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INTEGRATION OF ICT INTO SECONDARY EDUCATION LEARNING AND TEACHING PROCESSES: PROBLEMS AND RECOMMENDED SOLUTIONS[1]

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ABSTRACT

The aim of this study is to examine the problems and solutions regarding the integration of information and communication technologies into secondary education learning-teaching processes based on the views of teachers and school administrators. This study is a case study. The participants of this study are teachers and school administrators working in three different secondary education institutions in Antalya, where the Enhancing Opportunities and Technology Improvement Movement Project was implemented. To collect data, a survey questionnaire and semi-structured interviews were used. Basic descriptive statistics were employed for the analysis of quantitative data, and content analysis was employed to analyze qualitative data. It was found that teachers mostly benefit from computers, smart boards, printers, and web applications in the classroom. However, they sometimes use tablets and the Educational Informatics Network. The problems encountered in the process were related to the functionality of smart boards and tablets, the selection of appropriate materials, in-service training sessions, the curriculum, and the unintended use by students. Based on the findings, several suggestions were made for addressing technical issues in information and communication technologies, making changes to curricula and professional development programs, and raising awareness among stakeholders affected by this process.

Keywords: Information and communication technologies, learning-teaching processes, problems.

Bilgi ve İletişim Teknolojilerinin Ortaöğretim Öğrenme ve Öğretme Süreciyle Bütünleştirilmesi: Sorunlar ve Çözüm Önerileri

ÖZ

Bu çalışmanın amacı, bilgi ve iletişim teknolojilerinin ortaöğretim öğrenme-öğretme süreçleriyle bütünleştirilmesine ilişkin sorunları ve ortaya konulan çözümleri öğretmen ve okul yöneticilerinin görüşlerine dayalı olarak incelemektir. Bu çalışma bir durum çalışması olarak tasarlanmıştır. Çalışmanın katılımcıları, Fırsatları Artırma ve Teknoloji İyileştirme Hareketi Projesi'nin uygulandığı Antalya ilindeki üç farklı ortaöğretim kurumunda çalışan öğretmen ve okul yöneticileridir. Verilerin toplanmasında anket formu ve yarı yapılandırılmış görüşmeler kullanılmıştır. Nicel verilerin analizinde temel betimsel istatistikler, nitel verilerin analizinde ise içerik analizi kullanılmıştır. Öğretmenlerin sınıflarda çoğunlukla bilgisayar, akıllı tahta, yazıcı ve web uygulamalarından yararlandıkları, ancak bazen tablet ve Eğitim Bilişim Ağı'nı kullandıkları bulunmuştur. Süreçte karşılaşılan sorunlar akıllı tahta ve tabletlerin işlevselliği, uygun materyallerin seçimi, hizmet içi eğitimler, müfredat ve öğrenciler tarafından amaçlanmayan şekilde kullanılması ile ilgilidir. Bulgulara dayalı olarak, bilgi ve iletişim teknolojilerindeki teknik sorunların giderilmesi, öğretim programı ve mesleki gelişim programlarında değişiklik yapılması ve bu süreçten etkilenen paydaşların farkındalığının artırılmasına yönelik çeşitli önerilerde bulunulmuştur.

Anahtar Kelimeler: Bilgi ve iletişim teknolojileri, öğrenme-öğretme süreci, sorunlar.

[1] This article is based on the master's thesis completed by İpek Önal under the supervision of Prof. Dr. Şerafettin Karakaya, which was submitted to Akdeniz University in 2014.

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INTRODUCTION

Technology acts as a bridge between science and practice (Yalın, 2004) and leads to changes in all areas of social life. It encompasses not only hardware or software, but also knowledge, techniques, and skills that facilitate social life and put them into practical use (İşman, 2003). The impact of technological innovations on various fields including education, is undeniable. In a knowledge-based society and economy that has emerged as a result of technological developments, people are expected to have the ability to search for information, evaluate it critically, and produce new information (Scientific and Technical Research Council of Turkey, [TUBİTAK], 2005). Creating educational environments that enable individuals to acquire such skills has become one of the primary goals of modern education systems. Technological advancements have transformed the structure and functions of educational institutions. To develop qualified individuals who can adapt to these developments, it is necessary to continuously update the roles and contents of fundamental education components, such as students, teachers, knowledge, methods, purpose, and mission (Korkmaz, 2013, p. 433). In this regard, organizing educational environments effectively affects the roles of teachers, students, administrators, and parents and also requires the restructuring both the educational program, tools and equipment used in the educational setting. The use of information and communication technologies (ICT) as the most up-to-date visual and audio tools in educational environments to increase the quality of education and achieve educational goals has given rise to the concept of integration of information and communication technologies in learning-teaching processes. As a driving force behind this change in education, information and communication technologies require classrooms to be equipped with such technologies and necessitate the development of educational programs to provide guidance on objectives, content, and evaluation methods. In addition, it has led to a redefinition of responsibilities to enable stakeholders in education to effectively utilize such tools. Governments have put into force several improvements based on the education components mentioned above, utilizing regulations that could be considered reform aimed at implementing innovations brought about by information and communication technologies in education (Pelgrum, 2001).

Since the 1980s, studies have been carried out in Turkiye to improve technology in schools and train students, teachers, and administrators in the use of these technologies (Saban, 2007; Uşun, 2003). The most comprehensive of these studies carried out by the Ministry of National Education (MONE) in Turkiye is the Movement to Increase Opportunities and Improve Technology project called the FATIH project, which was launched in 2010. Within the scope of this project, which is planned to start in high schools in the first year, secondary schools in the second year, and primary school and pre-school institutions in the third year, it is aimed at improving the hardware infrastructure, creating educational e-content, harmonizing the curriculum, training teachers, and developing the conscious use of ICT tools (Ministry of National Education [Ministry of National Education [MONE], 2010). This project aims to ensure the most effective use of ICT tools in lessons at all levels of education institutions to enhance quality and equal opportunities in education. In this framework, the first phase of the project involves installing smart boards and internet connections in all classrooms, providing each teacher and student with a tablet computer, and supplying each school with a document camera. Furthermore, the next stage involves updating the curriculum and teacher guid books to support the use of ICT tools. In addition, as part of the project it is planned to provide teachers with in-service training on ICT tools.

