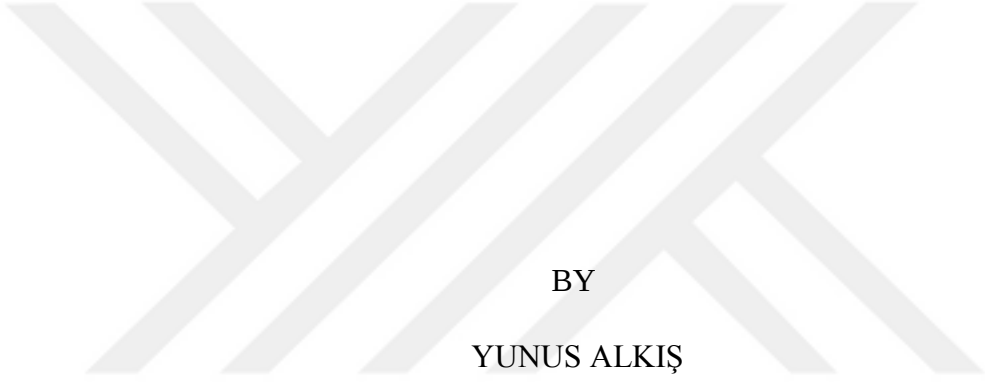


THE LIVED EXPERIENCES OF HIGH SCHOOL TEACHERS WITH
DIFFERENT SUBJECT MATTERS PERTAINING TO THE USE OF
INTERACTIVE WHITEBOARD (IWB): A PHENOMENOLOGICAL STUDY

A THESIS SUBMITTED TO
THE GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES
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BY
YUNUS ALKIŞ

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FOR
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IN
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Approval of the thesis:

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A PHENOMENOLOGICAL STUDY**

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I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

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ABSTRACT

THE LIVED EXPERIENCES OF HIGH SCHOOL TEACHERS WITH DIFFERENT SUBJECT MATTERS PERTAINING TO THE USE OF INTERACTIVE WHITEBOARD (IWB): A PHENOMENOLOGICAL STUDY

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Nowadays IWBs and similar technology-based whiteboards are widely available and affordable. There was a growing popularity and intend to use IWBs in learning environments and in education in recent decade and it is getting more widespread nowadays. However, literature is lack of examples of IWBs use in classrooms that addresses the lived experiences of teachers. Thus, it is very important to investigate and highlight the lived experiences of teachers for its contribution on providing a more effective learning environment in the classrooms. The primary purpose of this study is to understand and describe the lived experiences of different subject matter high school teachers with use of Interactive Whiteboard (IWB) in their classrooms for instructional purposes in depth and to arrive at the essence of their lived experiences of the phenomena. Accordingly, transcendental phenomenological framework was selected as a methodological framework in this study. Phenomenology is an appropriate and applicable methodology for the purposes of the present study in order to understand and describe the lived experiences of different subject matter high school teachers with use of Interactive Whiteboard (IWB) in their classrooms for instructional purposes in-depth and to arrive at the essence of their lived experiences of the phenomena. In the study, purposive

sampling technique was used. In the current phenomenological study, data were collected through in-depth multiple interviews with each 12 participants in the cycles of several weeks in the study. Accordingly, in the proper data collection process 3 discrete serial in-depth phenomenological interviews were conducted with each of the participants of the study. Data analysis process was employed by the phenomenal analysis procedure and guidelines. The practical and scientific applicability of the study provides a convincing and persuasive statement about significance of the problem which is worth researching.

Keywords: Phenomenological Research, Phenomenology, Teachers' Lived Experiences, Interactive Whiteboard (IWB), Instructional Use

ÖZ

ETKİLEŞİMLİ TAHTA KULLANAN FARKLI BRANŞLARDAKİ LİSE ÖĞRETMENLERİNİN YAŞANMIŞ DENEYİMLERİ: BİR OLGU BİLİM ÇALIŞMASI

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Doktora, Bilgisayar ve Öğretim Teknolojileri Eğitimi Bölümü

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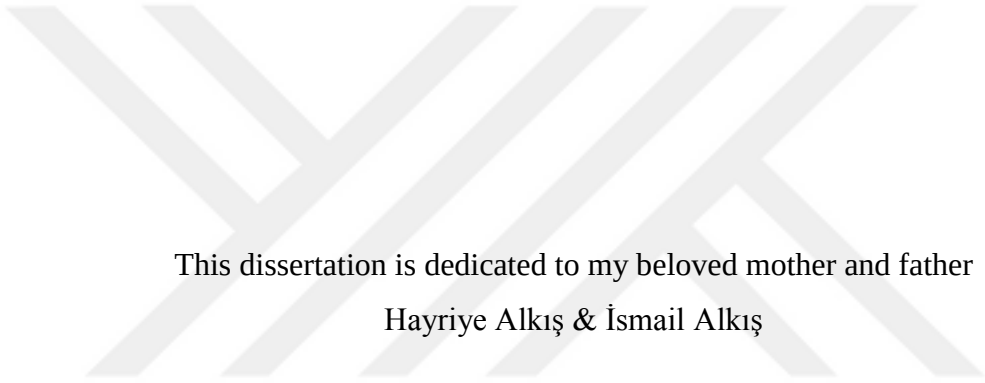
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Günümüzde etkileşimli ve benzeri teknoloji tabanlı akıllı tahtalar yaygın olarak mevcut ve uygun fiyatlıdır. Etkileşimli tahtaların eğitim ve öğrenme ortamlarında kullanılması amacı ve popülaritesi son on yılda artmaktadır ve günümüzde daha da yaygın olmaya başlamaktadır. Ancak, literatürde etkileşimli tahtaların sınıflarda kullanımı ve öğretmenlerin yaşanmış deneyimlerini ele alan pek çalışma bulunmamaktadır. Bu yüzden, sınıflarda daha etkin bir öğrenme ortamı sağlanmasına yönelik katkılarından dolayı öğretmenlerin yaşanmış deneyimlerini araştırmak ve vurgulamak çok önemlidir. Bu çalışmanın temel amacı kendi derslerinde öğretim amaçlı etkileşimli tahta kullanan farklı branşlardaki lise öğretmenlerinin yaşanmış deneyimlerini derinlemesine anlamak ve tanımlamak ve bu olguyla ilgili yaşadıkları deneyimlerin özüne varmaktır. Buna göre, bu çalışmada transandantal fenomenoloji metodolojik/yöntem bilimsel çerçeve olarak seçildi. Fenomenoloji bu çalışmanın amaçları için uygun ve uygulanabilir bir yöntemdir. Bu çalışmada, amaçlı örnekleme tekniği kullanılmıştır. Bu fenomenolojik çalışmada, veriler 12 katılımcının her biri ile yapılan derinlemesine birkaç haftalık döngülerden oluşan görüşmeler yoluyla elde edilmiştir. Buna göre, uygun veri toplama sürecinde çalışmanın katılımcılarının her biri ile 3 ayrı seri derinlemesine fenomenolojik görüşmeler yapılmıştır. Veri analizi sürecinde fenomenolojik analiz tekniği ve prosedürü kullanılmıştır. Çalışmanın

pratik ve bilimsel uygulanabilirliđi sorunun önemi ve arařtırmaya deđer olduđu hakkında ikna edici ve inandırıcı bir açıklama sađlıyor.

Anahtar Kelimeler: Olgu Bilimsel Arařtırma/Fenomenolojik Arařtırma, Olgu Bilim/Fenomenoloji, Öğretmenlerin Deneyimleri, Etkileřimli Tahta, Öğretim Amaçlı Kullanım





This dissertation is dedicated to my beloved mother and father
Hayriye Alkış & İsmail Alkış

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CHAPTER 1

INTRODUCTION

This study was conducted to understand and describe the lived experiences of different subject matter high school teachers with use of Interactive Whiteboard (IWB) in their classrooms for instructional purposes in depth and to arrive at the essence of their lived experiences of the phenomena. This chapter starts with an introduction and followed with a discussion on background of the problem. Then, the problem is stated and the purpose of the study is described. In the following sections, significance of the study is discussed and research question is explained. Assumptions, limitations and delimitations are provided. The chapter ends with a list of definition of terms and a brief summary of the chapter and a statement of what is included in chapters 2 and 3, under the subheading, organization of the study.

1.1. Background of the Problem

The history of Interactive White Boards (IWBs) that dates back to the time 1991 by the David Martin and Nancy Knowlton' company, namely, SMART Technologies, was founded and at that time the company's primarily aim was to create a whiteboard that would operate as a computer (SMART Tech, 2015). After rapid development in technology and recent technological trends based on traditional blackboard, IWBs found its place into classrooms of the twenty-first century as a second-generation revolutionary teaching tool (Betcher and Lee, 2009). Nowadays, IWBs are also known as SMART Board, Electronic or Digital Whiteboard.

Many forms of IWBs technology has been started to be used in the field of education in the 1990's. Particularly, in the early 2000's education acquainted with IWBs technology and has been began to use in K-12 and higher education with large-scale projects by many countries such as Australia, Italy, Mexico, Netherlands, New Zealand, Turkey, United Kingdom, and USA (BECTA, 2004; Smith, Higgins, Wall, & Miller, 2005; Greenberg, 2009; Holmes, 2009; Somyürek, Atasoy, & Özdemir, 2009; Lee, 2010).

In the case of Turkey, FATİH (Increasing Opportunities and Improvement of Technology Movement) large-scale innovative technology project was launched in 2010 by the Ministry of National Education. Under the scope of the FATİH project, all schools were equipped with LCD Panel IWBs, Tablets, and Internet, and integrated into Turkey's educational system. The main purpose of the FATİH project is to ensure equality of opportunity in education and to improve the technology in the schools by using ICT tools in teaching-learning process to be more appealing to the senses for the effective use in the courses (MEB, n.d). In FATİH project, teachers are located in the center of the project and so as to need to be investigated the teachers' point of views in the implementation process of the project.

Interactive Whiteboards that can be controlled by touching the board or via a specific pen are defined as large, touch-sensitive boards that are connected to a computer and a projector which displays the image on the board from the computer screen. (BECTA, 2003). The potential applications of IWBs are defined by BECTA (British Educational Communications and Technology Agency) and listed as: • using web-based resources in whole-class teaching, • showing video clips to help explain concepts, • demonstrating a piece of software, • presenting students' work to the rest of the class, • creating digital flipcharts, • manipulating text and practicing handwriting, • saving notes written on the board for future use, • quick and seamless revision (2003). In addition, applications and capabilities of IWBs have intentions to enhance the quality of teaching and learning in schools (Bakadam & Asiri, 2012).

According to Bidaki & Mobasheri (2013), although there are some practical issues with use of IWBs in classrooms such as teacher training, buying of IWBs/costs, and supplying practical IWB software, there are also some benefits of IWBs use such as improving pedagogical skills, gain the students' attention, saving teaching time, and help to expand the rate of using other ICT tools in the classrooms. IWB technology is seen get investment of financial resources regard to installation in the schools with respect to promises for students in terms of helping and making learning more engaging in technical subjects in which they struggle to engage and succeed in (Torff and Tirotta, 2010). IWB helps students in regard to motivate and made the lessons more interesting, attractive, and exciting according to similar findings of study conducted by Hall and Higgins (2005); and Schmid (2008).

There was a growing popularity and intend to use IWBs in learning environments and in education in recent decade and it is getting more widespread nowadays. For the twenty-first century education, IWBs could be a promising tool. Although various IWBs have been used for instructional purposes for quite some time, with each passing day, the development of sophisticated technology and realistic equipment increases. Even though IWBs have been developed and used in various fields, their impact is more noticeable and prominent in the field of education. Besides, the use of IWBs in education has recently drew the attention and interest in order to contribute and support for the effective use on teaching and learning. In order to increase the benefits of IWBs for teachers and students and evaluate the advantages/disadvantages and strengths/weaknesses of interactive whiteboards, there is still needed more qualitative researches to be conducted to understand and describe the lived experiences of teachers with use of Interactive Whiteboards (IWBs). Thus, it is very important to investigate and highlight the lived experiences of teachers for its contribution on providing a more effective learning environment in the classrooms.

1.2.Statement of the Problem

The literature does not offer much extensive and critical insights related to elements of the lived experiences of teachers and practical (technical) issues/challenges of IWBs use. For the teachers, using the interactive whiteboard in the most efficient way requires understanding of both the mode of operation and the potential of IWBs software. Thus, there is a need to understand the link between IWB technology use in classrooms and the lived experiences of different subject matter high school teachers with respect to impacts on teachers / students / teaching process / practices / practical issues, challenges of IWBs use in schools in Turkey. In light of the unique features of phenomenological research method and influence of this pure qualitative method, this study, unlike other IWB researches which are mostly survey-based, obtained the lived experiences of different subject matter teachers with use of Interactive Whiteboards (IWBs) through the deeply interviews. The practical and scientific applicability of the study provides a convincing and persuasive statement about significance of the problem that is worth researching.

1.3.Purpose of the Study

For that matter, the primary purpose of this study is to understand and describe the lived experiences of different subject matter high school teachers with use of Interactive Whiteboard (IWB) in their classrooms for instructional purposes in depth and to arrive at the essence of their lived experiences of the phenomena. Furthermore, the current study also investigates the impacts of the IWBs use on the different subject matter high school teachers' teaching process/practices and the practical issues/challenges of IWBs use in high schools by different subject matter teachers.

1.4.Significance of the Study

Nowadays IWBs and similar technology-based whiteboards are widely available and affordable. However, literature is lack of examples of IWB use in classrooms that addresses the lived experiences of teachers. In contrast to previous survey-based or similar researches, this study puts the lived experiences in the focal point. Besides,

instead a use of same subject matter teachers to transfer experience, different subject matter teachers has participated in the current study. This study helps teachers by obtaining first-hand lived experience opportunities related to IWBs use in high schools by different subject matter teachers. Besides, this study addresses many practical issues/challenges of IWB use in high schools by different subject matter teachers to encounter in their classrooms. This study helps to understand and describe the lived experiences and to facilitate the transition of teachers' pre-use of IWB to the use of IWB in teaching process in their classrooms. In addition, the present study provides opportunities for teachers to see impacts of the IWB use on the different subject matter high school teachers' teaching process/practices.

The majority of existing studies investigated the impacts of using IWB on teachers by focusing on primarily based on specific variables. Additionally, most of the studies are also based on surveys or questionnaires. Likewise, while some studies just focused on a specific subject matter related to IWB, some others used a limited sample size. Similarly, some of the studies selected teachers as participants who have just started using the IWB in their lessons or who are inexperienced in this regard. Regarding the impacts of using IWB, this study was conducted by means of selecting 8 (eight) different subject matter teachers as participants who have experienced using IWB in their lessons for quite a lot of time and teaching different high school levels. Those teachers are appropriate data source by having sufficient knowledge and experience about the use of IWB. Hence, there is a strong need for this kind of study considering the importance of teachers' lived experiences about the use of IWB.

1.5. Research Questions

Specifically, the following central research question and four sub-questions were investigated:

RQ. What are the lived experiences of different subject matter high school teachers with the use of Interactive Whiteboard (IWB) in their classrooms for instructional purposes?

- What are the impacts of IWB use on the different subject matter high school teachers' teaching processes?
- What are the impacts of IWB use on the different subject matter high school teachers?
- What are the impacts of IWB use on the students with respect to different subject matter high school teachers' perspectives?
- What are the practical issues/challenges of IWB use in high schools by different subject matter teachers?

1.6. Assumptions

For this study, the following assumptions are made:

1. There is no dependency in the interviews between participants,
2. The participants are willing to attend to interview sessions,
3. The participants are willing to use IWBs in their classrooms for instructional purposes,
4. The participants will respond accurately to all measures,
5. All relationships among selected variables are linear,
6. The measures employed are reliable and valid indicators of the constructs to be studied,

7. The data will be accurately recorded and analyzed,
8. The purposes, processes, and elements of the framework studied have a degree of applicability and generalizability to the high schools' level courses in the cities and districts throughout the country,
9. The research, data gathering, and findings and conclusions of the study represent "good research".

1.7.Limitations

This study's limitations will provide a better perspective on its contribution. This study is limited to subjects who agree to participate voluntarily. In this current research study, teachers from high schools in Ankara were invited to participate. The results may have been different if other teachers had volunteered. Validity of this study is limited to the reliability of the instruments used, and relies on the evaluations of the participants of the study. Additionally, despite the collaboration of the high schools, the school scheduling requirements may not allow us to conduct the research at consistent times. Another limitation is that contextual factors may influence the results (e.g., place where participants are interviewed). Socioeconomic status of teacher populations is not considered in this study, and may be a contributing variable. These are only a few of the potentially confounding variables that may affect the outcomes of this study.

1.8.Delimitations

The following delimitations are determined for the study. The study will focus on the lived experiences of different subject matter high school teachers with use of Interactive Whiteboard (IWB) in their classrooms for instructional purposes. The other potential aspects, although will be evaluated in the study in some parts, are not targeted within the scope of the study.

1.9. Definitions of Terms

Interactive Whiteboard (IWB): Interactive Whiteboards that can be controlled by touching the board or via a specific pen are defined as a large, touch-sensitive boards that is connected to a computer and a projector which displays the image on the board from the computer screen (BECTA, 2003).

Phenomenology: Phenomenology is a systematic effort to get in touch and communicate with participants' experience of phenomena, reveal and define the meaning structures of lived experiences, and arrive at essence for understanding of the nature or meaning of everyday experiences of the phenomena profoundly (Husserl, 1970a; van Manen, 1990; Lauer 1965).

Essence: Essence is explained as it what makes an experience and an experience' state and quality that is universal or general (Husserl 1969; Moustakas 1994).

Epoché: Epoché [Bracketing] process is identified as setting aside the daily and regular understandings, (pre)judgements, presumptions and presuppositions from prior experiences (Moustakas, 1994; Kvale, 1996; Ashworth, 1999).

EBA: Educational Informatics Network (EBA) is an online social educational platform led by The General Directorate of Innovation and Educational Technologies.

1.10. Summary

Chapter 1 presents the introduction, the background of the problem, the statement of the problem, the purpose of the study, the significance of the study, research questions, assumptions, limitations, delimitations, the definitions of terms, and summary of the study.

Chapter 2 is a review and synthesis of the literature. Chapter 3 presents the methodology used in the study, research questions, design of the study, participants of the study including a description and rationale of the sample, the data collection and data analysis procedures.

CHAPTER 2

LITERATURE REVIEW

The purpose of this chapter is to review the literature to identify use of interactive whiteboard in schools related to prior relevant studies and instances currently used in practice.

2.1.Introduction

It is important for the purpose of the study to understand the current utilizations and existing usage to get insight on how IWBs are used in schools/educational settings in the literature. By understanding existing approaches, it is possible to judge how these approaches can be utilized and extended to develop a unified methodology for the aim of the study. This chapter also includes review of research on different uses of IWBs. Special focus is given on phenomenological studies as they provide more insight on this study's approaches and possible uses of them.

2.2.Synthesis of the Literature

The definition of an IWB

According to the British Educational Communications and Technology Agency (BECTA), an interactive whiteboard, abbreviated as IWB, is “a large, touch-sensitive board which is connected to a digital projector and a computer. The projector displays the image from the computer screen on the board. The computer can then be controlled by touching the board, either directly or with a special pen” (BECTA, 2003). In the year following 2003, the same agency published another report of

interactive whiteboard, a guide for primary schools, in which they used a simple term or definition to describe the function of IWB. According to that definition, the purpose of IWB is “to enable the teacher or pupil to control the computer from the whiteboard itself rather than using a keyboard and mouse, although these can be used as well” (BECTA, 2004). The following figure shows a diagram portraying an IWB works or functions.

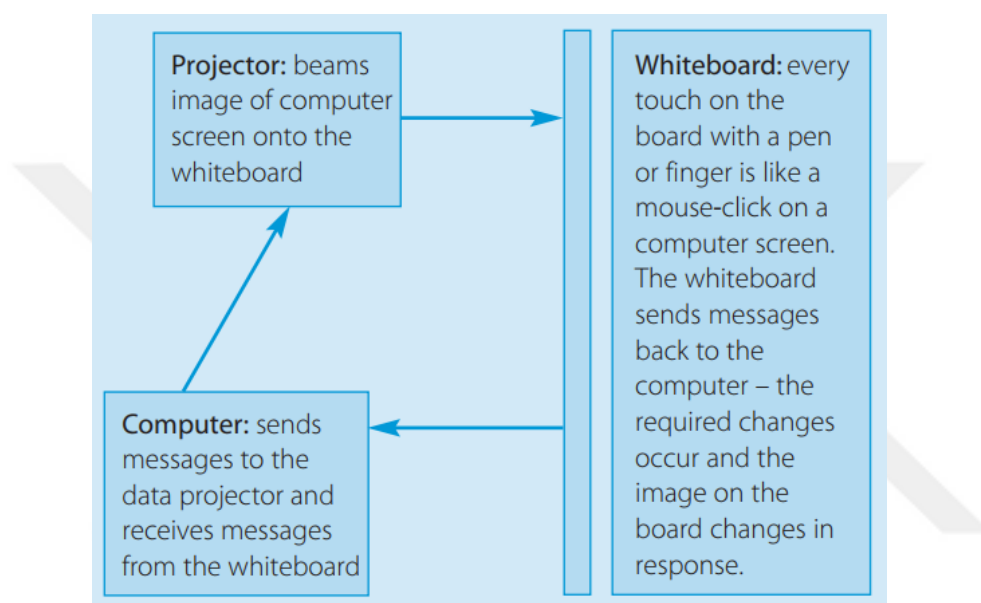


Figure 1. A diagram showing how an IWB works (BECTA, 2004)

Interactive whiteboards could be differentiated in terms of the technologies they are made of. According to the BECTA report, there are three key types of whiteboards: infra-red/ultrasound kits, passive whiteboards, and active whiteboards. The detailed description of these three types are given in Table 1 below.

Table 1

The description of three whiteboards technologies (taken from BECTA, 2004)

Infra-red/ultrasound kits	Infra-red or ultrasound kits fix to any standard whiteboard or any hard surface via clips or suckers. They use special pens (or pen housings to hold standard marker pens). This technology can also be used without a projector for simple save/print functionality. These kits are less expensive than a dedicated whiteboard, but not as robust or flexible. Some whiteboards can be purchased with this technology already installed and secured.
Passive whiteboards	These have a dual membrane resistive board which is touch sensitive. They can sense pressure on the whiteboard from any object from a standard whiteboard marker to a finger. On a very basic level these can be used without a projector to save/print the content on the whiteboard. Note that some passive boards do not advise the use of standard whiteboard markers as these could permanently mark the screen
Active whiteboards	These solid-state impact-resistant whiteboards are operated with an electronic or cordless stylus to detect the content being drawn to the whiteboard. They are more accurate than passive whiteboards, but have the disadvantage of needing a projector to ‘draw’ the image on the whiteboard as the pen does not physically mark the board. They are also more robust than passive whiteboards.

The interactive whiteboards come with a range of embedded functionalities ensured by its firmware or software. The common features of whiteboards include pages, pens and highlighters, interactive activities, templates or backgrounds, and shapes. These features are default in nearly every interactive whiteboard. However, due to

different types of firmware used in IWBs, there could be some distinct features or functionalities among the whiteboards.

Teachers and students' perspectives on the use of IWBs in the classroom

Over the last decade, the Turkish educational system and policies have been undergone many changes regarding the adoption of new media technologies. As part of these new policies, many projects have been designed to bring innovative technologies into the classroom and encourage teachers to incorporate these technologies into their courses. FATİH project, one of the Turkish-based educational initiative, aims to introduce students with information technologies, give them equal opportunities in education, and improve the use of educational technologies in schools ("Fatih Project - Movement of Enhancing Opportunities and Improving Technology," n.d.). The pilot test of the project, which was started in 2010 and continued until 2012, had conducted in more than fifty schools in seventeen different provinces. As part of the project, an interactive whiteboard with an LCD panel was installed in each piloted classroom of the school, and tablets were distributed to students and teachers. This reform-based educational movement has encouraged many researchers in education to wonder what contributions the use of IWB could bring to the classroom.

A bunch of research studies has been conducted with the teachers who used IWB in their lessons as part of the Fatih project pilot. For instance, one of the studies examined teachers' perspectives on IWB use in the classroom (Kocak & Gulcu, 2013). The teachers who participated in the study had previously taken a training course about how to effectively use IWB in the lessons, and therefore, they were familiar with the use of IWB in the course of teaching. In the study, the data were collected from 121 high school teachers through an attitude scale. The study reported that teachers had positive opinions about IWB use in lessons. Furthermore, it was found that teachers' opinions on IWB were not associated with their age, gender, and year of the teaching profession.

The potential advantages and disadvantages of integrating new technologies into educational settings have long been recognized by teachers who are keen to make use of instructional technologies in their lessons (Kara & Cagiltay, 2017). Moreover, there is a relatively large body of literature that portrays teachers' and students' opinions about the use of IWB in the classroom. The study by Tosuntaş, Karadağ, and Orhan (2015) is one of them. In their study, Tosuntaş, Karadağ, and Orhan (2015) tried to find out the factors that affect the teachers' acceptance and use of IWB in the lessons. The study utilized the structural equation model to reveal the cause-effect relationship between the variables being investigated. The study data derived from 158 teachers, who were selected based-on criteria sampling, using a 34-items questionnaire they developed in the study. The study reported that teachers' behavioral intention to use IWB in their courses is affected by the performance and effort they are expected to show in the classroom and social influence. In addition to that, it was reported that teachers start spending more time using IWB as their intention to use IWB in the future is increased, and facilitating conditions are improved. Saltan and Arslan (2013) conducted a similar study, but they used a case study method to investigate teachers' perceptions towards the use of interactive whiteboards (IWBs) within three focus areas: perceived usefulness, perceived ease of use and attitude towards interactive whiteboards. The study data, which were collected through a questionnaire, stemmed from 34 primary school teachers (male:12; female:22) in various subject areas. The researchers made use of descriptive statistics, predominantly frequencies and percentages, to analyze the collected data. The study reported that in addition to having positive attitudes about IWB, teachers considered the use of IWB in the classroom easy and useful. However, it was revealed that teachers perceived IWB more useful than ease of use. Like Saltan and Arslan (2013), Alparslan and İċbay (2017) examined high schools teachers viewpoints about the IWB in the lessons. The inspection of the study data which derived from 13 teachers (7 female, 6 males) by interviews showed that teachers were devoid of proper training for using the IWBs in the classroom. It was also reported that while teachers used the IWBs for various educational purposes such as

presentation, movie-animation-video, listening, visuals, and games, students used it for the purpose of entertaining.

In another study, the role of IWB as a pedagogical artifact in helping preschool teachers teach mathematics and form the layout of presenting the learning activities was investigated (Bourbour, Vigmo, & Samuelsson, 2015). In the study, IWB was integrated into preschool practices. The primary data of the study derived from the videos that recorded teachers during their practicing with IWB in mathematics courses. Besides, the researchers resorted to interaction analysis to inspect the video-recorded data. The study findings showed that IWB could be used to encourage students to engage in challenging math activities that involve problem-solving and reasoning tasks and intrigue their interests in the learning of the subject. Similarly, in this qualitative case study, Maher (2011) examined the effect of IWB on primary school students' understanding of texts. The study was conducted over three consecutive semesters, and both teachers and students (8-10 age range) participated in the study. In the classes that were selected for the study, the students engaged in the lesson activities that required writing a response to a narrative. The study investigated teachers' and students' experiences in using IWBs through semi-structured interviews and questionnaires respectively. In the study, a video-recorder was used to capture classroom interactions and dynamics. The study reported that IWB, because of its interactive features, can facilitate students access to a range of multimodal resources, which can assist students in understanding a narrative and empower them to write a joint response.

In the context of education, the efforts to integrate IWBs into the school classrooms with various levels have been intensified as IWB use gains popularity across the private and public schools. In this regard, the research conducted by Mathews-Aydinli and Elaziz (2010) is important because it portrayed a large cohort of students and teachers' perspectives on the use of IWB technology and its contributions in the courses. In their study, Mathews-Aydinli and Elaziz (2010) investigated students ($n=458$) and teachers ($n=82$) attitudes about IWB use in the language-teaching field. They used a questionnaire to collect data from a cohort of participants in various

school levels from primary school level to university level. The questionnaire data were supported by interviews with administrators and several-hour video-taped observations in IWB-based classes. After analyzing the study data, teachers and students' attitudes were found to be in favor of the use of IWBs in language instruction. In addition to that, it was reported that teachers' enjoyment of IWBs depends on the amount of time they use it. Moreover, it was found that as students' exposure to IWB is increased, they become more aware of the distinctive features of IWB technology. In another similar study, the researchers investigated the attitudes of teachers and students towards IWB use in the courses (Balta & Duran, 2015). They collected the study data employing two surveys from 23 teachers and 225 students at the secondary and high school level. The data collected in the study was analyzed utilizing the inferential statistical models. The study reported that students enjoyed using IWB in math lessons more than in the other lessons like literature and visual arts. In addition, elementary school students were more content with the use of IWB in the classroom than high-school students. As for the findings of the teachers, it was reported that teachers attitude about IWB was akin to the students.

Besides, previous research examined the perceptions of teachers towards IWBs and how they use IWBs in their lessons (Türel & Johnson, 2012). For the collection of the data, a questionnaire was developed in the study and then distributed to 174 teachers from various school grades (6 to 12) who have previous experiences of IWB use. According to the study findings, teachers believed that IWBs have particular features that could be leveraged in different subjects. Teachers also reported that IWBs could be a very useful teaching and learning tool by facilitating collaboration among colleagues and allowing teachers to develop effective instructional strategies and versatile skills of IWB use. Similarly, Lai (2010) examines the perceptions of secondary school teachers towards interactive whiteboard training workshops. The data collected in the study stemmed from the observations and the interviews with six secondary school teachers. After analyzing the data, the author pointed out three important findings. For teachers in the study, using IWBs in classrooms is beneficial, and it is necessary to attend training workshops about IWB use. The other important

finding was that teachers thought that it is extremely important to know how IWB is practically used because knowing practical IWB uses could help them integrate IWB practices into their lessons or teaching pedagogy.

It appears that most of the research studies that have been conducted so far give their focus more on teachers in urban schools rather than teachers in rural schools. Yet, there are still some researchers who are interested in knowing how teachers in rural regions perceive or think about the impact of interactive whiteboards on their classroom teaching practices. In this regard, a study conducted by Winzenried, Dalgarno, and Tinkler (2010) is important. Winzenried, Dalgarno, and Tinkler (2010) examined the views of primary and secondary teachers on the effects of interactive whiteboards to teaching and learning. In the study, a phenomenological perspective was adopted to ascertain the lived experience of teachers in relation to the impact of the interactive whiteboards on teaching practice. A total of six teachers, two from primary school and four from secondary school, participated in the study and provided their own perspectives regarding the impact of the interactive whiteboards on teaching practice. After analyzing the collected data, the researchers explored that teachers were keen for integrating IWB into their teaching practices and had observed the development in student engagement. Besides, the study findings showed that teachers' reflections on IWB helped them to be able to expand their IWB teaching strategies. In addition, it was found that teachers were distinguished in terms of the use of IWB and classroom teaching practices. Differently, instead of in-service teachers, Divaharan and Koh (2010) examined pre-service teachers' IWB learning experiences in a teacher education program. 124 Singaporean pre-service teachers attended the program and were instructed about the interactive whiteboard (IWB) along with the tutor modeling, self-paced exploration, peer sharing, and team-based design projects. During the program, teachers interacted with IWB and implemented it using the lesson plans they had prepared. As a data source, teachers' reflections were collected after the implementation of the lesson plan. The study findings showed that pre-service teachers largely considered IWB as a useful instructional tool to increase student's engagement and active

participation in the learning process. The findings also revealed that pre-service teachers were likely to successfully assimilate new and unfamiliar technological tools like IWBs when they collaborate or work in teams.

Integration of IWBs into school classrooms

Integrating a new technology like IWB into a classroom is bound to change its dynamics and the instructional methods teachers used when teaching the lessons without IWB. Knowing how teachers integrated such pedagogical tools into their courses could help mitigate the challenges during the integration process. A previous study examined the process that involved four teachers' integration of UWBs into their primary school classrooms (Bennett & Lockyer, 2008). The teachers who participated in the study were observed during the lessons one day per week over two semesters. The researchers also conducted interviews with the teachers. Study findings revealed that IWB was extensively used especially during the teaching of subjects such as literacy and numeracy. It was also reported that teachers readily integrated IWB into their existing teaching practices and the use of IWBs did not significantly influence the pedagogical approaches they normally use in the classroom.

The extent to successfully use and incorporate information and communications technology (ICT), specifically the interactive whiteboard into the classroom, seems to rely heavily on teacher's existing pedagogical skills and professional knowledge. Some of the prior research findings corroborate this claim. In a case study, for instance, the researchers examined the extent to which interactive whiteboard contributes to teachers' pedagogic practices in literacy and numeracy (Wood & Ashfield, 2007). The researchers observed and focused on five lessons in both literacy and numeracy, with a total of 75 students. The analysis of the study data, which were stemmed from interviews with teachers, focus-group discussions with students, and observations of whole-class lessons, indicated that teacher's skill and professional knowledge played an important role in mediating students' interaction with IWB, and this, in turn, improve whole-class teaching and Learning. The

mediating role of IWB in the interaction between teachers and students has been reported in other studies as well (Lewin, Somekh, & Steadman, 2008). After embedding interactive whiteboards in the teaching and learning process of primary school students, Lewin et al. (2008) observed positive changes not only in teachers' pedagogic practices but also in students learning outcomes in literacy, mathematics, and science.

The power of the IWBs and advantages of their inbuilt programs/software appears to provide moving material, completing tasks, outlining a content/statement, retention, and recall of data (the call back of previous materials), presenting concepts and many other varieties of techniques (Glover, Miller, Averis, & Door, 2005). According to Jamerson (2002), IWB technology and similar technological improvements changed the relationships between teachers and students.

Through the use of IWB technology, analysis of teachers' reflection and acceptance of this digital technology in their schools bring along the identification of teachers as 'missioners,' 'tentative' and 'luddites' groups within schools (Miller & Glover, 2002). Accordingly, teachers are considered as missionaries who not only understands the technology when compared to the level of usage of IWB technology but also can see and use advantages of the IWBs to meet the needs of both students and teachers as encouraging to use it as a teaching tool in their teaching (Glover & Miller, 2003). Additionally, tentative are defined as teachers who lack of technological skill or confidence to use IWBs so they are not using the technology as frequently as the missionaries as well they need for more training. Lastly, luddites are described as those who see the technology as a threat related to fear of the unknown and they believe that the technology is likely to change the relationship between teacher and student. Looking at the overall, missionary teachers fall into the minority group in schools particularly take a back seat on the list of priorities concerning IWB technology development in the school community.

The need arises to change the approaches within specific subject areas with respect to the use of interactive technology effectively and optimally (Damcott, Landato,

Rainey, & W, 2000). According to Warwick, Hennesy, and Mercer (2011), teachers' intervention is needed to change classroom teaching and learning IWB technology rather alone. Unless teachers produce improved learning experiences and quality teaching based on pedagogical principles for their students, IWBs technology will be just another piece of device/equipment that is wasting our time in the classrooms (Betcher & Lee, 2009).

The potential benefits of the adoption of IWBs technology in classrooms are specified as in a variety of ways from a simple board for writing notes to integrating and using wider range of variety of multimedia resources such as subject-matter contents, pictures, videos, sounds, demonstrations, drawing diagrams, using websites in lessons more easily (Ekhaml, 2002; Johnson, 2002). One of the advantages of IWBs is attracting and getting the attention of students much more powerfully than other classroom resources by motivating students (Beeland, 2002; Smith, Higgins, Wall, & Miller, 2005).

One of the several challenges for schools today is working out how to get all their teachers to adopt the use of IWBs technology and to become a standard and regular part of classroom teaching practice (Betcher & Lee, 2009). Although teachers comprehend the significance of IWBs in classrooms, acceptance of IWB technology is highlighted and delineated the most difficult barrier for integration in teaching by the resistance of teachers to change to keep on former teaching methods (Barak, 2007).

The role of teachers as critical agents in the introduction of IWBs into the classroom cannot be ignored because it is them who mediate integration process, mix IWB with lessons, and use IWB in line with lesson objectives, which all these, in turn, stimulate interactions and interactivity in the classroom (Armstrong et al., 2005). The use of IWB in the classroom inherently poses both challenges and opportunities to teachers. For the effective transition of the use of interactive IWB, it is required that teachers are equipped with specific technical and pedagogical competencies that could be achieved through teacher education and training programs (Beauchamp, 2004).

Researchers have provided ample evidence that the contributions of interactive whiteboards to students' student engagement and learning depend heavily on its effective usage (Glover, Miller, Averis, & Door, 2007; Schuck & Kearney, 2008). This clearly shows that educating future teachers about IWBs are quite important if successful incorporation of IWBs are to be achieved. Because, it has become the fact that teacher's pedagogy, the approaches, and the methods they use to teach, considerably affect student understanding or learning gains. A current study examined the use of interactive whiteboards by pre-service teachers (Campbell & Kent, 2010). In the study, 272 pre-service teachers participated in a training program aiming to guide them into pre-existing and widespread pedagogical models applied in interactive whiteboards. The study data stemmed from a discussion board where participants provide their reflections, including comments, criticizes, opinions, and so on, about the use of ICT in the classroom. The analysis of the qualitative data reveals that student's learning outcome is significantly influenced by how teachers use ICT in the classroom.

The effect of the use of IWBs on learning, engagement, interaction, and motivation

Making use of IWB as an ICT tool in the teaching and learning processes could be rewarding and provide a rich and interactive experience not only for teachers but also for students. A report on ICT impact reviewed study findings regarding the benefits of ICT on learning, learners, teachers, and teaching and barriers (Balanskat, Blamire, & Kefala, 2006). As for the benefits of learning and learners, the report described that the use of ICT tools in the classroom brings about positive improvement in motivation and skills, independent learning, and teamwork. Regarding the impact of ICT tools on teachers and teaching, the report showed that using ICT tools in the classroom leads to an increase in enthusiasm, efficiency, and collaboration.

The emerging literature on IWBs has highlighted some inconsistent and contradictory results regarding the impact of IWBs on different variables associated with students and teachers, and yet a review study reported some convincing

evidence supporting the benefit of IWBs to students' motivation, learning, and achievement (DiGregorio & Sobel-Lojeski, 2010). Furthermore, the study suggested that a set of contextual factors including teacher training, teacher confidence, school culture, technical support, and lesson preparation and practice time play a role in the effect of IWBs on pedagogy, motivation, interaction, perception, learning, and achievement. Some supporting shreds of evidence and further results are also given elsewhere. For instance, the pedagogical contribution of IWB use to teaching and learning is observed in prior studies (Çakıroğlu, 2016; Kennewell & Beauchamp, 2007). Besides, in an experimental study, Şen and Ağır (2014) analyzed the effect of IWB use on primary school students' performance in learning the English language and found that students ($n=75$) who were lectured by IWB outperformed their counterparts ($n=71$) who used blackboard for the presentation of the course content. Using the same research design, Tunaboğlu and Demir (2016) found the positive effect of IWB on secondary school students' achievement in mathematics learning. As to the findings regarding the effect of IWB use on teachers, it has been shown that the teachers' practice in using IWB in the lectures boosted their self-esteem as ICT-literate teachers (Kurtz1, Kochavi, & David, 2013).

A well-known previous review study on the use of IWBs concludes that IWB is likely to transform the traditional way of how learning happens and to increase both students' and teachers' motivation (Higgins, Beauchamp, & Miller, 2007). However, the same study also reported that the effect of IWBs on achievement might not be significant and measurable. Similarly, the other studies found that despite the primary school teachers' and students' positive perceptions of the use of IWB in the classroom, IWB use did not lead to a significant change in the teachers' ways of using technology and classroom interaction (Steven Higgins, 2010). Likewise, in an experimental study, a significant interaction was discovered between classroom interaction and IWB use in English as a Foreign Language classes (Toscu, 2013). However, other studies reported different findings regarding the effect of IWB use on the interaction taking place in the classroom. For instance, Smith, Hardman, and Higgins (2006) investigated whether the use of IWBs augmented the interaction

between student and teacher. The researchers of the study observed teachers in 184 lessons, with and without an IWB, over two years. It was reported that despite the widespread belief that IWB use extensively stimulates the classroom interaction, the study found a small impact of IWB use on teacher–student interaction. However, it was revealed that using IWBs in the classroom increased the pace of the lessons and decreased the amount of time spent on group work.

Torff and Tirotta (2010) conducted an experimental study to examine the relationship between the use of interactive whiteboard technology (IWB) and motivation. Participants of the study consisted of teachers ($n=32$) and students ($n=773$) from the upper elementary grades (3rd, 4th, and 5th). There were 315 students in the control group and 458 students in the treatment group. On the other hand, there were 13 teachers in the control group and 19 teachers in the treatment group. In the study, teachers and students were assigned to the groups based on the score they got on the survey which measured the use of interactive whiteboard technology. Mathematics was the only focused subject in the study. Teachers and students reported their motivational levels through surveys designed and developed by the researchers. After analyzing the students' and teachers' self-reporting data through factor analysis and analysis of covariance (ANCOVA), the study showed that despite the higher levels of motivation by students in the treatment group, a quite weak effect was observed. Also, students who reported a higher level of motivation were affiliated with the teachers who were better in supporting students about interactive whiteboard technology. The authors of the study concluded that despite the popular assertion that IWB enhances motivation, this study did not find a compelling result supporting this claim.

Examining the data of students' and teachers' subjective opinions, views, experiences, perceptions, and attitudes regarding interactive whiteboard (IWB) use and its potential pedagogical benefits could give the researchers insights into understanding what to refrain from and how to leverage IWB when using it in the classroom. Previous research studies have inspected the use of interactive whiteboards from the perspectives of students. In a phenomenological study, the

researchers extensively investigated fifty primary students' views related to the use of IWB in the class (Şad & Özhan, 2012). In the study, purposive sampling was used to recruit students who have experienced IWB for two years in their courses, and the interviews were applied to gather the qualitative data employing focus groups. The study reported that students were satisfied with IWB use because they thought that using IWB in the class was practical and economical, provided a better visual presentation, and enabled them to see more test items on the board. In the study, technical problems were reported to be the most uncomfortable aspect of IWB use. Besides, students were convinced that incorporating IWB into the instruction affected their learning positively. The inferences derived from the study findings highlighted that teachers were incapable of fully benefitting from IWB in the classes and integrating it into their instruction.

