kapsamında İncelenmesi. *7.Uluslararası Bilgisayar ve Öğretim Teknolojileri Sempozyumu (s. 203-205),* 6-8 Haziran 2013, Erzurum, Türkiye.
- **Gok, A.** & Yildirim, Z. (2013). Teachers' Opinions about, and Needs for In-Service Training for the Movement of Enhancing opportunities and Improving Technology Project in Turkey. E-Learn 2013 – World Conference on E-Learning in Corporate, Government, Healthcare and Higher Education. Las Vegas, NV, USA.