This process, which includes the use of information and communication technologies to enhance student performance is directly or indirectly influenced by interactions among different stakeholders such as teachers, students, school administrators, etc. (BECTA, 2003; Cuban et al., 2001; Ertmer, 2005; Yıldırım, 2007). Teachers and school administrators at the center of the process are primarily responsible for effectively integrating these innovations into learning environments (Karaduman, et al., 2011). The findings indicate that practitioners have developed positive attitudes toward the MONE target of using ICT in learning activities (Bingimlas, 2009; Usluel et al., 2007). At the same time, some studies have pointed out that teachers and administrators, as practitioners, encounter many problems in this process (Earle, 2002;

Hew & Brush, 2007; Usluel et al., 2007). The failure to correctly identify these problems and solutions encountered by teachers and administrators may cause them to view themselves as part of the problem and feel inadequate. In particular, situation can cause teachers to remain dependent on teacher-centered traditional practices and avoid using technological tools in teaching (Konstantinos et al., 2013). To achieve success in this complex process, it is important to understand the elements that are effective and not to overlook the problems that arise.

In light of this information, this study aims to reveal the current situation regarding the use of information and communication technologies to increase learning in the learning-teaching processes in secondary schools within the scope of the FATIH project pilot schools in Antalya province, to identify the problems encountered by teachers and administrators, and to uncover solutions for addressing these problems. This study is expected to reveal the current deficiencies and needs in achieving the desired objectives regarding integration of information and communication technologies into education in Turkey.

Aim

This study aims to determine the current state of the integration of information and communication technologies into learning-teaching processes in three pilot secondary schools selected in Antalya, Turkey, within the scope of the FATIH project to uncover the problems encountered and to propose solutions in line with the views of teachers and school administrators. In parallel to these aims, the study attempts to answer the following research questions:

1. What is the current situation regarding the integration of ICT into learning-teaching processes in three pilot secondary schools in Antalya within the scope of the FATIH project?

2. What problems are encountered in the integration of ICT into learning-teaching processes in these schools?

3. What are the proposed solutions to the problems encountered in the integration of ICT?

METHODOLOGY

Research Design

For this study, the case study approach, which is a qualitative research design, was employed. A case study examines a limited system or phenomenon over a specific period using multiple data sources. This limited system may be an institution, program, person, or specific policy. Case studies have proven particularly useful in policy assessments and in work to develop new practices in education. (Merriam, 2009). The case study method was preferred because it was thought to serve the purpose of identifying the deficiencies that emerged when using the ICT tools and educational applications offered within the scope of the FATIH project and providing an evaluation of this new application to all stakeholders, including teachers, school administrators, and policy developers.

Participants

The study participants were selected after two phases. In the first phase, schools where the study would be conducted were determined by typical case sampling. In typical case sampling, a typical situation in many situations in the universe regarding the research problem is determined, and information is collected through this example (Büyüköztürk et al., 2013, p.91). This sampling method is based on the notion that when researchers want to introduce a new practice, they select one or more of the most typical situations in which innovation occurs (Yıldırım & Şimşek, 2013, p.138). In line with the information obtained from MONE's website at http://fatihprojesi.meb.gov.tr/tr/index.php regarding the FATIH Project, three schools in Antalya province where the project was completed were determined.

In the second phase the teachers working in these schools were identified. There were 134 teachers at these schools. Of them, 83 teachers participated in the quantitative part of the study. To obtain different perspectives on the qualitative dimension of the study, 22 teachers from eight different branches and 7 administrators were selected through a sampling method based on maximum diversity. The purpose of including participants with different characteristics (branch, gender, years of experience, etc.) in the sample is not to generalize to the population. Through maximum diversity, the commonalities and differences in the views and experiences of various perspectives are examined in depth (Yıldırım & Şimşek, 2013).

Data Collection Tools

The study data were collected through a survey using a structured questionnaire and semi-structured interviews. In case studies, complementary methods are used to increase the reliability of the study along with the data collection method chosen as the basis (McMillan & Schumacher, 2001). Unlike other qualitative approaches, case study research allows researchers to collect and integrate quantitative survey data, making it easier to reach a holistic understanding of the phenomenon under study (Baxter & Jack, 2008, p.554).

The survey questionnaire, Survey Questionnaire on Teachers' Use of Information and Communication Technologies (SQTUICT), was developed by the author, and consists of two sections. The first section presents teachers' personal information. The second section aims to determine teachers' opinions about the ICT hardware and software tools they use in the process of integrating ICT with teaching, their intended use, and the factors affecting their use. The items in the second section of the survey are answered using one of the following options: "Never", "Sometimes", "Frequently" or "Always". The author developed two separate semi-structured interview forms. These were given to teachers and school administrators. The goal of these surveys is to reveal the views of the participants regarding the use of ICT in education, the problems they encounter, and their views on solutions to these problems. As a result of expert opinions and pilot studies, necessary corrections were made to the draft.

Data Collection Procedure

The necessary permissions for the study were obtained from the Antalya Provincial Directorate of National Education through decision number 56248838/605/460246. The data collection process was carried out in the second semester of the 2013-2014 academic year. The survey questionnaire was administered, and the interviews were conducted by the author. Face-to-face interviews with the teachers and administrators were recorded with using a voice recorder. Prior to the interview, the interviewee was informed about the aim of the study, and was asked to agree to take part in the interview on a voluntary basis and to allow the interview to be recorded.

Data Analysis

Content analysis and basic descriptive statistics were used to analyze the data. For content analysis, different interview records were randomly selected and coded by the author and an interrater to establish the consistency of the coding. As a result, a code guide was created to be used in the analysis of interview records (Babbie, 2010). In determining the findings regarding all sections of the survey questionnaire, the percentages, frequency distributions, and mean and standard deviation values were found. The data from the survey questionnaire were transferred to a computer environment and analyzed using descriptive statistical techniques in the SPSS.20 package.

Validity and Reliability

To establish reliability multiple data collection tools were employed. The analysis of the interviews is presented in the finding section using direct quotes from the participant statements. In addition, the interviewees checked the transcripts to confirm the accuracy of their statements (Büyüköztürk et al., 2013). To increase the validity of the study, the findings were organized in accordance with the conceptual framework. In addition, providing diversity in the participant variables also contributed to the external validity (Merriam, 2009).