A large number of studies have delved into understanding the merits of IWB to teaching, instruction and student learning outcomes. With the increasing adoption of IWB in the classrooms, it becomes necessary for pre-service and in-service teachers to get along with this technology and its features. A prior study investigated how well undergraduate secondary mathematics pre-service teachers could incorporate IWB features into their mathematical lessons (Holmes, 2009). In the study, the researcher inspected the lesson activities developed by each of 13 pre-service teachers as part of a compulsory mathematics method course. The lesson activities were prepared in line with features of IWB and guided by the Technological Pedagogical Content Knowledge (TPCK) framework. The results showed that IWBs have the potential to involve students in different types of visual representations and virtual manipulatives and, in turn, help them foster a conceptual understanding of the subject. A similar study was conducted to examine how IWB could help boost class discourse about key scientific concepts (Murcia & Sheffield, 2010). In the case study, the authors investigated the effects of IWB on classroom discourse about science and teachers' understanding of interactive technology. The lessons with and without the use of the IWB were captured through videos and those videos were then compared in terms of students' participation in science conversations. The study findings

showed that the teachers' interactive pedagogical uses of the IWB, comparing to the classroom without the use of IWB, made a positive contribution to the way students talk about science in the primary science classroom.

"How interactive are interactive whiteboards?" is a famous question that has been discussed over decades, and in the literature, lots of fruitful contributions are attributed to the IWB use due to its capability to ignite interaction within teaching and learning processes. An eminent study by Northcote, Mildenhall, Marshall, and Swan (2010) sought for the popular claims about the IWB and its impact on teaching and learning. The study findings are drawn from a collaborative research project of 25 participants involving university lecturers, school-based primary school teachers and principals, pre-service teachers and district education consultants. They collected data using two sources: observational notes and research field notes. The analysis of the data shows that participants shared some concerns regarding the use of IWBs in classroom situations. Those concerns were described as ease of use, reliability, visibility, and positioning. The findings also showed that compared to a popular belief that teachers mostly use IWBs as presentation tools, participants reported to go beyond the presentation tool and use them for more extensive purposes. In addition, the study did not find any link between the use of IWBs and lesson pace or time efficiency in the classroom. Another important finding explored in the study was the use of IWBs. It turned out that participants were more interested in the potential use of IWBs rather than their actual use.

The challenges of using IWB in the courses

Using IWB as an ICT tool in the course could be beneficial as well as challenging. A recent report on the ICT impact identifies some factors that are likely to interfere with the use of ICT devices in teaching (Balanskat et al., 2006). The barriers identified are classified as teacher-level barriers, school-level barriers, and system-level barriers. Teacher-level barriers include the teacher's lack of competence, motivation, and confidence in using new technologies. School-level barriers, on the other hand, involve the difficulty of schools in accessing quality ICT resources and

getting software maintenance services. System-level barriers deal with the rigid policies imposed by the educational system and inflexible assessment methods.

The integration of new digital technologies, specifically IWB, into the schools, has captured the interest of a wide Turkish education community as to the pedagogical affordances of IWB within the perspective of teachers and students. For instance, a study conducted by Çiftçi, Taşkaya, and Alemdar (2013) analyzed teachers' opinions regarding the implantation of IWB in the classroom. In the study, the data which were collected through open-ended questions derived from 80 teachers who had used IWB in their classrooms as part of the Fatih project. After analyzing the qualitative data, the study identified some benefits and challenges of using IWB in the classroom. The challenges explored included technical problems, teachers' lack of knowledge and experiences about IWB, and teachers' training for using IWB. In another study, similar and wider problems have been reported. The study examined the use of IWB in the classroom from the perspectives of both teachers and students who have prior experiences in using IWB (Pamuk, Çakir, Ergun, Yilmaz, & Ayas, 2013). The authors of the study collected data from 44 teachers (24 male, 20 female) and 75 students (40 male, 35 female), from ten schools in four provinces, using focus-group interviews along with the classroom observations and survey. The inspection of qualitative and quantitative data showed that both teachers and students encountered issues and problems while interacting with IWB. Those problems were categorized as technical and pedagogical problems. Technical problems consisted of touch-screen, software, internet connection, and writing of a text on the IWB screen. Besides, in the study, teachers and students emphasized that the resources developed for IWB use were neither sufficient nor varied.

In addition to the numerous studies that have examined the teacher's perspectives on the use of IWB in the courses, there are also plenty of researchers who are interested in uncovering the challenges, problems, issues, and negative aspects they perceived and experienced during the IWB use in the classroom. For example, in his survey study, Aytaç (2013) researched primary and high school students' views about IWB use and the challenges they encountered while it was being used in the classroom.

The study data were collected by a survey questionnaire from a total of 202 students, 98 from primary school and 104 from high school. The schools selected for the study had IWB installed in each classroom and distributed a tablet computer to each student. The study findings showed that primary school teachers' use of IWB was higher than high school teachers.

Additionally, the perspective of students on the use of IWB in the classroom was found to be positive in general. The study also reported that students found teachers incompetent to use IWB effectively, pointed out the lack of sufficient electronic materials, and complained about technical problems related to IWB and how these problems distracted their attention during the teaching process. In a similar study, the researchers scrutinized students' perceptions regarding IWB use in the lessons (Hall & Higgins, 2005). The study data were collected from 72 students (ages 10-11) by means of focus group interviews. The study reported that students felt fairly enthusiastic about what IWB could accomplish in the classroom, such as its versatility and the ability to provide multimedia features and bring fun and enjoyment to the learning. The study also reported a bunch of technical problems that students noticed about the use of IWB in the classroom. Those problems consisted freezing or crashing of the IWB, difficulty in seeing what was on the IWB due to the sunlight shining on the board, and recalibration of the IWB. The other negative aspect mentioned in the study was that students were deprived of access to technologies, and both teachers and students lacked fundamental ICT skills.

Similar problems of IWB use in the courses are mentioned elsewhere in other studies with different methodologies. For instance, using phenomenology design, Birişçi and Çalık Uzun (2014) investigate math teachers' subjective opinions about the use of IWB. After inspecting the data, which stemmed from the interviews with 14 mathematics teachers in secondary schools, it was reported that the teachers' main reasons for using IWB in the courses were to visualize and concretize abstract concepts. Besides, teachers used IWB like a projector to resolve the problems quickly. It was also found that the teachers with negative thoughts of using IWB in the classroom could not utilize IWB-like devices effectively, and they encountered

some technical problems because of the poor infrastructure. Like the previous study, Türel (2012) also focused on revealing the challenges teachers experienced when using IWBs. He recruited the teachers (79 males, 61 females) from various subject areas and took a mix of qualitative and quantitative data from them using a questionnaire, which was accompanied by open-ended questions. The findings presented by the study revealed that teachers tended to abstain from using IWBs during their lectures. Similar to the previous studies, it was found that teachers deprived of technical skills and pedagogical knowledge which are, in fact, necessary for the effective use of IWBs in the courses. Besides, the study reported that the teachers complained about the deficiency of resources or materials for IWB.

There are different sorts of problems or issues experienced either by students or by teachers when they engage in IWB itself or activities associated with IWB use. In some previous studies, for example, teachers reported struggling with IWB due to the failure in touch-screen sensitivity, the broken USB port, restricted internet access, and weak connection between PCs and IWBs (Alparslan & İçbay, 2017). In addition to that, teachers increasing dissatisfaction and common problems with the use of interactive whiteboard technology (IWBT) was revealed to be about compatibility and complexity aspects of IWBT and teachers' lack of experiences with the different features of IWBT (Al-Qirim, 2011).

Teachers could benefit from IWB in a variety of subjects, but they first need to possess some basic knowledge and skills of how to use it in the classroom effectively. A previous study on the use of IWBs reported that even though teachers seemed to be convinced that they were capable of using technical ICT skills in the classroom, they felt less confident in creating new pedagogic techniques (Van Laer, Beauchamp, & Colpaert, 2012). Similar findings are either recited or supported in other studies. For example, as to the introduction of interactive whiteboards into schools, the authors shared some concerns that adding new technologies would be useless without changing the existing pedagogy (McCormick & Scrimshaw, 2001). Changing the current pedagogy requires developing new approaches and teachers might not be capable of making these changes to happen. In a study, the authors investigated the

impact of interactive whiteboard technology on the change of pedagogy in one secondary school (Glover & Miller, 2001). The study data were gathered by a whole-staff questionnaire and in-depth structured interviews. In the study, 46 staff filled out the questionnaire, and 14 staff participated in interviews. It was concluded that teachers' inability to bring out new pedagogical approaches creates a negative influence on learning and teaching. Therefore, it was suggested that training and personal development programs would be a great benefit for the teachers.

Teachers' technological competencies and professional development in regard to the use of IWB

Despite giving in-service trainings about IWB, there are almost no trainings that serve fully its purpose based on studies in the literature. Hence, it is seen as a barrier to the successful integration of IWB in lessons concerning specific each subject matter. Accordingly, teachers demand more hands-on trainings at certain time intervals and longer time periods for specific each subject matter (Gök & Yıldırım, 2016). There are also some dissatisfactions related to prominent integration of IWB with respect to intensive curriculum, crowded classrooms, teachers who do not have technological competence, limited time, and limited resources in terms of quantity and quality (Gök & Yıldırım, 2015). In addition, due to the insufficient in-service trainings, the positive attitudes of the teachers to use the IWB in their classes have been replaced by a situation where they do not feel comfortable (Anatürk Tombak & Ateşkan, 2019). Likewise, teachers reveal that they have hesitation to use the IWB in their lessons despite their desire and potential to use it in their lessons because they have problems with their insufficient technological competencies and their self-confidence (Marín-Díaz, Figueroa-Flores & Varoa, 2017; Samsonova, 2019). It was stated that this is related to insufficient in-service teacher training.

On the other hand, teachers should reduce their prejudices about using technology in lessons and be open-minded in terms of innovation in terms of their professional development (Ersoy & Bozkurt, 2015). Moreover, confidence in the teacher's expertise and competence in using IWB plays an important role in the teacher's desire

to convey information to students in lessons (Gregorcic, Etkina, & Planinsic, 2018). But then, as teachers learn about the basic functions of the IWB and become familiar with this technology, they start looking for ways to incorporate it in a way that will benefit the teaching and learning processes, keeping the concerns of their technical skills in the background (Beach, 2012; Gregorcic, Etkina, & Planinsic, 2018). Even though the use of smart board is a challenge for teachers who have just met with smart board, in this process, the process of getting used to use smart boards in lessons will be shortened with the in-service trainings they will receive regarding teachers' readiness and competence, however, in this context, it was emphasized that the in-service trainings given to teachers are insufficient in terms of time, content and pedagogical support (Al-Faki & Khamis, 2014; Stols et al., 2015; Koştur & Türkoğlu, 2017).

There are some barriers to teachers' adoption of new technologies like IWB in the classroom and these barriers include factors such as teacher self-efficacy, teacher beliefs, professional development, and technological competencies (Buabeng-Andoh, 2012; Ertmer et al. 2012). Teacher training plays a critical role in better implementation of IWB and ensures better outcomes in integrating IWB as a crucial component for effective and efficient implementation (Yudt & Columba, 2011; Tsai, 2019). In order to cope with the encountered problems while using IWB, teachers need more training (Tsai, 2019). Also, it was emphasized that the training given to teachers about IWB should be planned and organized specifically to their subject matters by taking the needs of teachers into consideration (Altın & Kalelioğlu, 2015; Tosuntaş, Karadağ, & Orhan, 2015; Sarioğlu & Saraç, 2017). In this regard, teachers' professional development is key to future practice with IWBs and a pathway to teachers' effective use of these kinds of technology in their lessons (Warwick & Kershner, 2008; Hennessy & London, 2013).

2.3.Summary

The detailed analysis of the relevant studies on interactive whiteboard culminates with five main categories: characteristics of IWB, teachers and students' perspectives on the use of IWBs in the classroom, Integration of IWBs into school classroom, the

effect of the use of IWBs on learning, engagement, interaction, and motivation, and the challenges of using IWB in the courses. The literature review shows that, depending on its purposes, IWBs come with different features and characteristics. Therefore, an IWB may not necessarily need to have all the features available in any other type of IWB. However, fundamentally they share some common properties like pages, pens and highlighters, interactive activities, templates or backgrounds, and shapes.

The perspectives of teachers and students concerning the use of IWBs in the classroom seem to vary, but the degree of this variability is generally in favor of a positive direction. That is, teachers tend to have positive opinions about the pedagogical affordances of IWB in the classroom and are fairly enthusiastic about using IWB in their courses. However, they are perceived to be inadequate in terms of using and leveraging IWB in the classroom. Besides, not only teachers' unfamiliarity with the IWB but also the lack of IWB resources and new pedagogical approaches are perceived to be a problem associated with the use of IWB in lessons. In addition to that, the integration of IWB technologies into the classroom faces formidable hurdles including teachers' lack of knowledge and experiences about IWBs, school infrastructure, internet connection, scarcity of IWB resources and pedagogies, and so on.

There have been many efforts to integrate IWB into the school lessons, and IWBs have been used by teachers in many subjects to improve teaching and learning. In other words, infusing IWB into the classroom has happened almost in all school levels from primary school to secondary school, high school, and university. Both positive and negative findings have been reported concerning the use and integration of IWBs in the classroom. Related to the positive effect, IWB is considered to be beneficial for either the teaching and learning process. Some of the positive impacts include an increase in enthusiasm, efficiency, collaboration, motivation, learning, and achievement.

CHAPTER 3

METHODOLOGY

This chapter includes (3.1) *Introduction*, (3.2) *Research Questions*, (3.3) *Design of the Study*, (3.4) *Sampling Method*, (3.5) *Participants of the Study*, (3.6) *Data Collection Tool*, (3.7) *Data Collection*, (3.8) *Data Analysis*, (3.9) *Trustworthiness* and (3.10) *Ethical Considerations* sections, respectively.

3.1.Introduction

The main purposes of the study are to understand and describe the lived experiences of different subject matter high school teachers with use of Interactive Whiteboard (IWB) in their classrooms for instructional purposes in depth and to arrive at the essence of their lived experiences of the phenomena.

3.2.Research Questions

The research questions were emerged from the problem that is in accordance with the purpose of the study. Additional sub-questions are involved in phenomenological studies with respect to provide further information regarding the phenomena (McMillan, 2008). The following central research question and sub-questions were addressed and studied within present study:

RQ. What are the lived experiences of different subject matter high school teachers with use of Interactive Whiteboard (IWB) in their classrooms for instructional purposes?

- What are the impacts of IWB use on the different subject matter high school teachers' teaching processes?
- What are the impacts of IWB use on the different subject matter high school teachers?
- What are the impacts of IWB use on the students with respect to different subject matter high school teachers' perspective?
- What are the practical issues/challenges of IWB use in high schools by different subject matter teachers?

3.3.Design of the Study

Phenomenology is a systematic effort to get in touch and communicate with participants' experience of phenomena, reveal and define the meaning structures of lived experiences, and arrive at essence for understanding of the nature or meaning of everyday experiences of the phenomena profoundly (Husserl, 1970a; van Manen, 1990; Lauer 1965). Phenomenology is interested in individuals' narratives of their lived experiences of particular phenomena whilst seeks reality (Husserl, 1969; Moustakas, 1994; Cilesiz, 2010). Attaining the essence of persons' lived experiences, apprehending, and defining the phenomenon deeply are the goals and intents of a phenomenological study (Cilesiz, 2010). While the phenomenon is described as the object of a conscious subject's experience, phenomena are defined as the basis for all knowledge and building blocks of human science (Moustakas 1994). In addition to these, essence is explained as it what makes an experience and an experience' state and quality that is universal or general (Husserl 1969; Moustakas 1994). According to van Manen (1990), "phenomenology does not offer us the possibility of effective theory with which we can now explain and/or control the world, but rather it offers us the possibility of plausible insights that bring us in more direct contact with the world." In brief, phenomenological research is the study of lived experience.

Phenomenology is consisted of *Transcendental*, *Existential*, and *Hermeneutic* traditions (Cilesiz, 2009; Schwandt, 1997). Accordingly, in the context of educational/instructional technology research, Edmund Husserl's *Transcendental* phenomenological framework (Husserl, 1970b; Moustakas, 1994) was selected as a methodological framework in this study. Phenomenology is an appropriate and applicable methodology for the purposes of the present study in order to understand and describe the lived experiences of different subject matter high school teachers with use of Interactive Whiteboard (IWB) in their classrooms for instructional purposes in-depth and to arrive at the essence of their lived experiences of the phenomena. Consequently, in the current study, the qualitative research methodology was employed primary emphasis.

3.4.Sampling Method

In qualitative studies, the participants' selection is related to the purpose of the study. Participants in the phenomenological research study are individuals who represent the characteristics and focus of the study. In the study, *purposive sampling* technique was used. According to Creswell (2007), participants are selected by questioner with respect to their intentional disclose about the research problem and key phenomenon in the study. Polkinghorne (2005) stated that using purposive sampling for the selection of participants in a phenomenological study ensures that participants of the study have acquired the lived experiences in respect to the phenomenon. Additionally, purposive sampling is a suitable method to use for in-depth interviews with participants in reference to Patton (1990). Therefore, purposeful sampling is the most appropriate sampling method for this study.

A clear set of criteria were identified in order to develop clear and specific participant credibility. The required clear set of criteria and parameters to select the participants process were identified: 1) grade level, 2) teaching experience, and 3) use of the interactive whiteboard to deliver instruction in order to develop clear and specific participant credibility.

3.5.Participants of the Study

Sample size of the phenomenological study is usually considered proper and applicable while number of participants range from 3 to 10 subjects in reference to Creswell (2007, p. 157), although, Polkinghorne (1989) suggests it from 5 to 25 individuals who have experienced the phenomenon. In addition, Morse (1994) recommended that there should be at least 6 participants. In addition to these, Moustakas (1994) stated that a small sample is essential regarding to its nature of intensity. Accordingly, *twelve (12) high school teachers with different subject matters were selected as participants of the study* and this sample size would be an acceptable number of subjects. Twelve teacher participants have been actively using IWBs for instruction in their lessons.

Schools that participate in the study were selected based on interview with an IT specialist from YEĞİTEK (Directorate General for Innovation and Educational Technology). According to information obtained from the interview and based on assist and suggestions of specialist to connect with potential participants for this study, two (2) pilot public schools of FATİH project were determined to participate in the study. Participants of the study are high school teachers from different subject matters in the two Anatolian High Schools in Ankara, Turkey. Participating high school teachers are *4 females and 8 males* and they represent following *eight (8) different subject matters*, namely, *Physics (1 participant), Chemistry (2 participants), Biology (2 participants), Mathematics (3 participants), History (1 participant), Geography (1 participant), English (1 participant), and Religious Culture and Moral Knowledge (1 participant)* of two high schools.

Preliminary informal interviews were conducted by the researcher in order to select and evaluate the participant of the study. In the whole research processes, the researcher collaborated with the high school teachers as co-researchers to evaluate and give feedback about the research.

3.5.1. Participants' Backgrounds & Demographics

Participants of the study were twelve (12) high school teachers at two (2) Anatolian High Schools (pilot schools in FATİH Project) in Ankara, Turkey and all of them participated in the interview process. Participants of the study were 4 females and 8 males and their ages ranged from 37 to 55. Their range of teaching experience is spanning from 14 to 32 years. Eleven (11) of the participants have Bachelor's Degree and one (1) of the participants is holding a Master's Degree. There were 8 different subject matters and they are: Physics (1 participant), Chemistry (2 participants), Biology (2 participants), Mathematics (3 participants), History (1 participant), Geography (1 participant), English (1 participant), and Religious Culture and Moral Knowledge (1 participant).

Training for the use of IWB have been provided to twelve (12) participants to develop their understanding of teaching with IWB under the scope of FATİH project. In addition, it is necessary to specify that one (male) participant dropped out just prior to the second interview. Then, one (male) participant, in the same subject matter, had agreed to join the study. Participants' demographics are presented in Table 2.

Table 2

Participant Demographics

Teacher	Age	Gender	Subject Matter	Experience	Degree
HS1T1	47	Female	Physics	25 years	Bachelor
HS1T2	48	Male	Mathematics	24 years	Bachelor
HS1T3	38	Female	History	15 years	Bachelor
HS1T4	42	Female	Biology	19 years	Bachelor
HS1T5	48	Female	Chemistry	25 years	Bachelor
HS1T6	48	Male	English	20 years	Bachelor
HS1T7	50	Male	Biology	30 years	Bachelor
HS2T1	55	Male	Religious	32 years	Master's
HS2T2	53	Male	Chemistry	27 years	Bachelor
HS2T3	37	Male	Mathematics	14 years	Bachelor
HS2T4	42	Male	Geography	16 years	Bachelor
HS2T5	46	Male	Mathematics	23 years	Bachelor

Participant #1 - HS1T1 (High School 1 – Teacher 1 – Physics)

HS1T1 teaches in Anatolian High School 1 in Ankara and has been teaching for 25 years. She teaches in all four grades (9, 10, 11, 12) for her teaching career. She is 47 years old. She holds a Bachelor's Degree in Physics Teaching and she is teaching physics. She has been using the IWB for about four years since 2011. The three interviews were conducted during the 2015-2016 Fall Term in the 5-month time period. Interviews took place in the location of her choice, in the place used as study room and library in her idle class on weekdays on the school campus. After IWBs got installed on school, she participated and received two weeks of training in this regard.

Participant #2 - HS1T2 (High School 1 – Teacher 2 – Mathematics)

HS1T2 teaches in Anatolian High School 1 in Ankara and has been teaching for 24 years. He teaches in all four grades (9, 10, 11, 12) for his teaching career. He is 48 years old. He holds a Bachelor's Degree in Mathematics Teaching and he is teaching mathematics. He has been using the IWB for about four years since 2011. The three interviews were conducted during the 2015-2016 Fall Term in the 5-month time period. Interviews took place in the location of his choice, in the place used as study room and library in his idle class on weekdays on the school campus. After IWBs got installed on school, he participated and received one week of training in this regard.

Participant #3 - HS1T3 (High School 1 – Teacher 3 – History)

HS1T3 teaches in Anatolian High School 1 in Ankara and has been teaching for 15 years. She teaches in all four grades (9, 10, 11, 12) for her teaching career. She is 38 years old. She holds a Bachelor's Degree in History Teaching and she is teaching history. She has been using the IWB for about four years since 2011. The three interviews were conducted during the 2015-2016 Fall Term in the 5-month time period. Interviews took place in the location of her choice, in the place used as study room and library in her idle class on weekdays on the school campus. After IWBs got installed on school, she participated and received one week of training in this regard.

Participant #4 - HS1T4 (High School 1 – Teacher 4 – Biology)

HS1T4 teaches in Anatolian High School 1 in Ankara and has been teaching for 19 years. She teaches in all four grades (9, 10, 11, 12) for her teaching career. She is 42 years old. She holds a Bachelor's Degree in Biology Teaching and she is teaching biology. She has been using the IWB for about four years since 2011. The three interviews were conducted during the 2015-2016 Fall Term in the 5-month time period. Interviews took place in the location of her choice, in the place used as study room and library in her idle class on weekdays on the school campus. After IWBs

got installed on school, she participated and received one week of training in this regard.

Participant #5 - HS1T5 (High School 1 – Teacher 5 – Chemistry)

HS1T5 teaches in Anatolian High School 1 in Ankara and has been teaching for 25 years. She teaches in all four grades (9, 10, 11, 12) for her teaching career. She is 48 years old. She holds a Bachelor's Degree in Chemistry Teaching and she is teaching chemistry. She has been using the IWB for about four years since 2011. The three interviews were conducted during the 2015-2016 Fall Term in the 5-month time period. Interviews took place in the location of her choice, in the place used as study room and library in her idle class on weekdays on the school campus. After IWBs got installed on school, she participated and received two weeks of training in this regard.

Participant #6 - HS1T6 (High School 1 – Teacher 6 – English)

HS1T6 teaches in Anatolian High School 1 in Ankara and has been teaching for 20 years. He teaches in all four grades (9, 10, 11, 12) for her teaching career. He is 48 years old. He holds a Bachelor's Degree in English Teaching and he is teaching English. He has been using the IWB for about four years since 2011. The three interviews were conducted during the 2015-2016 Fall Term in the 5-month time period. Interviews took place in the location of his choice, in the place used as study room and library in his idle class on weekdays on the school campus. After IWBs got installed on school, he participated and received two weeks of training in this regard.

Participant #7 - HS1T7 (High School 1 – Teacher 7 – Biology)

HS1T7 teaches in Anatolian High School 1 in Ankara and has been teaching for 30 years. He teaches in all four grades (9, 10, 11, 12) for her teaching career. He is 50 years old. He holds a Bachelor's Degree in Biology Teaching and he is teaching biology. He has been using the IWB for about four years since 2011. The three interviews were conducted during the 2015-2016 Fall Term in the 5-month time

period. Interviews took place in the location of his choice, in the place used as study room and library in his idle class on weekdays on the school campus. After IWBs got installed on school, he participated and received one week of training in this regard.

Participant #8 – HS2T1 (High School 2 – Teacher 1 – Religious Culture)

HS2T1 teaches in Anatolian High School 2 in Ankara and has been teaching for 32 years. He teaches in all four grades (9, 10, 11, 12) for her teaching career. He is 55 years old. He holds a Bachelor's Degree and Master's Degree in Religious Culture Teaching and he is teaching religious culture. He has been using the IWB for about four years since 2011. The three interviews were conducted during the 2015-2016 Fall Term in the 5-month time period. Interviews took place in the location of his choice, in the place used as study room and library in his idle class on weekdays on the school campus. After IWBs got installed on school, he participated and received one week of training in this regard.

Participant #9 – HS2T2 (High School 2 – Teacher 2 – Chemistry)

HS2T2 teaches in Anatolian High School 2 in Ankara and has been teaching for 27 years. He teaches in all four grades (9, 10, 11, 12) for her teaching career. He is 53 years old. He holds a Bachelor's Degree and Master's Degree in Religious Culture Teaching and he is teaching religious culture. He has been using the IWB for about four years since 2011. The three interviews were conducted during the 2015-2016 Fall Term in the 5-month time period. Interviews took place in the location of his choice, in the place used as study room and library in his idle class on weekdays on the school campus. After IWBs got installed on school, he participated and received one week of training in this regard.

Participant #10 – HS2T3 (High School 2 – Teacher 3 – Mathematics)

HS2T3 teaches in Anatolian High School 2 in Ankara and has been teaching for 14 years. He teaches in all four grades (9, 10, 11, 12) for her teaching career. He is 37 years old. He holds a Bachelor's Degree in Mathematics Teaching and he is teaching

mathematics. He has been using the IWB for about four years since 2011. The three interviews were conducted during the 2015-2016 Fall Term in the 5-month time period. Interviews took place in the location of his choice, in the place used as study room and library in his idle class on weekdays on the school campus. After IWBs got installed on school, he participated and received one week of training in this regard.

Participant #11 – HS2T4 (High School 2 – Teacher 4 – Geography)

HS2T4 teaches in Anatolian High School 2 in Ankara and has been teaching for 16 years. He teaches in all four grades (9, 10, 11, 12) for her teaching career. He is 42 years old. He holds a Bachelor's Degree in Geography Teaching and he is teaching geography. He has been using the IWB for about four years since 2011. The three interviews were conducted during the 2015-2016 Fall Term in the 5-month time period. Interviews took place in the location of his choice, in the place used as study room and library in his idle class on weekdays on the school campus. After IWBs got installed on school, he participated and received one week of training in this regard.

Participant #12 – HS2T5 (High School 2 – Teacher 5 – Mathematics)

HS2T5 teaches in Anatolian High School 2 in Ankara and has been teaching for 23 years. He teaches in all four grades (9, 10, 11, 12) for her teaching career. He is 46 years old. He holds a Bachelor's Degree in Mathematics Teaching and he is teaching mathematics. He has been using the IWB for about four years since 2011. The three interviews were conducted during the 2015-2016 Fall Term in the 5-month time period. Interviews took place in the location of his choice, in the place used as study room and library in his idle class on weekdays on the school campus. After IWBs got installed on school, he participated and received one week of training in this regard.

3.6.Data Collection Tool

In the process of developing interview questions, firstly, initial interview questions were developed based on Creswell's phenomenological central interview questions (2007). After, revisions were made based on interviews with 16 Experts Opinion, namely, 2 Experts in phenomenology research processes, 3 Experts in qualitative research processes, 1 IT specialist from YEĞİTEK, 1 Deputy Principal, 2 IT Teachers, 6 Different Subject Matters Teachers, and 1 Turkish-Language Teacher. At the end of this process, *19 Interview Questions* were finalized as data gathering tool. (see Appendix D.)

In addition, *Demographic Information Form* was developed with respect to collect demographic and background information about the participants. (see Appendix C.)

3.7.Data Collection

In the current phenomenological study, data were collected through *in-depth multiple interviews* with each of the co-researchers who have experienced the phenomenon as a participant in the cycles of several weeks in the study (Creswell, 2007). Accordingly, in the proper data collection process, *three (3) discrete serial in-depth phenomenological interviews* are proposed by Seidman were conducted with each of the participants of the study (2006). According to Seidman (2006), *first interview* of the three-separate series of interviews is related to "Focused Life History" which is primarily focus on past experience with the phenomenon to the present time. In addition, the *second interview* of the three-separate series of interviews is related to "The Details of Experience" which is mainly focus on present lived experience with the phenomenon. Lastly, the *third interview* of the three-separate series of interviews is related to "Reflection on the Meaning" which is particularly concentrate on putting together first and second interviews in order to define the concrete details of experience with the phenomenon.

Interviewing is described as the most important data gathering technique for qualitative research by Fetterman (1989). The power and strengths of qualitative data

are underlined for a) focusing and emphasizing on specific case/situation/context with delimited phenomenon in natural settings; b) providing richness, intense thick descriptions, disclosing complexity in a real situation/context; c) continued data collection periods and times makes them strong and substantial for studying any process (Miles & Huberman, 1994, p.10).

Participants responded to 19 interview questions to gain insight into the lived experiences of different subject matter high school teachers with use of Interactive Whiteboard (IWB) in their classrooms for instructional purposes. Interviews were conducted over 5 months (2015-2016 Fall Term Between September and January) at three different time period in a quiet and empty classes. The interviews were conducted in *Turkish as native language* of the participants. Besides, all in-depth interviews were recorded and transcribed verbatim (Poland, 2002). Additionally, three interviews of each participant were merged into one paper after the transcriptions of the audiotaped interviews made. Interviews also were proceeded and lasted between 20-50 minutes which is considered suitable length for each phenomenological interview (Seidman, 2006).

The primary source of data for the study was three (3) discrete serial in-depth phenomenological interviews with each of the twelve (12) participants. Professional audio recording equipment was used to record the interviews. The all 36 interviews lasted from 20 minutes to 50 minutes. First interviews for 12 participants lasted 7 hours 13 minutes 14 seconds in total. Second interviews for 12 participants lasted 6 hours 18 minutes 19 seconds in total. Third interviews for 12 participants lasted 6 hours 04 minutes 41 seconds in total. Total record time for all 36 interviews was 19 hours 36 minutes 14 seconds.

Additionally, interviews were transcribed by using *InqScribe*, transcription software for audio recordings. Interview 1 of twelve participants consisted of 261 transcribed pages. Interview 2 of twelve participants consisted of 207 transcribed pages. Interview 3 of twelve participants consisted of 183 transcribed pages. Total transcribed pages were 651.

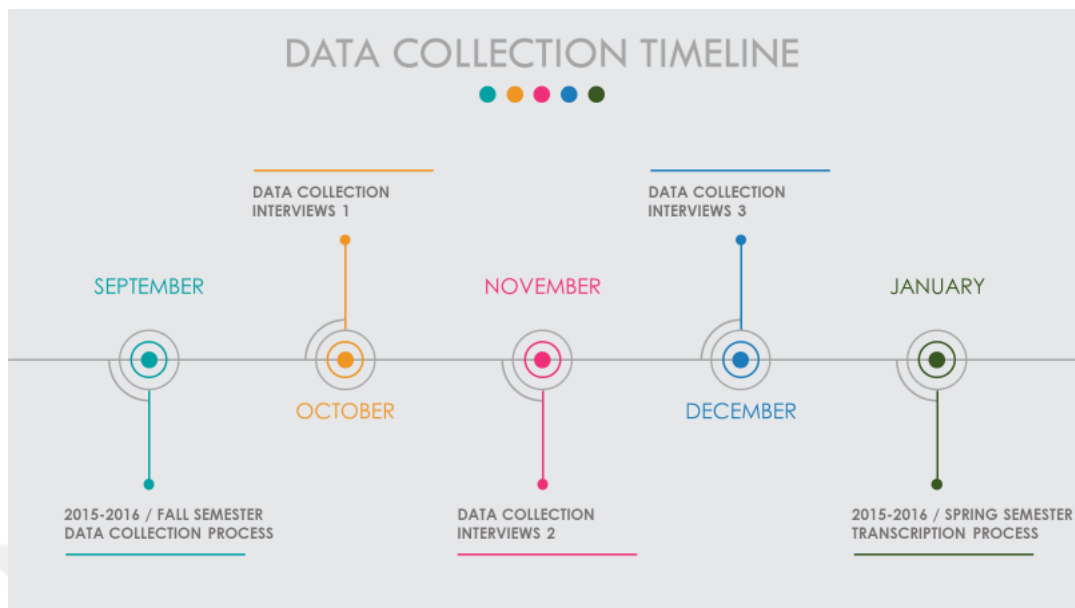


Figure 2. Data Collection Timeline



Figure 3. Summary of Collected Data

3.8.Data Analysis

In the present study, data analysis process was employed by the Moustakas' phenomenological data analyzing procedure and guidelines (modified van Kaam method, 1959, 1966) (1994). The steps of phenomenal analysis are listed below:

I. Phenomenological Reduction

1. Listing and Preliminary Grouping (Horizontalization)
2. Reduction and Elimination: To determine the Invariant Constituents
3. Clustering and Thematizing the Invariant Constituents
4. Final Identification of the Invariant Constituents and Themes by Application: Validation
5. Individual/Composite Textural Descriptions

II. Imaginative Variation

6. Individual/Composite Structural Descriptions

III. Synthesis of Composite Textural and Composite Structural Descriptions

7. Textural-Structural Descriptions Synthesis

Transcripts of the 36 interviews were analyzed by *MAXQDA 12*, professional software for qualitative data analysis. MAXQDA provides comprehensive coding process by enhancing the overall analysis experience.

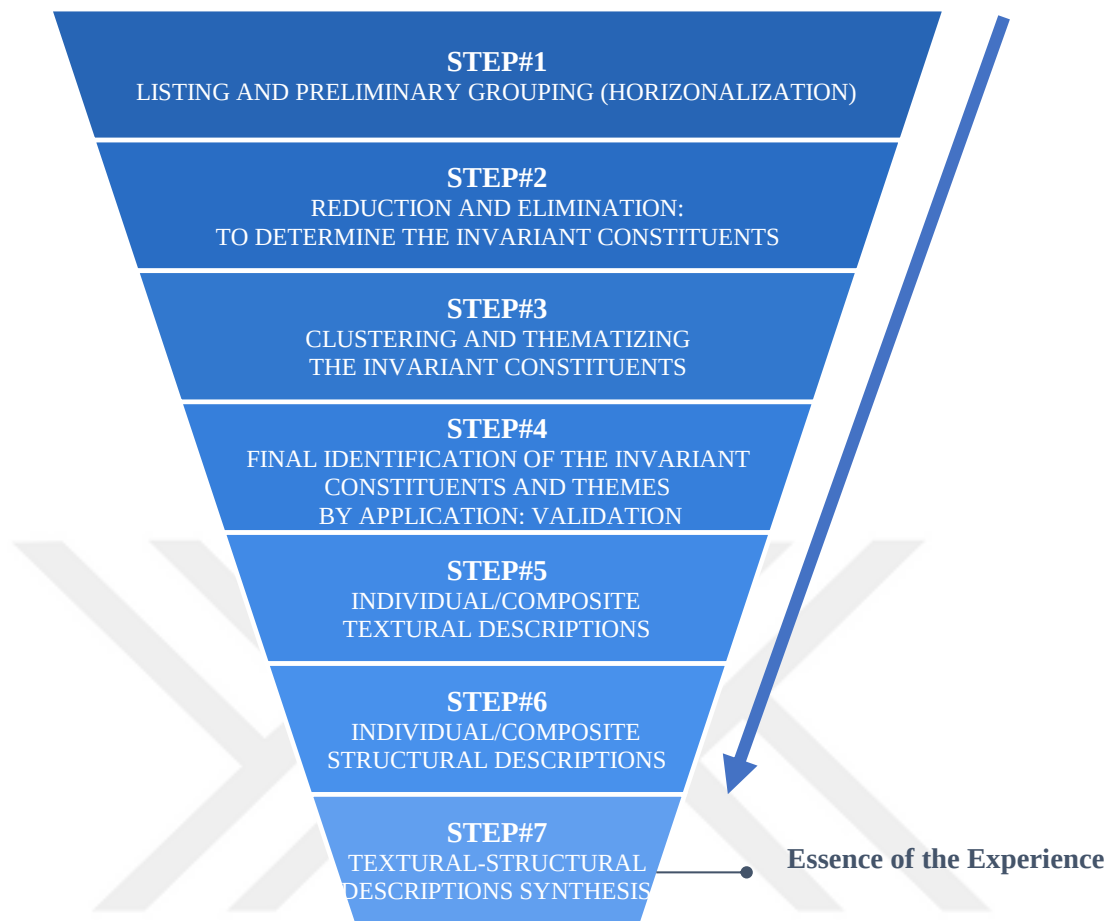


Figure 4. Data Analysis Funnel/Cone Diagram

Transcendental phenomenology aims to focus on describing the lived experience regarding the phenomena. The essence is the core meaning of an individual's experience. Accordingly, it is an attempt to unveil essence as descriptive, *not interpretive*.

3.9.Trustworthiness

Trustworthiness is presented in terms of the two major aspects, namely, Validity and External Validity (Generalizability) to ensure that findings are valid in this qualitative research. Validity is addressed in qualitative research according to the proper implementation of methods in order to ensure that the findings of the study are valuable and valid (Merriam, 1995). External validity is described as the transferability and applicability of the study's findings to other contexts and situations (Merriam, 1995; Yuksel and Yildirim, 2015). Generalizability of the qualitative research is weak and limited in terms of other populations, settings, and time, but under certain circumstances to some degree of transferability is possible (Guba and Lincoln, 1982; Johnson, 1997; Merriam, 1995). In this phenomenological study, the validity of the research was accomplished by multiple measures. Epoché (Bracketing) process, Subjectivity Statement, Member Checks, and Peer Review are the four (4) of the several measures taken in order to address and ensure validity. Consequently, the following four strategies were utilized to strengthen the validity of the current study.

3.9.1. Epoché [Bracketing]

Epoché [Bracketing] process is identified as setting aside the daily and regular understandings, (pre)judgments, presumptions and presuppositions from prior experiences (Moustakas, 1994; Kvale, 1996; Ashworth, 1999). Engaging in the Epoché process requires the researcher to becoming aware of their own biases and holding them apart from ongoing processes throughout the phenomenological research (Bednall, 2006).

Researcher's Epoché [Bracket]:

I made a lot of effort to bracket my prior experiences throughout the study. For this purpose, I wrote down about my own personal experiences with the phenomenon to take a fresh perspective.

3.9.2. Subjectivity Statement

Subjectivity Statement is described as a statement of the researcher's experiences, biases, and suppositions in order to understand how the data interpreted in terms of subjectivity related to the phenomenon to achieve objectivity (Peshkin, 1988; Merriam, 1995).

Researcher's Subjectivity Statement:

Before start collecting data in this study, as a researcher and as an educator I had some experience in using the interactive whiteboard to teach subjects in undergraduate and graduate courses as a teaching assistant at university. As an observer, I attended some Geometry lessons. In the lessons, teacher of the course utilized interactive whiteboard to deliver instruction and solve examples/problems. The lesson with IWB was quite advanced level but limited in analytic geometry scope. Besides, teachers complained of inadequate training in order to use the interactive whiteboard with all its features to teach. Despite the limited time I observed, students were enthusiastic about the integration and use of the interactive whiteboard in their lessons. In addition, studying instructional technology and working as a teaching assistant has developed, changed and expanded my horizons through the years in terms of pedagogy and technology.

3.9.3. Member Checks

Member Checks process is defined as by taking collected data from participants with in-depth interviews and send transcripts back to the participants to verify if the interpretations are feasible (Merriam, 1995). Member checking process was needed to ensure that no misinterpretation of participants' point of views and judgements takes place and to correct any inaccuracies.

Accordingly, transcribed copies of the interviews were sent to all of the participants for member checks processes in terms of trustworthiness when the whole transcription process way over. All of the participants approved and agreed on the accuracy of transcriptions and there was no need to change.

3.9.4. Peer Review

Peer Review is explained as asking colleagues or peers to analyze and cross-examine the transcribed data in the stage of data analysis to ensure the plausibility of the revealed findings (Merriam, 1995).

Accordingly, After the finishing clustering and thematizing the invariant constituents, four (4) research assistants were solicited to peer review in order to ensure that potential themes were not overlooked in the interview transcripts.

3.10. Ethical Considerations

Ethical considerations/issues were ensured along with the steps taken throughout the study. These steps were addressed below.

3.10.1. Human Subjects Ethics Committee Approval

Before the data collection started, permission related to *Human Subjects Ethics Committee Approval* was granted by Middle East Technical University. (see Appendix A.)

3.10.2. Confidentiality

Confidentiality of the participants was ensured with use of *pseudonyms* through the study. Pseudonyms were used for the participants through the study as HS1T1, HS1T2, HS1T3, HS1T4, HS1T5, HS1T6, HS1T7 for the participants of Anatolian High School 1 (HS1) and HS2T1, HS2T2, HS2T3, HS2T4, HS2T5 for the participants of Anatolian High School 2 (HS2) in order to ensure the confidentiality of the participants. They were named as above based on the order in which the researcher interviewed the participants.

3.10.3. Informed Consent Letter Form

The participants of the study were informed through informed consent about 1) that participation is voluntary (willingness to participate and interested in being part of the study), 2) of any aspects of the research that might affect their well-being, and 3) that they may freely choose to stop participation at any point in the study (Glesne and Peshkin, 1992, p. 111). Before the interviews were conducted, written *Informed Consent Letter Form* was given and signed by the participants. (see Appendix B.)

3.10.4. Debriefing Form

After the interviews were over, *Debriefing Form* was given the participants in order to inform about post-interview process. (see Appendix E.)