Regarding research ethics, during the data collection process, attention was given to the voluntary participation of teachers and school administrators. While the interviews were audio-recorded, and participants verbally confirmed that they participated voluntarily. In addition, the participants were informed about the purpose of the research. The anonymity of the research participants was maintained. In the direct quotes, the names of the teachers and school administrators are not given. Instead, coding was employed. For example, [GT.01] refers to a geography teacher interviewed first, and [SA.01] refers to a school administrator interviewed first.

FINDINGS

First Research Question: The Current State of ICT Integration into the Learning and Teaching Processes

The findings obtained from the survey questionnaire regarding the teachers' use of hardware and software are presented in Table 1. It was observed that teachers frequently use computers, smart boards, printers, internet, and web applications, and that the usage rates of tablets and educational IT networks among teachers are low. It was found that teachers almost never use document cameras, chat programs and simulation-digital games.

Table 1. Arithmetic Mean and Standard Deviation Values for Teachers' Use of ICT Hardware and Software

Hardware/software	$\bar{X}$	SD	Hardware/software	$\bar{X}$	SD
Computer	2,91	0,82	Tablet	1,79	0,79
Smart board	2,65	1,00	EBA (Education IT network)	1,78	0,69
Printer	2,48	1,09	Materials and Equipment	1,77	0,96
Internet and Web Applications	2,40	1,28	Electronic Book	1,69	0,80
Mobile phone	2,40	1,28	Mp3 player	1,55	0,87
Electronic mail	2,37	1,10	Projector	1,51	0,80
Course Software (DVD/CD etc.)	2,07	0,90	Simulation/Digital Teaching Games	1,42	0,62
Office Application Packages	2,04	0,82	Chat program	1,32	0,62
Imaging Devices	1,86	1,30	Document camera	1,26	0,54

The findings obtained from the interviews regarding the tools teachers use to integrate ICT into their learning-teaching processes are presented in Table 2.

Table 2. ICT Tools Employed by Teachers in the Learning-Teaching Process

ICT tools	f
Visual/video display on the smart board	18
Student presentation on the smart board	2
Blog preparation	2
Mobile Technologies	2

As shown in Table 2, 18 of the 22 teachers interviewed use smart boards in their lessons to make visual or video demonstrations about the lesson content. In addition, teachers use student presentations on smart boards, blogging, and mobile technologies. Teachers regarded smartphones as advantageous in terms of supporting students' use of word games and dictionaries and stated that they allowed their use in classrooms when necessary.

Reasons Why Teachers Use ICT

The findings obtained from the survey questionnaire regarding the reasons for teachers' use of ICT in classroom learning-teaching processes are given in Table 3.

Table 3. Reasons For Teachers Use ICT Tools in the Teaching-Learning Processes

Aim	$\bar{X}$	SD
To present the course content	2,75	0,91
Attracting students' attention during the lesson	2,75	0,91
Professional development	2,74	0,83
To make the course content more concrete	2,73	0,79
Using time efficiently during teaching	2,61	0,86
Communicating/sharing information with other teachers inside and outside the school	2,53	0,92
Designing the introduction, development, and conclusion sections of the course	2,51	0,88
Assessing student learning/performance	2,45	0,87
Missing learning at the end of/after the course	2,40	0,89
Development of teaching materials	2,33	0,84
Students' differential learning needs	2,38	0,79
Organizing collaborative work with students on assignments/projects	2,38	0,79
Interacting with students after class	2,30	0,92
Manage undesirable student behaviors	2,14	0,75
Administrative affairs	2,03	0,88

Teachers' aims to use ICT tools in learning-teaching processes are found to be as follows: Presenting learning content, attracting student attention during the lessons and providing professional development. Teachers less frequently use these tools to correct undesirable student behaviors and perform administrative tasks.

Teachers explained their reasons for using ICT during the interviews. Among these reasons, the following are mentioned: making it easier for students to learn (n=12), ensuring a fast flow of the course (n=9), and attracting student interest in the course (n=6). Many teachers who state that the use of ICT in teaching facilitates student learning believe that it enables the visual transfer of abstract concepts related to the subject to the student and that the concepts are concretized in this way. One of the participants [CT.02] reported the following: "It is more visual. Chemistry lessons seem very abstract to students because they have not seen them before. We will try to embody this with videos and visuals as much as possible."

Factors Contributing to Teachers' Use of the ICT in Learning-Teaching Processes

According to the findings obtained from the questionnaire, the factors that contribute to teachers' use of information and communication technologies in the learning-teaching processes are presented in Table 4.

Table 4. Factors Contributing to Teachers' Use of ICT

Factors	F
A computer	64
Personal interest in ICT	58
Technical assistance given at schools	47
In-training activities	35
Preservice courses on technology	26
Professional cooperation among teachers	26
School administrators' encouragement to use ICT	18

Teachers' possession of personal computers and their interest in ICT tools were identified as the most significant factors. Technical support at school, technology-related courses in the in-service and pre-service

periods, and colleague collaboration are other contributing factors. The factor that contributes the least to teachers' use of ICT is encouragement of school administrators to use ICT.

Compatibility Between ICT and the Curricula

According to the findings obtained from the interview data regarding the compatibility of ICT with curricula, the majority of teachers (n = 19) stated that the use of ICT was compatible with the learning goals of their courses and that the education program included those objectives, instructions, and teaching activities consistent with the use of ICT hardware and software (n = 17). One participant [ET.01] stated the following: "Of course. We have these in our teaching methods and techniques. We have methods. Within the scope of these methods, we specifically state the effective use of information technologies in the classroom in our plans, and these are included officially in our course outlines. For example, by watching videos, movies, or using the computer, any project or homework we give to the child is prepared and delivered on the computer...."