CHAPTER 4

RESULTS

This chapter presents the results from the transcendental phenomenological qualitative research. The chapter is divided into three main sections, namely, (I) *Phenomenological Reduction*, (II) *Imaginative Variation*, and (III) *Synthesis of Composite Textural and Composite Structural Descriptions* based on Moustakas' phenomenological data analyzing procedure and guidelines (modified van Kaam method, 1959, 1966) (1994).

4.1. Phenomenological Reduction [–I–]

4.1.1. Listing and Preliminary Grouping (Horizontalization) [Step#1]

Identification and listing all relevant expressions relevant to the experience of the phenomena is defined as *horizontalization* (Moustakas, 1994, p.120). Therefore, data analysis has started with the process of horizontalization the data (coding the verbatim transcripts, listing all relevant expressions) to reveal *codes or meaning units or horizons* of the each of the 36 interviews of 12 participants. Accordingly, this process had resulting in meaning units with the accompanying quotations.

4.1.2. Reduction and Elimination: To determine the Invariant Constituents [Step#2]

According to Moustakas (1994), to determine the invariant constituents, each expression need to be tested for two requirements: “(a) Does it contain a moment of the experience that is a necessary and sufficient for understanding it?” and “(b) Is it possible to abstract and label it? If so, it is a horizon of the experience” (p.121). Consequently, overlapping, repetitive, irrelevant, vague expressions, and redundant data were eliminated to determine the necessary *invariant constituents (meaning units or horizons)* of the experience. After cleaning the data, the remain parts were necessary and sufficient invariant constituents of the experience.

4.1.3. Clustering and Thematizing the Invariant Constituents [Step#3]

All 36 verbatim transcripts were analyzed in order to determine the invariant constituents (horizons) of the experience and clustered to create themes. The process of clustering and thematizing the invariant constituents resulted in themes in concern with the richness of data collected in relation to the phenomenon.

Accordingly, twenty core themes emerged from coding of data regarding clustering and thematizing the invariant constituents. (see Appendix F.)

4.1.4. Final Identification of the Invariant Constituents and Themes by Application: Validation [Step#4]

The invariant constituents and related themes were checked in terms of 1) *expressing explicitly in the whole transcription (data sources)*, 2) *compatible* and 3) *relevant to the participant's experience* according to Moustakas (1994, p.121). Accordingly, invariant constituents were deleted if they were not explicit, compatible, or relevant across the complete transcription of the participant.

4.1.5. Individual/Composite Textural Descriptions [Step#5]

Individual Textural Descriptions

The individual textural descriptions were constructed from each participant's experiences of the phenomenon from the clustered themes and delimited horizons in verbatim-transcribed interviews.

Individual Textural Description - Participant #1 – HS1T1 (High School 1 – Teacher 1 – Physics – Female)

HS1T1 became involved with use of IWB by Ministry of National Education (MoNE) selected her school as one of the pilot public schools of FATİH project. After IWBs were installed to the school, she “had two weeks of training” on the use of IWB. When the training sessions were over, she thought, “Training is not enough”. Because at that time she did not have any “hands on practice”. Therefore, she started to use and make practice as necessary in her lessons and “learn by trial and error over time”. After that, for the future, she needs “training for the preparation of animation and slideshow, or the sites where the image, animations and experiments are gathered” in terms of physics to practice more. In addition, she needs training for “developing/preparation of course materials”. In general, if we look from a broader framework, she uses the IWB for “lecture and through the problem solving” in all subject matters. More specifically, she uses IWB for purpose of “showing animations, experiments, shapes and videos” and “when it is necessary to draw”. For instance, for astronomy subject matter, she needs the most about “videos about the

formation of the sun, the stars, the galaxies and the black holes” and she thinks that it was “very useful for children to see these visually”.

Then, when looking at the kinds of resources she using, she utilizes “IWB compatible e-books (offered by publishers and MoNE), showing materials from EBA (Education Information Network) website, videos from YouTube and other related websites, and animation CDs of IWB compatible e-books” while using IWB in her lessons.

In her lessons, there were cases in which students get involved in “making presentations with visuals and videos, and problem/question solving” by actively using IWB. Therefore, they use their “creativity” in their presentation by using music, sound, and colorful glows etc. In particular, students get “self-confidence” when they have come up with different visuals about their project or performance task topic and presenting to their friends on the IWB. In this way, they are getting comfortable talking to society.

Having IWB in the classroom is a good thing to “easily reach the visuals and technology” for her and it “makes her job easier”. At the beginning, she wondered how her students react to use of IWB for instruction in her lessons but she did not see any negative reactions. On the contrary, it “increased the interest/attention of the students” and “facilitated understanding”.

Previously she felt “little nervous” but as time goes by she felt “very comfortable” at classroom while using IWB due to getting used to it. Although she had training about how to use IWB in her class, she was not good at using it at first. However, as she gained experience using, she was no longer a novice about IWB and now she “knows most symbols and tools well, and use it more comfortably”.

Compared to the past, she thinks that she is still “active” in terms of role of the teacher in classroom but she sees herself more like a “manager by managing information and class” and “easier for her to control students”. Concerning role of the students, she stated, “more students are able to get up and solve the problems”, regarding this, students are more active in terms of participation to the lesson. After

a while since she started to use IWB continuously and actively in her lessons, she described the “intensity of physics curriculum; to solve more problems/questions; and teach subject matters more quickly and more efficiently” as some of the main reasons to start using IWB.

Throughout the lessons, while she was using IWB more often in the “teaching/lecturing” and “problem solving”, she uses IWB less when “if necessary and have to draw and make practice by using hands” such as vectors subject matters in physics course. In particular, it is getting better and more efficient in subject matters requiring “visual”. Hence, she chooses the more or the less use of IWB according to the subject and situation.

She noted that there are positive effects of IWB usage on teaching process in her lessons. One of the positive effects is allowing her to “teach more topics in a shorter time effectively”. In addition, when she gets into conflicts on any subject during the lesson, she can “instantly search” the subject from internet and find out the right answer. Although there are positive effects on teaching process, she stated some effects that have negatively influenced her teaching process. For instance, when electricity is cut off, the lesson does not progress as planned, she “goes through the classic method” by using blackboard and this slows down the teaching process. Thus, in such circumstances, she needs to be prepared to against possible problems and determine practical solutions to overcome.

Since she started using IWB in her lessons, she does not think there is much change in her teaching style and habits. However, because of “writing less on the board” compared to the past, there was “more opportunity to walk around and control” students. In addition, she feels that “time is moving faster” in her lessons anymore while using IWB. Actually, “curriculum is very intensive for physics” so there are some time issues related to it and she thinks that the number of lessons should be increased. She indicated that IWB “decreased time” spent on the “lessons planning and preparation” with respect to previous. Associated with it, “shorten the time” she spends on the “teaching of the subjects”.

She has “improved communication with her students” in lessons after started to using IWB. In this respect, she thinks that the “communication between the students did not change”. IWB has positive impacts on her interaction with the course content by “helping to reach and show more sources” and “providing the opportunity to present different kinds of problems/questions” to the students. Similarly, it has a positive effect on the interaction of students with course content and “course contents have become more concrete”. She has communication with the other teachers at the school regarding “resource sharing”, “information and exchange of ideas” and “support for the use of IWB”.

She sorts many benefits of using IWB for herself. One of these is having opportunity to “reach a lot of and different/variety of resources”. Another benefit is that she does “not get tired” as before because she is writing less on the board compared to past. Next, use of IWB affected her motivation positively so she is “more motivated” and “more enthusiastic” now. Moreover, she thinks that IWB “does not affect the workload and effort” during the lesson. In fact, there is “no material” she has developed to use in her lessons currently.

If we look at the benefits of IWB use in terms of students, it is also beneficial to the student as well as the benefit of the teacher. To begin with, IWB is good at “expanding the imagination” of the students by showing pictures/images, videos, and movies about the abstract subject matters. In connection with, “learning of complex and difficult concepts was affected positively” and make learning/grasping easier for students. For example, IWB allows students to perceive each dimension of 3D vector drawings better in different colors with three-dimensional animations. Subsequently, it increases “attention” and “motivation” of students because she instantly reaches and shows colorful shapes, animations. Afterwards, she indicated that use of IWB increased “perception in understanding the subjects” and “pace of learning” thanks to watching animations and videos so they perceive the subject better. Then, there is a positive impact on student learning and she stated, “Success of students is increasing” in the positive direction and she sees the increase in success by getting very good grades in the written exams. The subjects are better understood because

she “solves more questions” and shows “more visuals”. Hence, she feels that students “learn better from IWB”. Relatively, use of IWB “reduced the time spent by students to take notes” owing to such as writing the only solution parts of the question or not writing to the whole details of the subject. Each student has their “own learning patterns” so as different sources are used, the “level of perception in each direction will be increased” if the resource diversity is increased. In short, it will “lead to facilitate learning”. There are some detriments of using IWB for students. For instance, students are able to “open music or movie with a loud voice at breaks”. This time, when she enters the class, the music or film is not finished, then she “spends a few minutes to close” it, and while doing so she has a “conflict with students” in this case.

She noted a number of issues, obstacles and challenges faced when using IWB that have negatively impact and “interrupt the lesson’s flow”. For example, there are “internet connection problems”, “touch panel problems”, “unresponsive boards”, “detecting mouse problems”, “power cut”, and “visibility problems”. In visibility problems, when sunlight shines directly onto the board from windows it leads to inability to read or glare on IWB. Then, as a practical solution, she “draws some of the curtains” and provide the necessary environment. In virus problems, when she plugs her flash memory into the IWB, it “gets viruses” and her all “information in it is deleted” or her “flash memory does not function” anymore. In contrast to above problems, she “does not have any resource or inadequate materials problems”. Overall, to solve the problems, she faces when using the IWB, at first, she uses the “students to solve” it. If students cannot fix or solve the problems, then she is communicating with the “school’s computer coordinator teacher” about the issues and she is doing the necessary operations. If there is a situation that she can do, she does it by “intervening instantly”, if she cannot do it, she “sends the IWB to the authorized service” as soon as possible and has it repaired. After all, she finds these helps “adequate”.

Individual Textural Description - Participant #2 – HS1T2

(High School 1 – Teacher 2 – Mathematics – Male)

The reason for starting to use IWB, it was “not his own initiative” or “desire” but IWBs were integrated to the classes by the “introduction of the FATIH project” by MoNE. Then, students see IWB in classroom and thinks so our teacher does not use the IWB or use the technology. Because he has observed that, the expectation is so from the students. He stated that he is already “interested in technology” so it was “not possible to stay away from the IWB”. So, he “felt like he had to use it” from the first time. Under the FATIH Project scope, he had a “weeklong teacher training” about the use of IWB. At beginning, the training was “not enough” and so certain things were shown. After learning certain basic things at start, he started to use IWB in his lessons in his school. Then, he developed himself by “asking, trying/experiencing, and struggling” with the information he has not learned. Hence, he developed himself with respect to the use of IWB by “researches” and “his own efforts”. According to the first years, his frequency of IWB use increased. At first, there were moments he used, there were moments he did not use, but over time, he has been using it for quite a while. Now he is using IWB completely in his lessons.

Main purposes he uses IWB in his lessons are “lecturing” and “solving more questions”. In addition, he thinks that IWB is the “best way to handle the curriculum”. Therefore, for example, his source choice includes curriculum and as to “process curriculum quickly” and to “solve a large number of questions” in a fast way with IWB. Because, if he does not use IWB, he solves a very small number of questions, by classical style by writing on board. He opens and uses IWB in all subjects and use much more detail in the “visual subject matters”. For example, he uses IWB “more effectively in geometry”; solid bodies, field volumes of objects, and the rotation of objects. When he uses IWB in his lessons, he uses “IWB compatible documents”. In addition, there is an EBA website created by MoNE and he is trying to “take advantage and make use of it”. For instance, “lectures or video presentations” were taken from there and used in his lessons. There are some cases students get involved in and they are; project “presentations” and “solving questions”

on IWB. Being an IWB in classroom means, IWB is at hand to “supply all kinds of resources” and “gives the chance to solve questions instantly”. So, on the IWB, he can reflect/show the questions and get the “chance to do small quizzes and exams”. IWB “speeds up lessons” and he catches the chance to “solve questions more quickly”. IWB allows him to solve a large number of questions because everything is ready, he “does not waste time writing questions” or letting students write the questions.

When FATIH project first came in, it brought a “different atmosphere”, especially when IWB were installed. At first, it was very favorable. In the first place, it was very positive effects in terms of visuals, experiments, video presentations, visuals of mathematics were “more striking/remarkable”, and it has “increased a lot of interest” in the beginning. It was a new technology among the students. However, over time, the IWB is now “being used as a part of normal daily life”, it has become a habit, and we (him and his students) are “used to it”.

While using IWB, he usually “feels comfortable”. In other words, since the materials, documents are ready there, before everything is ready without having the resources, documents and plans to prepare, he can enter the class and process the teaching subjects or solve questions. So, he feels more comfortable. However, sometimes, he feels the warming temperatures from time to time subject to IWB. It is said to be “radiation effect”, so there is a “psychology that seems to be affected” at times.

He sees a difference between when he first started using IWB in his lessons and now because he “uses it more practical” now. When he used it for the first time, he could “not use quickly”, and he was more “inexperienced”, such as in opening and closing or in use. Furthermore, at first, IWB was “not comfortable to use”, it was slipping when he was writing, he was trying to erase it again and he was losing it but he is “using it better” now. He realized that he has improved. He stated that he certainly has “gained much more experience” now than when he first used it. He knows well what he can do now. There are many differences in terms of technology adaptability. For instance, he can use it “more practically faster” and “more professionally”. When

he had problems in opening documents or applications, freezing on board, he knows that IWB were infected by viruses and he could not find its solution before but now he is able to “use many different and more professional solutions now” than the first time.

He indicated that use of IWB somehow affected the role of the teacher in the lessons. In other words, it affected “positively and negatively”. So much depends on the technology that brings some “troubles”. In more detail, he thinks that IWB seems to “push the role of the teacher into a secondary plan”. Because there was no smart board in the past and there was not so much document and information, so the teacher offered everything and explained it. Teacher was the “source of knowledge” before. Now, everything is ready there, the student opens the IWB, there is every type of questions and all kinds of lectures. Consequently, now the teacher seemed to fall into a kind of second plan. When we look from another angle, if the teacher was “technologically compatible”, teachers has “increased IWB adaptation” to the course as positive. However, he thinks a teacher who “not have a technological mastery” on the IWB had difficulties. Either this happened in some cases. In addition, teachers are always lecturing what is ready. Therefore, for example, while he draws a circle on the board in geometry before, now it is “ready on IWB”, so he does not bother to draw that circle and so the student “forgets to draw” the circle. In fact, he thinks that so much use of technology is not too good there. “Using technology more moderately”, “more planned”, “suitable for its purpose”, he thinks it is a very important point in education. In addition, the IWB slightly eased his burden. The visual space geometry objects were straightened, and the planes were created with colored pencils one by one by hand. Now everything was reflected on the IWB very nicely, so the “role of the teacher was shared a bit more” and his “burden seemed to be almost half-loaded”. Teacher maybe a little more “making guidance” on the lesson with IWB than before.

The role of the student sometimes comes to the “forefront” because sometimes some of his students “use IWB better” than teachers, or sometimes in the internet students has come up with such situations from time to time as more practical. He

occasionally encounters that kind of situations. In the same way, the students have “gained their confidence” by using IWB. Perhaps because of the visibility of IWB, the “desire to come to the board and solve the questions” has also increased. Nevertheless, of course, he has students who are hesitant of the use of IWB. He stated that if students do not get up and solve the questions from time to time on IWB, they do not want the class to see the ignorance (bad at using) about IWB. He makes students go to the IWB who are “technologically distant or not interested” in the IWB, and they are “stuck” there. The students are most worried about it. Therefore, he was “pushing students to learn to use of IWB” by pick up every student to the board. However, it is not a problem for students when they are get used to use of IWB.

He indicated that he uses IWB on all the topics but especially in geometry issues by typing, he could not lecture with respect to subjects with need visuals, such as in solid objects, space geometry, trigonometry, three-dimensional shapes etc. Hence, in such circumstances, he needs to use IWB a bit more intensively, more extensively and more often. When IWB occasionally is “formatted”, or in the case of “virus infections”, or there are other problems, he uses IWB less often during in that while.

Using IWB in his lessons, he stated that it contributed to his teaching process in terms of “accelerating the lesson”, “showing many kinds of questions”, and “difficult and abstract concepts can be seen more clearly”. In the same way, he thinks, “His teaching style has not changed much” so we are teaching in the same way. Nevertheless, it is “getting more practical”, “going faster”, and “trying to solve more questions”. In addition, he has “not lost a lot of time writing” so he is increasing chances of “getting into the details” in subjects. For instance, while he was writing the questions on the blackboard before, he spent time and the time was lost. But, now, he just solving questions on the board and there is no need to write questions on the board. In addition, he does not think IWB made a lot of changes in his habits.

As he mentioned, he got a chance to “go faster” because “more questions were solved”. Therefore, he started offering more questions to the students. He thinks that

this “positively affects success” of the students. He started to solve the questions faster and “got more practical about using IWB”. With IWB, the possibilities of “using from a wide variety of sources” have increased, so it has created an unlimited world in terms of resources and integrating them in his lessons. In addition, IWB allows teacher to have more comprehensive knowledge on his subject matter and increase his mastery of subject matters of mathematics. He indicated that using IWB in classes has really contributed to development of himself in that he can provide “more things visually” to the students. He also started to “become more familiar with technology”. Using technology more professionally and taking advantage of the internet has improved him a lot. He says that IWB has “affected his motivation very positively” compared to the past. He specifically highlighted that IWB “affected his workload negatively and increase the efforts” he spends on his lessons. He says it seems like normally have facilitated his workload, but it actually “increased his burden”. He was not so tired before and he started to “get tired more now in lessons” because now he is starting to solve more questions, trying to solve faster, trying to give all kinds of questions and teach subjects faster, it was even tiring. However, he said that IWB has “pushed teachers a little laziness” because before teachers entering the lessons by preparing much more specific lesson materials and documents. Now “everything is ready”. They do not bother themselves. Consequently, there are some negative aspects in that way.

Use of IWB “attracted students’ attention” and they become “more motivated”. Accordingly, it was “increased success of the students”. IWB prevented the loss of time and “reduced the time spent by students to take notes”. Likewise, it influenced the learning of complex and difficult concepts more positively. He thinks that students can “understand complex things better” because they can “see them visually”. IWB has “facilitated learning complex and difficult concepts”. There was a difference between seeing three-dimension objects on a paper and seeing them visually on IWB. It certainly “affects the perception of the students positively”. Because of visibility, he thinks, “Creativity thinking and perception has improved”, and students “perceive it more easily”. IWB seemed to be attractive at the beginning,

but as time progressed, students saw that s/he could reach to everything and so they were “accustomed to literal”. Being too dependent on technology students pushed laziness. Accordingly, from time to time it formed “laziness”. It has some disadvantages in that matter.

“Time is passing really fast” and certainly sometimes he does not understand how time has passed since subjects constantly explained on IWB. Use of IWB “decreased the time spend in planning and preparation” to lessons and much more reduced time than in the past. So, he is “more comfortable” and “more organized” now. Because there used to be a daily plan event before. The teacher prepared a daily plan and lesson materials for the narration of the lesson and the lesson was done in the direction of that daily plan so “planning took time”. He had a chance to directly explain with the presentation of the subjects, to explain immediately through the IWB, and to “follow the curriculum in the best way” “without making such extra preparations” and “used a lot of things as ready”. Accordingly, everything is clear in the curriculum, he does not have to prepare an extra plan. When he makes subject narration through the IWB, the “teaching can be processed in a faster way”. Compared to the past, there was a time saving, so he started to “do more in a shorter time”, and “prepare course materials and lecture notes more easily”. It used to be a lot easier than it used to be.

IWB seemed a little attractive to the students in terms of “solving questions”, “scrolling the page”, “moving objects” and so on. In addition, he stated that “participation and come up to the board in the lesson has increased”. Especially, IWB took a little “more interest by the students who more interested in technology”. For example, he said that a student who is less interested or has a weaker condition in the lesson is very good in terms of technology, so those students’ interest in the lesson was increased, and he had such a bond with the students in that way. Perhaps a student who was reluctant to do so by writing and practicing began to solve the question willingly by coming to the board. Hence, his communication and interaction with students has increased.

He has “more control over the topic” and “get into more detail” with IWB because he can “reach, open and use a wide variety of and more sources”. In the past, time was lost by making his own lesson materials, and doing a lot of work. Now, he has a lot of sources and publications on his IWB, and he can “provide based on the students’ level”. For example, if the level of the student is low, he can open related to it. Consequently, it increased teacher’s interaction with course content.

Students have “unlimited resources” in their hands, which means that their chances of “seeing different kinds of questions” increased. In addition, teachers are loading resources to the IWB. There is nothing that students cannot reach, so they can “open IWB whenever they want and reach the source”. It used to be very difficult in the past. So, the students could not find the lesson materials, and the “resource was inadequate”, but now they open on the IWB when they want to open and work. Hence, it increased students’ interaction with course content.

He especially had interaction/communication with same subject matter teachers at the school regarding the “practical use of IWB”, “shared ideas” and “sharing documents/resource sharing”. From time to time, he got support from teacher friends about how to use the IWB, how to open the files and how to install them, and sometimes he helped them. Accordingly, he said, “we all together support each other mutually” and “shared and learned about each other”. He also occasionally “got support from other subject matter teachers” in the school. The one-week training was given to him and he does not learn much in a week, but as he started to use it and ask to other teachers who knows very well IWB. After all, there is such an “exchange of ideas”. Lastly, he has “exchanged ideas with his friends who do not use IWB and had suggestions for them”.

From time to time, he prepared “power point presentations and animations” for his lessons and sometimes “got help while he develops these materials by his child and students” and have been supported by teachers who are very good at technology or ICT teacher. He indicates that these “materials are not enough” for his lessons so he

has to “turn to other sources” or “get materials to a certain level by eliminating deficiencies year after year”.

While using IWB, he encounters kind of problems/difficulties in his lessons. In other words, there are problems such as “cutting off the electricity and shutting down the IWB; IWB not opening because of being infected by virus; the files uploaded on IWB cannot be opened due to virus infection; touch panel problems/unresponsive/freezing IWB; visibility problems (sunlight shines directly onto the board); internet/network problem; incompatibility/not supporting resource formats to run or open; software problems”. In addition, there was insufficient material problems at first but there are many resources now so it is no longer a resource problem. When there is inability to read the IWB problem due to the brightness of the screen from outside light, he “pulled the curtains to prevent the sun” from coming as a solution if they have. When there was a problem on the IWB; not turned on, electricity cut, no internet, not responding, then he could not use IWB in such troubles. For that reason, he “continues the classical narration from the empty whiteboard” on the side. In this way, such problems do not prevent him from lecturing. In such a situation, it may lead to a little glitch in the teaching process, but he can still teach his planned subjects.

When using the IWB, he tries to solve the problems he faces “by himself” firstly. Then, if he cannot solve it by himself, he is “getting help from students” who use IWB well. Next, he contacts the “ICT teacher” at the school when he and his students cannot figure it out and get it done. In situations where the ICT teacher cannot overcome, “technical support is being obtained from the authorized service”. He thinks, “helpings that he gets was enough”.

He suggested that for using IWB more effectively in his teaching process, “curriculum should be rearranged, refreshed/simplified” and “the number of students in classes should be reduced”. Because the classes are crowded and the curriculum is very intense. If these are revised/rearranged, the IWB will be more useful and will be more suitable for the purpose. Teachers need to “follow the current developments”

and new publications constantly. It is better for the “inadequate teachers to receive training” and “receive support from other teachers”. It is necessary to take “trainings and seminars for specific each subject matter” “given by people that are more professional”. It will be beneficial for the teachers who use it for the first time and have experience in this subject at a certain level. In general, the “trainings and seminars need to be well planned” for their purpose. Those could be my advice.”

Individual Textural Description - Participant #3 – HS1T3

(High School 1 – Teacher 3 – History – Female)

She took “one-week training” on using IWB with the FATIH Project. She indicated that the “training was not enough” and there was “no hands-on practice” about using IWB. She said she needs “training on how to use IWB more actively about her subject matter”. In addition, she would like to get “training on how to prepare educational video”. In addition to the start of the FATIH project, there were some reasons to start using IWB. Firstly, she “no longer carry a map/book or related course materials” to the classroom. Then, she “reaches information quickly” in her lesson. Next, she thinks that IWB “refreshes the visual memory of students” in particular because her subject matter (history) is a verbal lesson and has to be “supported in a visual way”. Hence, if she does not take the map while she is telling a war, the subject is not fully understood because it “needs to be animated and revived in the students’ head”. In addition, IWB “made her work easier”. For being a history teacher, she usually needs in the “visual and auditory” and so she uses IWB to “show maps, pictures, images, tables, diagrams; to watch videos, movies and to teach/lecture” in her classes. While using IWB, she uses much kind of resources, namely, “images, videos, EBA, and websites” in her lessons.

Sometimes the students are preparing homework and making presentations on IWB. In some situations, students participate in activities such as “show something on the map” and “search something on the internet and display the answer to class” through the using IWB. IWB in the classroom means to her as “convenience” and

“simplifying and supporting the subjects”. Furthermore, it is a “good thing having a technological tool in her classroom” and it “makes her work easier”.

Since starting the use of IWB in her lessons, she thinks that it “influenced climate of her class positively”. Students were “happier and curious at first”. Visuals are important for her so after students see maps, pictures, or videos on the IWB, the “students learn better”. She told that especially the “ninth graders see IWB for the first time and they like it more and much more interested in”. However, in the 10th and 11th grades, it does not make much difference in terms of climate of class because they get used to it in time.

She stated that she sometimes feels “tense, nervous and uncomfortable” while using the IWB in her lessons because from time to time, for example, the “students may break the IWB program and upload something inappropriate”, or “weird or unpleasant things can come up from visuals from internet”. Therefore, she sometimes lives in trouble when she opens visuals. In order to prevent those kinds of cases, MoNE is “blocking access to certain sites on the internet”. She sees a difference between the time she started using IWB in her classes and now. There is a “progress”. She stated that she was “a little nervous and worried initially” about what to do but she “uses IWB more comfortably now” and “get used to it and better now”.

Use of IWB does no difference in terms of the role of teacher in her branch. She told that she is “still in the lead and active” and IWB helped her as an “auxiliary” tool. However, when she does the whole thing from the IWB, the students get bored so she thinks the “IWB should not take the place of the teacher factor.” Use of IWB has affected the role of students in lessons positively and “made students more active”. In addition, “students use the IWB better than her and more effective” because students are much “more accustomed to technology”. For example, when she does not know or cannot figure out something, then students come up the IWB and solve it. She also thinks that the role of the students may have been affected as well in terms of “instantly getting information”. For example, when she is giving homework

to investigate, “students search on internet and get information right away”, even in lesson break on IWB.

The use of IWB varies according to the subjects. She uses IWB more often “when she needs something visually” and mostly in “teaching/lecturing”. For instance, “whenever there is a question mark in the minds of the children, she immediately opens IWB”. In addition, when she tells students a subject and they do not understand what it is it, then, for example, there is something like a mound, Alacahöyük, she opens the shape of it on IWB and “support the subject matter visually”. Moreover, she uses IWB more often “when to watch videos and concretize (narration of) abstract concepts”. For example, when she talks about the Greek Gods/Civilization and students do not understand much and confounded but when she showed a twenty-minute documentary about it, they were actually understood. Thus, it “made her job easier”. She uses IWB less “if there are some topics that she is going to talk about” where she does “not need any visual”. In addition, she used IWB less, “when the internet is not safe” such as she opened up IWB and there were such “inappropriate photographs”. In addition, she uses IWB less, “in solving problems”.

IWB has some advantages on teaching process. When she tells students about Silk Road, because they do not know the map and it does not come to their imagination, so they do not know where it is but when she “opens the map from the direct images and show it”, students “grasps better”. Furthermore, “participation was increased”. When students see something visually or watch a video, they “like and enjoy it”. It “attracts the attention”. She stated “use of IWB did not changed her teaching style much”. She was already paying attention to visual in advance, and now she can say that it “has contributed a little more visuality”. It used to be that “there was not so much video tutorial” in his teaching but now, she can show video while teaching. There is a change in this direction. In addition, “there is a change in her habits” such as she used to have a habit of moving/carrying a map and she might say it's over and she now “no longer carry maps to classroom”. She thinks, “students learn better and made her job easier”. For example, when she needs to draw a picture related to Ottoman Empire, it was easy for her by showing it directly from the IWB. In addition,

she started to “give the student more say”. In addition, while she turns her back on to the students, it prevented students from becoming involved in their own interactions and helped to “better classroom management and control students”. In lessons, her goal is to transfer her knowledge to her students. During this transfer, the different ways and the different materials are better in terms of “enriched in material/resources diversity and visual material richness”. Therefore, she thinks “IWB is good for her”. She stated “obviously, I did not have a unmasterable negative impact in terms of teaching process”. But she indicated that “when she encounters problems such as power cut or no internet, classic lesson passes with blackboard in unpleasant way” so she started to “be prepared for any situation”.

From the point of benefits for her as a history teacher, she says that “there are many contributions to me in terms of time (provide time to create a discussion; allows to teach more topics/information in less time; time-saving), visuality (enrichment in the visual sense; supports in terms of visuality), and infinite resources (enriched in material/resources diversity; visual material richness; reach many sources from the internet)”. She points out IWB “reduced her effort during the lesson” because there are already prepared resources. Although “initially IWB increased her workload” because of preparing lesson materials at home, it “reduced her workloads in the later stages.” So she stated that “at least I’m dealing with less stuff and do not struggle much anymore because I used to constantly explore the visuals, in what way is shown, what do I say now they are already under my hand.” Moreover, she is “more motivated.” From a broader perspective she thinks IWB is “useful to her and makes her work easier”. On the other hand, she thinks that “as she gains experience, she become more dependent on IWB” and become addicted. Because being dependent on technology brings some difficulties. For example, sometimes “she wanted to open some maps on IWB and there was no internet”.

From the point of benefits for students, she said “I think students are positively influenced, so at least for my branch/subject matter for my lessons from my own perspective.” Because in verbal lessons there are always words in the mind of the students and IWB “helps to embody/shape verbal things” through seeing visually. in

contrast to some things that she is leaving to students' imagination. Thus the "information is becoming permanent thanks to IWB." She also thinks that it is "better consolidate/reinforce the subjects". In addition, IWB provides "opportunity to have much resources" and "opportunity to watch movies" related to subject matter. The students are "more motivated" by the fact that a new "technological tool is come up and placed to their classroom". For instance, she indicated, "I have a daughter, IWBs are now placed on her school and she very excited about it because the computer they always wanted was now in her classroom. New generation loves the technology. That's why I think students' motive." She also thinks that IWB "makes students learn better." She remarked that use of IWB lead students to "better understanding of the subjects". She put something on her teaching technique by using visuals on IWB and she stated, "I have now diversified and reinforced the ways of narration, questioning, and giving examples with IWB so the success of students has increased." IWB "facilitated learning" because it present "information in compiled and organized" way. For example, there are less diagrams, tables or something like that before and she could not write them all on the board under normal conditions. However, she stated, "it is much easier now, when I transfer a picture right away, the students learn better." IWB "reduced the time spent by students to take notes and lead to write less." She stated that it is "easier to access information" for students. Students are "aware of the fact that IWB makes their work easier" in a serious sense and it is much "nicer for them to deal with computer, tablet and IWB". Accordingly, it is more enjoyable to participate in an activity with IWB. Therefore, she thinks, "students are becoming more active in class".

Although using IWB has many positive impacts on students, there are also some negative impacts. For instance, she observed that some students were "dealing with disturbing/extracurricular activities at breaks". Moreover, students were a bit "lazy but very quickly reached information". She indicated students "became accustomed to literal and it pushed them laziness". This is causing to students in terms of "not holding information in memory and forgets more quickly". According to her, "internet is unreliable source" and not all the information is correct. The internet is a

“huge treasure of information”, but in the other side, it is “information garbage”. For example, her students have “entered some unreliable web sources and some of her students have started to believe in things that are not real historical facts.” IWB “influenced students’ creativity negatively” in the lessons. Students have “access to information quickly and it is not good” for them because she thinks, “they cannot struggle anymore, everything is in their hands and information flows.” For example, “when they search for something, but they do not learn it, they merely copy the information and present it to us. I do not think they can learn the essence.”

When she started using the IWB in lessons, she stated that it “reduced the time spend on teaching of the subjects” because there is a visual there, looking at the visual and no time lost with drawing or writing. Also, IWB “initially requires more preparation time” in the beginning but later it “reduced the time spend on lesson preparation” compared to before. Because for example, while she was preparing some presentations slides in advance, now they are already ready on the internet and she uses them. Another example is that formerly while she talks about "Fronts in the War of Independence" or Communities, she was just picking up one student and make her/him writing the names of those communities, which was going on for ten to fifteen minutes but now there is the diagram/table on the IWB and she just shows and talk about it. In this way, it provided “time-saving”. In lessons, she thinks “time is flowing fast”. This time, after being a IWB in classroom, things “start to progress very fast and time is running out”. However, she noted that there are some “time issues related to intensive curriculum and when encounter problems”.

She “shares idea/opinion with teachers” especially with verbal teachers because she is a history teacher. For example, she asks the philosophy teacher; "What are you doing and how do you use IWB?" or “I use IWB in the following way and you can use it too that way” like questions/suggestions, and “this kind of cooperation is becoming.” She said, “I feel a little colder or something like that in the relationships of the students to each other compared to earlier”. Accordingly, it decreased interaction/communication among students. It seems to her that “we are starting to grow a more internet-dependent generation.” She also thinks that IWB “melted the

warm atmosphere of the old” because the students are used to “come to school’s garden and chat among themselves” but now in all the breaks they “talk about subjects on the internet”. Moreover, IWB influenced her interaction/communication with students positively. She stated, “When there is a problem related to IWB, she is started to get some help from students.” For her, it is a good thing actually and she sees that “the person she is trying to give something actually starts giving her something.” Also, for example, while IWB is reducing the time spend on teaching of the subjects, at that time; she “began to spare the time to students for things like commenting, asking questions, debating.” IWB affected her interaction with course content in a positive way because she says that “IWB increased her resources” and now she “almost has endless resources”. It also influenced students’ interaction with the course content positively in terms of “drawing interest, reaching many resources, and as resources increase, students become more involved in lessons.” In time, IWB “differentiated the communication between students and teacher” because she said that she “used to talk about different things with students before, but now they talk about IWB”. She indicated that she did “not developed course materials” to use in her lessons and she said, “I have not reached that level yet.”

She is confronted with technical problems or obstacles from time to time. For instance, there is “no internet connection” in the school, or the MoNE has somehow “restricted access to internet”. Thus, she cannot tie herself to IWB and she cannot say, “Today I will be teaching from the IWB”. When she encounters “damaged, distorted, out of order board problems, the lesson cannot go the way planned and continue lesson with classic method”. In such cases, she “brings maps” related to topics or “change the class” in order to overcome the obstacles. In addition, due to being formatted of the IWB lead to “deleted files/programs related to course.” There are visibility problems (sunlight shines directly onto the board). For example, she said, “the students in my class say that they do not see much because of shine and because of the place where they sit in the classroom.” She solves this problem by “use of curtains to avoid/ prevent sunlight.” From time to time, there are touch panel problems/unresponsive boards such as the “touch panel is not working or it works

very slowly.” Sometimes she faces “virus problems and not functioning flash/USB memory” problems. She stated, for example, “My USB memory is infected by virus and all the information inside could not be recovered.” Accordingly, those kinds of difficulties become troublesome and she is in such a nuisance. When she faces technical problems while using IWB, she “tries to solve these problems by herself” firstly. Then she “gets technical support by her students.” Next, “technical support and immediate intervention are made by ICT teacher.” When there is unsolvable or condition that cannot be overcome, “technical support by technical service (authorized service)” was provided. For more efficient use of IWB in the teaching process in terms of her subject matter, she said, “I have suggestions. For example, I want to increase the number of videos in EBA, increase the number of lectures and so on.” Moreover, she needs to “receive computer certificate”. She also indicated, “I need training for specific my subject matter and the number of trainings need to be increased.” She emphasized, “We usually take trainings like for general use and we need training for developing course material such as to make videos and need trainings to use IWB more actively and as teachers we are open to trainings.” She needs training for students because she said, “Actually we always say all students know how to use IWB but most of them are not. Some students get up on the board and say "I do not know" so it might be something like a few days training for students especially for 9th graders.”

Individual Textural Description - Participant #4 – HS1T4

(High School 1 – Teacher 4 – Biology – Female)

She took a “one-week training” related to use of IWB by MoNE in the scope of in-service training at her school. In fact, she says that “the training is not enough, I have to practice on IWB, it remains theoretical sense and not actively use it but as I used it over time, I learned by practicing.” The given training does not cover her subject matter and it is related to general usage such as how to open/close IWB, how to enter the internet, or how to load course materials to the IWB so she said, “I have investigated extra for my subject matter.” Accordingly, she stated, she “need training

for specific each subject matter and more practical training”. In addition, she indicated she “need for adequate resources made by MoNE.”

She uses IWB in her lessons for “showing images/videos (movie, documentary) /visuals/experiments, repetition, reinforcement/consolidate, solving questions/problems, and concretizing abstract concepts” purposes. In short, she needs use of IWB most in in visual matters and for “visualization”. For example, she says “biology should be over-visualized”. Apart from that, she is “opening documents on the subjects that students are curious about and watch documentary.” She also uses IWB for “enriching examples”.

She uses various kind of resources such as “IWB compatible e-books/documents, animations, EBA educational website by MoNE and other educational websites related to biology, videos (movie etc.), scheme/diagrams, text (PDF, Word, Excel, etc.) and images “while using IWB in her lessons. In detail, biology teachers are “using biology sites that biology teachers recommend to each other.” While she is teaching, she said “I use video to reinforce. The visuals are colorful and flashier for the purpose of keeping in mind. I use the schematics again, for example. It is very beneficial to us in terms of biology.” Again, she opens the websites with plenty of “visuals to explain and to support the subject.” When she opens and “repeat the subject from IWB, students understand better.”

There are some cases students get involved in IWB activities. For example, students are “preparing a presentation and present from IWB” such as environmental pollution, radiation pollution, pollution of water, and air pollution subjects more likely especially in ecology. Furthermore, students are come up and “participate in solving questions/problem activities on IWB”.

She thinks, “IWB is very useful in terms of biology”. IWB in her classroom means to her “diversifying lesson, supporting subject matter in terms of visuality, drawing attention of students, repetition, fun and not boring biology lessons.” She stated that it is a “good thing to be able to go over the subject again.” It means also to her “reaching information and visuals instantly and easily.”

When she told about effects of start using IWB on the climate of her class, she noted, “IWB helps to satisfy students' curiosity.” For example, students ask everything they want to know or wondering. In addition, she said IWB provided “positive atmosphere and positive effect in terms of taking attention and not a boring lecture.” With IWB students are not produce excuses now because she says when students say, “I did not bring my book, I do not have a question bank” so “we can all follow the questions together on IWB.”

There are many differences between when she first starts using IWB and now. Firstly, now, she is “better about using IWB.” Secondly, now, she “develops/improves herself “. Thirdly, now, she “uses IWB more effectively”. Fourthly, initially, she is losing time while using IWB but, now, she “uses time better”. Fifthly, initially, she was “inexperienced” For instance, she said that “At first we were very inexperienced and students were fooling us such as students say that IWB does not enter the internet. However, now we have gained experience, they can no longer fool us. We are no strangers to technology anymore.” Sixthly, now, she “uses IWB more practical and faster”. Lastly, while using IWB in her lessons, she told about her comfort level as “I was nervous at first, but as I am accustomed, I feel very comfortable now.”

Use of IWB somehow influenced teacher and student's role in lessons. IWB pushed the role of the teacher somewhat secondary. For example, she indicated that “The previous teacher was active teacher and said *let's do this to students*, but after IWB, the students say *I wonder if we can look at it*. It is a little easier to direct the teacher. The teacher is retreating a bit more; the students help a little more flow of lessons.” In addition, IWB made teacher's work easier. For example, she stated “We can open anything we wonder about from IWB and search the information on the internet. We can see all kinds of visuals about what we search for.” IWB positively affected the role of the students and from time to time student's role comes out to the forefront. She said “The students are not only listening to the teacher but also contributing to the teaching and teacher.” In addition, “students were more active.” She emphasized that it is “more appropriate for student-centered education.” Furthermore, IWB

changed the point of view of student to the course and make students follow the lesson more intriguingly than before. She told “IWB changed the point of view of students to the lecture. Students follow the biology lessons in a more interesting way without getting bored.” Students reaches information instantly. She stated “We have seen that the students can access the information in a short time. After that, students are very good at using technology.”

She has some reasons to start using IWB for her lessons. Firstly, she started use of IWB because of the “introduction of the FATIH project.” She indicated, “We said we should use it if it is useful after installation of IWBs by MoNE. Now we are actively using it now.” She thinks she “reaches students in a better way.” She said “I started to find Is there anything (visuals, scheme, etc.) better than mine to teach? or Is there something more practical to show better than before? So, I chose IWB to reach the students better.” She also started to use of IWB in her lessons in order “to visualize the lesson, to solve problems/questions, to support topics, to enrich the course, and to consolidate “. In general, she says, “it is effective that the children encourage me and help me. Because we as teachers, are a little scared from the technology, but thanks to IWB and students we got a little closer to it.”

She explains when or in what circumstances start to use IWB in her lessons. She uses IWB more often, in lecturing; in solving problems/exercise; visually related topics; when needs to give visibility prominence; to show/do laboratory experiments when no chance; to enrich and to diversify the subjects; for reinforcement/consolidation purposes; for repetition; for students to catch missed points when teacher lecturing; to address different levels of intelligence; when subjects/cases need to be supported by IWB; to speed up the lesson. She indicated “I use IWB according to the content of the subjects. If the subject is mostly visual, if it can be explained with video better, then use of IWB is much better in that case. In addition, we are not always in the laboratory, we cannot always do experiment in the lab, but there are even experiments with IWB. We can even see them.” Another example is that she thinks “I use IWB so as to address different levels of intelligence. Because some people are visual intelligence and auditory intelligence, we have a chance to use a variety of

intelligence types.” In other case, she stated “I use IWB more often when I need to support the subjects with solving more questions”. She uses IWB less when to keep up topics. For example, she stated “When I'm about to catch up the subjects to curriculum, or if I am in a hurry or when I'm late and have time issues, I quickly tell things normally and I'm writing down important things”.