Teachers' Participation in In-Service Training Activities

According to the findings obtained from the interviews regarding teachers' participation in in-service training activities, the majority of the participants (n=20) stated that they participated in an in-service training activity on the use of ICT in teaching. Although the teachers who participated in the smart board training within the scope of the FATIH project stated that this training made a positive contribution to them (n = 5), some teachers (n = 9) indicated that the training should be improved. The major views about in-service training activities are that the training content is superficial; training content is not specific to course content; training is not practice-oriented, and the different learning needs of the participants are ignored. Some of the participant statements about this topic are as follows: "If I were to evaluate the in-service training, I can say that maybe you actually learn something at that moment, but you may forget what you learned because you do not apply what you learned very much." [LT.03]; "… There are some deficiencies in in-service training activities." [ET.02]; "… When you attend the training, you look at the content and participate, but the training ends before most of that content were delivered..." [ET.03]. Teachers' suggestions regarding increasing the quality of ICT-focused in-service training activities are as follows: making training activities specific to branches instead of providing general content, repeating training activities after a while, and including practical activities in the training.

Necessary Support for The Use of ICT

In the findings obtained from the interviews, most of teachers (n = 13) stated that they needed external support when using ICT tools in their lessons. They also added that they seek help from ICT teachers, have benefited from seminars, and trainings, and have received help from students during the lesson. Some teachers (n=6) who did not find the technical staff support sufficient stated that at some schools, information technology teachers are available on certain days and the support is limited.

The majority of participants (n=14) had a positive view about the school administration's encouragement and support in the use of ICT. It is also stated that there was professional collaboration among teachers regarding the use of ICT tools (n=17). They argued that collaboration between teachers took the form of sharing materials, solving hardware problems, using hardware tools such as smart boards and photocopiers, and installing software.

School Administrators' Views on The Use of ICT in Learning-Teaching Processes

The findings obtained from the interviews with school administrators (n=7) to reveal the status of integrating ICT and learning-teaching processes at schools include the following topics: attitudes of school administrators, current status, support, and future goals regarding the use of ICT in education. School administrators expressed positive views regarding the ICT tools' ability to improve teaching quality. However, school administrators view the preparation for the use of these tools negatively because they are time-consuming. School administrators defined schools' IT infrastructure and teachers' use of ICT tools as at the most advanced level. The support provided by the school administration for the use of ICT tools at schools is as follows: solving problems immediately, not restricting teachers' access to the ICT tools, and organizing in-service training activities. The goals expressed by school administrators to improve the use of ICT tools in teaching are as follows: ensure the use of the most up-to-date applications and materials by all teachers.

Second Research Question: Problems Encountered in Integrating ICT with Learning-Teaching Processes

Problems Experienced by Teachers

The findings obtained from the teacher interviews conducted to determine the problems encountered in the integration of ICT with secondary education learning-teaching processes are examined under the following headings. These are as follows: problems caused by the IT infrastructure (n = 14), students (n = 11), materials (n = 6), teachers (n = 6), and education programs (n = 3). Two of the teachers stated that there was no problem in the use of ICT in learning-teaching processes.

In evaluating the IT infrastructure, the participants mentioned internet connection interruptions, limited access to the internet, and problems caused by smart boards and tablets. One of the participants [LT.03] expressed the following: "… Let's think that students find the webpage you asked them to find. However, this page may not open. Sometimes you end up wasting forty minutes on Internet access is not permanent. At that time, you prefer to teach the lesson yourself rather than using tablets or the Internet. …" Another participant [MT.02] gave the following statement:"…For instance, we try to use a smartboard. It may not work during my lecture. We cannot use it properly. We cannot use it due to technical problems." Concerning the use of tablets, two participants stated their views as follows [GT.02 and GT.01]: "… Tablets are not so productive"; "There are 30 students using tables in the classroom. You have a hard time controlling students, we already have a hard time controlling the tablets."

The problems associated with students' inclusion of ICT in the learning-teaching processes at school are grouped under three headings: parents, unconscious use of these tools by students, and preparation for examinations. The restrictive attitudes of parents in the use of ICT in activities that support student learning at school, such as homework, and their concerns about student's excessive use of these tools were evaluated negatively by teachers. One participant [GT.01] expressed the following view: "For example, I am giving an assignment. The student said that my father turned off my computer or disconnected the Internet. When asked why he did this, he said that his father did this because he used it excessively..." In addition, participants stated that students should better understand the purposes and functions of ICT tools, particularly personal ones, and should improve their conscious use of tablets. It is stated that students use tablets to watch movies and play games other than teaching purposes, thus eliminating the security restrictions of such devices. In this regard, one participant [HT.03] stated the following: "Students use these tablets 10% for study purposes, and 90% for video games or movies. We have difficulties with these matters." The view of another participant [GT.02] in this regard was as follows: "…The purpose of using tablets should be better understood by students. Students should understand that these tablets are not given for gaming or any other purpose but for studying, and they should use the tablets for more useful purposes." Finally, students' tendency to solve more questions during class hours to prepare for university examinations was also negatively evaluated by teachers.

The problems associated with the use of materials in the integration of ICT with education are as follows: finding materials is time-consuming, and it is difficult to choose appropriate materials specific to the student level and branch. One of the teachers [BT.03] expressed the following view: "It really takes a lot of time to sift through different sources. You scan them and find that there is a lot of content. There is a lot of content. At this point, there is absolutely no problem with the content of the Education Information Network with the support of private companies. But it is difficult for us to plan this in terms of what content we should use, where you will obtain it, where we will teach it, or what, how, and how much we will earn in line with the educational program." The view of another participant [HT.02] was as follows: "There is a need for ready-made materials and sufficient presentations when using the information technologies in our field. More work can be done to enable us to access these materials..." Teachers stated that the materials needed such as videos, presentations, games, and training CDs, should be given in a ready-made manner in a certain system.

Teachers' proficiency levels and negative attitudes towards using ICT tools in teaching were evaluated as teacher-related factors that negatively affected the process. It was found that teachers did not have confidence in using these tools. They had difficulties using software programs when they wanted to prepare materials themselves. Some teachers found lecturing using the blackboard more useful and believe that smartboards and video screenings make students passive in the process. These concerns prevent teachers from using ICT in the classrooms.

According to teachers, another reason why they do not make sufficient use of the ICT in the learning-teaching processes is the intensity of their curricula. They stated that they could not find enough time for ICT-based applications in their classes to follow the subjects in the curriculum during the academic year. In addition, they argued that ICT-based content and materials should be designed by the ministry for each subject in the curricula.

Problems Encountered by School Administrators

The findings obtained from the interviews conducted with school administrators to determine the problems encountered in the integration of ICT with secondary education learning-teaching processes are examined under three headings. These are problems related to the IT infrastructure (n = 5), students (n = 2) and problems related to the approach of teachers (n = 1). Problems arising from technical malfunctions related to schools' IT infrastructure are expressed as malfunctioning of devices as a result of misuse, very slow or no internet connection, and malfunctioning of smart board systems. Concerning technical problems one participant [SA.06] stated the following: "There is a problem with the Internet connection. It was thought that access to high-speed Internet would be provided by this project. Although the infrastructure is ready, it has not yet been provided. In other words, the level of online education on the Internet has not been reached yet." Student related problems involve using ICT tools for purposes other than educational goals. The view of one participant was as follows [SA.03]: "While the teacher is delivering the course, a student sitting at the back can access non-educational websites with his tablet. We are also trying to prevent this too." Another participant [SA.05] stated the following: "It is necessary to prevent students from using it in different ways. It is my personal opinion. It should be used for educational purposes only." Another problem expressed is teachers' lack of experience with ICT tools.

Third Research Question: Participants' Solutions to Problems Encountered in Integrating ICT with Learning-Teaching Processes

Solutions Proposed by Teachers

In the interviews with the teachers, they suggested several solutions regarding the problems experienced in the effective integration of ICT with secondary education learning-teaching processes. These suggestions are as follows:

- It was stated by teachers that there are difficulties for students seeing the board because the placement of the smart board in classrooms is not proper. For this reason, physical condition of the classroom should be taken into consideration when placing smart boards in classrooms.
- It is recommended that teachers log in to the smart board system with a password to prevent the systems from crashing, and install virus programs. In addition, it is necessary to provide interaction with tablets to make smart boards more functional.
- Instead of using the personal tools of teachers, such as mouse and keyboard, these tools should be provided with smart boards by the MONE.
- It is suggested to solve problems related to the Internet connection in schools.
- It is stated that students who do not have computers and Internet access should be provided with an opportunity to access them.
- In order to increase tablet functionality, it is suggested that necessary materials such as office programs, and textbooks should be loaded ready-made.
- Teachers suggest organizing in-service training activities in a practical way, including sample ICT activities and materials specific to the subject area, and ensuring the continuity of these training activities. It is also considered important that these training activities enable teachers to develop a positive attitude toward integrating ICT tools into teaching.
- For teachers, it is necessary to increase the technical support provided to schools or to employ information technology teachers permanently instead of on certain days.
- Finding different sources to access digital materials and selecting materials suitable for students are difficult and time-consuming. In addition, the content and materials provided by the Ministry are not sufficient. Therefore, ready-made content and materials can be offered by the Ministry.
- Students can eliminate the security restrictions of ICT devices, and use them for watching movies and playing games other than teaching purposes. For this reason, teachers stated that students should be informed about the educational purpose and functions of these tools, and should be

inspected both at school and outside of school without resorting to banning them. They also suggested raising awareness among students and parents about the benefits and limitations of using ICT in education is very important.

- One of the reasons why teachers cannot adequately integrate ICT tools into their lessons is the subject density in the education program. Teachers have suggested that digital content and materials for course contents in the education program should be designed and provided by the Ministry.

Solutions Proposed by School Administrators

In the interviews with school administrators, some solutions were suggested regarding the problems experienced in effectively integrating secondary education learning-teaching processes with ICT. These solutions are as follows:

- It is suggested as a priority to eliminate problems in schools' IT infrastructure, particularly Internet connection problems.
- In order to use the ICT tools with caution, it was stated that these tools should be adopted by all stakeholders in education and that necessary assistance should be obtained from experts when necessary. It is suggested to organize the school-based practical training sessions for teachers to use these tools for teaching.
- It is necessary to raise students' awareness about the use of ICT hardware and software tools for educational purposes.

DISCUSSION, CONCLUSION, and SUGGESTIONS

In this study, the current situation regarding the use of ICT in secondary education learning-teaching processes is revealed, and the problems encountered in the process and potential solutions to these problems are presented in line with the views of teachers and school administrators. According to the findings of this study, teachers frequently use ICT tools such as smart boards, printers, the Internet and web applications in their teaching processes. However, the rates of tablet and education IT network (EBA) use were low. In their studies, Ayan (2018) and Kılıç Koçak (2019) state that teachers do not have sufficient knowledge about the education information network and have problems accessing or uploading EBA content. Providing teachers with sufficient in-service training on EBA and smart boards and ensuring that they are competent in this regard will ensure that EBA serves its purpose. ICT tools are mostly used by teachers to present course content to students and make courses interesting. Ismail, Omar & Raman (2021); Mumtaz (2000) similarly stated in their studies that teachers generally use the ICT tools because these tools make their lessons more interesting and easier for learners. On the other hand, the ineffective use of technology by students, such as the use of tablets for games, is stated as a problem. Durak and Sarıtepeci (2017) point out that the use of technology increases participation in the classroom, but its misuse, which is too game- or entertainment-oriented, can distract students and lead to indiscipline problems.

Teachers' possession of personal computers and their interest in these tools, as well as the technical assistance provided at schools, were stated as factors supporting the use of computers by teachers. It is especially important to have a permanent information technology teacher at schools to provide technical support. Research suggests that providing support to teachers increases the use of ICT in teaching (Kaya & Usluel Koçak, 2011; Yücel et al., 2010). The support provided by school administrations is deemed sufficient in terms of teachers' use of ICT in teaching. The scope of this support was explained by school administrators as solving problems quickly and not imposing restrictions on access to ICT tools.