IWB made many kinds of contribution to her teaching process. One of the advantages is the “visual sense of enrichment”, “opportunity to reach videos”, “opportunity to reach the animations” and “opportunity to see/solve more questions/problem types” for her. In relation to this, she stated, “It has become more practical and richer biology lessons. Also, biology lessons have become even more interesting.” She also mentioned, “IWB increased interest in biology. In terms of grasp of the subjects, reinforcement was better thanks to IWB. That is why I think it is more positive in the exams. The tedious/boring biology lessons are becoming more fun. It's getting better.” IWB is good for repeat the course content and it allows giving some tricks about subject by doing repetition. She stated, “It is good for me to repeat the course content again with IWB. I remember the places that I forgot; in the meantime, I say it is good to tell you my students what it reminds me of some points on IWB. Also, it allows me to give some tricks.” Using IWB makes subjects/learning more permanent. For example, she said, “When students are asking an inquisitive question, it is much more effective to show visuals rather than telling how these whales are giving birth, it is more memorable and more permanent in mind. It also increases the interest in documentaries “. In addition, IWB “makes lesson enrich” in terms of materials/resources, diversity or visuality. Accordingly, now there was a “more fluent lesson” and the students were not bored. According to her, IWB did not changed her teaching styles but it has enriched her teaching process. For instance, she says, “There was enrichment in my teaching style. Well, it was not uniform anymore. It is much more visual now”. In addition, IWB changed her habits. She talked that “When children were watching the events on the IWB, I have a chance to talk to the students individually and a better chance of dealing with them”.

There are also negative impacts on teaching process. Firstly, while using IWB, she encountered unwanted situations and faced strange information. For example, she had a negative experience and told “Students ask how people look like after krnepental syndrome or cancer diseases or how Down syndrome people looks like or how super females look like in biology lesson. I entered the genetically super female on internet and things turned out very badly and accessed to strange information. So, we have to be very careful when searching and choosing search words from IWB because we can enter strange sites.” Another negative influence on teaching process is that “when encounter problems, it is slowing the lesson, making waste of time and stalling the lesson.” Similarly, there is a little time lost also when students are asking everything they curious about, and we are searching them in the lesson meantime. Thus, we are getting a little stalled and lost time during lesson”. She also noted that the “internet is an unreliable source of information.” Although there are some websites that are scientific, there are also websites that have false or misleading information. Students “deflects the main aim of the course” with use of IWB. For instance, students say let us look at the other subjects, let us look at it, and so on during the lesson and it leads to shift their interest to out of subjects.

IWB has positive impacts on teachers. Firstly, she is “not get bored” anymore. She stated “It affected me better, I'm not bored in class. When I'm bored, I'm doing a little more visual weight lessons, so it turns out to be not boring lessons.” Moreover, for her, “IWB helps her to satisfy students' curiosity.” She stated that “now there is a teacher who can get into and interact with more children and meet more their curiosities.” She mentioned, “IWB affected my motivation positively”. As she teaches better with IWB, she takes more interest and increase students' interest, so “higher the productivity of the teacher” and “the teacher is more enthusiastic about teaching” accordingly. IWB reduced workloads in the later stages and the burden of the work is more relaxed. For example, “instead of searching books from different sources, it pushed me to search information for different sources on the internet”. Actually, she stated, “according to the situation, IWB sometimes increased and sometimes reduced the effort she has spent in her lessons”. After started using IWB,

she began to writing less on the board and no longer require drawing on the board. For example, “if I need to draw a very detailed scheme/diagram, I will find the scheme on a website on the internet and show it; so, I do not have to draw it”.

There are some impacts on students both positively and negatively. Firstly, students “more actively involved in teaching-learning.” In addition, IWB drew more attention of students, increased interest and made students more participative/attentive. Accordingly, she indicated, “IWB allowed the students to attend the lesson. Students attend more with visuals to the lesson and it attracts more attention by students. Since the visual materials related to the topics are short and effective, the students are immediately interested and watched”. Moreover, for students it is “easier to access information.” She stated, “Students have the chance to search anything they wonder about. They have a chance to follow the current news. It is good in that respect. For example, at times when people are bitten by ticks and on the news, students searched not only tick which is the cause of the Crimean-Congo hemorrhagic fever on the IWB, but also the harmless ones”. Furthermore, students are more motivated. She stated, “IWB positively affect students’ motivation and saves from memorizing. For example, we are taking biology out of books and integrating it into nature. Students can watch biological processes or events in nature. I mean, students are more involved in live events than book information. In that respect, it is very good in terms of biology”. Moreover, IWB enhanced learning. She told, “The student who is irrelevant, or the student who does not understand anything from reading the book, but they understand when they see it in the visual. Some students have photographic intelligence and they like visuals more. Some students like to read, others like to take notes, so we can address different types of intelligence. We can appeal and address to both visuals and tactile and we can gather several different groups of students”. IWB also is increasing the awareness of the students. She noted, “As in biology, students say there were interesting events/things, and as there were living things on around me. It is very good in that respect that it has increased in awareness of students. This event also increases the student's interest in biology”. IWB has positive effect on the success of the students by diversifying, enriching and

facilitating learning. She stated, “Concepts are good for being seen in the schemes, in the visuals, and in the experiments on IWB. In other words, students replace and put in place concepts in terms of visual sense”. In addition, she told, “The use IWB affects the success of students positively because it has diversified and enriched learning.” Students are more creative. For example, “IWB affects creativity positively because when we give a presentation to students, they have the chance to scan the resources in the subject on the internet and prepares presentation using the information technology by preparing and integrating animated diagrams and etc.” IWB makes subjects and learning more permanent in mind. She told, “The students are interested in technology. They are more open to visual events. They also see the lesson visually. It is a more permanent lesson because both seeing and hearing are together”.

When she is using IWB in her lessons, she indicated that “time is passing/flowing faster” and IWB speeds things up. Accordingly, she has not any problem with time management and she said, “I do not have any problem with time because I adjust the use of IWB according to the situation. I open it when I see it as I need it”. She stated, “At first glance it sounded like a waste of time using IWB when you were novice. But now, when you use the IWB in right place and right on time, it speeds up the events, and it gets even better.” Although lesson with using IWB “requires more preparation time in the beginning, later IWB reduces time spend on lesson preparation and lesson planning”. In addition, IWB reduced the time spend on teaching of the subjects. For instance, she told that “It's diminished the time spend on teaching because I am teaching, reinforcing and solving questions on IWB. There are less handout copying and distributing or bring up question-solving exercise book because it was a waste of time. Thus, it's getting faster now”.

IWB provided “more interaction between teachers and students.” For example, she gave an example and told, “The naughtiest student can use a computer very well and has interest in technology, so I can involve him/her in IWB activities. The student is away from where s/he sits, and join the lesson, and then s/he says that I can do something for this lesson. It was like helping teachers and participating in biology.”

It also increased students' interaction with course content. She told, "Some students like to spend time with computers. When they want to study on visual course materials again when they want it at school or at home they can reach and repeat them again." She spoke of about that IWB increased her interaction with course content also. She explained, "Students are more curious about visual things. They are wondering what is the most poisonous frog in the world then talking about just frogs. We had many opportunities to reach that kind of stuff. I can get different information through it". She has interaction/communication with other teachers at school with respect to share idea/opinion, share resource, and support for the use of IWB. She said, "As teachers we help each other to share and recommend the useful website links, lesson materials and etc. with own subject matter teachers. When there is a problem related to use of IWB, we support each other with other subject matter teachers. We have that kind of sharing among teachers at school". Moreover, she has not developed course materials for her lesson. She stated, "I use course materials in the internet environment, I do not develop anything myself. Because lesson materials are so rich that, I do not have to develop the course material. There is everything related to my subject matter".

She faces some problems/obstacles while she is using IWB in her lessons. She listed followings as issues she faces: "internet/network connection problems; virus problems; restricted internet (access-banned sites) by MoNE; resources (materials) problem provide by MoNE; trouble on internet/weird strange things happen on internet; touch panel problems/unresponsive boards; visibility problems (sunlight shines directly onto the board); and takes time to open the IWB/open slowly". She told, "MoNE needs to do some more work on resources because there are still insufficient resources. MoNE needs to make its network (EBA) more usable and richer content by developing and loading more resources on it". She also told, "Sometimes the internet problem is happening." She told that she "uses curtains to avoid sunlight and prevent visibility problems". She "solves the problems she encountered when using IWB by herself at first". Then she gets some "help and technical support by her students". Next, when there is a situation where she and her

students could not overcome, “technical support and immediate intervention is made by school’s ICT teacher”. Lastly, in situations where nothing can be solved, technical support is called by technical service/authorized service from out of school. She said, “If there is a problem, I solve it with the students in the first place. However, if there is a technical problem, we tell the ICT teacher of the school. If there is a bigger problem, then I tell the administration of the school. The administration is calling a technician/ authorized service. There are technicians of IWB, they come and repair under the FATIH project.”

She stated some suggestions and recommendations for using IWB more effectively in the teaching process in terms of her subject matter and they are: “need for adequate resources made by MoNE; need to increase resources/materials; need more practical training; need to be refreshed/simplified curriculum by MoNE; need training for specific each subject matter; need more reliable information parallel to the curriculum; and students need to access information safely”. For example, she said, “We want the Ministry of National Education (MoNE) to enrich the EBA website in terms of visually and content and needs to be renewed in accordance with the curriculum.

Individual Textural Description - Participant #5 – HS1T5
(High School 1 – Teacher 5 – Chemistry – Female)

She has been trained about the use of IWB for 2 weeks at her school. Before the training, IWBs had already been placed in her classroom for the being pilot school of FATIH Project. She said, “The things told are not so much about actually using IWBs, but more about things that are about the applications. We learned by ourselves how to use the smart board.” She needs training for specific each subject matter. Accordingly, she thinks, “I learned everything about the IWB but I need the training, in fact, related to my subject matter”. In addition, she needs trainings to learn new things about IWB. She stated, “So after initial training, I developed myself, I do not really need a lot of IWB training after all, but I would like to learn if there are new things about IWB.”

Her main purposes of using the IWB are teaching/ lecturing and problem/question solving on IWB. For example, “I will teach the periodic table. Instead of drawing and filling a periodic table for hours, we are opening up the internet and we find an image of a periodic table on IWB. I can show all the elements of 1A group, 2A group on it individually and talk about which group they are in, what kind of group they are, and talk about the characteristics of that group. So, I can tell the whole lesson there on a periodic table for two or three hours. I can tell it, show it to the students, it can be that simple”. She is also currently using the IWB “to instantly connect to the internet, to display something on YouTube, to show animation or video, to show images/visuals, to visualization, to show three-dimensional shapes, to show scheme/diagrams/tables/paintings, in difficult to understand/topics that cannot comprehend and to indicate sections that have difficulty in drawing” as a part that is more useful to her. For example, she indicated “I’m showing students everything I need to visualize on the IWB by connecting the internet in every subject. It’s good to have an IWB in that sense.” She uses IWB to show more visual things such as “to illustrate three-dimensional atom when I cannot draw a 3-dimensional thing on the board or to show the shapes I cannot draw on the board or if it is difficult to understand about a topic, I can use IWB to show animations”, and so on related to chemistry as her subject matter. There are more such cases. She also uses IWB for time-saving purposes. For instance, she told “When I want to save time, and if I need to draw something, so I’m using that time because of gaining time”. She told that she uses IWB as supportive purposes and especially in such situations.

There are many kinds of resources she uses while using IWB in her lessons. They can be listed as “websites, animations, images, videos, EBA, IWB compatible e-books/documents”. In accordance with, she stated, “We are connecting more to the Internet. I’ve been downloading and showing videos from YouTube, and mostly watching animations and so on.”

There are also some cases that students get involved in, namely, making presentations and problem/questions solving on IWB. She told “There are many verbal topics in 10th grade especially. Therefore, I want students to do research

assignments and make presentations by preparing their presentations and then present it using IWB”.

It means for her “get information instantly, instantly connect to the internet, and more richness in terms of being able to reach different sources” to have IWB in her classroom. She told, “I think it is more richness in terms of being able to instantly connect to the internet faster and reach different sources”. She also stated, “if there is a question mark in our mind, relate to my subject matter or something other than my subject matter, then we can immediately find its answer by instantly connecting to the internet. It's nice to be connected to the internet.”

Starting use of IWB has positive influence on the climate of class and bring positive atmosphere. It also has positive effect in terms of increasing interest, more attractive, more enjoyable and more effective teaching. She told that “For example, when I show animations related to quantum subject to students, the quantum is a very incomprehensible and endless topic, with the animations, the students could have a little more control over the subject and mastering the subject by having comprehensive knowledge of the subject. So, they are very interested because they are watching something visual. Even students who are not interested in quantum are starting to say that I will read the quantum books from now on, so I think it is nice.” She also thinks that “I mean, of course, there is something different for students, we always tell that the students cannot concentrate all the time while listening to the teacher. We are making a difference there; maybe we are taking a little bit of their minds in a different direction with use of IWB.”

Her level of comfort while using the IWB in her classroom is varying according to the situation and uncomfortable/nervous from time to time but generally, she is “not so nervous”. She told, “At first I was a little bit nervous at times when I was not used to, but I get support from the students in that times. I'm more comfortable and making more progress to improve myself now.”

There are some differences between when she (at) first start using IWB and now. Firstly, she stated that “I has been nervous and getting anxious but I do not have any

trouble as I learned as time goes by. I do not feel nervous when I use it now.” She is initially not quite knowing what to do about using IWB and inexperienced but now she uses it more comfortable. Accordingly, she told “It's improving as I use it, so I am using it more easily now. The first time I did not know what I was doing. Actually, like a regular computer but still different.” Now, she also “begin to master about using IWB”. Hence, she indicated “I learn what I can do in there, so there is a difference when I use it, according to the time I used first.” In consequence, now, she is “better about using IWB” and uses a better way.

Use of the IWB affected the role of the teacher in the lessons in a sort of way. Teacher is still active and still in the lead position but IWB made teacher's work easier. She thought IWB as an auxiliary and as a resource supporting teaching. She stated “So I am teaching how I used to be, I'm still doing the same. I can say that the IWB shortened our time in terms of applications and in terms of visibility. IWB made some things easier, but I am the one who is still talking about it. I can think of IWB as an assistant to me. The focus of the lesson is not the IWB, but I can say that the still focus is the teacher and IWB is just an auxiliary.”

The use of IWB has an effect on the role of the student as well as the role of the teacher. IWB helped to use and learn technology at some point. Accordingly, she told, “There are students who has not technological tools or computer at their home, so they may have learned to use it at least here; the technology may be a bit closer to them. There are students who never saw technological tools or computer. I think IWB is interesting for them.

She has some reasons to start using IWB. First, she started using because of the introduction of the FATIH project. In addition, she wanted to use for benefiting from technological opportunities. Hence, she told, “It is necessary to because of implementation of IWB in every classroom with FATIH Project. Also, if there is a possibility, we want to take advantage of that technological possibility and we started to use for it.” She also started to use IWB to visualize the lesson/to add visibility. Accordingly, she stated, “I started using it. Then, as I used it, I looked at students

and saw that as we used it, it made our students happy, so we started to use in terms of visuals.” Also, followings are other reasons why she stated to use IWB in her lessons: “time-related/using the time correctly/saving time/gain time; to teach better; to make teacher’s work easier; to teach 3D and abstract concepts.” Correspondingly, she stated, “It was all about time and I wanted to teach the students better, which is why I started. Directly connect to the internet, download something from there and visualize it, use the time correctly, and show it instead of drawing. It is all about that. Also, I think students understand something in three dimensions more easily with IWB.”

In relation to situations she started to use IWB more often, she indicated followings: “use more often, in solving problems/exercise; use more often, in visually related topics; use more often, in practice; use more often, in more verbal subjects/issues; and use more often, in matters requiring the drawing.” In addressing to situations, she started to use IWB less, she told following: “use less, in lecturing.” Accordingly, she stated, “I use IWB less in subject narration and more often in problem solving, in practice, in more verbal and more visual matters”. Similarly, she told, “I usually prefer to use IWB when we are not able to cope with drawing like when draw a periodic table or drawing will take a lot of time.”

Use of IWB has some positive impacts on teaching process. Initially, IWB “makes the course better adapting, actually more enjoyable, perhaps with the things they watch. So, I can say that IWB is enriching the lesson.” Moreover, IWB has “no change in her teaching style and in her habits”, but it just “supported the teaching process in terms of visuality” and provides enrichment in the visual sense. She told, “I do not think there has been any change in my teaching style or habits. The teaching process was a little more visual. I mean, we did not show much change except that.” In addition, IWB increased resource diversity. She stated, “I have supported lessons with a variety of resources”. On the other hand, there are also some negative impacts on teaching process. When she “encounters problems” while using IWB such as internet connection problem, damaged or out of order board, “lessons cannot go the

way planned”, “classic lesson pass with unpleasant way” and “slowing the lesson”. For this reason, she “need to be prepared for any situation” during the lesson.

With regard to impacts on teachers, there are some positive and negative influence for teachers. She is “more motivated” and said, “We are also impressed by the way that the students are affected. The better the students learn, the better to keep in mind and more interest in the lesson, it increased my motivation. Yes, I can say that.” She started to teach better with IWB. She stated, “Being able to teach the students better about those three-dimensional things we sometimes cannot figure out is that they can benefit us both at the same time.” In terms of negative impacts, IWB affected her workload in both ways. Although, IWB initially increased workload a little bit, it reduced workloads in the later stages. She indicated, “It is increasing with the preliminary preparations at home a little bit, but we are trying to put it in order.” In addition, IWB “initially increased workload” when facing such troubles, unable to connect to the Internet or access-banned websites at the beginning. At that time, she “needs to download videos and put it on the USB drive to show students”. Thus, she “has to work more at home” and had to deal with it a lot. In addition, IWB increased effort (endeavor) during the lesson and so in this case she “need to make more effort”.

There are some positive impacts of using IWB on students. They are: “better adapted to the course, better concentrate/concentration increased, better understanding of the subjects, better grasp the subject, easier to keep subjects in mind, better retention/more permanent in mind, increase drawing attention of students, watching and following lesson quieter, increased interest and increased participation and involvement to the lesson”. Consequently, she stated, “In terms of the student, the lesson will be more permanent in students’ mind when they watch with visuals. In my lessons, for example, after watching animations and then telling the things related to the subject. I think it is better and easier to keep in mind. Also, I think IWB is not only has increased students’ understanding but also their involvement into lesson.” Similarly, she told, “So when I am showing something on the IWB, students become more interested in listening to the lesson; and they can master the subject more. Even if there is an irrelevant student, we can take the attention of even that disinterested

student. When I show an animation on the IWB, it helps to better understand the subject.” Likewise, she indicated, “As far as I can tell from the feedbacks, it certainly does make the students understand better. I mean, it become more permanent in mind.” She also said that students are “more motivated” and IWB “increased their interest”. She gave an example, “For example, after showing animation, I will give an example from quantum again. Quantum subject is not understood at all and it is very difficult to explain it already. It is very difficult to teach it by telling it. Students were more interested in animation and they went and explored themselves. Therefore, I said you could watch the continuation of this thing because I do not even have time in class. I mean that is to say, the interest has increased.” Accordingly, IWB provided ease of understanding and better understanding of the subjects by letting students understand more easily. She told, “Students can understand visual things better. We cannot rotate a three-dimensional thing there on the board, but there is a better understanding on IWB. They can see the truth behind there better.” Students learn better and have better retention with IWB. She stated, “Students learn better with visual things and subjects become more memorable.” Moreover, IWB facilitated learning and increased success. She said, “Because students can understand better a subject by seeing a 3D drawing that a topic they do not understand at all. I think it affects it positively.” Furthermore, IWB reduced the time spent by students to take notes. She told, “In some shape drawings, I can say that it is a little effect and change.” She mentioned that IWB positively affected students’ learning of complex and difficult subjects. She stated, “Here is the most IWB I think is effective and efficient, that is, it is effective in learning the complex and difficult concepts. I think it's better to be used there.” Her providing a variety of resources for various learning styles has positively affected the success of students by enhancing learning and increasing interest. She stated, “that is to say students are more interested in that subject with providing various sources.” IWB increased the creativity of students in a way. She points out that “Students use IWB when making presentations, so their creativity can be strengthened. Therefore, a student who does not know how to make a presentation or perhaps never give a presentation or maybe

a student who does not know how to use a computer could have learned it there. I mean, they could have improved on that”.

Her perception of time by using the IWB in her class is “time flowing fast”. According to her, use of IWB reduces time spend on teaching of the subjects such as by “showing that shape instead of drawing” and lead to “gain time”. She “gain time by reflecting the questions/problems directly and demonstrate/practice on IWB”. Although IWB has positive effects on time, there are also some negative effects. From time to time, there are some time issues when encounter problems while using IWB. In such situations, it leads to “waste of time and stalling the lesson”. Another negative effect is “time issues related to intensive curriculum” with intense use of IWB. Relatively, she stated, “Actually, if I use IWB a lot, I think I cannot complete curriculum because it is intense especially 11th and 12th grades.” The preliminary work and preparations at home has increased slightly so IWB increased workload relatively. She has a “little more work to do at home”, so her “research time is a little higher”. She thinks, “It is disadvantageous sometimes in terms of time. Therefore, we need to make preparations and preliminary work in advance. For example, when we are not able to connect to internet, we have to prepare related materials beforehand. If everything goes on time in such a place, the course can be fruitful if it goes normal. But apart from that it is disadvantageous sometimes.”

IWB increased her interaction/communication with students and made her better in the eyes of students by increasing interest to her subject matter. She told, “Students do not show much interest in lessons like chemistry but they love to watch visual things on the IWB, that is, whether they are movies or animations related to the lessons. However, accordingly, when students started to love the lesson, they started to like the teacher in the same way. I am attracted to the students” interest a little more. I can say that the students are more interested in the lessons, so our communication has definitely changed as well. For example, if there was a student with a prejudice against the chemistry lesson, maybe I broke it. I think it is better that way.” IWB also increased interaction among students. She stated, “If the students make a presentation, we are already trying to group. With this grouping, it may be

that we may have increased the interaction among the students, perhaps a bit in the sense of distribution and sharing of work.” In addition, IWB increased teacher and students’ interaction with course content by “providing more resources”. She also mentioned some kind of interaction she has with teachers at school about using IWB and those are “share idea/opinion among teachers”, “support for the use of IWB” and “share resource among teachers”. She stated, “At first, we learned about how to use IWB especially from mathematicians because they are the first to take the initiative to this. They were more exploratory. So we started to investigate more sources. After learning that we used IWB in the narration and question solutions, so we got into interaction with other teachers like that.” Similarly, she stated, “We are the two of us who are already in constant communication with each other as chemistry teachers and we shared the resources with each other”.

Additionally, she “did not prepared/developed any the course material” such as video or animation. She “used the existing materials”.

There are some issues she faces while using IWB. These challenges or barriers have the function of limiting, restricting, and defining the teaching-learning negatively. They can be listed: “damaged-distorted-out of order board; internet/network connection problems; restricted internet (access-banned websites) by MoNE; insufficient resource/material problem; visibility problems”. One of them is restricted internet (access-banned websites) by MoNE. She told, “In the first years I think they do not do much stuff and we cannot connect/access to everything. I cannot open the video I want. At least I think that we need to be able to access all kinds of publications in scientific fields.” In that kind of situations, she has “resolved by uploading materials USB drive at home and display it on IWB at school”. Sometimes she faced with such problems “internet connection” or “damaged-distorted-out of order board” problems, with IWB in such technological matters. Visibility problems happens sometimes, but she “handles it by closing the curtains.” When she faces technical problems, she “tries herself first”. She does if there is something she can do but if she cannot handle she “invites students to help” because she does not want to waste time in such situations. When she “needs technical support” while she and

her students cannot overcome problems, she is “communicating with IT teacher” and “IT teacher makes immediate intervention and provide technical support”. If the IT teacher cannot handle the situation, the technical service is called and “technical support is provided by authorized technical service”.

She provided some suggestions and needs. She needs to increased/enriched the number of materials in EBA and need for adequate resources made by MoNE. She stated that “If the resources in EBA can actually be improved a little more, especially chemistry in the field of science. In the early years, there were few materials. Now they have developed a little more and something is being done for EBA, but I think it is not enough.” She needs to be refreshed/simplified curriculum by MoNE. She stated, “We have a problem with catch up the curriculum because the curriculum is intensive.” She also needs training for developing/preparation of course material. She stated, “There might be things like encouraging teachers to prepare/develop course materials. So, we think why we cannot prepare the course materials.” In addition, she “needs training for specific each subject matter”. She also stated she “needs for removal of blocking access to certain sites by MoNE” and “should be able to enter sites other than the sites only MoNE gives permission”.

Individual Textural Description - Participant #6 – HS1T6
(High School 1 – Teacher 6 – English – Male)

He had “2-weeks training” on use of IWB because of his school was selected as FATİH Project pilot school. His school was one of the first schools to use IWB in Turkey. He thought that the given training was “not enough” because it was “not a hands on-oriented training”, so it was not very practical. Accordingly, he “needs more practical and more efficient use of IWB trainings” and have to be “teach teachers about what to use in their classrooms”. In addition, he thinks that there should be “training for specific each subject matter”.

He has some intended use of IWB in his subject matter and can be listed as “teaching/narration; problem/question solving; doing exercises/drills; make presentations; visualization; show videos; show animations; show images/visuals;

watch movies; auditory/listening/pronunciation”. He stated, “I have a visual aspect of my work because I am an English teacher. There may be videos or animations to motivate the students. There are also IWB compatible versions of our textbooks. We use to watch visual materials, videos, and make auditions and listening from there. Like I said, it's a great thing for English, so we are watching and listening to all kinds of visuals in a very effective way”. In addition, he “uses videos about the letters which are difficult to pronounce in English”. It is “effective in listening to people in his/her own language”. He then “prepares and show power point presentation materials for that video as a summary”. Similarly, he told, “IWB is especially useful for my branch as an English teacher. I can find many things related to my lesson and use it for presenting visual materials, showing videos etc. We can watch movies, listen songs from the internet. He makes listening from the IWB. It is a great and rich resource for my English lesson”. In addition, he “opens the drill and practice question and solution from IWB”. Accordingly, he uses “IWB as supportive purposes”. He gave example and said, “I can use videos to reinforce the topic” or “use pictures to teach words” or “use PowerPoints to teach the lesson”.

He uses many kinds of resources while using IWB in his lessons. They are “educational websites; EBA, images; videos (movie etc.); animations; sound (song etc.); PowerPoint slides; IWB compatible e-books/documents”. For example, he “watched English movies both in English and subtitles in English”. In addition, he stated, “I have at least one video on every subject. There are exercises and we solve exercises on IWB. After that I had taught the alphabet the other day and found a good song about the alphabet and listened to students, and it was high school student level”. He “opens the book's IWB e-book version” and “see the texts and watch videos of the topics”.

In some situations, students participate in the activities that they use IWB in the lesson. Students “likes the game like exercise” so when he “opens the game they are joining” and there is “active participation” there. Students also “like the videos and such visual things”. While “doing exercises/drills practice done with flash animation”, students “drag and drop” solutions. Students also involved in

“problem/questions solving”, “listen songs / repeat the pronunciations” and “make presentations” activities using IWB in the lesson. He told, “Students have time to make a presentation. I had that kind of work and told students to present about new words and new grammar structures that they learned, so they have prepared presentations and present to the class”. Another example is that, he stated, “Students listen songs and repeat pronunciations; and practice and solve problems on IWB”. Accordingly, students usually join those things.

It means to him to have an IWB in his class; “make his work easier; ease (convenience, simplicity); support course in terms of visuals/visualization”. He stated, “It's easier for me to do my job. It gives me the convenience of giving different things. So, I offer my materials more easily.” Similarly, he told, “it's a great convenience when presenting things, I prepared at home, to students. Sound is beautiful and there is no light-related trouble. If so, I present the materials to the students with great ease”. He also stated, “IWB supports in terms of visuality, so it is beneficial for English lessons because visuality is very supportive of my own field”.

Starting to use IWB in his lessons influenced and changed his classroom's climate positively in terms of “more effective teaching; increase attending in lesson; increasing interest; more enjoyable”. For example, “It changes the climate of the class. Although if you describe the definition of a subject with hundreds of words to students, you show a picture or a video of it and it is more effective. Accordingly, students are more involved when they see it and it is more effective when he teaches something with IWB”. Similarly, he stated, “IWB affects the climate of the lesson more positively. When visuality gets into the course, the student gets more interested in and draws more attention”. In addition, he told, “the use of IWB in the courses appeal students and they like it. According to the old turn, it is very fun especially in English lessons because students are making listening, playing educational games, and reaching everything”.

While using IWB his lessons, he “feels more comfortable and not nervous now” because he “used to it” and there is no problem with it. He is “used to it” because it has been 5 years. There are things he cannot do, but he “still uses it”. Similarly, he stated, “it's comfortable for me now that I'm accustomed to it. I am comfortable with it, so there is no problem”.

There are differences between when (at) first his start using IWB and now. Now, he “uses IWB faster” and “use more practical” way. Moreover, he now “uses time better”. He also, now, “uses IWB more comfortable” because he is now “more experienced”. In relation to this, he stated, “Now I have a better idea of what is happening at least and what problems are occurring. I'm more relaxed because I'm more experienced”.

Use of IWB in lessons affect the role of the teacher. He thinks that it “depends on the teacher”. As he said, “it is important how you use it”. He does not think IWB changed the role of his as a teacher very much. He told, the teacher should be a teacher and IWB should just help him. He emphasized that, “Everything should not be transferred to IWB and the teacher should not be drawn to the edge. So, we need to be careful. Teacher and IWB roles should not mix. IWB is a tool we use and we are teachers. Consequently, if teachers' dependent on IWB is too much, then it weakens them”. He thought “teacher still active and still in the lead position” and he “uses IWB as an auxiliary/as a resource supporting teaching” and said, “I see the IWB as a tool means to support me”. He thinks, “I present my materials more easily, but I'm not totally tied to it either. I think, IWB should not be teacher's teacher, but IWB should stand there as a resource supporting teaching. Otherwise, it is inconvenient, so the teacher should be the leader and will use IWB smart board reasonable”. In addition, IWB makes teacher's work easier. He told, “I think IWB is nice and it is pretty useful thing that facilitates the job of the teacher and relaxing the teacher.”

There are also some influences of using IWB in lessons on the role of the students. He thinks that IWB “did not affect the role of the student but in terms of English

subject matter affected students positively. The students are more likely to attend lessons and they are more interested". It just "made easier both the role of the student and student's work". In other words, there is "no trouble in the roles". Teacher is teacher again; student is student again. It just "provided the convenience that facilitated communication between teacher and students, in fact it facilitated".

There are some main reasons to his start using IWB and they are "to enrich the course; to visualize the lesson/to add visuality; to make teacher's work easier; to support topics; to listen pronunciations". He stated, "It is a much more enriched English language lesson than the old one". Furthermore, he stated, "the main reason is, of course, is adding visuality. I think it is very useful to add visuality because it is English, to listen to different pronunciations in English, especially in terms of English subject matter". Thus, he "started to use IWB in order to add visuals into the lesson such as to show things like animation, PowerPoints, etc." In addition, since he is an English teacher, he "has already used projection tool" because he "needs to support lesson with videos and visual materials". Accordingly, he is "not struggling with the projections" and it was harder than that, so it "made his job easier".

In some situations, he started using IWB more often or less and it influenced his experience with using IWB in his lessons. He uses IWB "more often where to watch something; visually related topics; when needs to give visuality prominence; in lecturing; in solving problems/exercise; in practice; when to present visuals; for reinforcement/ consolidation purposes". He stated, "So I usually use IWB more in practice. In the practical aspect of the lesson, I use it more in such things as student practice or vocabulary teaching, etc." All the facts that "IWB has infiltrated into everything in the teaching process now". It plays a part in the subject narration/lecturing, exercise and problem solving. In a way, "I managed to apply it in some way and try to use it all in all". He is using it more often when he is practicing and asking questions to students. Then it is backed up with videos to reinforce it. It sounds like a little more at the level of practice, usually for question solving". On the other hand, he uses IWB "less when IWB need to be passive; in lecturing in some cases". He uses IWB a little "less in narration /teaching such cases and subjects". In

addition, he “uses IWB less” when he “tries to make students talk/speak English language”. In such situations, “IWB is a bit more passive”.

IWB has some kind of effects on his teaching process when he uses it in his lessons. First, IWB “supported the teaching process in terms of auditory, visuality and enrichment in material/resources diversity”. IWB is supportive of him in terms of visuality and auditory and it is beneficial to English lessons in that regard. IWB enriched course materials in terms of visuals. As the “students learn more easily by seeing, hearing, and watching”, IWB has many “benefits to English lessons from that point of view”. He is able to “use very different resources”, which is useful for him. Regarding this, he told, “There is a lot of source diversity. Internet means many different sources, so it is rich, especially for English lessons there is a lot of very rich resources”. He teaches English lessons and “IWB support all kinds of things visually and audibly”. In addition, IWB enriched and supported teaching process in terms of providing opportunity to show/play lesson materials, opportunity to reach the animations, more fun/enjoyable lessons. He stated, “In terms of teaching process, the more the game is, the better for the students, and IWB helps me in this regard. IWB supported the process of teaching to play games and to show materials, and made it easier for me to make the lesson more enjoyable”. Therefore, he thinks, “IWB is contributing teaching process by providing more visuality, more fun/entertainment, and better education”. He also said, “Lessons are now more fun with more animation and more educational games.” Accordingly, IWB changed his teaching styles and habits in lessons. He indicated, “I tried to do something different so I forced myself as well. Thanks to IWB, I thought to watch a movie and make something about it. So it forced me to do something, and my technique/teaching style has changed, it has been changed positively”. In addition, he “started to visualize more” because he thinks that he has “made the lesson more enjoyable” and “IWB has made it easier to watch the materials he has brought to the class”. In years, he has “felt the need to make an English lesson fun” for students. As time went on, IWB helped me in this regard, as the students had fun and learned as he worked in that way. Therefore, he “has to make the lesson more fun” and for this purpose, “IWB is a nice tool”. After

all, he told, “more visuals, more videos, more songs, and more games changed my habits in this regard”.

There are some positive and negative impacts of IWB on teachers and the positive impacts are “more enjoyable teaching; makes teacher’s work easier/facilitated teacher’s work; reduced workload; reduced effort; teach better; provides personal development/improvement; more motivated”. IWB “helped him with his own personal development” and IWB “helps him to do more entertainment-oriented things” on lesson and “offer more opportunities in terms of making the lessons fun” for the students. Accordingly, he told, “We are in the computer age and everybody needs to use it. We need to close the difference between the student and us as teachers. Students are a bit ahead of us in terms of using technology. The IWB helped me with that and it was very useful in terms of my professional sense as well as my subject matter. IWB took us to an advanced level”. He no longer carries course materials and he said, “I do not carry any cassette-player for listening, it makes my job easier.” IWB reduced his effort for the lesson. “In the past, there was more effort to bring course material, but now we carry such things easier”. He stated, “It affected my motivation positively and it feels good”. Initially, IWB increased his workload but it reduced his workload in the later. He stated, “IWB has increased my working load, so a little. When searching for videos or materials about the course, it took time at home in the beginning. The work required a bit of time on the internet, but apart from that it made my job easier later”. He is “still making efforts”, but “now his job is easier” and he is “making less effort than past”. He told, “You will be surprised how much effort was spent teaching something when there was not an IWB in the past. However, now, IWB offers many different alternatives to make lesson easier”. IWB has negative effects as it has positive effects on teachers. Initially, it “makes teacher lazy”. In addition, IWB increased his effort (endeavor) during the lesson. He stated, “The effort I have spent on the lesson has increased because the opportunities that I have forced us to do other extra things in the lessons from time to time”.

IWB has positive impacts on students. Firstly, IWB “increased interest” of students and now they are more interested in lesson. For example, he told, “When there are

fun things to do like game-like exercise or there are interesting videos to watch so students get more attention for lesson". In addition, students expressed themselves more easily/more comfortably and they developed themselves. He told, "Students expressed themselves more easily and showed animations they did. Accordingly, students have developed themselves because they used to know only PowerPoint, but now they know the flash animation programs and learn different presentation programs". IWB "reduced the time spent by students to take notes" so students started to "write less" during to lessons. For example, students take notes during the lesson but sometimes he "opens the questions / exercises and solve on the IWB with students". In such case, "students do not write too much" and it was "beneficial to them in terms of gaining time". Thus, in such a way that it "took less time to take notes". Students are "more motivated" and "more enthusiastic so they are "more participative/attentive" to the lessons". He told, "When lessons are fun, students are more participate and involved in the lessons. Having fun is the thing of all ages. It is the same in junior high school, high school, or adult people. When you are learning though fun, it is more effective when you put entertainment into your teaching. So, they are enthusiastic and I see that the IWB increases the motivation of the students". Accordingly, IWB "facilitated and enhanced learning" of students so it "increased the success" of these students. He stated, "Listening and speaking of the students has also improved as the English lesson is more supported both visually and auditory". For learning English or a foreign language, it is "necessary for students to learn by seeing and hearing". Since his and his students' use of foreign language is very narrow in school setting, IWB has "created a backdrop for him and his students to hear, see, and speak". Now "visualization makes it easy for students to learn complex and difficult concepts". He "thinks that IWB surely more influenced the student with more visual characteristics". Thus, he "provides various resources for various learning styles of his students". It is "very influential" when he has "supported and brought various resources". He gave an example and said, "I brought a lot of videos in the English pronunciation of "th" voice and listened to the students. It is a tough voice. I showed students a lot of examples about it and so it's easier to learn in that

way”. There is a “really positive impact on the way that students understand complex things more easily” when you “support subjects with visuals and videos”. That’s “where IWB helps him a lot”. He gives another example and stated that “While teaching a difficult time concept in English, for example "near past time", students cannot perceive it because the notion of time is not a term in Turkish. However, when you support the subject with pictures and videos with IWB, it makes it easier to understand such complex things. So, students obviously understand more complex things when you support them visually and auditory”. In addition, it is “easier to reach different sources” with IWB. Students also “learned a lot on the IWB” and can “reach different sources more easily”. Moreover, IWB is “developing students’ creativity” and they are “more creative” now. When he gave performance work and presentation related to a topic, “Students prepared very beautiful things by using IWB”. He stated, “IWB has a positive impact on students’ creativity. The quality is increasing. I mean, they did not make such a nice presentation before. They learned to make a presentation. There are better quality things than the past. In addition, for example, students made a small movie or video clip by using the computer in their performance homework before IWB and they did not come up with such nice assignments but now it is getting better and better”.

There are also some negative impacts of IWB on students and they are “became accustomed to literal and pushed as laziness/make students lazy; dealing with disturbing/extracurricular activities at breaks “. He stated, “It is bad for students to use IWB badly in breaks. They connect to the internet and search for something directly googled without researching. It is also true for us in dictionary usage in English lesson. For example, classic dictionaries were better and more beautiful. Now the dictionaries on the internet are lazing students. The classic dictionaries taught us a lot of things, actually”. Similarly, there are “no negative things in the class. It is only harmful for students to use IWB in different areas during breaks”. If the “students do not go out in the breaks and play games or do something else”, there is a problem and they are in trouble. So we “need to get students out of the class” and get fresh air. Nevertheless, he “does not think it's a huge loss”.

His perception/sense of time by using IWB in his lessons is in the direction of time flowing fast. Regarding this, he stated, “Of course, time is flowing much faster, because it is more fun and we spend a good time with students by watching animations or similar things, so it goes faster”. IWB also saves time. He stated, “It does not take long time to open-close processes as tape because there are programs on IWB related to it and it is gaining time for me”. There are some “time issues when need to overdo with extracurricular activities”. He thinks, “we need to not exaggerate extracurricular activities. If there are too many things that we bring to the course and watch it, so these kinds of things passing in front of the current subject. Therefore, it is something a teacher has in hand to manage time, so “it is depending on the teacher and teacher need to manage time better”. While “initially IWB required more preparation time”, “later it reduced time spend on lesson preparation” because “at first it takes time to get animations, videos, or other related material”, then but “later it returns as a positive contribution and it shortened the time in terms of planning and preparation. It is not a problem anymore”. Furthermore, IWB reduced the time spend on teaching of the subjects. As an example, he told, “when teaching a word to students, there is a difference between showing its picture and telling a lot of sentences about it. Similarly, I can teach a topic more easily with a video”.

IWB increased his interaction/communication as a teacher with students. He stated, “Students are more likely to come to the board and participate in the lessons, and when so, the dialogue/communication with the teacher increases more. As students can express themselves more, the dialogue also develops between teacher and students”. IWB also increased interaction among students. Regarding this, he told, “Students helped each other when they were doing group work on IWB or when students play games on IWB related to subjects; they share and interact with each other”. Moreover, IWB increased teacher’s interaction with course content and enriched resources diversity. He stated, “IWB enriched the lesson in terms of content and so I can interact with more content now. I used to come up with a few things to the classroom, but now I can use a lot of and very different things for my lessons. Also, I feel better myself as I get more materials/ resources for the lesson”. Similarly,

IWB increased students' interaction with course content because "students can reach much more different content with more easily. They also love lessons when there is more visual content in the course content". He has some kind of interactions or communication with teachers in the school about the use of IWB in lessons like share idea/opinion, share resource, and support for the use of IWB. He stated, "I share ideas and videos with teachers in my own subject matter. We use common things. We ask and help each other in terms of in our own area of English subject. As I said, we also share our materials from different sources with each other". In addition, there are his interaction with other subject matter teachers. For example, he published a magazine in English with IT teacher and did it through the IWB and over the computer.

He has developed some course materials for his lessons. He told that "Well, I'm doing something myself. I'm doing PowerPoint presentations and doing various animations." He also indicated that he did not get help in developing these materials because he attended a course related to material development. He said, "I had developed myself with Photoshop and about the Flash animation programs so I'm not getting help right now." He thinks that those materials he developed is enough for his lessons for now but it may be better and it can be improved. Moreover, he told that he did not have problems with developing these materials.

He encounters some kind of problems, challenges or obstacles while using IWB in his lessons. He listed those problems as "damaged, distorted, out of order board; virus problems; visibility problems; internet/network connection problems; touch panel problems/unresponsive boards; resource (material) problem." He stated, "There is a problem when hardware deteriorates and repairing takes some time in those situations." In addition, he noted that "when there is a virus, so there is trouble." There is some visibility problem and he said "not too much, but sometimes only students sitting close to the windows are having visibility problems with the flare of the screen." Moreover, he sometimes faces the Internet connection breaks or does not occur problem. In addition, he told, "IWB is affected by sun and dust, so a certain part of the board is not working and the other part is working". Lastly, he thinks,

“EBA needs to be improved with respect to increase/enrich the number of materials in EBA and there must be different materials, games, presentations. “

He solves or minimize the problems he faces when using IWB in his lessons with firstly trying to solve by himself. He sometimes asks and get technical support by students. In cases where he cannot overcome himself, ICT teacher makes immediate intervention or technical support provided by technical service (authorized service). He told, “I mean, if I can, I do, but I don't get into it when I don't understand the problem, so I'm calling and getting help from the ICT teacher or authorized service.”