Likewise, the potential contributions of in-service training programs in integrating ICT with learning-teaching processes are also emphasized. Studies have revealed that teachers' training in the integration of ICT (Xu & Zhu, 2023) is as important as adequate support from administrators (Mirzajani et al., 2016). It can be seen that the training that teachers received on the smart board within the scope of the FATİH project is useful in incorporating ICT tools into teaching, but these trainings should be specific to the subject and should be practice-oriented. In his study on the use of smart boards, Gündoğdu (2014) states that methodical-didactic methods suitable for smart boards should be taught to teachers in a practical way. According to Kabakçı (2009), in-service training is not considered useful when it does not include practical activities. Şendurur (2012) and Göktaş (2006) highlighted the same points in their studies regarding the effectiveness of in-service teacher training. In particular, identifying teacher needs and designing educational

content to include the use of ICT for teaching come to the fore. Similarly, Saban (2009) emphasized that such trainings should be compatible with learning objectives and should focus on the integration of ICT tools into the teaching-learning process. The lack of in-service training on ICT is an important barrier to the integration of ICT in education in Turkey (Turgut & Aslan, 2021). It is important that in-service trainings organized for technology integration are planned according to technology usage levels, carried out face-to-face and field-based in order to better respond to the needs of teachers (Yıldırım, 2020).

In terms of incorporating ICT tools into education, the participants stated that the curricula were appropriate in terms of outcomes, instructions and, teaching activities. However, teachers cannot allocate sufficient time to the use of ICT tools and other related activities in their lessons due to the density of subjects in the curricula. At the same time, teachers and school administrators regard preparing these tools for use and accessing and selecting appropriate materials as time-consuming. This situation may prevent teachers from using ICT tools in their lessons, although the majority of them have a positive opinion on the use of ICT in education. Similar to this result, Uluyol and Şahin (2014) pointed out that ICT-related innovations also require changes in curricula. Özgüler and Özgüler (2020) recommend that education IT network provide essays, question and answer activities, and slides compatible with the lessons in accordance with the curriculum in order to integrate ICT into the curriculum.

The results of the study conducted by Bozkuş and Karacabey (2019) in which they examined the integration process of information technologies in education within the scope of the FATİH Project are similar to the results of this study. It draws attention to the strengthening of the technical infrastructure, face-to-face and practical in-service training, and informing parents about the project for a more effective technology integration.

Finally, Demir (2024) examines the effects of the FATİH Project, especially from the perspective of in-service teachers, through a systematic literature review. The results show that the limitations presented in this study remain valid and the problems encountered continue today. It is important to improve technical infrastructure and support services; to support teachers with long-term, specialized in-service training according to branch and IT skills; to increase conscious, safe, manageable and measurable ICT use, and to restructure curricula to support the use of technology.

Teachers and school administrators have stated that there are various problems regarding the use of ICT in learning-teaching processes. Inadequate IT infrastructure, teachers' lack of knowledge and experience in accessing and selecting appropriate materials, not in-depth in-service training, students' use of ICT tools for purposes other than their intended purpose, and subject density in curricula are the main problems. Based on the study findings, the priorities that need to be done regarding the more effective use of ICT in education are as follows:

- Solving IT infrastructure problems such as outages and completing infrastructure works
- Taking necessary steps and making improvements to ensure a more functional use of smart boards and tablets
- Support teachers' technical and professional use ICT tools more effectively in their teaching and ensuring the continuity of this support
- Structuring professional training to include rich content and sample digital applications for applied fields and teachers' fields
- Provide training to teachers on selecting or developing appropriate digital materials for course content by scanning resources, such as the internet and education portals
- ICT tools and materials that can be used in teaching courses may be contained in teacher guidebooks. They can be collected under a certain system to make them ready for teachers to access,
- Carrying out activities to ensure that all teachers are informed about the Education Information Network portal established for this purpose and ensuring their active use of the portal
- Ensuring that all stakeholders, especially teachers, students, school administrators, and parents, gain awareness about the benefits and safe use of ICT in the learning-teaching processes
- Organize educational programs to provide sufficient flexibility and time for teachers to plan and implement lessons related to the use of ICT and enrich tools and instructions regarding the use of ICT.

Ethical Statement

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GENİŞLETİLMİŞ ÖZET

Türkiye'de 1980'lerden bu yana okullarda teknolojinin geliştirilmesi ve kullanımı konusunda öğrenci, öğretmen ve yöneticilerin eğitilmesi için çalışmalar yürütülmektedir (Saban, 2007; Uşun, 2003). Türkiye'de Milli Eğitim Bakanlığı (MEB) tarafından yürütülen bu çalışmaların en kapsamlısı 2010 yılında başlatılan ve FATİH projesi olarak adlandırılan Fırsatları Artırma ve Teknolojiyi İyileştirme Hareketi projesidir. Bu proje, eğitimde kaliteyi arttırmak ve fırsat eşitliğini sağlamak amacıyla, tüm eğitim kurumlarında derslerde Bilgi ve İletişim Teknolojileri (BİT) araçlarının etkili kullanımını hedeflemektedir. Projenin ilk aşamasında, tüm sınıflara akıllı tahta ve internet bağlantısı sağlanması, her öğretmen ve öğrenciye tablet bilgisayar verilmesi ve okullara doküman kameralarının temin edilmesi planlanmıştır. İkinci aşamada ise öğretim programı ve öğretmen kılavuz kitaplarının, BİT araçlarının entegrasyonunu destekleyecek şekilde yeniden düzenlenmesi hedeflenmiştir. Ayrıca, proje kapsamında öğretmenlerin BİT araçlarını etkili bir şekilde kullanabilmeleri için kapsamlı hizmet içi eğitim programların düzenlenmesi öngörülmüştür. BİT kullanımını içeren bu süreç, öğretmenler, öğrenciler, okul yöneticileri gibi farklı paydaşlar arasındaki etkileşimlerden doğrudan ya da dolaylı olarak etkilenmektedir (BECTA, 2003; Cuban vd., 2001; Ertmer, 2005; Yıldırım, 2007). Sürecin merkezinde yer alan öğretmenler ve okul yöneticileri, bu yeniliklerin öğrenme ortamlarına etkili bir şekilde entegre edilmesinden birinci derecede sorumludurlar (Karaduman, vd., 2011). Araştırma bulguları, MEB tarafından BİT'in öğrenme süreçlerinde entegrasyonuna ilişkin paydaşların olumlu tutumlar sergilediklerini ortaya koymaktadır (Bingimlas, 2009; Usluel ve diğerleri, 2007). Fakat, öğretmen ve yöneticilerin bu süreçte çeşitli sorunlarla karşılaşabildikleri de görülmektedir (Earle, 2002; Hew & Brush, 2007; Usluel et al., 2007). Bu karmaşık süreçte başarı sağlanabilmesi için etkili unsurların belirlenmesi ve karşılaşılan sorunların doğru bir şekilde ele alınması büyük önem taşımaktadır.