There are some suggestions of him for using IWB more effectively and more efficiently in the teaching process. He thinks, “The teacher needs to improve himself/herself about IWB.” He also stated, “I can say that; In English books prepared by the National Education should prepare IWB version of it. Those books should be supported with videos and should be compatible with IWB”. He needs for adequate resources made by MoNE. Moreover, he suggested, “EBA (Educational Informatics Network) website needs to be improved. It is a good project and it would be better if it gets richer in terms of content and increase the number of materials.”

Individual Textural Description - Participant #7 – HS1T7

(High School 1 – Teacher 7 – Biology – Male)

He had one-week training related to use of IWB previously FATIH project implemented and started to use. He thinks this training was “not enough” for him because more such a “theoretical weighted training was given”. Then he improved himself by experimenting and learning by doing at school. Therefore, he stated, he “need more practical training” about using IWB. In addition, he told, “Information technologies are constantly evolving and changing, so I think we should have in-service training on an annual basis to update and improve ourselves.” According to changing technology, he “needs to learn some details”, so, these “trainings should be repeated or should be increased.”

His intended uses of IWB are; visualization; teaching/lecturing; show videos; show animations; show images/visuals; show experiments; use to indicate sections that have difficulty in drawing; concretizing abstract concepts; problem/question solving. Accordingly, he said, “Now, our biology lessons are not always possible to work in the laboratory and since there is no chance to experiment in laboratories, we try to use IWB in subjects that require experiments so in terms of visibility, and we benefit from the visibility of the IWB.” In addition, he told, “I use the IWB to show the parts we have difficulty in drawing, or use it for videos.” Moreover, he points out, “As our subject matter is biology, we always use abstracts in the parts of the human body, so we need more of the human body-related visual material, so at least we need to show the photos of the organs, or videos about their tasks. So, I use it extensively in systems or other subjects to show it.” He also told, “Sometimes I need to use it for an animation show. It depends on the content of the subjects in the course.” He “uses IWB compatible books from the publishing houses to solve the questions in lessons.”

There are some kind of resources he uses while using IWB in his lessons and they are; websites; EBA (Educational Informatics Network); images; videos (movie etc.); animations; IWB compatible e-books/documents. Accordingly, he told, “Now, as content, I try to benefit from the content of National Education website (EBA) and use the websites that are allowed by the National Education but it is not enough. Sometimes I try to use other sites to benefit or download such as animation, video etc. Sometimes I can download the necessary topics at home and load it into the flash memory in order to show it on the IWB. We take advantage of these things.” Furthermore, he said, “there are different types of biology websites. On biology websites, I can show students about the task of the organs at times, or the circulatory system. Besides, there are videos about the work of the heart and there are animations and experiments related to the split mitosis and meiosis.” He can open and show them to his students. It depends on the nature of the subject. For example, he told, “when describing the light-dependent reactions in photosynthesis, students cannot see or imagine those processes because the subjects are so abstract. Then I opened the biology site through the IWB, and make students watch the subject with photos

or video via the IWB. Then I explain the information back there. So, I took the course in this way.”

There are some circumstances his students participate in in the activities in which they are using IWB and those cases students get involved are; make presentations; make/show videos; and in-class performance work. Accordingly, he told that sometimes he “gives individual assignments or performance work” to his students. In this case, he stated, “Let's say that students will do a study of the mitosis division. They are preparing for the performance work at home and put it into their flash memory, and brings it to classroom. Then students can explain it to us on the IWB.”

Having IWB in the classroom means to him as supporting course in terms of visuals/visualization; concretizing abstract concepts; get information instantly; and more richness in terms of being able to reach different sources. Accordingly, he stated, “Well, actually, it's strengthening our hand in terms of course materials. We do not just address the students' ears, but we also address them in their eyes. Therefore, in the head of the student, we show the materials in the minds of the child in three dimensions. It makes the learning process easier when there is a 3D image. So, some things become concrete from being abstract.” Furthermore, he told, “When I touch the buttons, I can access the information I want.”

Beginning to use IWB in his lessons affected air of his class and changed the climate positively in terms of “increasing attending in the lessons.” Moreover, he told about his comfort level when using IWB in his lessons. He, now, “feel (more) comfortable.” He stated, “I can say that I was having difficulty in showing videos but I am more comfortable now.” He thinks he is “usually comfortable” and does not feel very tense because when he is “stuck there is at least a chance to show the student on the IWB” so he “feels so much more comfortable than before.” In addition, he feels uncomfortable/nervous from time to time. For example, he “wants to open a video on the internet, but the ministry of education cannot allow it”, so he cannot do what he said to the students, which may “make him uncomfortable” or reduce his credibility to a certain extent. It can be such problems and it is a little more

troublesome for him when it happens. According to him, students are generally reacting positively about using IWB in their lessons. In relation to that, he stated, "The students generally react positively. In general, they can see or hear something new, visually or audibly outside the book, which is good for them. Image is a good thing and affects the students positively."

He sees some difference between when he first started using IWB in his lessons and now. First, initially, he was inexperienced but, now, he made more progress and improved himself about using IWB. Next, now, he begins to master about using IWB. Then, initially, he was getting anxious about using IWB but, now, he uses IWB more comfortable and more relaxed. He told, "I have developed myself a little more. In other words, as the frequency of use increases, my skills to dominate and has comprehensive knowledge of about IWB are increased." In addition, he told, "I see the difference. At first, I was novice, but now I am more comfortable and I know more about IWB."

Using the IWB influenced the teacher's role in the lessons in both positive and negative way. He thinks, even though IWB makes teacher's work easier, it pushed the role of the teacher somewhat secondary. Accordingly, it passivated and made teacher lazy. In addition, it led to forgetfulness of the teacher. He told, "I think it's a little bit like IWB made it easier for me to work. I think it depends on the usage situation. If teachers are constantly using the IWB and think everything is on it and do not need to find something new, they become lazy and it push them laziness." Moreover, he told, "Like I said, it's about the character of the teacher or the technique of his lesson processing. However, if the teacher uses the IWB in every second and shows everything from there, it pacifies the teacher." He also thinks, "Now it seems as if IWB has reduced functionality of the teacher in some cases. For example, we were drawing each shape on the blackboard in advance, and it was making us a little more active as a teacher. However, now when we open a pattern/shape from the IWB and say to the students to draw the shape but we do not draw ourselves as teachers. Therefore, in some cases, it pacifies us. This can lead to forgetfulness in important points and makes us lazy. I think we're a little more passive now." In terms of

influence of the student's role, he thinks IWB partially passivated the students. He told, "Now, in fact, the IWB is passivating student's role because they need to draw normally, but they can't keep the information in memory, they just know the way to access information. Therefore, I think the student has a negative effect in this sense."

He has some main reasons to start using IWB in his lessons. In detail, these reasons are; to visualize the lesson; not have a chance to make lab work; time-related (using the time correctly, saving time, gain time). Accordingly, he told, "Now my main reason firstly is not able to use the experimental labs because the class and laboratory conditions are not appropriate. Therefore, I am benefiting from IWB in terms of visualization because I need a lot of visual material in our biology class. Secondly, downloading videos, collecting and compiling course related documents at home and bringing to the class is losing too much time so we make use of the IWB to facilitate such operations."

In some situations, it has been effective in his experience of using IWB in his lessons and in some circumstances; he started using IWB more often. These more often circumstances are; in lecturing; visually related topics; when needs to give visuality prominence; complicated and more visually require cases; show/do laboratory experiments when no chance; and when subjects/cases need to be supported by IWB. Accordingly, he stated, "I had to show visual information, especially in the twelfth-year biology systems and in the eleventh-grade plant biology. That's why I used more." Furthermore, he told, "I use the IWB more often when subjects are complicated and requires more visualization." In detail, he said, "Actually it changes according to the subject. There are some issues, such as the subject of heredity, are always quantitative, but in general terms there are some subjects verbally. When it comes to verbal subjects, a visual thing must be done. Therefore, I have to be able to appeal to the eye and ear of the students. I'm more in need of a IWB in that situations." There are also some using IWB less circumstances and those are; student's easy to grip parts; when not find materials (visuals etc.) in the internet; and where topics that do not require the use of IWB. He told, "For example, subject entries are simple and easy to understand. In those cases, I am using the method I

already know as normal and I use the less IWB.” Moreover, he stated, “So now it depends on the subject of the lesson. For example, sometimes I cannot find everything on the internet through IWB and cannot reach the images I want, then I close the IWB continue I know the usual classical methods. Because I cannot find everything in the internet environment, in that sense I have a lot of needs.”

There are some positive and negative impacts of using IWB on teaching process. Positive impacts on teaching processes are; allows to transfer more information to students; opportunity to watch experiments; concretize abstract concepts/revive a three-dimensional; instantly reaching information/reach information more easily; change in habits; change in teaching styles; enriched in material/resources diversity/visual material richness; enrichment in the visual sense/supports in terms of visibility. Accordingly, he stated, “I have the chance to transfer more information to the students.” In addition, he told, “I have the chance to watch the experiments and show them to the students. In this respect, I think it makes a positive contribution to education.” Moreover, he considers, “Students can visualize at least the subject and event in their heads in three dimensions and they can conduct ideas. When the subject is abstract, the student cannot make a fiction. But when they see it on the IWB they can clarify in their head about how the incident happened. Therefore, I think that it is a good.” In a similar way, he told, “Immediately, I can access to what I want, such as to images, sounds or experiments.” His teaching style and habits have changed since he started using IWB in his lessons. Relatively, he said, “I had the opportunity to do experiments before. I could do an experiment and I was in the process. Now, when I use the IWB for these things, I am a bit out of this process.” By using IWB in his lessons, he told that it has change in his habits. In detail, he said, “For example, I drew my own drawings. Now I do not draw some of the drawings. Hence this means a change in the sense of my habit.” In addition, he told, “I can access more material now, thus it facilitated my work in terms of teaching process.” Similarly, he indicated, “Now I have access to more visual information.” Furthermore, he thinks, “it is advantageous in terms of resource diversity. Because I

cannot access the information, images, or videos before, but I can now easily access with the help of the IWB. Therefore, diversity has increased.”

Although there are some positive impacts of using IWB on teaching process, there are also some negative ones. One of the negative impacts is when encountering problems related to IWB and lesson continues with classic method. For example, he told, “Now sometimes we have trouble, like, a website can be closed or the internet can be cut off. Then let us say the subject is visually unfinished, and we continue in the classical way. So sometimes we cannot show exactly where we need to tell or where we need to show. We can have this kind of trouble.” Another negative impact on teaching process is encountering unwanted situations and facing strange information on IWB in lesson. For instance, he stated, “Now there are sometimes bad experiences, for example, images that we don't want can be opened, that is to say, you know that the sites that you normally know at home are sometimes infected with viruses. Therefore, we are facing unwanted situations and it can be sound or an image. It is not only bad for student but also for the teacher. Sometimes you come very enthusiastic and for example, the internet is cut off. Then you just feel bad again so you can have difficulties.”

There are some impacts of using IWB on teachers. Positive impacts are; allows mastering subjects/have more comprehensive knowledge; reduced workloads in the later stages; eliminate difficulties of preparation; makes teacher's work easier/facilitated teacher's work; no longer require to draw; reduced effort during the lesson. Accordingly, he thinks, “it affects me more positively. Because I have a chance to have comprehensive knowledge of more about subject matters. I think it's positive about me.” In addition, he stated, “For example, there were projection devices before and we were all preparing materials ourselves related to it at home. In order to make every issue seriously, I was downloading videos and collecting information if there is. Therefore, I was spending more time at home to prepare. But now that I have them on the IWB and spend less time on these things, so my work load at home has decreased a bit.” Moreover, he told, “IWB made our job easier. This is the positive side, but sometimes it also pushes us to laziness. For example, I

mentioned a little bit earlier, sometimes we used to draw the shapes ourselves on the blackboard, and this made us more active. However, now we see that there are these visuals on the IWB and we do not need to draw these shapes ourselves, so not drawing, it can able to pacify us a little bit more. This makes us passive in the sense of using ready-made information; there are times when I think we are more alive or equipped. I can say that.” He also said, “I drew my own drawings before. Now I do not draw some of the drawings. For example, I draw the cross-section of the leaf on the board or draw the cell in the plants on the board before, but now I opens when I click on the IWB, so I don't need to draw them.” In terms of his effort in lessons, he said, “There are inevitably little changes. For example, I was drawing all the shapes on the blackboard before but now I do not draw some of them. Then it is reducing my effort within class.” In addition, he told, “I think that IWB increased my motivation. It increased my motivation to reach more information and share more.” Also, he said, “In terms of workload, of course, my work became easier because, for example, on the IWB in the classroom, the effort I spend would be slightly reduced. I was drawing or writing everything on the blackboard by myself, but now I am opening the IWB for some issues instead of drawing the things and don't write what I have to write. Therefore, it was slightly eased my burden in lessons.”

Although there are positive impacts on teachers, there are also negative impacts and they are; make teacher lazy; reduce activeness; increased effort (endeavor) during the lesson; reduce mastery of subject. Accordingly, he stated, “IWB can push the teacher into laziness. Teachers may not update/improve themselves by thinking it is already on the IWB and this may also pacify the teacher.” Also, he indicated, “IWB reduced my effort at home and increased my efforts within the classroom because I am using different places (websites, etc.) to reach more visual.” Similarly, he thinks, “The workload at home was reduced, but the workload in the class was slightly increased.” He also stated “As a teacher, IWB may have reduced my mastery of the subjects in terms of small details, because sometimes I can miss the small details. Because I can see materials there and they are ready to use, but otherwise I have done my own preparation and all kinds of details are examined at home one by one.”

IWB has positive and negative impacts on students. Positive impacts are; facilitate learning; learn better; increased success; enhance learning; provides ease of understanding/understand more easily; easier to access information/reaching information instantly; reduced/shorten learning time of students; more interested/increased interest; increased focus on the course; more motivated/increase motivation; increased participation/more participative/more attentive; opportunity to make presentation; reduced the time spent by students to take notes; more creative/raised creativity. Accordingly, he stated, “Now one of the advantages for students is shortening the duration of learning. They can reach/access the image/pictures/audio materials immediately if they want.” He told, “According to the content of the course, IWB increased students focus on some subjects. It also increased students’ interest because there are situations in which students can see subjects visually or they can visualize them in their minds. Also, in some subjects, IWB increased students’ motivation and participation.” In addition, he thinks, “IWB is useful for students by seeing three-dimensional abstract things as concrete. Thus, it increases students' learning skills.” In addition, he told, “When I give performance studies to the students, their participation in the class increases. They need to present their performance studies to the classroom, and then all of the students use the IWB to show their work. Some of them loads their study materials from their flash memory onto the IWB, opens, and displays their presentations from there. Some of them directly refer to materials or videos from the search engine or websites on IWB and present. According to the preparation of the students’ use is changing.” Also, he thinks IWB positively influenced students’ motivation and told “Now the students' motivations are increasing in the instant sense, but when they use technology constantly, it becomes routine at some points. Since it has become routine, it becomes clear that students do not care after a certain period of time. They say that I can access the information whenever I want and I don't need to learn because I will open it when I need it, and this is getting troubled when it is routine at some time.” Furthermore, he indicated, “When I look at the students' success has increased a little more because they can reach the source or questions they want. In this sense, their

success has increased slightly. In the previous years, the average of the in-class exams in the previous years is different. Now it has risen.” He also said, “IWB reduced the time spent by students to take notes because students say, “we can read this information from this place” or “open the same site, we look”.” In addition, he told, “Now, in terms of learning complex and difficult concepts, for example, IWB made it easier when it was about visual. For example, we can open the image of something that we cannot describe verbally, or we can show the video if any. It made it easier to comprehend three-dimensional things in terms of grasping what was complicated. In addition, writing-drawing related work in classroom has become light. When it is visual, the learning process becomes easier and facilitates learning, especially if there is video or animation.” Also, he thinks presenting a variety of resources for a variety of learning styles affect students’ learning and success positively “because not every student can learn the same way. Some can learn by hearing, some can learn by seeing, and some can learn from the combination of all of them. There are both visual and sound on the IWB, and these appeal to both eyes and ears. I think that this increased the chances of the student to reach different information and the ability to learn by enhancing learning.” In terms of creativity, he thinks, “IWB influence the creativity of the students positively in presentations.”

Even though positive impacts, IWB has some negative impacts on students. Negative impacts are; reduce students’ effort/not make any effort; forgets more quickly/easier; not hold information in memory/head; make students lazy/became accustomed to literal; reduce creativity/affect students’ creativity negatively. Accordingly, he told, “One of the bad sides is that students forget more quickly and more easily. For example, in the sense of reaching the information relieved the student but the effort of the student is decreasing. Because his or her effort is decreasing, something like instant knowledge is happening.” Moreover, he stated, “As far as I’m concerned, IWB pacified the pupils a little, because at home, when I gave a presentation or performance assignment, students were researching it from different books. Now, they enter directly into search engines, downloads and edits ready materials.” In addition, he indicated, “The fact that the IWB actually reduces the creativity of the

students in lessons because they do not need to make a special effort by either searching from their phone or finds themselves coming out to IWB. Students say anyway I do not need to do and I can find/reach it later. When I look at this point, their creativity actually diminishes.” Another negative impact is laziness. He told, “IWB makes the students lazy at some points/times because it's ready there. S/he doesn't make an extra effort of her/his own.”

There are some impacts of using IWB on time in lessons. Those impacts can be listed as; initially, requires more preparation time in the beginning; but later reduces time spend on lesson preparation; reduces time spend on teaching of the subjects; time flowing/passes fast; time-saving/gaining time. Accordingly, he told, “When there were projections, we had two and a half hours to prepare for the lesson because we were downloading information for a presentation, then we had uploaded photos or videos from different sources. I was supposed to work at home for at least a 2-3 hour for my course before. Now when we have IWB and connect to internet, we do not need to be prepared that much. It's such a comfort.” He also noted that “Well, I don't need any extra preparation at home.” Because he said, “Now I have easy access to images and other materials related to the course with search engines on the internet.” Moreover, the time he spent on his teaching changed and he stated, “Maybe it could be a little shorter in terms of teaching time.” He thinks time is flowing faster in his lessons when using the IWB. In detail, he said, “Well, the time flows faster, because when I show visuals, I am going to make the lesson more live and the process of the lesson becomes more lively in terms of the students. This allows me to move faster in my lessons.” He thinks IWB changed the time he spent planning/preparation to lessons and teaching subjects since he started using it in his lessons. He told, “Now, my time at home was slightly lower in terms of planning and preparing lessons. Because when I used the projection device, I was able to download videos and visuals at home, then I use them to make presentation. Therefore, I lost a lot of time in that time. Now I use the time more in my favor.”

The use of IWB in his lessons affected his interaction/communication with his students and course content. Accordingly, he told, IWB increased his

interaction/communication with students. However, he said, IWB decreased interaction/communication among students. For example, “Students who came to the forefront in the classroom were helping each other in this regard when there were not IWB in classroom. So now, in the sense, students say that everything is on the IWB and become a bit more selfish. It seems like students are a little more alone. While students are dealing with a question or a topic or discussing together with each other before, now they are not. Now students are use IWB and opening whatever they need. It seems to me that there was such a break among students.” Furthermore, he thinks that IWB decreased sharing of information among students. For example, “Now it can be as follows. In some subjects, students were able to ask the other students when there was a place where they were stuck or did not know. Now they can reach answers from the search engines on the IWB. This seems to me to reduce the sharing of knowledge among students.” In addition, he thinks IWB increased his interaction with course content and changed the source teachers are looking for. For instance, “When I looked at the content, I used books more weighted previously. I collected the books of different authors on the subject and collected information from them. The content was just verbal at that time. Now I still use books, but I use more websites and search engines so it changed the source we are looking for as a teacher. In terms of content, diversity increased, but the time I devoted to books decreased, I can say it.” Moreover, he has some kinds of interaction/communication with other teachers in the school related to share idea/opinion and support for the use of IWB. Accordingly, he told, “I am able to ask other teachers who use IWB when I am stuck in terms of the use of the IWB and get information from them.” He also stated, “For example, among biology teachers, we are talking between ourselves as if I have opened this subject from here and I am watching or studying from here. Sometimes we can ask friends in other branches when we are stuck on IWB.” Similarly, he told, “As teachers we are now exchanging information on our own subject matter basis and sometimes on the basis of other subject matters in terms of IWB. For example, we are doing meetings and bringing up such issues that asking about issue I took

advantage of the following site etc. and talking among teachers. We can share such things related to IWB.”

There are not any materials that he has developed for use in his lessons on IWB. Accordingly, he told, “I don't have any material that I developed. However, before I had projector, I was preparing PowerPoint presentation such as related to respiratory system, circulatory system, or excretory system. Nevertheless, after start using IWB, I do not prepare presentation materials because my prepared materials inadequate for my course so I find and use the materials that are ready.”

There are also challenges/barriers while using IWB on lessons. These issues are virus problems; trouble on internet/weird strange things happen on internet; internet/network connection problems; power failure/electricity cut; restricted internet (access-banned websites) by MoNE; visibility problems; touch panel problems/unresponsive boards; damaged, distorted, out of order board; not supporting resource formats to run or open; resource (material) problem. Accordingly, he stated, “Now sometimes you open videos in health information topic, for example, there may be unwanted situations in the videos, so at that time, let's say that IWB is infected by viruses and they are outside of you. Sounds may be different or different images may be entered on IWB, and this may be the surprise side of the work, sometimes it can be bad or that type of things. It can be especially in videos.” If IWB is damaged, he processes his teaching through in spare classroom. He told, “So in this case, if we have to give a very essential image or if we need to show it, I will call a student in the class and ask if the board is ready or not. If there is such a distress situation, we are trying to make a class change or we are looking for a replacement class.” In addition, he considers there can be surprises and cannot prevent them. For example, He told, “Let's say I open a stage in meiosis and the school's internet can be cut off for the moment. Therefore, you are stuck, so you cannot show images and draw yourself to the students. It is not the same thing that appears in the image you draw with yourself, because it is different in 2D and the other is in 3D, so it can be a nuisance.” He stated, “Sometimes there may be no electricity or sometimes the internet is cut off or sometimes MoNE may not allow

some search engine or websites. In this sense, I am having this kind of troubles.” He also told, “I have kind of visibility problem such as the inability to read the IWB or the flare of the screen with external light. In those cases, we draw our curtains on such problems or open/close the lamps and trying to troubleshoot the problem. Now let us say that there is no problem for the students in the middle in the classroom, but for the students who are a little more crossed by the edge of the window or the edge of the wall, there may be problems related to the angle.” In addition, he indicated, “Sometimes students are installing a program on the IWB and the IWB related programs are confused or infected with viruses. In such cases, sometimes the IWB may not be opened or touched (unresponsive boards). When this happens, I need to find an empty class and move. For example, this year I have a class, 11-D class, 3 times the IWB was removed and went to the service to repair, and it is still not repaired. If I had to show a subject on IWB, then I switch to an empty classroom and use the IWB from there.” Furthermore, he told, “I am experiencing such problems like not supporting resource formats to run or open. For example, there may be times when I cannot open a video or an image that I upload to the flash memory at home. The reasons for this are that when we are not in the classroom as teachers, students are installing different games on internet or from their flash memory so they are infecting IWB with viruses, so IWB programs cannot work. In such cases where I get help from IT teacher and if she can do it, she does it. If she cannot, the authorized service is called. That's the kind of troubles happening in the technical sense.” Moreover, he thinks, he has a shortage of resources. Accordingly, he told, “The ministry is investing so much, but there is a lack of resources, for example, biology-related videos in English can be translated into Turkish and published them via EBA. They can do this type of work.”

Initially, he can solve or minimize the problems he faces while using IWB by himself or get technical support by his students. If he cannot handle the problem, then he calls ICT teacher in order to make immediate intervention to solve the problem. Accordingly, if ICT teacher cannot solve the problem, then Technical support by technical service is provided.

He has some suggestions and needs for using IWB more efficiently in the teaching process. These needs/suggestions are; need for adequate resources made by MoNE; need to increase/enrich the number of materials in EBA; need to increase the number of trainings; teachers should develop themselves; need to reduce the number of students in classes; need for removal of blocking access to certain sites by MoNE; need to receive in-service training on an annual basis. Accordingly, he told, “There must be a lot of visual material in biology, for example, videos and animations should be very much and need to be increased. Because students may not keep virtual things in mind or have difficulty in learning. In this sense, there are very wide and variety of sources in English and we do not know English language as teachers and unable to use those resources sufficiently. Therefore, I think MoNE should translate them into Turkish and give us via EBA or any other website.” In addition, he thinks teachers need to take more in-service trainings. “Because technology is constantly developing and a certain generation or teachers over a certain age is more comfortable to adapt to technology, but while it is difficult to adapt to people of a certain age. So, the way to fix it is often in-service training and in this sense, such in-service training programs should be increased.” Besides, he thinks, “So teachers need to be diligent. In other words, the teacher must repeat the practices that s/he got in the trainings so that s/he can improve herself/himself.” Additionally, he told, “Now, first, the number of students in the class must be reduced. Secondly, the ministry is blocking access to some sites, restricting it. They need to be removed. Because when I come and want to use IWB, some things are limited and I have trouble with respect to reaching recourses. I think these restrictions should be reduced a little more.”

Individual Textural Description - Participant #8 – HS2T1
(High School 2 – Teacher 1 – Religious Culture – Male)

He has received “one-week training” about the use of interactive boards before the installation of IWB on the classrooms in the scope of FATİH Project. This “training was not enough” for him but he developed himself through the time. He thinks, “in fact, it is better to take a little more training because the programs are changing.”

He uses IWB in his lessons for some purposes. His intended uses are; teaching/narration/lecturing; problem/question solving; show images/visuals; show videos; make presentations; show animations; concretizing abstract concepts. Accordingly, he said, "There's definitely a presentation". In addition, he told, "I need IWB almost on every subject. Of course, there are visual, video, presentations, competitions/games, lecturing; I use all of them through the IWB. Maybe because it is a social branch, students are dissatisfied with verbal lessons after five minutes. That is the exception of the best class in fifteen minutes. I use it without missing a topic. No matter what I am talking about, I am not missing anything related to topic, so I like it very much." In addition, he stated, "I am also solving questions on IWB. I do have my own problem solving especially using the starboard program on IWB like here is something to put answers in place in response by drag and drop. Students also enjoy it very much."

There are some kind of resources he uses when using IWB and they are; images; videos (movie etc.); sound (song etc.); PowerPoint slides; EBA (Educational Informatics Network); IWB compatible e-books/documents; websites; text (PDF, Word, Excel, etc.); animations. He told, "I became a member of a paid religious culture site. There are flash animation programs on this site, there are presentation programs prepared in PowerPoint and there are programs prepared for Starboard. Similarly, there are short videos. I am using this way. I've used all of the religious culture sites on the internet before, but I'm downloading much better-quality presentations than the site I'm currently on, there are videos that are short and attractive." Similarly, he indicated, "Of course, there are videos about the subject, such as a set of videos related to after death, fate or doom. There are maximum 10 minutes of videos on the subject of the course. Therefore, it attracts the attention of the students and they likes to watch those videos." Besides, he told, "At the end of the unit, when the questions are asked in the form of flash animated competition, they are the ones students like the most. Moreover, they love videos. I do not take too long, so it can be boring. About the section we're talking about, if it completely

fits with what I am telling them students don't forget. So, they do not need to look at the book, but they know the subject.”

In some circumstances/cases, students participate in activities by using IWB. They are; when open game/animation; problem/questions solving; doing exercises/drills; filling crossword puzzles; inclusion in the subject narrative; make presentations. He told, “I have a crossword puzzle, for example and I'm reflecting the puzzle about the course subject. Students fill them up with their hands on IWB.” Besides, he gave another example and it is “There is a flash animation drill and practice program, namely, "Who Wanted Five Hundred Billion?" and it was adapted into Qur'an unit for ninth graders. In this program, students have to answer the question within a certain period of time, in a minute or in seconds. This animated problem/questions solving program excited the whole class. Then I've been deliberately pointing out the wrong answers. When the answer is checked, the program asks whether you make the final decision or not and counting down seconds, nine, eight or so. Then I see students learned that subject.” Similarly, he indicated, “From time to time to attract the attention of children, for example, there are touch sections of the subject matter and I'm getting students on the blackboard in order to do the touch section. For example, I explained something about the subject for fifteen minutes. I had a question about it. The students like coming to the blackboard. Small classes, especially for younger students. So, it goes like this.” In addition, he told, “I've grouped students to make presentation as a get performance grade. They prepared presentations and, well, they made it pretty”.

Having IWB in the classroom means to him as productivity. Accordingly, he said, “Let me tell you, a class with an IWB is like irrigated land and a class without an IWB is a non-irrigated land. The yield in former is not similar to latter one.”

Starting use of IWB in his classroom affected and changed the climate of the class. These effects are providing positive atmosphere (not a boring lecture); positive effect in terms of taking attention; students generally reacting positively; and positive effect in terms of increasing interest. He told, “I have a very positive response from my

students. The students are very positive and they like it. In the classical method, students would be bored after ten to fifteen minutes. So, it's not that way with IWB. It comforted me and students.” Accordingly, he told, “Using IWB very impressed the climate of the class. The students know that I am always going to open the IWB and knows that there will not be a boring lesson. That is to say, even if the student's head is somewhere else, they are looking at IWB. There are so many positive atmospheres for students.” In addition, he stated, “Once a student thinks that he is a religious teacher, but he is a technology-savvy and using IWB. The student who say that I will not listen to this lesson is even interested in the lessons. There are even students who load the presentations into their flash memory from IWB.” Similarly, he indicated, “Very positively affected. I mean, even kids who have no interest in my class have a look. It takes a bit of something to come from those colorful visuals. Therefore, I can say that I have achieved seventy-eight percent success. My lecture and my view of teaching changed.”

His comfort level when he uses IWB in his lessons has changed over time. He told “I feel very comfortable” while using IWB and “On the contrary, I'm having trouble when there's no IWB.” In addition, he stated he was “uncomfortable/nervous from time to time” when encounters problems. Besides, he stated IWB “comforts himself” and accordingly he said “I have to tell the Qur'an in terms of my branch. But it is not possible to memorize its meaning. When I reflect the meaning on IWB, I feel comfortable and say that I read the verses of Allah. In other words, it is not possible to memorize each verse, so the IWB makes me feel comfortable and our dialogue with the student is very good.”

He sees some difference between when he first started to use IWB in his lessons and now. These differences are; “initially, have difficulty with technical problems; now, make more progress/develop/improve yourself; now, better about using IWB/use a better way; now, use more professionally; now, enjoy (like); now, desire to use; now, more experienced; not miss anything”. Accordingly, he indicated, “Much has improved; we have developed ourselves as teachers in time.” Similarly, he told, “I believe I've developed myself a lot, but I still want to take training. We went a long

way as teachers, because we learned this with a bit of trial and error. We have developed with friends here.” Moreover, he told, “In the beginning, I was opening the programs hard and I was wondering if I could not open. I have made a lot of progress. I like it a lot.” In addition, he said, “After a while you are developing yourself, and you like it. I know that I am going to go in a lot of empty classes and work on IWB about what I can do for my subject matter because I do not want to work in front of the students. Of course, I have always wanted to use IWB”.

Use of IWB has influenced teacher's role in the lessons in a sort of way. According to him, “teacher is still active”, “still in the lead position” and “in a better position to control the students”. Accordingly, he told, “IWB has affected the teacher's role very positively. I am not skipping anything on something I have told once because I follow it by the order in there.” He told, “Well, IWB is putting the teacher in the foreground.” Besides, he stated, “My role has increased. I have been more effective with IWB. Because if it was not a very interesting subject, the student was breaking up from the topic and blow over their interest, now there's something new about subject or a video about it, so the student doesn't break up. So, it's going well.” Also, he stated, “I don't write with classic chalk. I'm writing a note on IWB and while students write it at the moment, I'm checking the class, who is writing what and how. I both save time and even if your writing is not very nice, I avoid the distraction of the student by reflecting a very nice article.”

Likewise, use of IWB has influenced student's role in the lessons in a sort of way. According to him, students are “listening more” during lecturing. He told, “Students listen more, so even if there are no words left in the mind of the student, some shapes and videos are in mind. He had a very positive effect on the student.”

There are some main reasons for him to start using IWB in his lessons. These reasons are; not to miss any part of the topic; to be more organized; to visualize the lesson (to add visuality); to increase curiosity; to increase interest; to increase success; to increase performance of the teacher (self). Accordingly, he indicated, “I started to use because of curiosity and useful and it is much better than before.” In addition, he

stated, "Well, I'm not going to skip any part of the topics. According to my teaching subject order, because my lesson is a verbal lesson and a one-hour course. A student asks a question, that question brings too many new questions and so the topic is not covered due to those questions related to time problems. Nevertheless, from now on, I went out of class that day for example, until the week I go in every class that I explained that subject, but I say that I'm taking my note, I stayed in this class and in this slide and I continue from there. I am not skipping the subject, and it is the kind of benefit I got. So, I'm processing things without skipping anything in this way." Accordingly, he told, "First of all, I really liked IWB with my curiosity and the programs I prepared. I looked at something very successful, a very nice thing and so I gave it what I wanted to give via IWB to the students. I also saw that the curiosity, interest and success increased, so that the students' success and my performance increased. My course is colored. Our lessons were not so colorful and I believe at the moment that the even non-believer/ in different sects students can listen. In the classical narrative where those students hesitate to ask, now they are asking questions related to the topics."

There are some when or in what circumstances for him to use IWB in his lessons and they are; use more often, in lecturing; use more often, in solving problems/exercise; use more often, in more verbal subjects/issues; use more often, to watch something/something to watch. Accordingly, he said "I use IWB in any case, I'm constantly opening my subjects on it. There are no cases I use IWB less. I have to make sure that every subject has a presentation. No need for verbal when you have IWB. Because the students are bored in verbal teaching, so I noticed well. I have to make a good quality presentation, so I am using IWB." Besides, he told, "The use of IWB is a must in solving questions. Do you know why? Either the student does not bring the book we have evaluation questions, I think it is very useful, the unit ends and we are solving evaluating questions through IWB. Also, it doesn't matter if the student brings the book or not, because the student sees the question at least so I don't feel any discomfort." In addition, he stated, "I use IWB mostly in problem/question solving and there students touch the questions on the IWB. For example, the student

is dragging them into the spaces and using the fill-in puzzle section. I make more students to participate in this process. Also, because it is colored, students like very much.” Furthermore, he told, “I use IWB a lot about the life of the Prophet and about the content of the Holy Quran. It is very useful for me to bring the samples from there. I read the verses there, because it is hard to memorize hundreds of verses in a week for me. Students also do not memorize but understand because there is a colorful content and videos.”

Using IWB has contributions in his teaching process. Those contributions and positive impacts on teaching processes are; more fun lessons; more efficient/productive lesson; change in habits; enrichment in the visual sense/supports in terms of visuality; enrichment in the auditory sense/supports in terms of auditory; enriched course contents; enriched in material/resources diversity/visual material richness; make subjects/learning more permanent; change in teaching styles; more pleasant environment; allows to transfer more information to students; allows to teach more topics/information in less time/teach fast, opportunity to use more resources; better classroom management/control students. Accordingly, he stated, “My lessons pass usually just like having fun. This tempo makes me tired because I am moving 35 minutes of 40 minutes, but I am happy, the students learn something. Thus, students are looking forward to my lesson because of the entertainment goes on.” In addition, he said, “Before I use IWB, I write less on the blackboard. Now at least our presentations on IWB and there are sections to be written in. I started to use it more. It did not have a negative effect on my habits. So, you are writing and watching on a technological screen.” Furthermore, he stated, “I think I've processed my lesson with richer materials and the source was variety.” Moreover, he indicated, “The students understand the subject a lot better and becomes permanent in their head.” Besides, he indicated, “I get very positive feedback from the students. I give more content in a shorter time and in a more pleasant environment.” Also, he stated, “It's like teaching more to the students. Content has been enriched. It certainly enriched.” In addition, he told, “IWB developed me as content and teaching. I also

manage the course better. It has also developed and contributed to my classroom management.”

There are some impacts of using IWB on teachers and they are; more motivated; more enjoyable teaching/lecturing/lesson; teach better; more effective; more motivated; allows to master subjects/have more comprehensive knowledge; writing less on the board; initially, increased workload; reduced workloads in the later stages; reduced effort during the lesson. Accordingly, he said, “For me, it means telling my class almost perfectly. It is good to have IWB. I'm enjoying my teaching, so I'm teaching the lesson with pleasure.” In addition, he told, “30 minutes of 40 minutes is very efficient. It motivates success and me to teach. I believe it is very useful. That's good.” Besides, he said, “I'm using IWB more now and I'm more effective.” In addition, he indicated, “There is a lack of information about the IWB compatible prepared resources I've got and I have learned something new from those materials. Sometimes, as teachers, we are late to follow the literature. Nevertheless, because the resources we use are up to date and made by professional people, they have added new information to my knowledge. In fact, we have the core of information, but those who prepare the prepared materials make the information can be taught to the students.” Then, he told, “My writing style is not very good, and the student will make a note of it when I type. As my style changed with IWB, now I am writing the subjects at home with the most beautiful writing style and in the colorful way, then student writes it. I mean, as a style, IWB saved me from writing on board.” He also said, “IWB has driven me to teach more motivated lessons and my motivation has increased. I love teaching more now.” Although there are positive impacts of IWB on teachers, there are some negative impacts of IWB on teachers and they are; initially, increased workload; increased effort (endeavor) during the lesson but later stages, it reduced effort during the lesson. Accordingly, he told, “Sometimes it can be tiring during the lesson but it is not so different. Maybe it was a little less when I was teaching my class alone. Because when I use videos or visual materials, I had the chance to rest my voice so it reduced my effort during the lesson.” In addition, he said, “I have a little more preparation. IWB increased my workload, but I'm not

bothered by the load because I'm a very loving to preparation for class.” Similarly, he told, “I was less tired at school now. I was getting more tired in the classical way before.”

There are also some impacts of using IWB on students and they are; more interested/increased interest; more motivated/increase motivation; increased participation/more participative/more attentive; increase listening time of lesson; helps to satisfy students' curiosity/increase curiosity; more creative/raised creativity; increased success; better retention/more permanent in mind; better concentrate/concentrations increased; increase gathering/draw attention of students; better understanding of the subjects; facilitate learning; enhance learning; provides ease of understanding/understand more easily; learn better; reduced the time spent by students to take notes; reduced/shorten learning time of students; writing less; master a subject/have comprehensive knowledge of the subject; better grasp the subject/grasp more easily/comprehend; provides advantage for students with visual intelligence. Accordingly, he told, “Like my subject matter, in verbal lessons, students are little less interested in the lesson. But here with the use of IWB, the interest of students rose much more.” Similarly, he said, “The student's interest in the class increased even those who have no interest for course. For example, even a student who doesn't like me for years has come and says, “My teacher I have never listened to such a lesson.” We are developing our dialogue and relationship very positively with students.” In addition, he stated, “The students understand the subject much better. It's permanent in their head.” Likewise, he said, “There is a topic I showed it to the students and they said my teacher you showed it us before. However, I showed it to them in the ninth grade. So, they remembered what I showed in the ninth grade, three years later, when I showed in the twelfth grade. Well, it's very difficult in verbal situations. Of course, visuality made it permanent in students' mind and they remembered it”. Moreover, he stated, “Sometimes I even let the big classes take pictures of IWB screen. You know, the students do not want to write and say we will read from that picture. I even made it.” In addition, he told, “students understand visuals more quickly because they see. When students look at IWB and

listens to me, they grasp very well so it has reduced the grasping time also.” Furthermore, he said, “We have some Arabic concepts and terms in our lessons, and students learn more easily to understand and pronounce those concepts/terms. They are more easily understood because they are reflected on the IWB and hear them.” Similarly, he stated, “Now I can tell the subject in a shorter time and the student is learning better. I’ve always identified these.” Similarly, he stated, “Students learned better, listened to a more relaxed environment and influenced the student positively. I believe they learned more.” In a same way, he told, “It was better for my class. They learned better and learned more from a richer source and started to ask me more questions.” Moreover, he expressed IWB enhanced students’ learning and said “Students do not quite understand the word that comes out of my mouth sometimes, but when I present it from IWB with a post or a video, they understand it. In other words, the student has experienced a great ease in their pronunciation in this way”. He also said, “Definitely, students learn a lot. We did not hear such things. In other words, even when the teacher told me about such a limited task on the blackboard, it was an event that had lost our interest ten minutes later. So, I would like to have a religious culture teacher like myself.” Moreover, he stated, “I’m teaching all of the topics completely without missing a part with IWB. It does not only stay verbal but also places in students’ visual memory.” In addition, he stated, “It positively affected the students’ motivations. For example, when I keep a frame on IWB too much, students get bored. They also want to be pictures, cartoons and etc. because they don’t just love written texts on IWB. Students likes the visual more. I do not do much, but sometimes, for example there are text on a page at the current frame and so students get bored. Other than that, the visuals are very nice, especially the ones prepared by professional and the students like it, I also like it.” Also, he said, “The times of listening to the lectures increased a lot. Of course, students listened more. In ten minutes, the dissatisfied students looked and listened more. This time to listen period increased to twenty-five to thirty minutes.” In addition, he stated, “IWB certainly improved success of students. In verbal subjects matters like mine, students were not listening on a certain. So, IWB had a very positive effect on students’

achievement in this respect.” Furthermore, he told, “There's something like that sometimes I write notes on IWB, but some days if students have little heavy lessons then they say my teacher can we take a picture of the IWB with their mobile phones. In such circumstances, they write less and it reduces the time spent by students to take notes”. Additionally, he said, “I must say that videos can have a great impact on students’ creativity and some of the presentations but more videos.”