Bu çalışmanın amacı, FATİH projesi kapsamında Antalya'daki ortaöğretim okullarında BİT'in öğrenme-öğretme süreçlerine entegrasyonunda mevcut durumu tespit etmek, karşılaşılan sorunları ortaya çıkarmak, öğretmen ve yöneticilerin görüşleri doğrultusunda çözüm önerileri sunmaktır. Bu amaçlara paralel olarak çalışmada aşağıdaki araştırma sorularına yanıt aranmaktadır:

1. Antalya ilinde seçilen üç ortaöğretim okulunda BİT'in öğrenme-öğretme süreçlerine entegrasyonuna ilişkin mevcut durum nedir?

2. Bu okullarda BİT'in öğrenme-öğretme süreçlerine entegrasyonunda karşılaşılan sorunlar nelerdir?

3. BİT entegrasyonunda karşılaşılan sorunlara yönelik çözüm önerileri nelerdir?

Bu çalışma nitel araştırma desenlerinden durum çalışmasıyla tasarlanmıştır. Durum çalışmalarının eğitimde yeni uygulamalar geliştirmeye yönelik araştırmalarda yararlı olduğu kanıtlanmıştır (Merriam, 2009). FATİH projesi kapsamında sunulan BİT araçları ve eğitim uygulamalarında ortaya çıkan eksikliklerin tespit edilmesi ve bu yeni uygulamanın öğretmenler, okul yöneticileri ve politika yapıcılar da dahil olmak üzere tüm paydaşlara bir değerlendirme sunması amacına hizmet edeceği düşünüldüğü için durum çalışması tercih edilmiştir.

Çalışmanın katılımcıları iki aşamada seçilmiştir. İlk aşamada, çalışmanın yürütüleceği üç okul tipik durum örneklemesi ile belirlenmiştir. İkinci aşamada ise sekiz farklı alandan 22 öğretmen ve 7 yönetici maksimum

çeşitliliğe dayalı bir örnekleme yöntemi ile seçilmiştir. Çalışma verileri, yapılandırılmış anket ve yarı yapılandırılmış görüşmeler aracılığıyla toplanmıştır. Diğer nitel yaklaşımlardan farklı olarak durum çalışması, araştırmacıların nicel anket verilerini toplamasına ve entegre etmesine olanak tanıyarak incelenen olgunun bütüncül bir şekilde anlaşılmasını kolaylaştırmaktadır (Baxter & Jack, 2008, s.554). Anket formunun ilk bölümünde öğretmenlerin kişisel bilgileri yer almaktadır. İkinci bölüm, öğretmenlerin BİT'i öğretimle bütünleştirme sürecinde kullandıkları BİT donanım ve yazılım araçları, bunları kullanım amaçları ve kullanımlarını etkileyen faktörler hakkındaki görüşlerini belirlemeyi amaçlamaktadır. Ayrıca öğretmenlere ve okul yöneticilerine yönelik iki ayrı yarı yapılandırılmış görüşme formu da geliştirmiştir. Verileri analiz etmek için içerik analizi ve betimsel istatistikler kullanılmıştır. Geçerlik ve güvenirliği sağlamak için bazı önlemler alınmıştır. Görüşmelerin analizi bulgular bölümünde katılımcıların ifadelerinden doğrudan alıntılar yapılarak sunulmuştur. Bulgular kavramsal çerçeveye uygun olarak düzenlenmiştir. Ayrıca katılımcıların belirlenmesinde çeşitlilik sağlanması da dış geçerliliğe katkı sağlamıştır (Merriam, 2009). Gönüllü katılım ve katılımcı anonimliğine dikkat edilmiştir.

Bulgulara göre öğretmenlerin bilgisayar, akıllı tahta, yazıcı, internet ve web uygulamalarını sıklıkla kullandıkları; tablet ve eğitim bilişim ağının kullanım oranlarının düşük olduğu görülmektedir. Akıllı tahta, ders içeriğini görselleştirmek amacıyla öğretmenlerin çoğunluğu tarafından kullanılmaktadır. BİT araçlarına, öğrenim içeriğini sunmakla birlikte öğrencilerin derse ilgisini çekmek ve mesleki gelişim amacıyla da başvurulmaktadır. Öğretmenlerin çoğunluğu öğretim programlarının BİT kullanımıyla uyumlu olduğunu belirtmiştir. Öğretmenlerin çoğunluğu BİT kullanımına ilişkin bir hizmet içi eğitime katılmıştır. Eğitim içeriğinin yüzeysel olması, alanlarına özgü olmaması, uygulama eksikliği ve katılımcı ihtiyaçlarının göz ardı edilmesi ifade edilen sorunlardır.

Öğretmenler, BİT araçlarını kullanırken dışarıdan bir desteğe ihtiyaç duyduklarını belirtmiştir. Okul yönetiminin BİT kullanıma yönelik desteği yeterli görülmüştür. Öğretmenler arasında BİT araçlarının kullanımına yönelik işbirliği olduğu; materyal paylaşımı, donanım ve yazılımların kullanımı gibi konularda bu işbirliğinin sağlandığı belirtilmiştir.

Öğretmenlerin öğretimde BİT entegrasyonuna ilişkin ifade ettikleri sorunlar beş başlık altında ele alınmıştır: Altyapı, öğrenci, öğretmen, materyal ve program kaynaklı sorunlardır. Altyapıya ilişkin internet bağlantısı kesintisi ve sınırlı erişim, akıllı tahta ve tabletlerden kaynaklanan teknik arızalardan bahsetmişlerdir. Velilerin teknoloji kullanımına ilişkin olumsuz yaklaşımları ve öğrencilerin bu araçları bilinçsizce kullanımı sorun olarak ifade edilmiştir. Öğrenciler, BİT cihazlarının güvenlik kısıtlamalarını ortadan kaldırmakta ve bunları film izlemek ve oyun oynamak için kullanabilmektedirler.