Using IWB has impacts on time and they are; waste of time/time loss/stalling the lesson; time flowing fast/time passes/moves faster; initially, requires more preparation time in the beginning; save time/time-saving/gaining time; better time management/use time better; reduces time spend on lesson preparation; reduces time spend on teaching of the subjects. Accordingly, he told, “Time flows very fast. I am not worried that I cannot complete this lesson in this class because I have enough materials.” In addition, he told, “Initially, I was using more time in preparation. IWB brings me a more preparation process at home. I download materials at home and I look at them one by one in terms of about I can do this or I can add that so it brings preparation process.” Similarly, he told, “I'm not wasting a lot of time before the IWB, I'm talking about it for the last few years, and of course I've been preparing before, and now I'm getting more prepared after IWB. So, at first, my preparation at home, I do weekly, it took more time to prepare.” Furthermore, he said, “Just in some classes, IWB opens a little late in the beginning of the lesson, and the time is a bit troublesome.” In addition, he stated, “I am managing time very well with IWB. Even though sometimes it varies according to questions of the students, I come up to where I planned with respect to subjects. I do not have time problems. On the contrary, it helps me with time.” Similarly, he told, “Now I look less books and encyclopedias than before. I always take advantage of the internet. Therefore, it is a good use of time. More things in less time. I teach myself and give it to the student.” Also, he said, “Later, IWB reduces his time spend on lesson preparation. Time has decreased and the planning was just fine.” Besides, he stated, “In every class, I had the serious time benefit of lecturing in the same way. Because you are writing in verbal lessons, you write the subject on the board, and then you are telling. Planning and teaching

more things to the students, giving them something to do in my timing. The time for me was shortened. I can give more topics in less time in lessons. Now I can tell the subject in a shorter time.”

His and students’ interaction/communication with course content affected somehow by using IWB. IWB increased teacher’s and students’ interaction with course content. Accordingly, he told, “The course content has been enriched. It certainly enriched. Now, there are what we know and what we read, but also put more good examples from other sources, I’m using them, of course. Of course, the enrichment of the content was reflected in the student.”

After starting use of IWB, his interaction/communication with his students are like; better in the eyes of students/more pleased with the teacher; increased his interaction/communication with students; declining conversations among students; increased interaction among students. Accordingly, he told, “IWB very positively affected. Students like it too. It saved from being boring. Good in dialogue. I feel that feeling from the faces of the students. So, they’re looking like that and wants to participate. At least students have information. So positively affected. My students come after class or even a part of my students and said that we are in the empty class and opening your lesson materials and we look at them. I say, look at, it’s already loaded. We also have kinds of dialogues with students.” In addition, he said, “I can say that in my class, for example, as I WB take part of my role while talking about lessons, the conversations among the students are diminishing. So, you’re turning your back when you’re writing, and it’s just that they’re talking. In this sense, it helped.” Moreover, he told, “Some students use IWB better than other students. For example, when students want source from me, I taught them from here you can take these resources as follows. Then, the students taught each other these things, and so they probably improved their friendship. That’s the kind of benefit.”

There are his interaction/communication with other teacher and they are; share idea/opinion among teachers; share resource among teachers; support for the use of IWB. Accordingly, he told, “Teacher friends asked me when they didn’t know about

what to do with IWB, for example, I couldn't install or open the documents on the IWB. So, sometimes when they have a problem with the IWB, they ask me to help and support about using IWB. Sometimes I show some things about using IWB to my teacher friends. In this way, we're doing nice interaction with them and sharing information. So, I'm helping teacher friends with some issues". Similarly, he said, "We share ideas about using IWB. Sometimes I even show my teacher friends that I am doing these things so they are also very interested". In addition, he stated, "I say to two other same subject matter teachers that you can use my IWB presentations and other resources. One of those teachers doesn't use IWB at all and another teacher said I'll use it if I need. However, those two teachers are not actively using the IWB for now".

There are not any materials he has developed to use in his lessons. Accordingly, he told, "I have my own presentations, but I didn't develop a separate material, so there's nothing I've developed myself". In addition, he thinks, "The resources that I found and benefited from the internet are enough for my lesson for now".

There are some kind of problems, difficulties and obstacles he encounters when using IWB in his lessons and they are; internet/network connection problems; virus problems/not function flash memory; deleted files/programs related to course from IWB; power failure/electricity cut; visibility problems; touch panel problems/unresponsive boards; takes time to open the IWB (open slowly, time issues); resource (material) problem. Accordingly, he told, "Our troubles sometimes IWB takes a little more time while opening." Moreover, he told, "I have a virus problem in the installation, deleting programs and the deletion of my documents in flash memory. It is a major issue but I am trying to solve it by bringing backup flash memory. My dialog with the computer teacher is very good and she immediately solve the problem after the lecture. Sometimes there are problems with opening of IWB and sometimes there are problems with IWB's touches. But we solve it by sharing with computer teacher". In addition, he indicated, "Sometimes when the sun light may come on the screen of the IWB, we close the curtains or change students' places to see the IWB". Furthermore, he stated, "Well, in our school IWBs don't have

network connectivity most of the time. We are having internet/network connection problems”. He solves or minimizes the problems he faces while using by him self firstly. Then, he got immediate intervention by ICT teacher to get technical support. If the problem is much bigger and hard to handle, computer teacher gets technical support by technical service (authorized service). Accordingly, If IWB is damaged, he is processing through lessons in spare classroom.

He has some suggestions and needs for using IWB more effectively and more efficiently in his teaching process and they are; need to increase the number of trainings; need for adequate resources made by MoNE; need resources prepared more professionally; need to increase resources/materials; teachers should develop themselves; teachers should be motivated; need training for developing/preparation of course material; need for trainings to learn new things; need to increase/enrich the number of materials in EBA. Accordingly, he stated, “I would like to take at least one more week of training in the field and it is not only about the use of IWB, but also about where it can be used.” In addition, he suggested, “The renewal of the courses given to the teachers about the IWB should be repeated. We have our general directorate. We also mentioned these in our seminar studies. Materials related to IWB can be prepared more professionally if they can be prepared by MoNE. Then, MoNE can load those materials on IWB or send them to schools and computer teachers install them. Thus, teachers can also open and use those materials as if they are opening textbooks”. Also, he told, “Teachers should be more interested in technology and develop themselves. Students are demanding this, but very few of us meet this demand as teachers”. Moreover, he thinks, “We definitely need training to use of IWB. We just have to join because we have to. But, teachers need a little more enthusiasm. Our teachers need a little bit of rejuvenation.” Also, he stated, “If the resources are more professional and the state is in control, it is very nice. we have such a problem. I want to have professional presentations, videos and programs made by MoNE. So MoNE has to take a hand. Relatively, EBA is insufficient”.

Individual Textural Description - Participant #9 – HS2T2

(High School 2 – Teacher 2 – Chemistry – Male)

He has participated in and received “two-week training” on IWB use opened by MoNE as chosen pilot school under the scope of FATIH project. This training was not enough for him. According to him there are missing aspects of this training. He thinks that he needs “more practical” and “subject matter specific training”. Also, he stated that trainings should be “more frequent” and should be “longer in time”. He also needs “recourses prepared by MoNE”. Frequency of using IWB is every lesson for him.

He uses IWB in his lessons for some purposes and he needs IWB the most in teaching/narration/lecturing; problem/question solving; show videos; make presentations; show experiments; show images/visuals; show animations; show simulations/to support difficult topics; visualization. Accordingly, he mentioned, “I am giving lectures, showing examples, pictures/images, animations, videos, experiments, simulations and slideshows/presentations on IWB. I show students in making the necessary visual experiments on the subject that can't be done in classroom. I usually get materials from EBA.” In addition, he told, “I am usually using animation to draw students' attention and save a little bit of course from boredom. I'm using IWB for instructional purposes”. Also, he told, “Generally I will explain the topics visually to students through IWB”. Similarly, he said, “I use IWB when to support difficult topics with simulation and experiments are needed visually”.

There are some kind of resources when he uses IWB in his lessons and those are; PowerPoint slides; images; videos (movie etc.); animations; EBA (Educational Informatics Network); websites; Text (PDF, Word, Excel, etc.). Accordingly, he stated, “I'm using the image, animations, slideshow/presentations, experiments, simulations and etc. Also, I usually get videos and experiments from EBA”.

In some situations/cases, students participate in activities they are using IWB. Those situations are; make presentations; make/show experiments. Accordingly, he stated,

“Sometimes I give the subjects to the students. They use IWB to make their own presentations.” Similarly, he said, “Students do their presentations and experiments in the same way that I teach them. Then I can activate the students”.

Having IWB in his class means for him as comfort of the teacher. Associated with this, he told, “Having IWB in classroom is relaxing the teacher. It is very good for the comfort of the teacher.”

At first, effects of start using IWB on the climate of class is very favorable and has positive effects in terms of taking attention. Accordingly, he told, “So the students might have liked it when they first saw IWB, but now they've got used to it after some time”. In addition, he stated, “IWB attracts the attention of students”.

His comfort level when he uses IWB in his lessons changed through time. Initially, he “has been tension/nervous” but now, he is “used to it and has no problem”. Also, now, he “feels (more) comfortable and IWB “comforts himself” but he is “uncomfortable/nervous from time to time”. Accordingly, he said, “I was nervous at the beginning, but now I'm used to it and it doesn't give me any tension because it's my benefit”. In addition, he told, “I feel more comfortable now. It gives me comfort”. Moreover, he stated, “I'm usually comfortable, but sometimes I can be tense. Electronic devices are inevitably affecting us in terms of the radiation. Accordingly, sometime, he consists of a psychology affected by radiation. Thus, I can be uncomfortable/nervous from time to time”.

There are some differences between when he (at) first started using IWB and now and they are; now, more relaxed; now, use more comfortable; now, better about using IWB/use a better way; and now, make more progress/develop/improve yourself. Accordingly, he told, “Now I'm moving more comfortably in the classroom and I can say that it's more comfortable with IWB. I'm more comfortable than the first days”. Also, he said, “I'm trying to improve myself. I can use IWB more functionally now.”

Use of IWB influenced the teacher's role in the lessons in some way. According to him, it "pushed the role of the teacher somewhat secondary" and "passivate/inactive" the teacher. Accordingly, he stated, "Before using the IWB, the teacher was more active. Now the teacher is more passive. Why is that? In the past, the teacher showed his drama, movements and behaviors to the students. The teacher was communicating one to one with students. Now the teacher is not leaving IWB. For example, the teacher usually transfers what he wants to transfer with the IWB." Similarly, he told, "The teacher was more active in the past. IWB now more passivated the role of the teacher. Because it puts the teacher's role on the IWB."

Using IWB has influence on the role of the students on both positive and negative way. While IWB makes some students "more active", it makes some of them "passivate/inactive". Accordingly, he told, "The students who are interested in the subject matter are more active with IWB, because they can use the IWB to present the subjects from there. This gives them much more comfort". On the other hand, he said, "I think it passivate students, but it can change according to subject matters, of course. In other words, I can say that the generalization was a bit more passive."

There are some main reasons of him to start using IWB in his lessons and they are visually appealing; to visualize the lesson; to discard redundant/unnecessary/useless information; to enrich the course; time-related (using the time correctly, saving time, gain time); to give more topics/information in less time; to support topics. Accordingly, he told, "I think with IWB I give a lot of information in less time to the students. I think it is a lot better to transfer the information to the students because I can support the subject with experiments, videos and etc.". In addition, he stated, "I've given more things and because I believe that it is visually appealing to students' eyes, and because I have prepared it myself and not include unnecessary information. So, I think the students get more information without getting tired." Moreover, he thinks, "Without using the IWB, I couldn't do an experiment, or I couldn't show any animations, or I'd have written very few chapters. I think it's good for enriching."

He uses IWB in some circumstances more often and uses less in some cases. Those circumstances are; use more often, show/do laboratory experiments when no chance; use more often, to enrich and to diversify the subjects; use more often, when use/show animation; use less, in lecturing; use less, example/sample solving (solution); use less, in solving problems. Accordingly, he told, "I'm using IWB to show experiments on topics that cannot be experimented most often. The laboratory in our school is hardly used so I'm usually using it most of the time to transfer experimental information". Similarly, he said, "I try to enrich the subjects with the help of animation and experiment. I wouldn't be able to experiment or use animation without using the IWB. I think it's good in enriching." In using less cases, he said, "I am writing on the board by myself in the sample solutions. I'm not giving the solution directly. I give the example there so on the other side of the IWB I'm teaching about that sample solution." Similarly, he told, "In the solution of the questions, I usually use the blackboard". In addition, he stated, "I'm telling myself in the narration sections and if I have to solve problems I'm definitely using the board myself."

There are some positive impacts of using IWB on teaching process and those are; enrichment in the visual sense/supports in terms of visibility; enriched in material/resources diversity/visual material richness; enriched course contents; more fluent lesson; concretize abstract concepts/revive a three-dimensional; allows to teach more topics/information in less time/teach fast; allows to transfer more information to students; change in habits; opportunity to use more resources. He told, "I can prepare in advance and show most of the things that I have to write on the board from IWB and support them with visuals. I think it is useful in these terms". Also, he told, "So I'm writing the same narrative phrases or even topics on the IWB, and I'm trying to enrich it even more by showing animations and experiments to the students. That's the advantage I get through teaching process." In addition, he stated, "I think I have given more information in a short time and more fluently. It is very positive in terms of saving time." In terms of his habits, he said, "Before I started to use the IWB, I usually wrote a summary of what I wanted to teach on blackboard. Now, I'm showing it from IWB." Moreover, he said, "I'm using more resources and

I'm trying to give more information to the students with IWB.” In addition, in concretizing abstract concepts he told, “Students can see the topic both in writing and visually animated. I think it's better for students in this respect.” There are also some negative impacts of using IWB on teaching process and those are; encounter problems, have to look for a solution; be prepared for any situation; change in teaching styles. Accordingly, he told, “when I encounter problems, I look for a solution. With those situations my technological knowledge of the IWB has increased even more. These problems made me do more research. After that I am behaving more cautiously and be prepared for any situation”. In addition, he said, “I can say that my teaching style is usually more monotonous. Because I showed the subject, writing or experimental animations from IWB, it made me more passive.” Also, he told, “I can use a lot of different resources for resource diversity. I integrate a wide range of different and dynamic sources into the lesson.”

There are some positive impacts of using IWB on teachers and they are; more motivated; reduced workloads in the later stages; writing less on the board; re-use lesson materials; Accordingly, he stated, “IWB motivates me more. My motivation has increased in a positive way.” Although there are positive impacts, there are some negative impacts of using IWB on teachers and they are; increased effort (endeavor) during the lesson; initially, increased workload; feel uncomfortable when not using IWB; make teacher lazy; reduce activeness; bring sleep of teacher. Accordingly, he said, “Well, I feel uncomfortable if I can't use the IWB. I have the habit of using IWB. Maybe this could make the teacher lazy.” In addition, he told, “For me, IWB reduced my activeness in the classroom but made it more comfortable.” Moreover, he said, “I'd say IWB increased the workload a little bit more. Because I have to do constant research and I have to do preparation. Thus, I am looking for a variety of sources to give more information about the subject matter.” Furthermore, he stated, “I've told you the negative aspects that bringing children to sleep and occasionally bringing our sleep. I don't know how to prevent this, maybe the filtered stuff can be used. Radiation prevention programs or materials can be used.” Also, he said, “IWB increased my effort in my lessons even more. Because in front of you there is a

technological device and you want to give more information and you are more ambition, so I need to spend more effort during lessons.”

He talked about some positive impacts of IWB on students and they are namely, more motivated/increase motivation; facilitate learning; better understanding of the subjects; increased success; reduced the time spent by students to take notes; enhance learning; more creative/raised creativity; learn better. Accordingly, he told, “Students' motivations are increased if there are experiments, animations or similar visual things. As I said, if there are enriched situations then the motivation is more.” In addition, he stated, “I think students have a better understanding of the topics with animations. Similarly, subjects are better settled in the minds of the students I showed by simulation on IWB. The students learned better the complex and difficult concepts on IWB by experimentally and visually. Sometimes it's better for students to hear subjects on the IWB when I teach about things, and the they like it.” Moreover, he said, “I think that the IWB has a positive effect on the success of the students, because we are in a mediocre school and I think the student with a very weak average has passed a certain average through the IWB. I use different resources to prepare my subjects. So, I say this also has a positive effect on students' achievements. I'm a 20-year teacher, when I look at and compare past years, in chemistry, the grades are even higher, which shows that students have a positive development because the grades are very high.” According to him, IWB reduced the time spent by students to take notes and associated with this, he said, “Sometimes students can take pictures of topics on the IWB. It used to be writing long sentences before, and now students can get shorter notes. Students are able to re-open and read the subjects on the IWB later.” In addition, he thinks students are more creative now and stated, “I've given some subjects to students. They prepare and make their presentations, do the experiments themselves if they have experiments, or even try to do it visually in the classroom, or they can do it at home and show the video here. So, this way I can activate more students and they're more creative.” Even though positive impacts of using IWB on students, there are some negative impacts and they are; disconnected/detached from course. He told, “Well, sometimes, I'm observing that

students get more disconnected from the lesson and IWB causes sleep of some students.”

There are some positive impacts of IWB on time and they are; time flowing fast/time passes/moves faster; reduces time spend on teaching of the subjects; deal with time problem; Accordingly, he told, “I can say time flows faster with IWB.” In addition, he thinks IWB reduced the time he spent on teaching subjects and said “Now, I can teach in 5 minutes what I used to teach in 15 minutes with IWB.” Even though positive impacts, there are some negative impacts of IWB on time and they are; time issues when encounter problems; initially, requires more preparation time in the beginning; time issues when want to give more information. Accordingly, he stated, “At first, the time I spent increased more and more. Maybe I am not pouring on paper, but here I am looking for experiment, or every condition that will animate the subjects. I bring resources completely IWB compatible format. So, this takes quite some time.” Moreover, he said, “Unfortunately, there is time problem. When you want to teach more information, sometimes you don’t have enough time. So, you have to go short in that times.” He deals with this kind of problem with “trying to reinforce the sections that are not explained with repetition by analyzing the examples.”

He thinks his “interaction and communication” with his “students decreased/broken a little.” Accordingly, he told, “When the teacher does not make eye contact with the students, the relationship between teacher and students breaks because students does not pay attention to the teacher and they are interested in the IWB.” He also thinks that IWB “increased teacher’s and students’ interaction with course content.” With this respect, he stated, “Now, I use more resources from different publishing houses and my own information. As I use more resources, I can say that the content has been enriched. Students usually like experiments and animations. So, they get bored when it's not there.” His communication and interaction with other teachers in the school related to the use of IWB is about “share idea/opinion among teachers” and “support for the use of IWB.” Accordingly, he told, “Since we are actively involved in the use of the IWB with Mr. M, the other teachers usually consult with

us and we share ideas about it.” In addition, he said, “When there are problems or something, I give support for the use of IWB to the other teachers or there is usually a computer teacher to help with IWB.”

He has developed some course materials and they are “PowerPoint presentations materials” and “capture video”. Accordingly, he told, “I have developed my own materials. At least I'm experimenting. I'm making a video experiment with someone in one of my students and I can show that video back in class. In fact, students are able to shoot videos of experiments among themselves and show it in the classroom on IWB.” He thinks “prepared materials are inadequate” for his/her course.

He encounters some kind of problems/difficulties/obstacles when he uses the IWB in his lessons and those are power failure/electricity cut; damaged, distorted, out of order board; deleted files/programs related to course from IWB; internet/network connection problems; restricted internet (access-banned websites) by MoNE; visibility problems (sunlight shines directly onto the board); touch panel problems/unresponsive boards; resource (material) problem; not supporting resource formats to run or open; takes time to open the IWB (open slowly, time issues); problems with the size of the IWB; difficulty of use of IWB; virus problems/not function flash memory. Accordingly, he told, “I usually use the IWB and sometimes we can't get the electricity on the it and sometimes it doesn't turn on.” In addition, he told, “Due to sunlight or irregularity of class environment, sometimes students cannot see the IWB”. Moreover, he said, “I am not able to save my documents on the IWBs because they are often infected with viruses by flash memory sticks of other teachers. Sometimes, when I save some documents, they can be deleted by the virus from IWB in the next day. So, the ministry needs to do well in terms of the board with those kinds of problems.”

He solves or minimizes the problems he faces while using the IWB in several ways. Firstly, he tries to solve problems by himself. Then, if he cannot handle the problem, he calls ICT teacher and she make immediate intervention to solve it. Next, if ICT teacher cannot solve the problem, she gets technical support by technical service

(authorized service). For example, in visibility problems, he told, “Sometimes the light appears and hit the IWB from windows and students cannot read the text.” In this respect, he solves this problem with “using curtains to avoid/prevent sunlight.”

There are some suggestions, recommendations and needs of him for using the IWB more efficiently in the teaching process and they are; need more comprehensive training; need more practical training; need training for specific each subject matter; need programs related to each subject matter on IWB; need to increase the number of trainings; training period/time should be longer; need for adequate resources made by MoNE; need to be refreshed/simplified curriculum by MoNE; need to have previously loaded resources on IWB; need to change/update programs on IWB; need to increase/enrich the number of materials in EBA; teachers should be motivated. Accordingly, he told, “I use EBA but it is not enough. Most experiments are not included, and some experiments even visually old. Thus, it needs to be increased/enriched the number of materials in EBA”. In addition, he thinks “Teachers should be motivated. They can be further motivated by giving more frequent trainings.” Also, he stated, “It is good to give special training to every subject matter.” Moreover, he told, “Programs suitable for my subject matter can be installed on the IWB. For example, subject matter specific course materials can be loaded on the IWB. For each subject matter, the ministry of national education has to do it in advance. Then, I can take and use them from there.” Furthermore, he said, “Because the curriculum is intense, sometimes the time is not enough and the problem begins, so I think the curriculum can be further lightened.”

Individual Textural Description - Participant #10 – HS2T3

(High School 2 – Teacher 3 – Mathematics – Male)

He took two-weeks training from MoNE about using IWB. He thinks “it was not very useful and was not enough.” His intended use of IWB for his subject matter varies. These can be listed as teaching/narration/lecturing; problem/question solving; solving a large number of questions; show three-dimensional shapes; concretizing abstract concepts; show animations; show videos. Accordingly, he said,

“I can teach all the topics with the IWB but mostly in the part of solving questions.” In addition, he told, “The student comes to solve the questions and the number of our questions is much more now with IWB. For example, the first question was there today, there were six such points. You tell that point you're writing that question if it's not what you normally do. You write yourself on the blackboard first. Because they don't know how to read it, for example two minus two minus three points, they don't know it in parentheses. You're writing again, that students write in the notebook, then you give them time to figure it out. Then you draw on the board. So, we've probably solved two such questions, but with IWB we've solved maybe six maybe seven questions. So, the advantage of IWB so much more and so we have added new issues on the top we've talked about the absolute value. It gave me a terrific advantage.” Moreover, he told, “I use IWB especially in geometric shapes and abstract concepts and it is incredible.” Also, he said, “It's very nice, for example, you have ten questions and you touch here that question comes alone with animated and you do it there and you touch it below you do not go if the student wants to take a picture or if you want you can transfer it via Bluetooth to students.”

There are some teaching resources/materials that he uses for his teaching and they are text (PDF, Word, Excel, etc.); EBA (Educational Informatics Network); IWB compatible e-books/documents; animations; videos (movie etc.). Accordingly, he told, “There are books sent to us, we take their PDFs from those books. There are those who have IWB application and IWB compatible e-books and we get and use their question parts.” In addition, he expressed, “When I first entered, I tried and used a little EBA from IWB. But, I think EBA needs further development.”

There are some cases students participate in activities that they are using IWB and they are problem/questions solving; moving vectors; Accordingly, he said, “Students can come up and solve problems/questions on the IWB.” Moreover, he told, “Especially when describing the vectors on the IWB using the starboard program, I can make the page square. After that, students count the squares and make them beam vectors. Size and direction of the vector is important. So, when students take the

vector and see that the vector is not changed, they are concretizing this abstract concept.”

It means some for him to have IWB in his classroom and they are; comfort of the teacher (comfortable); something good/important; concretizing abstract concepts. Accordingly, he told, “The visuals are very good and it becomes easier to learn with the schemas. Thus, it is concretizing abstract concepts.” In addition, he said, “IWB is a good thing for me. I am very pleased with the it. So, I wish we had had it in advance so we would improve ourselves more.” Similarly, he stated, “I strongly support using IWB and it is very comfortable.”

There are some effects of start using IWB on the climate of class and they are; at first, very favorable/very positive effect. Accordingly, he said, “The reaction is very good and positive.”

His comfort level when using IWB is changed through the years but now, he “feels (more) comfortable”. Accordingly, he told, “I’m very comfortable. I’m going to be better. So, I am more active.”

There are some differences between when (at) first start using IWB and now for him and they are; now, more experienced; now, make more progress/develop/improve yourself; now, use faster; now, better about using IWB/use a better way. Accordingly, he stated, “I’m more experienced.” In addition, he told, “I definitely developed myself. As mathematics teachers we’re already good at the computer. So other teachers are asking us everything related to IWB.” Moreover, he said, “I’m faster. I am learning the programs. I get faster in the programs as I use them.” Also, he told, “Now, I have comprehensive knowledge of using IWB.”

There are some influences of using IWB on the role of the teacher and they are; more active; make teacher’s work easier; facilitated the role of teachers; teacher still active (still in the lead position); increase efficiency/enhance productivity; improved/developed himself. Accordingly, he said, “Well, I think I’m more active now. Everything’s ready on IWB and I keep solving questions/problems and never

shut up.” Also, he told, “It made the teacher's role easier. I mean, it made it terribly easy. In other words, in terms of teaching and resource, it is a perfect thing for the teachers.” Furthermore, he thinks “Actually, the teacher's activeness does not change in the lessons. So, I think the teacher can still be active. I can solve more questions and make more time for the student, in fact, then more students participate in the lesson.” Moreover, he stated, “I think that the teacher's performance in the course is better. The teacher has to improve herself because she has solved many more questions. The teacher is developing himself, the child is also looking at my teacher who works for me, and the child is more like the teacher.”

There are some influences of using IWB on the role of the students and they are; more active (students become more active); Accordingly, he told, “Students are more active now. So, for example, before IWB, three questions can be solved, and when I take it to ten questions thanks to the IWB, I give the students the opportunity to make solve more questions with it. Thus, IWB activates the student inevitably.”

There are some main reasons for him to start using IWB in his lessons and they are; have a desire to use (used eagerly); to teach 3D and abstract concepts; to solve more problems/questions/benefit of question solutions; no longer carry a map/book/no need to carry course materials; to consolidate; to learn more. Accordingly, he said, “When I first came to this school I saw the IWB. Then, I used it eagerly.” In addition, he told, “When I first started using IWB, I was fascinated by the vectors in geometry. After that, I never stopped using it.” Also, he stated, “My first goal in using IWB was to solve more questions. Also, I don't need to take books to class anymore.” Besides, he told, “The more I solve, the more students learn. Similarly, the more questions I solve, the students consolidate the subjects more. I used IWB for mathematics to explain the question/problem solving-oriented course.”

He talked about when or in what circumstances he started to use IWB and they are; use more often, in solving problems/exercise; use less, in lecturing; use more often, teach 3D and abstract concepts; use less, when there is no source/not have enough sources. Accordingly, he stated, “I can explain all the issues with the IWB, but I use

it more in the question-solving section. We are not trying to write questions on IWB. We're just trying to solve questions/problems on it. Sometimes I talk about the subject with IWB and sometimes I can also teach the subject directly on the questions." In addition, he told, "For example, in the case of solid object volumes, it is perfect. I have a chance to show the faces of 3-D objects. I can flip them if I want and show to students how many faces the 3-D objects have. So, here I have a chance to teach the subject with IWB." Besides, he said, "I use IWB less when I don't have the source because content and curriculum is changing."

There are some positive impacts of using IWB on teaching process and they are; allows to solve more questions; allows to stay on the subjects more; allows to teach more topics/information in less time/teach fast; more efficient/productive lesson; allows more students to come up to the board; enrichment in the visual sense/supports in terms of visibility; concretize abstract concepts/revive a three-dimensional; allows to show/see/solve more different types of questions; change in teaching styles; change in habits; opportunity to use more resources; enriched in material/resources diversity/visual material richness; instantly reaching information/reach information more easily; better consolidation. Accordingly, he said, "This year I always used IWB. It's pretty good. So once my students do not write, I do not write, I can spend much more time on the subjects, I can solve more questions, and there are more like advantages of it." In addition, he stated, "I use the IWB as a visual." In addition, he told, "The teaching style can change, for example, you make an example that day. The example you did in the first hour does not disappear, you are going to solve the tenth example, the student does not understand a place you can tell him with the first example. Because it doesn't get lost, the data is in the same data and it's a great thing." Besides, he stated, "So I used to teach students from the book and I didn't fall off the book from my hand, but now I'm taking just myself to the classroom. Because all the books, every source I have is now on IWB. I'm pre-loading the classes I've entered." In addition, he told, "Both the increase in the different types of questions and the transition from abstractness to concreteness in subjects helped the teaching process." In addition, he stated, "It was

very good having IWB at hand, consider it as follows. How to access everything on the Internet, for a teacher at the moment the IWB allows access to everything in the same way. For example, I can get the any book I want using IWB.” Similarly, he told, “It is incredible in terms of variety of resources. I use all the IWB compatible resources on the market. I have them all in PDF or IWB compatible format. I use some of the sources for geometry or I use others for mathematics. So, I can use most of the resources.” Also, he said, “Very good, so very different, so incredibly useful. Under normal circumstances, I can bring a lot of benefit to the students on IWB and I have a chance to give more information.” Even though positive impacts, there are some negative impacts of using IWB on teaching processes and they are; encounter problems, continue lesson in spare classroom.

There are some positive impacts of using IWB on teachers and they are; more motivated; writing less on the board; allows to master subjects/have more comprehensive knowledge; teach better/started to teach better; feel became a better teacher; re-use lesson materials; no longer carry course materials; not get tired/make him/her tirelessness. Accordingly, he stated, “As many questions are solved in the lecture, the knowledge increases very much. IWB has the advantage, when so many questions are solved and narration is much better than before.” In addition, he said, “Teaching instruction has definitely increased. For example, today I have explained the analytical plan in a lesson. I explained the location of the points, I found the distance of the point, I found the distance of the axis and I also explained the absolute value to the students. It wasn't possible with blackboard and I wouldn't be able to do it on that blackboard.” Besides, he stated, “I have learned to teach every question. There were some patterns before. We teach those patterns because time isn't enough before IWB. But now I am teaching every question pattern and time is enough thanks to IWB. So, I learn every question pattern and day by day I am teaching better.” Moreover, he said, “Because I've solved more questions, my knowledge of the field has increased.” In addition, he stated, “I feel like I am a better teacher because I am telling a lot. I mean, I'm happy with that. When I enter lessons, I say, "I taught this."” Moreover, he stated, “IWB have increased my motivation and I am not getting tired

that much. I can actually say that I am getting some tired of solving lots of questions, but it's a pleasurable fatigue." In addition, he said, "Now everything's on the IWB. I am just going to go to class so I don't have to take anything with me. All my resources are in it." Even though positive impacts, there are some negative impacts of using IWB on teachers and they are; increased effort (endeavor) during the lesson; initially, increased workload. Accordingly, he stated, "Honestly, I've never worked so hard before. I was telling simple things. Now that I have solved so many examples from each topic and I always solve more questions. IWB caused increasing my workload." Similarly, he told, "I need to work more but this is not cheesy working. So, I am working with fun. Actually, solving much more questions is not a very bad thing."

There are some positive impacts of using IWB on students and they are; increased solving more problems/questions; writing less; reduced the time spent by students to take notes; writing less; facilitate learning; enhance learning; more motivated/increase motivation; better concentrate/concentrations increased; better perception; better consolidate/reinforce the subject; learn better; increased participation/more participative/more attentive; raised students' knowledge levels; master a subject/have comprehensive knowledge of the subject; increase gathering/draw attention of students; increased success; increase listening time of lesson; provides advantage for students with visual intelligence; not get tired/tirelessness; not a burden carrying course materials. Accordingly, he told, "If the source of the students is the same on the IWB, this allows the teacher to solve more questions. In mathematics, the subject is simple and the teacher explain the details in the question. As the questions are in the student's book, then students write the only solutions and so they write less in lessons. Thus, I can solve many more questions than before." Furthermore, he stated, "I have used IWB in today's lesson. In which situations it works more in geometry because the geometric shapes on IWB and the drawing of them on the board are not the same. The draws of IWB much better and gets easier to learn for students. Well, students can participate more then." Similarly, he told, "When we look at the general, IWB increases participation." Moreover, he stated, "The IWB has inevitably increased the students' concentration."

For example, the duration of the interaction is twenty-five minutes and you can use it more efficiently with it. So, there was an advantage of it with this respect.” Also, he told “IWB keeps visual intelligence alive in lessons for students. It can attract more attention of students.” In addition, he stated, “The students are more likely to attend the class because of the possibility of getting up to the IWB.” Besides, he said, “So the level of knowledge of the students increased a lot, because the students saw both the many kinds of questions and the transition from the abstract to the concreteness of subject matters.” Besides, he told, “I believe that the students learn better with the IWB. Because they encounter more and different type of questions than before.” Furthermore, he stated, “You know, a certain part of our brain works with visual intelligence. It was a huge advantage for students working with visual intelligence. So, IWB has started to increase the time we listen carefully.” Besides, he stated, “In the past, the source of information was just me and what I would write. Now students have it in front of the them with IWB. Also, students have opportunity to ask and understand the topic from their friend next to them because information is already in in their hand. So, it actually boosted success.” In addition, he stated, “IWB has increased the perception of the students much more. Because it's made content concrete. All mathematics is abstract. So, I am taking it all out of abstractness and making certain things concrete. But it's more and more used in that geometry. The math part is also completely abstract but I can solve more questions and enable consolidation of topics.” In addition, he told, “IWB affected the motivation of students positively.” Even though positive impacts, there are some negative impacts of using IWB on students and they are; dealing with disturbing/extracurricular activities at breaks. Accordingly, he told, “Students can use IWB for their purpose and go to the website they want at breaks.”

There are some positive and negative impacts of using IWB on time. The positive impacts of time are; time flowing fast/time passes/moves faster; reduces time spend on teaching of the subjects; reduces time spend on lesson preparation. Accordingly, his sense of time when he uses IWB in his lessons is in “time’s flowing fast” direction. In addition, he told, “The time I spent on teaching has reduced since I

started using IWB in my lessons. For example, catching up the curriculum is much more easily because I can teach more in less time. Thus, students have the chance to stay more free time.” Besides, he said, “In the preparation process, we used to make notes at home. We used to teach according to those notes. Now we're not doing that. Now we're going to teach on the IWB and solve questions related to the subject. Solving questions is enjoyable, so it's fun like a puzzle. Thus, IWB reduces the time spend on my lesson preparation at home.” Similarly, he said, “I didn't prepare as much as I used to be, for example, I am not doing a summary out or taking notes as much as before.” The negative impacts of time are waste of time/time loss/stalling the lesson; time issues when encounter problems; initially, requires more preparation time in the beginning. Accordingly, he told, “If the smart board in the classroom is not open, it is a waste of time. I wait for the opening of the IWB, then I open the program, then I choose what I am going to teach later, and it's a waste of time. This inevitably leads the teacher away from IWB a bit.” Besides, he said, “When there are problems related to IWB, we are wasting time in the lesson.” Similarly, he told, “The time increases when you don't have trouble on the IWB, but it takes all the time when there is a problem with it.”

There are some kind of interaction and communication he has with other teachers in the school about using IWB in the lessons and they are; support for the use of IWB; share idea/opinion among teachers; and share resource among teachers. Accordingly, he stated, “The other teachers usually come to ask me questions about use of IWB. For example, I can't do that or how it's happening? or I don't have that book and can you load it on IWB. There are more questions about the use of IWB.” Similarly, he said, “The more I'm going to set up the program to them.”

Use of IWB in his lessons affected his interaction and communication with his students and course content somehow and those are based on followings; increased his interaction/communication with students; increased interaction among students; better in the eyes of students/more pleased with the teacher; increased students' interaction with course content; increased teacher's interaction with course content. Accordingly, he told, “I think I am better at the students' eyes. Students thinks my

teacher is looking at the same technological age as we are from. So, I can be more intimate with the students in this respect. Because we have teachers who cannot keep up with technology. For example, at that moment I entered the class, students are playing a music and I don't turn it off immediately. Then, the students say that our teacher is good.” Similarly, he told, “students are more on IWB to participate lesson because they love the lesson. So, if they like the lesson, they love the teacher. So, we can think of it.” According to him IWB increased students’ interaction with course content and he stated “Now when the students walks up to the IWB and interact with content, they love me and mathematics. So, they see why and how they succeeds.” He thinks IWB increased his interaction with course content and told that “I know something more now. So, I have comprehensive knowledge of subjects. For example, if I have fifty questions about a subject, students have the chance to see these fifty varieties. It wasn't before that, I could show less different types of the questions.” Besides, he stated, “I am better at content. I got the resources. Imagine if I used to have 3 books in my bag. But it's not like that now. I already have 100 books in my USB memory. So, I can access information much more easily. What happens when I get the information? I have to learn it, I work harder.”

There are no course materials he developed himself to use in his lessons.

There are some issues/challenges he faces when using IWB and they are; touch panel problems/unresponsive boards; damaged, distorted, out of order board; resource (material) problem; internet/network connection problems; visibility problems; takes time to open the IWB (open slowly, time issues). Accordingly, he told, “Sometimes we are having trouble with the touch panel of the IWB.” If IWB is damaged or not operational, he is processing lessons through in spare classroom. In addition, he stated, “Sometimes IWB cannot work. So, we need to get into the classroom system. Classroom system becomes much more useful because in this system, the teacher becomes owner of the IWB and the classroom and looks after more valuable to IWB in the classroom.” Moreover, he told, “The biggest obstacle is that sometimes touch panel of the IWB doesn't work. So, it makes us waste a lot of time. Slow opening of IWB is another problem.” Moreover, he stated, “Sometimes there are sun flashes in

the classrooms for windows. So, the students can't see IWB's screen. That's a nuisance. Students inevitably turn their head like this, turns it up, gets up, and the sun glare inevitably lowers their motivation. It makes lesson difficult for them. Especially in summer we have that kind of problem and we can solve it with curtains or something. Unfortunately, not every class gets it. We have that kind of problem.” In addition, he mentioned about internet/network connection problems like saying “There's no network connection, so there is no internet. It's a problem.” Furthermore, he told, “The books of National Education are not sufficient.”

There are some ways he solves problems that he encountered while using IWB. First of all, he tries to “solve the problem by himself”. When he can't solve the problem by himself, “ICT teacher makes immediate intervention” in terms of technical support. If the ICT teacher cannot handle the problem, “technical support by technical service (authorized service)” is called.

There are some needs and suggestions and they are; need more practical training; need training for specific each subject matter; need individual training for old teachers; need for training to adapt to technology for later ages teacher; need special classes for each teacher; need MoNE to allow free use of resources; need to be refreshed/simplified curriculum by MoNE. Accordingly, he told, “They gather all teachers together and teach through EBA. It's not what it's supposed to be when there's noise. Instead of making these trainings collectively, a class of twenty teachers will be enough and should be a computer in front of us. Of course, instructor must show in practice how to use the IWB.” In addition, he stated, “It is better getting a specific training in terms of my subject matter about using IWB.” Furthermore, he speaks, “One-to-one training is required. Especially for older teachers. These trainings can be enough for me because I have a computer base, but when I look at the general, it is not enough.” Similarly, he told, “Older teachers need to be trained one by one. Especially, to use the IWB, we need to convince them so that they can teach subjects through the IWB. Otherwise they do not use and the old system continues.” In addition, he stated, “The curriculum should definitely be reduced. It is a pity for students because a student who has failed does not know the taste of

success.” Moreover, he told, “Absolutely every teacher needs training. Also, EBA can be separated on the basis of each branch, from which the subjects are described based on videos or animations.”

***Individual Textural Description - Participant #11 – HS2T4
(High School 2 – Teacher 4 – Geography – Male)***

He had a “one-week” training on the use of IWB under the scope of the FATİH project. Accordingly, he told, “I’ve taken a week-long seminar, but it’s inadequate, because I am just taking a seminar on the basic knowledge of the IWB. I finish without turning it into practice, so it seems insufficient to me.”

His intended use of IWB for his subject matter can be listed as teaching/narration/lecturing; problem/question solving; show images/visuals; show videos; show animations; show maps; show three-dimensional shapes; watch movies; make presentations; concretizing abstract concepts; visualization. Accordingly, he stated, “I’m using IWB in lecture and in problem/question solutions.” In addition, he said, “I need IWB more on the shapes, especially on the map.” Furthermore, he told, “IWB gives us a lot of opportunities, especially in solving questions. Because I can use time efficiently. I am able to better reflect abstract concepts in the subject narration, and make the students comprehend better with films and videos. The IWB is helping in these matters.” Also, he stated, “I use IWB in video film screenings to explain abstract subjects. For example, students can easily understand the pigment theory about the formation of the world when we put a film about it when we find it difficult to tell the words by words, or it can better comprehend the occurrence of rain formation or other weather events that occur with the storm.”

There are some kind of teaching resources he uses when using IWB in his lessons and they are; text (PDF, Word, Excel, etc.); images; videos (movie etc.); websites; PowerPoint slides; animations; Accordingly, he told, “I have my own PowerPoint slides and I use them. In addition, there is a website about geography, I benefit from there.” In addition, he said, “I often use PDF, WORD and PPT. The videos are a little

more minority, and also, I use animations. I use videos or animations more in the lecture.”

There are some cases/situations students get involved in and they are; make presentations. Accordingly, he told, “Especially at the beginning of the subject units or even at the beginning of the year, I'm grouping the students. When it's time for those students, they present their presentations on the subject to the class. After that, I present my own presentation and make the students' narration sufficient. Therefore, a student participates at every point about IWB.” Similarly, he said, “Students can prepare presentations and videos, especially on simpler topics. For example, they can turn their presentation topics into surveys about population issues. They prepare a presentation by using data their surveys and support it with videos or other information.”

It means for him to have IWB in his classroom as overcome problems in verbal expression; save time; use time more efficiently; comfort of the teacher (comfortable). Accordingly, he stated, “For example, sometimes electricity is cut off. We can't use the IWB. Well, then I'm saying what I'm going to do. I'm really surprised. Then I understand that there is something that IWB has added because it provides readiness in terms of preparation and I save time in terms of presentation. In other words, the IWB overcomes the things that we cannot overcome in oral expression with the classical system.” In addition, he said, “For me, having a IWB in my class means that I use time more efficiently. Then, I think students get more. For example, it is more difficult by just writing or just narration. I make the reaching to the students a little more comfortable. Also, I can make the question solution more comfortable.”

There are some effects of start using IWB on the climate of class and these effects can be listed as; students more enthusiastic; come up with much preparation; more confident students; student understand more easily; more productive/produce more things; open up students' horizon. Accordingly, he told, “After starting to use IWB in the lessons, students come to the lesson more enthusiastically, more diligently,

and they feel more confident in the solution of the questions part of the lessons.” Moreover, he stated, “There are some positive contributions to the atmosphere/climate of the class. While the student can understand more easily, the horizon opens up, they can produce more things and can be more productive, so there is no limit in their productivity.”

His comfort level when using IWB in his lessons changed throughout the time. According to him, “initially, he has been tension/nervous but “now, he feels (more) comfortable” while using IWB in his lessons. Accordingly, he told, “I was a little nervous at first, but then I saw the IWB just as comfortably as the person using the pen, so I can easily reach it as a tool. So, I am comfortable now while using IWB.” Similarly, he said, “The comfort and convenience IWB provides to reach the student is unutterable.”

There are some differences between when (at) first he started using IWB and now. Those differences are; initially, not quite know what to do; initially, getting anxious/worried/nervous; initially, excited; now, make more progress/develop/improve yourself; now, begin to master; now, use more comfortable; now, more relaxed; now, more confident. Accordingly, he told, “I see the difference at first and now. I don't think I'm doing enough at first. When I first started to use the IWB, I was vacillating. Then I started to do something more comfortable, and so there was no excitement in the negative sense later. I can be more relaxed now.” In addition, he stated, “I feel a bit more sufficient about myself right now. The uneasiness and excitement of the first time I used IWB now left its place to safety. I can say I can use it easily now.” Moreover, he said, “I improved myself about using IWB. I think I have a little more control about using it.”

Using IWB has some influences on the role of the teacher and they are; pushed the role of the teacher somewhat secondary; brings teacher more directing position. Accordingly, he said, “The use of IWB has pacified the role of the teacher. The teacher was more active before.” In addition, he told, “It has also a positive effect on the role of the teacher. IWB brings the teacher to a more directing position.”

Using IWB has also some influences on the role of the students and they are; more comfortable self-expression. Accordingly, he stated, “It seems to me that the role of the student is changed as follows. Students are more confident. They are more relaxed in terms of self-expression. it is more comfortable and safe way of learning.”

There are some main reasons for him to start using IWB in his lessons and they are; to get more efficiency in terms of education; to visualize the lesson (to add visuality); in order to affect/influence/impress students; to increase participation (student contributed more); started to use because of seeing as a development; For students to comprehend/grasp/grip; to solve more problems/questions/benefit of question solutions; student can learn more easily. Accordingly, he said, “I thought I could get more efficiency in terms of education by using IWB.” In addition, he told, “Because our lesson, especially for geography class, is to be involved in the event, because visuality is very important so, I thought it was more efficient to gain that visuality and influence the students by using IWB.” Moreover, he told, “My main reasons for using IWB are; I started using it because I thought it was an improvement. For example, I used the overhead projector before the IWB, and I discovered that when I projected on the blackboard, I saw that the students had more participation. Then, I think the most important thing in education is learning by doing/experiencing the principle and IWB reveals that principle very comfortable. So, by using IWB, we are able to bring both the living and the experiences into consideration more easily and make students comprehend.” Also, he said, “I was already using an overhead projector before IWB. My main reason was that I thought that the students could learn more easily with these materials on IWB. Another reason is that I solve less problems/questions while I write the questions and make students write it too. Then, I realize that we solve more questions with the IWB, so I use it.”

There are some times and situations/circumstances he start to use IWB more or less as follows; use more often, in solving problems/exercise; use more often, solve more problems/questions; use more often, in lecturing; use more often, visually related topics; use more often, complicated and more visually require cases; use more often, concretize (narration of) abstract concepts; use more often, teach 3D and abstract

concepts; use less, where topics that do not require the use of IWB; use less, unnecessary or less necessary to use IWB; use less, in concrete topics. Accordingly, he told, “I use the IWB more in the solution of the questions. Because it is not possible to write one by one each problem/question on blackboard or distribute it as a sheet test. When I reflect on the IWB, I think it is more efficient.” In addition, he stated, “In the lecture, for example, the problem was mostly in the teaching geological periods and the formation of the Earth. Because it is a little difficult for the student to describe four billion years ago, to describe it with sentences and words. Therefore, it is more advantageous to be able to illustrate the picture depicted four billion years ago with IWB.” Moreover, he said, “I used IWB more often in solving questions and in expressing abstract subjects. Because when I saw that words were inadequate, I used IWB in abstract subjects. I also used to IWB during a lesson, for example, while I could solve 10 questions without using IWB in the classical way, I saw that I raised it up to 40 with the IWB and therefore I continued to use it.” On the other hand, he thinks that “I found that it is unnecessary or less necessary to use IWB for things that are either verbally easy to express or easy to explain.” Similarly, he told, “I started using less IWB on concrete topics. In other words, I continue to use less IWB on topics that can be solved with verbal narratives that we call theoretical issues.”

There are some positive impacts of using IWB on teaching process as follows; change in teaching styles; change in habits; concretize abstract concepts/revive a three-dimensional; allows to solve more questions; allows to transfer information more easily; allows to teach more topics/information in less time/teach fast; enrichment in the visual sense/supports in terms of visuality; opportunity to reveal aspects/things have remained hidden; opportunity to use more resources; opportunity to show/play materials; instantly reaching information/reach information more easily; increased chances going into detail/get detailed information; sharing lesson materials/course resources easily; more efficient/productive lesson; enriched in material/resources diversity/visual material richness. Accordingly, he told, “IWB affects the teaching style of the teacher as follows. It allows the teacher to teach from

piece to whole as in the induction method. It helps to teach to students by giving piece and let them integrate and make it whole. It teaches the transition from piece to whole.” In addition, he stated, “I found it more necessary to use IWB on abstract subjects that are difficult to grasp. Because it gave a better understanding of abstract matters that cannot be narrated verbally fully. For example, when we talked about the layers of the earth, we could hardly see what was happening at 5000 meters deep, but now we can visually express the layers of the earth at 5000 meters depth. When students see the lava fragments coming from the depths of the earth in volcanic eruptions or when they see the shapes of lava around the volcanic mass, when they see the fairy chimneys, they understand the subjects better.” Besides, he mentioned, “When I used the IWB, for example, there were things that remained hidden, and there were things that I thought I had to use, and there were things I revealed with IWB.” Furthermore, he told, “In the teaching process, it was very easy to gain in time with IWB. For example, let me put it this way, in a lesson, while solving 10 questions on a subject without IWB, I’ve seen that I can increase this number to 20 questions or 30 questions using IWB. Then, for example, by opening the questions we prepared to share with students, e-mail to the parents of the student, by enabling others to share a faster interaction has emerged.” Besides, he told, “My teaching style has changed. For example, I preferred classical methods instead of learning by doing when there is no IWB, but now I tried to learn and resolve learning by doing with IWB.” Also, he told, “I had the habit of writing and make students write what I told and I reduced it to a lesser extent. In other words, instead of having the student note book and take notes, I send the subjects I have taught to their mails or upload them to the IWB. From IWB, students are able to follow the course by taking the resources with their flash disk.” In addition, he stated, “IWB increased resource diversity. I started to feel the need to enrich resource types of my course materials. So, I’ve always been in contact with different resources.” Also, he mentioned, “When I used IWB, I was able to reflect the information about my field to the students more comfortably.” Additionally, he mentioned, “We are able to solve more questions, more intense narration, and spare more time for narration with

IWB.” In addition, he told, “I have a problem in geography, especially in abstract subjects. I have minimized those problems related to abstract concepts in geography and with IWB. Especially in abstract concepts, students were able to feel and learn visually.”

Even though positive impacts, there are also some negative impacts of using IWB on teaching process as follows; encounter problems, continue lesson with classic method; encounter problems, classic lesson pass with unpleasant way; encounter problems, not access to information. Accordingly, he told, “In our class, sometimes the electricity is cut off or there is a problem on the IWB, then I feel it. From my point of view, I think the lesson is a little more prosaic. For the student, something like lesson goes through a strenuous process of writing or saying on the blackboard and noting what I say.” Besides, he told, “I cannot provide access information/recourses when there is no internet connection in the lessons.”

There are some positive impacts of using IWB on teachers as follows; writing less on the board; provided personal development/improvement; expanded/ broaden point of view on the subjects; more motivated; reduced effort during the lesson; more productive/efficient; reduced effort during the lesson. Accordingly, he told, “IWB made me a little more productive and I felt the need to constantly renew myself. For example, I have prepared some course materials a while ago, even though our subjects are the same, situation that requires me to develop and renew more. Looks like we're evolving open-ended way.” In addition, he stated, “My perspective on any subject has expanded with IWB.” Besides, he said, “My motivation a little bit more increased and intensified. Because at school or at home, I really concentrated on doing this.” Moreover, he stated, “IWB increased my workload and effort a little more because firstly I prepare and then I teach/present and repeat it in class. Then I look at the shortcomings of the issues I have explained therefore it increases workload and efforts. However, it has some benefit in this regard, so when we pass all these processes, we achieve efficiency.” Also, he said, “IWB has reduced my effort a little more during lessons. Because now I can teach more easily, and students can comprehend abstract concepts at ease with IWB.”

Even though positive impacts, there are some negative impacts of using IWB on teachers as follows; increased effort (endeavor) during the lesson; initially, increased workload; make teacher lazy. Accordingly, he told, “Sometimes I can break a little bit in terms of preparing course materials, for example, I say that I can use ready course materials. Then, IWB sometimes pushes laziness.”

There are some positive impacts of using IWB on students as follows; better grasp the subject/grasp more easily/comprehend; increased success; facilitate learning; enhance learning; increased solving more problems/questions; increased participation/more participative/more attentive; more relax; more creative/raised creativity; more motivated/increase motivation; better retention/more permanent in mind; more confident/gained confidence; expressed themselves more easily/more comfortable expressing; provides ease of understanding/understand more easily; reduced the time spent by students to take notes, writing less; easier to access information/reaching information instantly. Accordingly, he told, “I think IWB has a positive impact on the teaching process and I think I get more efficiency with it.” In addition, he said, “For example, the water in the equator flowing without any signs but water flowing to the right in the northern hemisphere, left to the south hemisphere, the students visually sees and grasps better like those subjects on IWB.” Furthermore, he stated, “IWB somehow influences the students. The first one is that students can participate more in the course and IWB has influence in terms of opening the horizon of the students and being more creative. Secondly, for example, while the student cannot grasp the formation of snow or rain or how the hail is narrated verbally, the student can grasp and make sense more easily when he / she sees the subject visually on the IWB.” In addition, he said, “The students are more competent about technology and computer, so the student can grasp and solve the issues more easily. In the early days, when I was struggling, the students dominated the board, and I learned a lot from them.” Moreover, he told, “Students now grasps what they see more easily on the IWB. Students also began to ask that they could not comprehend more easily what they saw on the IWB. We have solved them with other sample presentations by asking them. In this way, it has been easier for students to

reach information.” In addition, he stated, “I think IWB affected the students' success positively. For example, when I compare the previous periods with the present period, I was having difficulty in explaining the abstract subjects to the students. For example, when I am teaching height of shadow, I am having a hard time explaining the change of the height of the shadow to the months and years. But now that they see the change in the shadow length with their eyes and grasped it more comfortably with video/movie and thus IWB increased the student's learning a little more.” Furthermore, he said, “IWB minimized the amount of time students spent taking notes. Because I don't let them take notes, so they usually take the note from the IWB and load it onto their flash drive. They do what they will do in a day, like in five or ten minutes.” Additionally, he told, “IWB positively influenced students' creativity. Students have developed themselves and became creative by thinking about geography subjects, which sources can be used in which topics and which presentation I can prepare.” Besides, he mentioned, “It was a positive impact for the students using IWB because we rely on the visuals with it. So, they can learn more easily and comfortably.” Also, he said, “When I support the students' inability to understand abstract concepts visually with IWB, their motivation increases and they do not get bored.”

Even though positive impacts, there are some negative impacts of using IWB on students as follows; dealing with disturbing/extracurricular activities at breaks; reduce effort/not make any effort; make students lazy/became accustomed to literal. Accordingly, he told, “One of the negative aspects to the students is that sometimes they are using the IWB for extracurricular activities such as music, rather than teaching-related or education-related things.” Similarly, he said, “Students can deal with different things when there is an internet connection on IWB in classroom when they have free time, so it can have bad effects.” In addition, he said, “Because students find the resources near at hand, they don't try to search for them anyway.”

Using IWB has some positive and negative impacts on time as follows; time flowing fast/time passes/moves faster; reduces time spend on writing out on the board; reduces time spend on teaching of the subjects; use time efficiently; deal with time

problem; better time management/use time better; save time/time-saving/gaining time; initially, requires more preparation time in the beginning; time issues when want to give more information; . Accordingly, he told, "It is more advantageous to show the questions on the IWB rather than writing the questions on the board in terms of time saving." In addition, he said, "I use time more efficiently and it flows faster. For example, there are no wobbly moments when I use IWB, and there are practical successive processes, so I use time more efficiently." Besides, he stated, "I don't have time problems on IWB. Because when there are following pages for each other, the problem is solved automatically. I can see how much time I can devote to which page on the IWB." In addition, he said, "IWB has advantage in terms of time. While teaching more comfortable and in a shorter time, it takes longer in preparation time." Moreover, he told, "Time is flowing faster. In other words, we finish more quickly, for example, we solve many questions or we can watch many programs and enter very detailed things about the subject, but the course is over. So, I need to be a little more careful at the point of planning." Also, he stated, "I spend a lot of time at the point of preparation before class. So, it nearly doubled preparing time. I think that although the pre-class preparation time increases, the efficiency increases." Similarly, he told, "It began to take longer preparation time. Because before the class, I started to make different preparations for each class in the preparation stage. For example, I prepared more complex presentations while a class grasped the subjects more easily. As another class grasped more difficult, I made it simpler." Besides, he mentioned, "IWB actually reduces the time I spend on teaching subjects. With the teaching of the subject, it increases the solution of the questions and increases the comprehension." Likewise, he stated, "The things that are effective in decreasing time while teaching the subjects are to be converted to digital environment and based on shape and visuality. For example, let me give an example. When we were working on volcanism, we used to try to express what volcanism is and how it is. Now, when we try to express what volcanism is, we give an image and video from Mount Etna, so I can save twenty minutes in two minutes."

IWB somehow has impact on his interaction/communication with students and course content as follows; increased interaction/communication with students; increased teacher's interaction with course content; increased students' interaction with course content; increased the distance between students and teachers; decreased/broke interaction/communication with students; increased interaction among students; share resource among teachers. Accordingly, he told, "Overall as far as I observe, IWB increased the distance between the student and the teacher. It seems to me that IWB took the student away from us a little more." In addition, he said, "IWB also increased my interaction with the course content. Because I started using more resources." Similarly, he stated, "IWB influenced my interaction with the course contents, for example, I needed more resources, I needed more presentations, and I started to solve this with the internet and other networks. We as geography teachers established networks and sent course materials to each other with these networks and benefited from them." Besides, he stated, "IWB has positively influenced the students. Each time students see me preparing things more comfortably at class, they also emulate me and began to prepare their own course materials." Moreover, he told, "When I prepare projects and presentations in groups by using IWB, so students learn to work in groups and understand socialization. It has had some impact on the point of socialization and interaction among students." Furthermore, he mentioned, "IWB has very positive effect on my interaction with the course contents. Because I'm more comfortable with what I'm looking for such as course contents, lecture forms, question solutions, both in national and international sources. Let me give you a recent example; the world's largest pit prepared from an international source, and I can easily take the image or video from YouTube on the subject or about formation of the world in the form of animation or video format. I think, IWB is good at with this respect." Also, he stated, "I communicated more closely with the students because this communication not only made it easier for the student to reach you visually, but also allowed us to spend one-on-one time on the subjects that I would prepare for the next lessons." Besides, he said, "IWB affected the students' interaction with the course contents in the

following positive way. I could reach the student more easily, for example, while students could reach the subject more difficult or could not reach the topic that they missed before, now they started to reach more easily with IWB. Students open IWB and load course materials to their flash memory, so they could easily see the day they didn't come, or they could easily reproduce the issues they were missing.”

He developed some course materials for use in his lessons as follows; prepared PowerPoint presentations materials; prepared animations. Accordingly, he told, “The materials I have developed are presentations and animations to use in my lessons.” In addition, he receives assistance in developing these materials by ICT teacher and his colleagues. With this respect, he stated, “I was initially assisted by ICT teacher in developing the course materials. After I learned how to do, I tried to do it myself. Then I asked to friends from the geography group about how they did it and I kept myself open for improvement.” Moreover, he thinks that prepared materials are inadequate for his course and said “Developing materials and keeping it up-to-date is an open-ended process and open to development, and it's never enough. For example, I look at the presentation I used to a while ago, I say how much I have done something inexperienced, then I renew it. It's not enough, so I have to constantly renew.”

He has some kind of interaction and communication with other teachers in the school about the use of IWB in the lessons as follows; share idea/opinion among teachers; share resource among teachers; support for the use of IWB. Accordingly, he told, “There is a group of teachers in my geography subject matter. Together with the teachers in our branch, we developed a website. There, we can share lecture presentations, animations and questions instantly.” In addition, he said, “My communication is like this; for example, some teacher friends have problems with IWB because they do not know how to use it. Some say I don't know because I feel technically inadequate. I've always told them that I didn't receive training when I started teaching, but I learned it by doing and experiencing, so I try to direct them to use IWB.”

He encounters some issues/challenges while using IWB in his lesson as follows; internet/network connection problems; power failure/electricity cut; damaged, distorted, out of order board; deleted files/programs related to course from IWB; visibility problems (sunlight shines directly onto the board); not supporting resource formats to run or open; touch panel problems/unresponsive boards; resource (material) problem. Accordingly, he stated, "We always use the IWB as teachers, but the students also open and uses it in break time. I've been uploading all the things I'm going to do on the IWB and likewise our ICT teacher had programs installed. However, students sometimes delete those documents or add other programs on IWB. We have kinds of problems." In addition, he stated, "IWB is sometimes broken or out of order when students try to listen music or play things, then I can't use it." Besides, he said, "We don't have any access to the internet at our school right now. We're having problems here with this respect." Furthermore, he told, "Sometimes in the sun-shining classes from windows, there is glare, then we try to overcome it by turning off the lights or use the curtains to avoid/prevent sunlight. When there is no curtain in some classrooms, we have problems reflecting the biggest distress, not seen whole or not seen in part of the class. So, we're having problems with that." Additionally, he stated, "IWB software and my own programs sometimes may not compatible. We have problems with this. This software needs updating." Also, he mentioned, "When I was using IWB in my lectures if there was a power cut, then I had problems with teaching process."

He solves the problems that he encounters while using IWB by trying to solve by himself firstly. Then, ICT teacher is making immediate intervention for technical support. If there was a problem that ICT teacher cannot handle, then technical support by technical authorized service is called.

He has some suggestions and needs for using IWB more effectively and efficiently for his subject matter in his lessons as follows; need more practical training; need training about more efficient use of IWB; need training about more efficient use of IWB; need training for specific each subject matter; need for adequate resources made by MoNE; teachers need to be trained constantly; need refreshing trainings;

need to increase the number of trainings/more frequent; need to increase resources/materials; need resources prepared more professionally. Accordingly, he told, “First of all, I need to get the necessary materials for the use of IWB. Then I need to know how to use them. More seminars/trainings on IWB should be organized in detail.” Also, he said, “I think the given trainings needs to be developed for each subject matter. In other words, on the IWB, knowledgeable and sufficient people in their field should provide training on these issues.” In addition, he stated, “I don't think the help and training I get is enough. Since the IWB is open-ended and open to continuous improvement, I think that we as teachers should be constantly renewed and trained.” Besides, he mentioned, “In order to use IWB more efficiently in my subject matter, the Ministry of National Education should develop materials related to geography and they are trying to do this with EBA. That is, common programs should be used in every school and we should go accordingly.” Additionally, he told, “Teachers should attend the training seminar more often related to IWB.”

***Individual Textural Description - Participant #12 – HS2T5
(High School 2 – Teacher 5 – Mathematics – Male)***

He had one-week training under the FATİH Project. According to him, the training just enough to use some basic things at the basic stage. Relatively, he told, “I didn't know much in detail, but it was enough to use basically at first.”

He uses IWB in his lessons for some purposes as follows; visualization; problem/question solving; teaching/narration/lecturing; concretizing abstract concepts; show images/visuals; show videos; show three-dimensional shapes; use to indicate sections that have difficulty in drawing. Accordingly, he told, “It is easier for me to solve the questions on IWB and it saves time. IWB is suitable at the question-solving stage.” In addition, he stated, “I needed IWB for narrative if some visual are needed about abstract subjects. IWB is appropriate in that sense to visualize it.” Also, he said, “Students can't visualize things on space or on planes. But there are some perspective drawings on the IWB, such as the front face or back face. Students could better visualize when there was a three-dimensional shape on

the IWB. Otherwise it would take some time for us as teachers to draw that shape on the board, maybe we couldn't draw or draw it badly, but at least when the figure was directly reflected on IWB, the students could better visualize it.” Similarly, he stated, “Sometimes in order to visualize a concept in the eyes of the student, I would use the shape or any visual in the field on IWB.”

There are some teaching resources/materials he uses in his lessons on IWB as follows; images; videos (movie etc.); animations; EBA (Educational Informatics Network); text (PDF, Word, Excel, etc.); websites; IWB compatible e-books/documents. Accordingly, he told, “Because it's a math lesson, I usually use animation a lot. In geometry, I use video sources from the EBA website in terms of being visual when I am giving 3D concepts especially in perspective subjects.” Besides, he stated, “In order to understand a topic that I cannot express verbally, I transfer figures or videos onto IWB and use it.”

There are some cases students get involved in by using IWB as follows; problem/questions solving. Accordingly, he told, “Students are most involved in using IWB in the question solution part.”

It means for him to have IWB in his classroom as follows; support course in terms of visuals/visualization. Accordingly, he told, “When I use IWB, I can say it as a support. It gives me a chance to open questions, visuals or etc. and show to students, or provide support for accessing external sources other than our available resources if the internet is available.”

There are some effects of start using IWB on the climate of class for him as follows; positive effect in terms of taking attention; more attractive; more motivating; students generally reacting positively. Accordingly, he told, “The IWB has a positive effect on the focus of the students, because the students are distracted quickly because they are treated like a mathematics boring lesson. At least doing something on the IWB, different things can attract the attention of students. Remarkably, it is convenient to pack up the class.” Also, he stated, “I can say that IWB arouses curiosity of students.” Furthermore, he said, “IWB has been positively influenced

the climate of the lass because it has also been a little more motivating to get up on the board and experience the experience of using the board for students, perhaps because it is attractive.”

His comfort level when using IWB in his lessons are changed throughout the time as follows; uncomfortable/nervous from time to time; now, feel (more) comfortable. Accordingly, he told, “I’m actually comfortable, but when I have a problem related to IWB and I have tied my lecture process to the IWB, then I have a problem. For example, let’s say that there are too many flash memory circulations on the IWB by many teachers and the virus on the board is too much. If I have flash memory with my course resources and plug it in the virus infected IWB, then my flash memory becomes unusable and if I can’t open my course resources, there is a stress like that.”

There are some differences between when he (at) first start using IWB and now as follows; initially, inexperienced; initially, not learned buttons and symbols exactly good; initially, slower while using IWB; now, more prepared; now, make more progress/develop/improve yourself; now, use faster; now, know better symbols; now, better about using IWB/use a better way; now, habit to use IWB/get used to it; now, use time better; now, more experienced. Accordingly, he told, “When I first start using IWB, I might be a bit more novice. When it comes to opening the IWB, touch issues, or while I’m picking up some pen, but then I can say that I’m getting better and faster in later.” In addition, he said, “So the more I use it, the more I develop. For example, I learn how to transfer the picture, or create a shortcut, to direct it to a place, I learn much better by doing it myself. After a while, my use of IWB accelerates and get better.” Moreover, he stated, “If I compare my first use with my next/later use in terms of using the IWB, of course I am getting used to practicing things all the time. At first, for example, if I have spent a few hours preparing the function topic, then I can easily handle it in a much shorter time. I am developing myself inevitably. I mean, it’s good to do things on IWB.” Additionally, he mentioned, “So when I first used the IWB, I was slower. For example, when I use it now, I am technologically faster because I use more IWB. When I encountered a problem in the beginning, I was inexperienced about using IWB, but now I have

gained more experience.” Similarly, he expressed, “At first when I started using IWB, I was inexperienced, but then I gained experience. For example, when I put my flash memory into the IWB and my flash memory becomes corrupted, I’ve learned to be more prepared by carrying a spare flash memory or copying documents to the IWB next time.”

Using IWB in lessons has influence on the role of the teacher as follows; pushed the role of the teacher somewhat secondary; ease teachers’ burden; make teacher's work easier; thought IWB as an auxiliary (as a resource supporting teaching). Accordingly, he told, “When there was no IWB, the only source of information was the teacher, and there was nothing else because he was only teaching the lesson himself. Right now, he may be teaching it himself, but some of his things are secondary.” Similarly, he stated, “I can say that IWB has made the teacher more passive. When there was no IWB, the teacher was more active and in forefront, but when the board came, the teacher retreated a little.” Besides, he said, “I think the burden on the teacher has lightened. For example, at least teachers are a little relieved in writing on the board.” In addition, he told, “IWB has made the teacher's job easier.” Also, he said, “IWB is just help us and just like the tool to provide us with convenience, such as not wasting time to write the questions on the board.”

Using IWB in lessons has influence on the role of the students as follows; more active (students become more active); not affect the role of the student. Accordingly, he told, “It is good for activating and motivating the students during the question/problem solution phase on the IWB.” Besides, he said, “I think there is no change with respect to role of the students by using IWB.”

There are some main reasons for him to start using IWB in his lessons as follows; to increase interest; to attract the attention of students/gather attention; to increase participation (student contributed more); to make teacher’s work easier; to solve more problems/questions/benefit of question solutions; because of curiosity/enthusiasm; time-related (using the time correctly, saving time, gain time); to accelerate/speed up lesson; to teach 3D and abstract concepts. Accordingly, he

told, "When IWB first installed, I used it with curiosity. So, I saw the ease of use at that time. There was also the difficulty, of course, because it was the first use and the IWB did not become more common. I had to prepare materials myself, so I had trouble. After preparing, I also saw the ease of teaching." Besides, he said, "I use it mostly in terms of practical and time saving during the question-solving process of all subjects." Also, he stated, "It takes some time to draw shapes in geometry, so I started using the IWB to speed up this process and save time. In addition, in order to better visualize abstract subjects in the minds of the students." Besides, he said, "When I first used the IWB, it was a bit of curiosity and enthusiasm. In addition, I used it to attract the attention, increase interest of the students, to make students more participatory. I also started to use it for making teacher's work easier. So, I tried the IWB and found it useful." Moreover, he pointed out, "One of the main reasons is to have an advantage in the solution of questions. I also used IWB to save some time and I gained it."

According to him, there are some time and some circumstances start to use IWB in his lessons as follows; use more often, in solving problems/exercise; use more often, teach 3D and abstract concepts; use more often, reviving; use less, in lecturing; use more often, concretize (narration of) abstract concepts. Accordingly, he told, "I use IWB more in the process of solving questions." In addition, he stated, "I don't use IWB a lot in the narration part, but, I use it more on the solution of the questions part." Besides, he said, "In geometry, for example, students may not imagine a 3-dimensional cube so that some figures can be visualized with the help of using IWB." In addition, he stated, "My most use phase was to solve the questions. I'm used IWB more often in question solutions. Because I'm telling the part of the narrative myself, then I'm briefly summarizing the definition and then giving the features on the IWB. I use it to solve questions or to use it to visualize things in the students' mind." Furthermore, he pointed out, "in some geometry classes, I use IWB to better visualize the concepts, and make the perspective related subjects especially better for students."

There are some positive impacts of using IWB on teaching process as follows; allows to solve more questions; concretize abstract concepts/revive a three-dimensional; allows to show/see/solve more different types of questions; enriched in material/resources diversity/visual material richness; instantly reaching information/reach information more easily; enriched course contents; faster paced/accelerated teaching lesson; no change in teaching style; no change in habits; make class environment quieter. Accordingly, he told, "IWB encourages participation. Well, from my point of view, it's good for time. I can solve a lot of questions." Besides, he stated, "Well, IWB saves time. I solve more questions. In the question stage, I use the advantage of solving lots of questions and different types of examples." In addition, he said, "Students revive the concepts that they can't visualize, and they can understand more by seeing them there." In addition, he stated, "My teaching style is the same, it hasn't changed much. Likewise, my habits are still the same. Because I teach again, I solve the questions again. I get up and solve by touching the board myself." Furthermore, he told, "Well, it's more advantageous to use different sources with IWB. Now, most of the publishers offer IWB compatible versions of their resources, or I can easily find and access resources on the internet. So, IWB enriched course contents, so he gained a great wealth in terms of resource diversity."

Even though positive impacts, there are some negative impacts of using IWB on teaching process as follows; encounter problems, continue lesson with classic method. Accordingly, he told, "For example, let's say I have a flash memory that contains my course materials. I put this memory in the IWB, and the information in it was gone because of the virus. What am I doing that day now? I had to solve the questions or explain the subjects from my own book materials with classical method."

There are some positive impacts of using IWB on teachers as follows; writing less on the board; more enthusiastic about teaching; more motivated; reduced effort during the lesson; reduced workloads in the later stages. Accordingly, he told, "In the question-solving part of the course, I get rid of at least writing by sliding the

questions or selecting the questions. I either write the solution to the question on the IWB or get up the students to the IWB to make them solve the questions.” Similarly, he said, “When I use IWB, writing stage is eliminated because it is ready on it. There is a conversation again, but the writing is eliminated because I have opened the pages on IWB, read the definition of the subjects during the lesson.” In addition, he stated, “I was more eager, more enthusiastic and more excited while using IWB in my lessons.” Furthermore, he pointed out, “I can say that the workload has decreased after a while. Because, I had to do a lesson plan before. but after when I have IWB, I can just try the information on the IWB, and it saves even more time for me.” Besides, he told, “IWB reduced writing on the board in terms of myself.”

Even though positive impacts, there are some negative impacts of using IWB on teachers as follows; initially, increased workload. Accordingly, he told, “IWB has increased the workload in preparation for lesson in the early stages, but has reduced my effort in the classroom environment. When I make preparation for using the IWB, it increased the workload because I needed to increase the diversity of the resources to benefit from different sources but makes me feel a little more comfortable in the classroom.”

There are some positive impacts of using IWB on students as follows; helps to revive subjects in students’ eyes/heads; better illustrate in mind; better grasp the subject/grasp more easily/comprehend; increased success; facilitate learning; enhance learning; increase gathering/draw attention of students; increased participation/more participative/more attentive; more motivated/increase motivation; more encouraging to come up the board; more creative/raised creativity; more enthusiastic; provides ease of understanding/understand more easily; better consolidate/reinforce the subject; opportunity to see different types of questions. Accordingly, he told, “In question solutions part of the lesson, I reflect the questions to the IWB and I try to solve the question by using IWB by getting up more students to the board because IWB attracted the attention of the students.” In addition, he stated, “IWB is mostly encouraging for students because they get up, touch with the finger, write, wipe, draw, so they are eager to get up on the board.” Similarly, he

pointed out, "IWB is advantageous in terms of attracting the attention of the students. IWB gets students' attention and it can be a little more encouraging for students to get up the board." Besides, he said, "IWB have increased students' participation in the lesson." Moreover, he stated, "IWB is important to get the students' attention." Similarly, he told, "IWB is important for students to participate in the course and to make participation more effective. Also, it is important for the student's motivation. Another effect on the student, as the students are distracted quickly, I think that in this respect, now IWB has gathered a little more attention of the students." Furthermore, he stated, "From the perspective of the student, for example, since I use it in geometry class, IWB could visualize and it's better imagining it for students in their mind. I realize that the students' eyes are shining with this respect." Moreover, he pointed out, "IWB can be supportive because it encourages students in the question-solving phase. Also, it increased the participation in lessons." Besides, he stated, "IWB positively influenced the motivation of the students because they are more involved in the teaching and problem/question solution phases of the lesson." In addition, he told, "Students' success has been positively affected because instead of solving three questions, maybe I have solved five with them. I have solved questions from different sources, which has contributed positively on their success." Also, he said, "IWB has affected learning complex and difficult concepts positively. Consider perspective subject in geometry. 3D objects have top or side views. I can't draw it on the board. Because it is an abstract concept, students cannot visualize it, but when they see it visually, it is good to have a more positive revival in their head." In addition, he told, "IWB created enthusiasm, desire and eager towards lesson for students. The use of IWB is a way to increase students' motivation. Because when it is opened, the student would see something on the board or get up on the board, solve the question and touch it, so it is motivating." Besides, he stated, "IWB increases the students' participation in getting up to the board because of their enthusiasm for the board. It increases class participation." Furthermore, he said, "IWB made it easier for students to learn complex and difficult concepts. It has been a success boost for providing students with a variety of versatile alternatives with IWB." Similarly, he

told, “IWB increases success because it increases the attention of the students. At the same time, the students are more comfortable to grasp some of the issues that could not be understood easily.”

Even though positive impacts, there are some negative impacts of using IWB on students as follows; dealing with disturbing/extracurricular activities at breaks; Accordingly, he told, “Students still use IWB to listen to the loud music at breaks.”

Using IWB has some positive impacts on time as follows; better time management/use time better; save time/time-saving/gaining time; reduces time spend on writing out on the board; reduces time spend on teaching of the subjects; reduces time spend on lesson preparation; time flowing fast/time passes/moves faster. Accordingly, he told, “By using IWB I save some time in solving the questions part and a few more questions can be solved.” Similarly, he stated, “IWB had a positive effect in terms of saving time in question solutions. It was especially time-consuming in solving questions because it takes time to write on the board or let students write the questions on their notebooks.” Also, he told, “It is more advantageous in terms of time because there is no stage of writing questions on the IWB.” Furthermore, he stated, “if students like the subject, if they are interested in, we do not understand how time passes as teacher and students. We do not understand how 40 minutes goes. So, I notice that time is flowing fast.” In addition, he mentioned, “Time is shorter in the narration part of the lesson with using IWB.” Also, he told, “if I am going to use IWB, the resources are more now and the publishing houses are starting to send IWB compatible books. Because resources are much available, I am planning and preparing in a short time now.”

Even though positive impacts, there are also some negative impacts of using IWB on time as follows; initially, requires more preparation time in the beginning. Accordingly, he told, “When I first started to use IWB, I had to prepare course materials because I had such a shortage of resources. So, this process took more time and wasted more time at the stage of preparation initially. But, in the current period, many publishing houses, or EBA or universities have many resources. Then, when I

take the resources from there and use it, I can tell you how much more time there is, and now it is easier to finish the preparation in a less time now.”

Use of IWB in his lessons affected his interaction/communication with his students and course contents as follows; declining conversations among students; increased teacher’s interaction with course content; increased interaction/communication with students; increased students’ interaction with course content; increased interaction among students. Accordingly, he told, “The IWB reduced the students' conversations among themselves during the lesson.” In addition, he said, “In order to give different examples to the students while explaining the topics on the IWB, I have collected and compiled three or four sources, maybe more.” Besides, he stated, “The communication between the students has increased by making it a race in terms of getting up to the IWB and participating in the lesson.” Moreover, he said, “it's actually more positive to the students in terms of resource diversity. For example, it is important to see different types of questions. If there is internet on IWB, I can open it and use various resources for that purpose.” Also, he told, “IWB positively influenced my communication with students. I'm already good with my students. I think that at least half of students have a better communication with me because of their interest in the IWB.”

There are some his interaction/communication with other teachers about IWB as follows; share idea/opinion among teachers; share resource among teachers; support for the use of IWB. Accordingly, he told, “I share idea with other teachers and get support about the problems I face while using the IWB to solve these problems. I practiced those problems more or less by applying them on the IWB with some teacher friends. Of course, later I started to do some things by trying, and I learned.” Besides, he said, “I had more sharing with the other teachers in the school when I have troubles with IWB. If I couldn't solve it myself and with the help of the students when I had some technological problems, then I ask other teacher friends how they solve it when at lesson breaks. In such a case, they either tells the moment or finds an empty classroom and immediately shows how to do the solution on the

IWB. In this way, we share with other teachers, especially with teachers in my own subject matter. Sometimes, we had a share in terms of content.

There are no course materials he developed himself to use in his lessons.

There some issues/challenges he encountered while using the IWB in his lessons as follows; internet/network connection problems; virus problems/not function flash memory; resource (material) problem; touch panel problems/unresponsive boards; damaged, distorted, out of order board; visibility problems (sunlight shines directly onto the board); not supporting resource formats to run or open. Accordingly, he told, “Sometimes in classrooms, too many teachers loaded the course documents with flash memory on the IWB, and there could be a virus incident on the board, and there could be situations like the board not opening, or you couldn't open a flash that you just installed.” Moreover, he stated, “I had difficulty in the resource. I had to prepare my resources compatible with IWB in some subjects. So, I had difficulties there.” Furthermore, he pointed out, “Because the touch screen of the IWB is sensitive, sometimes there are problems with the touch panel in terms of detection.” Besides, he said, “I am just sticking to my own resources and not reaching different sources because there is internet/network problem at school related to infrastructure.” Besides, he told, “Not in every class, but according to the position of the class we are experiencing visibility problems related to IWB by sunlight shine. The sunlight strikes from classroom's window and so the screen of the IWB is not visible, especially for the student staying on the sides and a little diagonally. Whatever on the board screen, students don't see anything because of the glare. This problem can be handled with different arrangements in the classroom, or maybe with using curtains.”

There are some practical solutions to problems that he faces while using IWB and he solves or minimize these problems by himself firstly. Then, he gets some technical support by students if possible. Next, if he cannot handle the problem, ICT teacher makes immediate intervention in terms of technical support. Lastly, if the there are

more technical problem related to IWB, technical support by technical service (authorized service) is called by administration.

There are some his needs/suggestions for using IWB more effectively and more efficiently in his teaching process as follows; need refreshing trainings; need training for specific each subject matter; need trainings to use IWB more actively; need to increase the number of trainings / more frequent; need to receive in-service training on an annual basis; need training about more efficient use of IWB. Accordingly, he told, “In order to use the IWB in more detail, refresher trainings could be done periodicity.” In addition, he said, “There may be training on how to use the IWB for active use and how to apply it to the subject matter rather than the general purpose.” Similarly, he stated, “IWB trainings were always given for general purposes but I think it would be better if they were given on a subject matter basis. At least some of the topics are exemplified in mathematics, how to use in specific subject matter. Refresher seminars can be held to keep up with new and up-to-date information about the IWB.” In addition, he pointed out, “It may be a seminar program for the efficient use of the content with IWB. In-service trainings about how to use course contents more effectively with the board is needed.”

Composite Textural Descriptions

Composite textural description was developed to experience for the group as a whole from the individual textural descriptions (Moustakas, 1994). Accordingly, the composite textural description is a combination of all twelve teachers' textural descriptions based on the shared meaning units and the experiences of the group as a whole.

Every teacher experienced and took one-or-two weeks training regarding use of IWB under the scope of the FATIH project at first. The training was entry-level and it seems insufficient for all teachers. The intended use of IWB was common basically among all teachers, but there are also small differences between numerical and verbal subject matters. Most of the teachers use IWB in order to visualize their lessons. While verbal subject matter teachers use IWB more often for teaching/narration/lecturing, the numerical subject matter teachers use IWB more often for problem/question-solving part of their lessons. On the other hand, the teachers use IWB less where topics do not require the use of IWB or it is unnecessary or less necessary to use IWB. Likewise, for many participants, the teaching resources were similar. Almost all of the teachers obtain their course content from the Internet or from the websites or resources provided by MoNE (Ministry of National Education). In addition, the teaching materials were commonly images, videos, animations, e-books, sounds and PowerPoint. While students are getting involved making presentation activities in verbal subject matters, they are getting involved problem/questions-solving activities in numerical subject matters mostly.

A wide range of teachers describes having IWB means to them as convenience and simplicity in their teaching process. Teachers mentioned that using IWB provides opportunities to support their lesson in terms of visualization. IWB also allows teachers to get information instantly. Besides, using IWB made teachers' work easier, ease their burden and comforted them. Starting the use of IWB created a positive impression on the climate of class. At first, IWB was very favorable and interesting for students. Students were happier and curious. Later, students were

accustomed to IWB. But, in general, it created a positive atmosphere in the lessons and saved the lessons from the boringness for both teachers and students.

For many teachers, while using IWB, they feel tense, nervous and uncomfortable at the beginning, but later, they feel relaxed and comfortable after getting used to it. Similarly, most of the teachers were excited, inexperienced and slower when they first started using the IWB. On the other hand, they are now more confident, experienced, faster, and better about using IWB. Accordingly, teachers made more progress and developed themselves and use IWB in a better way. For certain teachers, using IWB pushed the role of the teacher somewhat secondary and passivate the teacher. Unlike these teachers, the rest of the teachers indicated that the teacher is still active and still in the lead position in the lessons. Most of them see IWB as an auxiliary and as a resource supporting teaching. According to teachers, using IWB was not affect the role of the student much. But, students become more active and student's role comes out from time to time to the forefront. Also, IWB changed the activity that the student engages on the board. Besides, students who are away from technology learned to use technology at some point with using IWB.

Teachers generally described the positive impacts of using IWB on their teaching process. For many teachers, their teaching styles and habits have changed after started using IWB. IWB provides opportunities for most of the teachers to better classroom management in their teaching process. In addition, the teacher is in a better position to control the students with this respect. Using IWB provides enrichment in the visual and auditory sense to all teachers in their lessons. Likewise, IWB has enriched the course contents in terms of material/resources diversity. It leads to more enjoyable and fun lessons. Besides, the use of the IWB accelerated the teaching process and enabled faster-paced lessons. Every teacher reaches information more easily and instantly via IWB. In this respect, IWB provides opportunity for teachers to reach and use images, videos, animations, documentaries, experiments in their teaching. Furthermore, IWB allows to teach more topics in less time. For certain teachers, especially for numerical subject matter, it allows to solve more and different types of questions/problems. So, more students come up to the board in this

regard. Most of the teachers also mentioned that the use of IWB allows teachers to concretize abstract concepts and makes subjects/learning more permanent. Accordingly, the lessons are more efficient with a more pleasant environment. Thus, IWB increased interest in lesson. On the other hand, most of the teachers continue the lesson with classic methods if they encounter problems with IWB. But in such circumstances, the lessons pass in an unpleasant way for both teachers and students.