Öğretmenlerin BİT araçlarını derslerine yeterince dahil edememesinin nedenlerinden biri; öğretim programının yoğunluğudur. Ayrıca uygun materyalin seçimiyle ilgili olarak sorun yaşanmaktadur. Öğretmenler; video, sunum, oyun ve eğitim CD'leri gibi ihtiyaç duyulan materyallerin belirli bir sistem içinde hazır bir şekilde verilmesi gerektiğini belirtmişlerdir. Öğretmenlerin bu araçları kullanma konusunda kendilerine güvenmedikleri de diğer bir bulgudur. Öğretmenler materyal oluşturmak için yazılım programlarını kullanmakta zorluk yaşamaktadırlar. Bazı öğretmenler akıllı tahtaların ve video gösterimlerinin öğrencileri süreçte pasif hale getirdiğine inanmaktadır.

Okul yöneticileri BİT'in öğrenme-öğretme süreçlerine dahil edilmesine ilişkin olumlu tutum göstermektedirler. Okulların BİT altyapısını ve öğretmenlerin BİT araçlarını kullanımını en ileri düzeyde olarak tanımlamışlardır. Bu sürece ilişkin ifade edilen sorunlar; BİT altyapısından kaynaklı teknik sorunlar, cihazların yanlış kullanımı, düşük internet hızı, akıllı tahta arızalarıdır. BİT araçlarının ders esnasında öğrenciler tarafından -oyun, web sayfalarında gezinti vb.- amacı dışında kullanımı ise ifade edilen diğer bir sorundur.

Bu sorunlara ilişkin öğretmenler ve yöneticiler tarafından getirilen başlıca çözüm önerileri şunlardır:

- Akıllı tahta yerleşimlerinde sınıfın fiziksel koşullarının dikkate alınması,
- Akıllı tahtaların daha işlevsel hale getirilebilmesi için şifreli giriş sistemi, virüs programlarının yüklenmesi ve tabletlerle etkileşimli kullanımın sağlanması,
- Okullarda internet bağlantısıyla ilgili sorunların çözülmesi ve yüksek hızlı internetin sağlanması,
- Tabletlerin işlevselliğini artırmak için ofis programları, ders kitapları gibi gerekli materyallerin hazır olarak yüklenmesi,

- Hizmet içi eğitimlerin uygulamalı, konu alanına özgü materyalleri içerecek şekilde düzenlenmesi ve sürekliliğinin sağlanması,
- Okullara sağlanan teknik desteğin iyileştirilmesi veya bilişim teknolojileri öğretmenlerinin belirli günler yerine okullarda sürekli olarak bulunması,
- Öğrencilerin BİT araçlarının eğitimsel amacı ve işlevleri hakkında bilgilendirilmesi ve velilerde BİT'in eğitimde kullanılmasının yararları ve sınırlamaları konusunda farkındalık yaratılması,
- Ders içeriklerine ilişkin dijital içerik ve materyallerin bakanlık tarafından tasarlanıp sağlanması önerilmiştir.

Bu çalışmada, ortaöğretim öğrenme-öğretme süreçlerinde BİT kullanımına ilişkin mevcut durum ortaya konulmuş, süreçte karşılaşılan sorunlar ve bu sorunlara yönelik olası çözümler öğretmen ve okul yöneticilerinin görüşleri doğrultusunda sunulmuştur. Öğretmenler akıllı tahta, internet gibi araçları sıklıkla kullanırken, eğitim bilişim ağını nadiren kullanmaktadır. Ayan (2018) ve Kılıç Koçak (2019) çalışmalarında, öğretmenlerin eğitim bilişim ağı konusunda yeterli bilgiye sahip olmadıklarını ve EBA içeriğine erişmede veya EBA içeriği yüklemede sorun yaşadıklarını belirtmektedir.

Öğretmenler tarafından BİT araçları çoğunlukla ders içeriklerini öğrencilere sunmak ve dersleri ilgi çekici hale getirmek amacıyla kullanılmaktadır (Ismail, Omar ve Raman, 2021; Mumtaz, 2000). Öğrencilerin oyun amacıyla tabletleri eğitim dışı kullanmaları (Durak ve Sarıtepeci, 2017) diğer bir sorundur. Okullarda sağlanan teknik yardım, öğretmenlerin bilgisayar kullanımını destekleyen bir unsurdur. Öğretmenlere sağlanan teknik desteğin iyileştirilmesi gerekmektedir. Benzer araştırmalar, öğretmenlere destek sağlamanın öğretimde BİT kullanımını artırdığını göstermektedir (Kaya ve Usluel Koçak, 2011; Yücel vd., 2010).

FATİH projesi kapsamındaki öğretmenlerin katıldıkları akıllı tahta eğitimleri faydalı bulunmuş olsa da, bu eğitimlerin konuya özgü ve uygulamaya dönük olacak şekilde geliştirilmesi gerektiği ortaya konmuştur. Öğretmenlerin BİT entegrasyonu konusunda eğitimlerinin (Xu ve Zhu, 2023) yöneticilerden yeterli destek alınması kadar önemli olduğu görülmektedir (Mirzajani vd., 2016). Gündoğdu (2014) akıllı tahtaların kullanımı ile ilgili yaptığı çalışmada, akıllı tahtalara uygun metodik-didaktik yöntemlerin öğretmenlere uygulamalı olarak öğretilmesi gerektiğini belirtmektedir. Şendurur (2012) ve Göktaş (2006) hizmet içi öğretmen eğitiminin etkililiği ile ilgili çalışmalarında aynı noktaları vurgulamışlardır. Özellikle öğretmen ihtiyaçlarının belirlenmesi ve eğitim içeriklerinin öğretimde BİT kullanımını kapsayacak şekilde tasarlanması ön plana çıkmaktadır.

Araştırmanın diğer bir sonucuna göre derslerdeki konu yoğunluğu öğretmenleri BİT araçlarını kullanmaktan alıkoymaktadır. Uluyol ve Şahin (2014) BİT ile ilgili yeniliklerin öğretim programlarında da değişiklik gerektirdiğini belirtmiştir. Özgüler ve Özgüler (2020), BİT'in eğitime entegrasyonu sürecinde EBA'da öğretim programlarıyla uyumlu makaleler, soru-cevap etkinlikleri ve slaytlar sunulmasını önermektedir.