Almost every teacher has an increase in their motivation thanks to the use of the IWB. Accordingly, it contributes to teachers' personal development and enables to have more comprehensive knowledge about their subject matter. So, they started to teach better. For many participants, even though initially increased, it reduced effort and workload in the later stages. Moreover, the use of IWB enables teachers to write less on the board, so they do not get tired as before. Most of the teachers mentioned that use of IWB facilitated and enhanced learning for students. In addition, teachers indicated that IWB provides ease of understanding to students, so they understand and grasp better subjects. Furthermore, using IWB is better for retention so it is more permanent in the student's mind. Hence, students learn better, and their success increases. Also, students are more motivated and more interested in the subjects. IWB draws the attention of students so students become more participative. After starting the use of IWB, students began to write less, so it leads to reduce the time spent by students to take notes and decreases their tirelessness. It is easier to access information and different kinds of resources for students. Additionally, they can reach information instantly. On the other hand, there are some negative impacts of using IWB on students. For certain teachers, IWB makes students lazy and reduces their effort toward lessons. In addition, most of the teachers are uncomfortable with students' dealing with disturbing/extracurricular activities at breaks.

For many teachers, they use time better and save time with IWB and so it provides better time management in this respect. Moreover, every teacher experienced initially requiring more preparation time with IWB, but later it reduced the time spent on lesson preparation and teaching of the subjects for teachers. Also, many of the teachers described that time is flowing fast in their lessons when they use IWB. On

the other hand, almost all teachers face time issues when they encounter problems with IWB.

Use of IWB increased teachers' and students' interaction with course content. It also increased teachers' communication with students. On the other hand, while IWB increased interaction among students, it declined conversations among them. Besides, the use of IWB increased teachers' interaction/communication among themselves concerning sharing ideas/opinions/resources and getting support for the use of IWB. As well, most of the teachers did not develop any course materials for their lessons because they have neither the knowledge nor the time to develop the material.

While using IWB, almost all teachers encountered some issues/challenges. Sometimes this problem was internet/network failure, and sometimes it could be a power failure or virus problem. There are also some touch panel problems/unresponsive/out of order board problems occasionally. Likewise, there are some visibility problems related to sunlight shines from the window directly onto the board. Additionally, the teachers mentioned insufficient material/resource problems. When encountering these problems, every teacher tries to handle the issue himself/herself at first. Then, depending on the magnitude of the problem, either the ICT teacher gets help or the authorized technical service is called to solve the problem.

In general, almost all teachers made underlying suggestions and requests based on their needs. First of all, they requested more hands-on and practical training based on specific each subject matter specifically. They also wanted refreshing training from time to time. Besides, some of the teachers need a refreshed/simplified curriculum in order to get more efficiency of using IWB. The resources are insufficient for the most of the teachers, so they need to be provided increased/enriched the number of materials in EBA made by MoNE.

4.2.Imaginative Variation [–II–]

Imaginative variation is to seek possible meanings through use of imagination and approaching the phenomenon from different perspectives in order to arrive and describe the essential structures of the phenomenon (Moustakas, 1994).

The steps of Imaginative Variation include (Moustakas, 1994, p.99):

1. Systematic varying of the possible structural meanings that underlie the textural meanings;
2. Recognizing the underlying themes or contexts that account for the emergence of the phenomenon;
3. Considering the universal structures that precipitate feelings and thoughts with reference to the phenomenon, such as the structure of time, space, bodily concerns, materiality, causality, relation to self, or relation to others;
4. Searching for exemplifications that vividly illustrate the invariant structural themes and facilitate the development of a structural description of the phenomenon.

4.2.1. Individual/Composite Structural Descriptions [Step#6]

Individual Structural Descriptions

Individual Structural Descriptions were constructed based on the Individual Textural Descriptions and Imaginative Variation for each participant.

***Individual Structural Description - Participant #1 – HS1T1
(High School 1 – Teacher 1 – Physics – Female)***

HS1T1's experience of instructional use of IWB started after IWBs were installed to her school under the scope of FATIH Project. As she was trained for 2-weeks about how to use IWB, she began to use it in her lessons but training was not enough for her. She believes that she needs more hands-on practice and course material preparation training related to IWB in terms of her subject matter. She put in the effort to use, practice and learn use of IWB by herself with trial-error over time. Her intended use of IWB in her lessons are gathered under two main headings namely teaching/lecturing and problem/question solving. More specifically, she uses IWB in order to show animations, experiments, shapes and videos. From the variety of resources, she uses IWB compatible e-books and EBA (Education Information Network) website offered by publishers and MoNE respectively; videos from YouTube and other related websites; and animations. It is evident that she focuses on best way to involve and utilize all those resources in her lessons.

IWB contributed to students to get involved more in cases like making presentations and problem/question solving in the lessons. She noticed that presentations from students were more creative by using IWB with visuals and audio. Accordingly, she believes that students are getting more confident and speak more easily/comfortable in public. She considers IWB as tool to reach visuals and technology easily in her classroom. In this way, IWB helped her in terms of making her job easier. She described her initial feeling about using IWB as nervous and novice level. However, this process reversed as time goes by and she gained experience. Now, she is good at using IWB and no longer feels nervous. After she is getting used to it, she feels more comfortably. Since starting use of IWB in her lessons, she does not think IWB changed her role as a teacher in the class. She still takes active role in the lessons and has more control on both content and her students. Similarly, involvement and participative level of her students was improved and increased in her lessons. Thus, she thinks the role of the students affected positively with IWB. She explained alleviating the intensity of the curriculum, solving more problems/questions, and

teaching subjects more quickly/efficiently as the main reasons for starting to use IWB in her lessons. She needs and use IWB more often in the following situations; teaching/lecturing and problem/question solving, while in the following cases she needs less; have to draw and make practice by using hands. More specifically, her decision of using IWB is based on whether the subject requires visualization or the use of IWB.

IWB is beneficial for her teaching process with respect to teach more topics in a shorter time effectively and instantly search during the lesson. Even though IWB has positive impacts on teaching process, it has also some detriments. When she encounters problems while using IWB, the lesson cannot go the way planned. Accordingly, she continues lesson with classic method and classic lesson pass with unpleasant way and slows down the teaching process. Thus, she believes that she should always be prepared for any situation. After starting to use IWB in her lessons, she began to write less on board in the classroom and it gave her more opportunity to control the students. Apart from this, she does not think that there is much change in her teaching style and habits. Her lesson planning and preparation at home takes less time anymore. In a similar way, use of IWB reduced the time she spends on teaching of the subjects in the lessons. During the lesson, she thinks time is passing fast and she does not realize how time passes. However, there is a time problem arising from the intensity of the curriculum related to her subject matter as physics. Regarding this, she thinks that the number of weekly physics courses should be increased as a solution to this problem.

While the use of IWB enhanced her communication with students, she thinks IWB did not change communication among students. The use of IWB by the teacher has contributed positively to her interaction with course content in terms of helping to reach and show more sources and providing opportunity to present different kinds of problems/questions to the students. From the point of students, she considers IWB increased students' interaction with course content and made the course content more concrete. She had communications with other teachers in the school about share/exchange ideas/information, share resources, and use of IWB.

IWB benefited her in many ways. Having opportunity to reach many different/variety of resources is one of the positive influence of using IWB. Furthermore, she says, she is not tired anymore because she writes less throughout the lesson on the board after she started using IWB. In addition, she feels more motivated and more enthusiastic now. She considers the use of IWB did not lead to any change in her workload and efforts. She wants to develop her own course material for her lecture, but, at present, there is no material that she has developed and used in her lecture.

IWB was beneficial for students. In parallel, she believes IWB is expanding the imagination of the students by seeing pictures/images, videos, and movies about the abstract subject matters. Similarly, students learn better complex and difficult concepts and it becomes grasping easier for them by seeing subjects with colorful three-dimensional animations. Thereby, the use of colorful shapes and animations by the teacher in lectures has increased the motivation, interest and attention of the students. In addition, students perceive the subjects better and the speed of learning increases because the teacher supports the narration of the subject with videos and animations. She solves more questions and shows more visuals so it facilitated the understanding of subjects and increased success of the students in her course. After the use of IWB in her lessons, she observed an increase in the success of the students in examinations. Thus, she sees students learn better with IWB. As she increased her resource diversity in her teaching, it raised perceptions of students with different learning styles and facilitate their learning. Students wrote less and no longer have to take note of everything anymore because the resources are in their hands in digitally. Thus, IWB has reduced the time spent by students to take notes. Students listens music or watch movies during breaks on IWB and deal with such activities. Because of this, when the break is over and teacher enters the lesson, the students do not finish what they have done on IWB and this led the teacher to discuss with the students and time loss.

She has encountered some problems when using IWB in her lessons, and she believes that these problems have interrupted the lesson and affected it negatively. Although

she has faced unresponsive boards, virus, detecting mouse problems, power cut, visibility problems, internet connection problems, and touch panel problems, more often in the years when she first started to use IWB, she has recently faced fewer such problems. She solves the visibility problem by pulling the curtains of the class in such situations where shining IWB with light come from the window. She is afraid of losing documents related to the lecture on IWB and on her USB memory when IWB is infected with the virus. She considers she currently possesses sufficient lesson materials. She tries to solve encountered problems by herself first, then asks for help from her students. If there is a problem that cannot be overcome, she calls ICT teacher and the ICT teacher provides adequate support. If there is a more complicated problem, the authorized service is being called.

***Individual Structural Description - Participant #2 – HS1T2
(High School 1 – Teacher 2 – Mathematics – Male)***

After the placement of IWB in the classroom with FATIH project, the given training was not enough to use IWB effectively, despite the one-week training. So, starting to use IWB started with his school was chosen pilot school within the scope of this project. This process has accelerated as he is interested in technology and his students enthusiastic about the use of IWB in lessons. By using IWB with researching and learning on his own effort, he developed himself and came to a better level. The intensity of using IWB in his lessons increased every year. He mainly uses IWB with aim of lecturing and solving more questions in his lessons. He considers IWB is the best way to handle the curriculum with respect to teach curriculum faster and to solve more questions than usual in a fast way. He thinks that otherwise, it will be a waste of time and a reduction in the number of questions solved by writing it on the board with the classical method. Although he uses IWB in almost every subject, he uses IWB more in more visual matters such as geometry related subjects.

He utilizes IWB compatible documents as well as video lectures or presentations in his lessons. Some of these resources are available from publishers, while others are being used on the EBA or other websites. Furthermore, students are engaging some

project presentations and solving questions activities on IWB. Having an IWB in the classroom means to be able to access to all the resources for him, solving the questions instantly and faster, and making small quizzes or exams on IWB when necessary. It is also time-saving because he does not write questions on board and solve more questions. Thus, he considers it is increasing the pace of the lesson.

At first, IWB was very favorable and positive effects were considerable in terms of visuals, experiments, and video presentations. Especially, he thinks visuals were more striking and it has increased a lot of interest in mathematic lesson. Although IWB initially created a different atmosphere in the lessons, he and his students got used to it over time. He often feels comfortable when using IWB because he has all teaching materials at his hand, but sometimes it disturbs the thought that there may be heat radiation effect from the IWB. In the beginning, he had difficulty in using IWB because of inexperience, uncomfortable and slow use. However, now, he is good at using IWB and uses it more practical way. He developed himself in using IWB as he gained experience. He can use IWB better, faster and more professionally. He can find different and more practical solutions when he encounters problems while using IWB compared to the past.

He considers IWB affected the role of the teacher and push the role of the teacher into a secondary plan in the lessons. Because, in the past, he was the only source of knowledge in the classroom but now IWB bring so much dependence on the technology regarding resource and information. Therefore, he thinks a balance is needed and it is vital to use IWB more moderately, more planned, and suitable for its purpose. In addition, IWB slightly eased his burden and brought him to the point of doing some more guidance in the lessons than before. In general, he indicates if the teacher is technologically inclined, it will be easy to integrate IWB into the lesson, while the teacher who is away from technology will have difficulty. On the other hand, using IWB better and finding more practical solutions to the encountered problems brought role of the students' forefront from time to time and increased the confidence of his students. In addition, there is an increase in his students' participation and problem solving throughout the course because of the visuality of

IWB. Likewise, students who are technologically inclined do not have a problem with the use of IWB, while those who are not prone to technology tend to stand back. That is why he encourages every student in the class to use IWB by forcing them to come up to the board and use IWB.

While he uses IWB more intensively and more often in subjects with need visuals particular geometry related matters, he uses IWB less when he encounters problems with respect to IWB such as virus or internet problems and etc.

There are many contributions of IWB use to the teaching process and he listed them as showing various types of problems/questions to the students, accelerating pace of the lesson, and making students see difficult and abstract concepts more clearly. He considers his teaching style and habits has not changed much after using IWB in his lessons. He is teaching in the same way but he is getting more practical, going faster, and trying to solve more questions in his lessons. In addition, there is a chance/opportunity to get in detail in subjects in teaching process because he does not waste time with typing subjects or questions on the board.

He considers IWB allows him to solve more questions and more quickly so he got a chance to go faster in his lessons. Thus, he believes this has positively affected the success of the students. Day by day, he became more practical and better about using IWB. Furthermore, IWB provides him opportunities to use many variety resources and let him integrate them into his lesson. He also thinks he has more comprehensive knowledge on his subject matter so it has increased his mastery of subject matters of mathematics. He considers using IWB has contributed to development of himself with respect to technology. After starting use of IWB and internet more professionally, he benefited more from both IWB and internet. Thus, IWB has made it possible to him to present more things visually to his students. Moreover, he is more motivated than before. On the other hand, there are some negative aspects of IWB on him. One of the negative aspects is that although it seems like IWB have facilitated his workload, it affected his workload negatively. It increased his efforts and burden on his lessons and has led to him more fatigue. Another negative aspect

is that he thinks teachers have become lazier than before because the course material and resources were ready and they have them at their hand compared to past reach instantly.

Use of IWB has some benefits to students. First of all, IWB attracts students' attention and they are more motivated than before. In addition, IWB reduces the time spent by students to take notes and save time in this respect. Besides, it facilitated learning of complex and difficult concepts for students, so they understand complex things better because they see them visually. It certainly affects the perception of the students, so they perceive subjects more easily. Thus, using IWB increased success of the students. Furthermore, creativity thinking of students is affected positively by using IWB. On the other hand, students were accustomed to literal because they think that they can reach to everything via IWB. So, being too dependent on technology pushed students laziness.

There are also some benefits of using IWB in terms of time. Initially, time is passing really fast for him. Also, use of IWB decreased the time he spends in lesson preparation phase. In addition, he is more comfortable and more organized with regard to follow the curriculum in the best way by using IWB. While using IWB, he teaches faster compared to the past and do a lot of work in a shorter time. Also, he prepares his course materials and lecture notes more easily.

His communication and interaction with students have increased, especially with students interested in technology. IWB has increased students' interest and participation in lessons. So, they are more interested and more participative such as in solving questions/problems part of the lesson. Because he has a bond with the students who are more interested in technology by using IWB. In addition, IWB increased teacher's and students' interaction with course content. Accordingly, he reaches and uses a wide variety of sources with the help of the IWB. Thus, he has more control over subject matter and give more detail to his students. Besides, he has opportunity to provide resources based on the students' level. On the other hand, students also can reach unlimited resources and have a chance of seeing different

kinds of questions/problems with using IWB. In the past, it was difficult for students to reach lesson materials/resources. He interacts and communicates with other teachers at the school in terms of practical use of IWB, and sharing ideas/documents/resource.

He prepared some Power Point presentations and animations as lesson materials for his lessons. But, he thinks that these materials are not enough for his lessons so he reaches other sources and uses these materials to a certain level. He encounters some problems while using IWB in his lessons. Firstly, sometimes electricity is cut off and IWB is shutting down. Besides, sometimes IWB is infected by virus and so IWB does not open or the files uploaded on IWB cannot be opened due to the virus infection. In addition, there are some problems related to touch panel and unresponsiveness of the IWB. There are also internet/network problem. In addition, IWB does not support some resource formats to run or open. Likewise, sometimes, there are some software and incompatibility problems. In addition, there was insufficient material problems at the beginning but day by day recourse problem began to disappear. Furthermore, sometimes sunlight shines directly onto the IWB and it causes visibility problems. In such cases, he pulled the curtains to prevent the sun as a solution. When he faces such problems, then he could not use IWB and continues the classical narration and uses whiteboard. Such situations lead to waste of time for him. When faced with such problems, he tries to solve the problems by himself firstly. Then, if he cannot solve it by himself, he is getting help from his students or he contacts the ICT teacher at the school. If ICT teacher cannot handle the problem, authorized technical support is called by administration. For using IWB more effectively and more efficiently in his teaching process, he made some suggestions. First of all, according to him, curriculum is intense and it should be rearranged, refreshed/simplified. In addition, the number of students in classes should be reduced. He thinks if these are revised/rearranged, then IWB will be more useful and will be more suitable for the purpose. Besides, teachers need to follow the current developments in order to keep up. It is essential to get trainings and seminars

for each subject matter specifically. Additionally, these trainings and seminars need to be well planned for their purpose.

***Individual Structural Description - Participant #3 – HS1T3
(High School 1 – Teacher 3 – History – Female)***

She got one-week training about using IWB. The training was inadequate for her because it was not based on hands-on practice. Thus, she needs more training about how to use IWB more actively with respect to her subject matter. Besides, she needs to get training about how to prepare educational video/materials. She started to use IWB for some reasons. Initially, she is no longer carry course materials like map/book to the classroom. In addition, she uses IWB in order to reach information quickly in her lessons. Besides, she uses IWB with respect to support her lessons in a visual way because her subject matter (history) is a verbal lesson. She also utilizes IWB to animate and revive some subjects in the students' mind. Additionally, she uses IWB to make her work easier. In more detail, she usually needs and uses IWB with visually and auditory perspective such as to show maps, pictures, images, tables, diagrams; or to watch videos, movies and to teach/lecture in her lessons. While using IWB, she uses images, videos, EBA, and websites in her lessons as her resources. Students involves in preparing some work/activities, searching/showing something related to lesson and making presentations on IWB. Having IWB in classroom means to her as convenience, simplifying and supporting the subjects. Accordingly, having a technological tool in classroom makes her work easier. The climate of her class is affected positively by using IWB. In connection with, students are happier, more curious and more interested in her lessons. In addition, according to her, students learn better after starting to use more visuals like maps/pictures/videos with IWB. But in time it becomes inevitable to become accustomed to this technology. While using IWB, sometimes she feels tense, nervous and uncomfortable because of facing some troubles/problems related to IWB. If she compares the time she first started using IWB and now, she sees big difference. This is an ongoing progress for her from at the beginning. At first, she was nervous and worried about what to do but now she

uses IWB more comfortably and get used to it. So, she is good at about using IWB now.

Use of IWB does not affect the role of her as a teacher. She is still in the lead and active. She uses IWB as an auxiliary tool. On the other hand, use of IWB has affected the role of students in lessons positively. Accordingly, IWB makes students more active. Also, students use IWB better and more effective way because they are much more prone to technology. In addition, students are instantly getting information by on internet and get information right away with IWB. She uses IWB more often in teaching/lecturing. Also, she uses IWB more often to support subjects visually. Moreover, she uses IWB more often when she needs something visually such as to watch video/documentary and concretize abstract concepts. Thus, IWB makes her job easier. On the other hand, she uses IWB less when she does not need any visuals or she needs to talk about the subject. Besides, she uses IWB less when she faces troubles about internet. Also, she uses IWB less in solving problems.

Using IWB has some benefits on her teaching process. First of all, when she opens and shows visuals (images, videos, and etc.) to students about the subjects with IWB, it attracts the attention of students and so they grasp and learn subjects better. IWB has contributed providing more visuality. In addition, her students' participation to lesson increased with the help of using IWB. Besides, her teaching style did not change much with using IWB. In addition, her habits changes after she started to use IWB such as she is no longer carry maps to classroom. Also, using IWB makes her job easier. For example, it is easy for her by showing a map or image directly from the IWB instead of drawing them. Additionally, she started to give more say to her students. In addition, IWB helped her to control students and to provide better classroom management. Also, IWB enriches her material/resources diversity and provides visual material richness. She does not think the use of IWB has a noticeable negative impact on her teaching process. But when she faces problems such as power cut or no internet, her lesson passes in classical and unpleasant way with blackboard.

There are some contributions of using IWB to her. Firstly, IWB has benefits for her in terms of time such as providing time to create a discussion. Likewise, it allows her to teach more topics/information in less time and helps to save time. In addition, IWB supports her teaching in terms of visuality and provides enrichment in the visual sense. Besides, it provides enrichment in material/resources diversity and helps her to reach many sources. Additionally, although initially IWB increased her workload and effort, it reduced her workloads and effort during the lesson in the later stages. Moreover, she is more motivated and IWB is useful to her by making her work easier. On the other hand, she become more dependent on IWB as time passes and with more frequent use. So, she thinks that she will be affected more by future problems because of this dependency.

As well, there are some contributions of using IWB to students. Initially, IWB helps students to embody/shape verbal things through seeing visually. So, information is becoming more permanent with this way. Likewise, IWB is better consolidate/reinforce the subjects for students. In addition, IWB provides opportunity to have more resources than before and opportunity to watch movies related to subjects. Besides, students are more motivated. Additionally, use of IWB lead students to better understanding of the subjects and let them learn better. Her teaching technique changed by using IWB. Accordingly, she diversified and reinforced the ways of her narration, questioning and giving examples with IWB, so this increased success of students. IWB facilitated learning by providing information in more compiled and more organized way. Furthermore, IWB reduces the time spent by students to take notes and lead to write less. Moreover, it is easier to access information for students with using IWB. Also, IWB makes students' work easier so it is more enjoyable to participate in an activity with IWB. Thus, students are more attentive and more active in lessons. Even though benefits of using IWB for students, there are also some disadvantages for them. First of all, students are dealing with disturbing/extracurricular activities at breaks. In addition, students became accustomed to literal because of reaching information more quickly, so it pushed them laziness and forgets more quickly. Also, the internet is a huge treasure of

information for students but it is also full of unreliable and false information so they have to learn to distinguish between right and wrong. IWB influenced students' creativity negatively in the lessons for her.

The use of IWB has been very beneficial in terms of time. Initially, IWB reduced the time she spends on teaching of the subjects. Also, IWB required more preparation time in the beginning but later it reduced the time she spent on lesson preparation compared to the past. In addition, using IWB saves time such as showing diagram/table/shape on the IWB instead of drawing it. Furthermore, time is flowing fast for her while using IWB. But, sometimes she faces time issues related to intensive curriculum and when she encounters problems with respect to IWB. She communicates/interacts with other teachers with respect to share idea/opinion. In addition, using IWB decreased interaction/communication among students to her. Besides, it melted the warm atmosphere of the old because students stay in classroom at break and deal with IWB instead of going out to school's garden with their friends. In addition, her interaction/communication with students increased. In detail, for example, if she encounters a problem related to IWB, she gets help from her students so she communicates more with them by this means. Similarly, she spares more time to students for things like commenting, asking questions, debating because IWB helps to save time with this respect. Moreover, IWB affected her and students' interaction with course content in a positive way. In detail, she has more and variety resources then before. Likewise, having more and variety of recourses draw interest of students and provide opportunity for students to reach these resources, so they become more involved in lessons. Additionally, use of IWB differentiated her communication with students in time. For example, the topics that she and her students talk about have changed, and now they talk more about technological issues. She did not develop any course materials in order to use in her lessons because she does not feel self-sufficient in this regard.

She faces up with some problems with IWB. First of all, she has internet connection problem in her school. Similarly, MoNE restricts access to some websites. In addition, if she encounters damaged, distorted, or out of order IWB problems, her

lesson cannot go the way planned and she continue lesson with classic method. Also, sometimes touch panel of the IWB can be unresponsive. Besides, her course materials on IWB is deleted due to being formatted of the IWB or virus problems. Furthermore, sunlight shines directly onto the IWB and cause visibility problems for students. But, she tries to solve this problem by use of curtains if there are to avoid/prevent sunlight. Accordingly, when she faces those kinds of problems while using IWB, she tries to solve by herself firstly. Then, if she may not overcome the problem, she gets technical support by her students. Next, still problem exists, then technical support and immediate intervention are made by ICT teacher. Besides, if ICT teacher cannot handle the problem, technical support by authorized technical service is called by school administration. She gives some suggestions and needs in order to use IWB more efficiently and more effectively in teaching process. First of all, she needs training for specific her subject matter and the number of trainings need to be increased in order to use IWB more actively. Besides, she wants to be increased the number of course materials like videos in EBA website. She wants to get training for developing course material such as to make videos. Also, she needs to receive computer certificate in this regard. Additionally, she needs training for her students about how to use IWB.

Individual Structural Description - Participant #4 – HS1T4
(High School 1 – Teacher 4 – Biology – Female)

She got one-week training with regard to use of IWB. However, the training was not enough for her. The training was based on theoretical sense rather than hands-on practice. In the first place, she did not actively use it but as time goes by she learned it by doing/practicing by her own. Accordingly, she needs training for her subject matter specifically with more practical way. In addition, she needs for adequate resources made by MoNE. She uses IWB in her lessons for specific purposes. First of all, she uses IWB in order to show visuals like images/videos/movie/documentary/experiments. Also, she uses it for repetition, reinforcement and consolidate subjects. In addition, she uses IWB for solving questions/problems and enriching examples. Besides, she uses IWB for concretizing

abstract concepts. Accordingly, she uses IWB mostly in visual matters and for visualization purposes. While using IWB in her lessons, her resources used include images, videos (movie etc.), animations, scheme/diagrams, text (PDF, Word, Excel, etc.), IWB compatible e-books/documents, EBA educational website by MoNE and other educational websites related to biology. It is beneficial for her to support subjects and make students understand better with the help of these recourses via using IWB.

Students get involved and participated in solving questions/problem and making presentation activities with using IWB. Having IWB in classroom means to her diversifying lesson, supporting subjects in terms of visuality, drawing attention of students, repetition, and fun/not boring biology lessons. Besides, it means to her reaching information and visuals instantly and more easily. The climate of her class changed somehow with using IWB and it provided positive atmosphere. Firstly, IWB helps her to satisfy students' curiosity by reaching information instantly with IWB. Besides, it has positive effect in terms of taking attention of students. In addition, it saved lesson from becoming a boring lecture. Additionally, students do not produce excuses when they are not bringing their course materials like books because she lets them follow subjects thorough IWB. There are some differences between when she first started to use IWB and present. Initially, she was inexperienced and losing much time while using IWB. Likewise, she was nervous at first. However, as time goes by, she gained experience and developed herself so now she is better about using IWB. In addition, now she uses IWB more effectively, more practical, and faster. Also, she uses time better now. Accordingly, she gets used to it and feels much comfortable now than before.

The role of the teacher in lessons has changed by using IWB somehow. Accordingly, she was more active before start using IWB and it pushed the role of the teacher somewhat secondary. But, it also made teacher's work easier such as providing opportunity to access information/visuals/course materials instantly and easily. Likewise, the role of the students has changed and positively affected by using IWB. Interrelatedly, sometimes students' role comes out to the forefront by contributing

more to the teaching process. Also, students are more active and follow the lesson more intriguingly than before, so they are not got bored anymore. In addition, students access information instantly with using IWB. She has started to use IWB in her lessons to reach students in a better way. In detail, she started use of IWB in search for the better teaching process and to teach in more practical and better way. She also started to use IWB in order to visualize the lesson, to solve problems/questions, to support topics, to enrich the course, and to consolidate. She uses IWB more often in lecturing and in solving problems/exercise. In addition, she uses IWB more often when she needs to give visuality prominence and visually related topics. Also, she uses IWB more often to show/do laboratory experiments when she has no chance. Besides, she uses IWB more often to enrich and to diversify the subjects. Furthermore, she uses IWB for reinforcement/consolidation and repetition purposes. Moreover, she uses IWB more often when subjects need to be supported by IWB and to speed up the lesson. She also uses IWB more often in regard to address different levels of intelligence of students. Lastly, she uses IWB more often to catch missed points for students and to re-teach. On the other hand, she uses IWB less when to keep up topics with the intense curriculum or if she has time issues.

IWB provides some benefits to her teaching process. First of all, IWB gives opportunity to reach videos, animations and to solve more question/problem types for her. In addition, IWB provides enrichment in terms of materials/resources, diversity, and visuality in her lessons. Accordingly, her lessons become more practical, more fluent and more fun, so students are not got bored anymore. Besides, her biology course content become richer and more interesting for her students. In accordance with, IWB increased students' interest in biology. Furthermore, IWB has also benefits in terms of grasping subjects and reinforcement, so this has a positive effect on the exams for students. Also, IWB is good for repeat the course content and makes subject repetition easier. In addition, using IWB makes learning more permanent by providing opportunity to use visuals with this respect. According to her, IWB did not changed her teaching styles but it has enriched her teaching process.

But, IWB changed her habits. On the other hand, there are also some disadvantages of using IWB for her teaching process. Initially, she can encounter unwanted situations and faces strange information on internet search during her teaching, so she always has to be careful against such situations. Similarly, if she encounters problems related to IWB, it slows the lesson, making waste of time and stalling the lesson. She also lost time when students are asking something they curious about and she has to search the internet to answer their curiosity during the lesson. In addition, although there are some scientific websites and information on the internet, there are also some websites that have false or misleading information. So, internet is an unreliable source of information for students in this respect.

There are some benefits of using IWB to teacher. First of all, she is more motivated now and started to teach better with IWB. Likewise, she is more enthusiastic about teaching and her productivity increased in relation to this. In addition, she is not getting bored anymore and her lessons are not seen boring for her students because her lessons are more visual now. In this respect, she takes more interest of students. Moreover, IWB helps her to satisfy students' curiosity. Also, IWB reduced her workload and burden in the later stages as time goes by. Besides, according to the situation, IWB sometimes increased and sometimes reduced the effort she has spent in her lessons. Furthermore, after started using IWB, she began to writing less on the board and no longer require drawing on the board. For instance, she shows a scheme/diagram instead of drawing it with IWB.

The introduction of IWB in the lessons provided benefits and advantages to students at certain points. Initially, IWB takes more attention of students and increased their interest. So, students became more participative and more motivated in lessons and more actively involved in teaching-learning process. Also, it is easier to access information with IWB for students than before. IWB provides opportunity for students to search and reach anything they wonder about related to subjects. Besides, IWB has positive effect on the success of the students by diversifying, enriching, enhancing and facilitating learning. In this respect, she addresses different types of intelligence with IWB by providing visuals, auditory and tactile appeal for students.

Furthermore, IWB makes subjects and learning more permanent in students' mind because they are seeing and hearing are together. Also, IWB is increasing the awareness of the students and increases their interest in biology because it becomes more attractive for them to see visually what they hear verbally. In addition, IWB affects creativity of students positively because when she gives a presentation to students, they prepare presentation using technology and integrating animated diagrams and etc. in it.

The use of IWB also provides benefits to her and her teaching process in terms of time. First of all, time is passing faster while she is using IWB and it speeds things up for her. Accordingly, at first glance, it sounded like a waste of time using IWB when she was novice and inexperienced. But now, on the contrary, when she uses the IWB in right place and right on time, it speeds up the events, and it gets even better. So, she has not any time problem with this respect. Besides, IWB reduced the time she spends on teaching of the subjects. In addition, although IWB requires more preparation time in the beginning, it reduces the time she spends on preparation for her lessons. Her interaction/communication with students has increased with using IWB. Because students are interested in technology, so she involves them in activities by using IWB as technological tool. Thus, IWB helps her to increase students' participation in biology lessons. Likewise, it also increased students' and her interaction with course content. IWB provides opportunity to her and students to reach and use visual course materials when they want at school or at home. She interacts and communicates with other teachers at school with respect to share idea/opinion, share resource, and support for the use of IWB. As teachers they help and support each other about use of IWB. On the other hand, she has not developed any course materials for her lesson because there are so many course materials for her subject matter so she does not need to develop.

She encounters some problems while using IWB. First of all, she faces internet/network connection problems and restricted internet (access-banned sites) issues by MoNE. In addition, there are some virus problems with IWB and some trouble on internet in terms of showing up weird strange things/visuals occasionally.

Besides, sometimes she faces touch panel or unresponsive IWB problems. Likewise, it takes much time to open the IWB from time to time. Also, she has problem with scarcity of resources/materials provided by MoNE to use in her lessons. In relation to this, MoNE needs to make EBA website more usable and richer content by developing and loading more resources on it for her subject matter. In addition, sometimes sunlight shines directly onto the IWB and she has visibility problems with this respect. But, she uses curtains to avoid sunlight and prevent visibility problems if the classroom has them. She tries to solve these problems by herself at first. Then, she gets some help by her students. Next, if she cannot handle the problem, technical support and immediate intervention is made by school's ICT teacher. Lastly, if ICT teacher cannot overcome the problem, technical support is provided by authorized technical service. She made some suggestions and indicated her needs in order to use IWB more effectively and more efficiently in teaching process in terms of her subject matter. First of all, she needs for adequate resources made by MoNE and increase resources/materials in EBA website in terms of enriching visually and content. In addition, she needs more practical and specific her subject matter training. Besides, she needs to be refreshed/simplified curriculum by MoNE and needs more reliable information parallel to the curriculum provided by MoNE. Also, students need to access information safely with IWB.

***Individual Structural Description - Participant #5 – HS1T5
(High School 1 – Teacher 5 – Chemistry – Female)***

She has been trained about two-weeks with regard to use of IWB. This training was not enough for her. So, she learned and developed about how to use IWB by herself. Accordingly, she needs training for specific her subject matter. Besides, she needs trainings to learn new things about IWB. Her intended use of IWB consists of teaching/lecturing, problem/question solving, to instantly connect to the internet, to display something on YouTube, to show animation or video, to show images/visuals, to visualization, to show/illustrate three-dimensional shapes, to show scheme/diagrams/tables/paintings, in difficult to understand/topics that cannot comprehend, to indicate sections that have difficulty in drawing, and to save time.

She uses IWB as supportive purposes in such situations. She uses some sort of resources while using IWB in her lessons. These resources involve websites, animations, images, videos, EBA, and IWB compatible e-books/documents. Students get involved in making presentations and problem/questions solving activities with using IWB. Having IWB in her classroom means for her to get information instantly, instantly connect to the internet and being able to reach different sources. Starting use of IWB has positive influence on the climate of class and bring positive atmosphere. It also has positive effect in terms of increasing interest, more attractive, more enjoyable and more effective teaching. The comfort of her while using the IWB in her classroom changed over time. Initially, she is uncomfortable/nervous from time to time but now she is more comfortable and making more progress to improve herself. When she first started using IWB she has been nervous and getting anxious. Likewise, initially, she is not quite knowing what to do about using IWB and inexperienced. But now she uses IWB more comfortable and more easily. She also now begins to master about using IWB and better about using IWB. Use of the IWB affected the role of the teacher in the lessons in a sort of way. Teacher is still active and still in the lead position. Besides, IWB made teacher's work easier. She uses IWB as an auxiliary and as a resource supporting teaching.

Likewise, the use of IWB has an effect on the role of the student in terms of helping students to use and learn technology at some point. Because despite the widespread use of technology, there are still students who do not have access to technology. She started using IWB because of the introduction of the FATIH project firstly. Then, she wanted to take advantage of technology. In accordance with this, she wanted to visualize the lesson, to use time correctly, to save/gain time, to teach better, to make teacher's work easier, and to teach 3D and abstract concepts. She uses IWB more often in solving problems/exercise, in visually related topics, in practice, in more verbal subjects/issues, and in matters requiring the drawing. On the other hand, she uses IWB less in lecturing. Use of IWB has some positive impacts on teaching process. First of all, IWB makes the course more enjoyable. Also, it is enriching the lesson and supports the teaching process in terms of visuality. Besides, IWB supports

lessons providing variety of resources and increases resource diversity. Moreover, IWB did not change her teaching style and her habits. On the other hand, there are also some negative impacts of using IWB on teaching process. Accordingly, if she encounters problems while using IWB, lessons cannot go the way planned and she continues with classic lesson so it passes with unpleasant way and slowing the lesson. For this reason, she needs to be prepared for any situation during the lesson for such circumstances. There are many benefits of using IWB for teachers. First of all, she is more motivated. In addition, she started to teach better with IWB. There are also some drawbacks of using IWB for her. To begin with, although IWB initially increased her workload a little bit, then it reduced workloads in the later stages. Besides, if she faces IWB related problems, the it also increases her workload in order to deal with these problems. Likewise, IWB increased her effort during the lesson. The use of IWB provides many benefits and advantages for students. Initially, with using IWB, students are better to learn, better to keep in mind, more motivated, and more interested in the lessons. They are better adapted to the course and better to concentrate. Also, IWB provides ease of understanding, better understanding of the subjects and better grasp the subjects for students, so it is easier to keep subjects in mind for them. Similarly, it is better retention and more permanent in mind for students. Besides, it increases drawing attention of students and increases participation and involvement to the lesson. In addition, students are watching and following lesson much quieter now. Additionally, IWB facilitated and enhanced learning, so it increased success of the students. Furthermore, IWB reduced the time spent by students to take notes. Also, IWB positively affected students' learning of complex and difficult subjects by providing a variety of resources for various learning styles. Moreover, IWB increased the creativity of students in activities that they involved in by using IWB.

The use of IWB provides many advantages in terms of time. Initially, time is flowing fast while using IWB in her lessons. In addition, use of IWB reduces the time she spends on teaching of the subjects and lead to gain time. Although IWB has positive effects on time, there are also some negative effects. Sometimes, if she encounters

problems while using IWB, she faces time issues in regard to waste of time and stalling the lesson. Next, she is also having time issues related to intensive curriculum with use of IWB. The time related to preliminary work and preparations at home has increased slightly. IWB increased her interaction/communication with students and made her better in the eyes of students by increasing interest to her subject matter. So, her communication has changed compared to the past. IWB also increased interaction among students. In addition, IWB increased teacher and students' interaction with course content by providing more resources. Besides, she interacts and communicates with other teachers at school about using IWB in terms of sharing idea/opinion and resource among teachers, and support for the use of IWB. In addition, she did not develop any the course material for his lessons. While using IWB she encounters some issues and these problems limits and restricts the teaching-learning process negatively. These problems include damaged-distorted-out of order board, internet/network connection problems, restricted internet access by MoNE, insufficient resource/material problem; and visibility problems. When she faces technical problems, she tries herself first. For example, if she faces visibility problems, then she tries to handle it by closing the curtains if she has it in classroom. In addition, if she cannot handle the problem, she calls students to help because she does not want to waste much time in such situations. Then, if the problem still exists, she is communicating with IT teacher and IT teacher makes immediate intervention and provide technical support for her. If the IT teacher cannot handle the situation, the technical service is called and technical support is provided by authorized technical service. She has some requests and needs. First of all, she needs to be increased/enriched the number of materials in EBA and need for adequate resources made by MoNE. In addition, she needs to be refreshed/simplified curriculum by MoNE. Besides, she also needs training for developing/preparation of course material. In addition, she needs training for specific her subject matter. Also, she needs for removal of blocking access to certain sites by MoNE in order to access more resources.

Individual Structural Description - Participant #6 – HS1T6

(High School 1 – Teacher 6 – English – Male)

He was trained two-weeks in regard to use of IWB. The given training was not enough for him because it was not a hands-on training, it was more theory-based one. Thus, he needs more practical trainings in terms of more efficient use of IWB. Also, he wants training for specific each subject matter. He uses IWB in order to teach/narrate, to solve problems/questions, to do exercises/drills, to make presentations, to auditory/listening/pronunciation, to visualization, to show videos, to show animations, to show images/visuals, and to watch movies. He uses a variety of sources which includes educational websites, EBA, images, videos (movie etc.), animations, sound (song etc.), PowerPoint slides, and IWB compatible e-books/documents. During the lessons, students participate and involved in game like exercises so they provide active participation. Students also participate in doing exercises/drills practice with flash animation, and they try to solve these with drag and drop movements on IWB. Students also involved in problem/questions solving part of the lesson actively on IWB. Besides, students listen songs and repeat the pronunciations with the help of IWB. In addition, they make presentations by using IWB in the lessons. Having IWB in his class means to him, firstly, supporting his course in terms of visuals/visualization. Then, it means to him as making his work easier. Lastly, IWB is ease, convenience, and simplicity for him. The climate of the classroom changed positively after he started to use IWB. First of all, IWB provides opportunity for more effective teaching for him. Also, it increases students' attending in lesson and increases interest. Lessons are more enjoyable now with IWB. Initially, he feels uncomfortable and nervous while using IWB his lessons, but now he feels more comfortable because he is used to it. Similarly, when he started using IWB in the beginning, he has been using IWB slower and not using time correctly because he was inexperienced about IWB. But, now, he uses IWB faster and more practical way. Also, he now uses time better and more comfortably. Because he gained experience over time. Accordingly, he is more relaxed and more experienced about using IWB.

Use of IWB in lessons did not changed the role of the teacher for him. He as a teacher is still active and still in the lead position in the lessons and he uses IWB as an auxiliary/as a resource supporting his teaching. He thinks teachers should not attempt to transfer all information to the students using IWB. Likewise, if teachers dependent on IWB too much, then it weakens them. It is a tool for him to present his materials more easily and makes his work easier. The role of the students in his subject matter as English Language is affected positively for him. The students are more interested and more attentive to lessons. It provides convenience and facilitates communication between teacher and students. He started to use IWB in order to enrich the course, to visualize the lesson/to add visuality, to make teacher's work easier, to support topics, and to listen pronunciations. He uses IWB more often in teaching/lecturing; in solving problems/exercise, where to watch something, visually related topics, when needs to give visuality prominence, in practice, when to present visuals, for reinforcement/consolidation purposes. On the other hand, he uses IWB less when IWB need to be passive and lecturing in some subjects/cases where IWB not needed. Using IWB affected his teaching process somehow. Initially, IWB supports his teaching process in terms of auditory and visuality. Also, it provides enrichment in material/resource diversity. Besides, IWB provides opportunity to reach/show/play lesson materials like animations. After started using IWB, lessons are more fun/enjoyable. IWB is contributing his teaching process by providing more visuality, more fun/entertainment, and better teaching/learning. In addition, IWB changed his teaching styles and habits in lessons in positive way. IWB affected him as a teacher positively. Accordingly, he teaches more enjoyable now. In addition, although IWB increased his workload and effort at the beginning, then it made his work easier and reduced his workload and efforts in later times. IWB helped him with his own personal development with respect to his subject matter. He is more motivated and teach better by using IWB. IWB helps him providing more opportunities in terms of making the lessons fun for the students. He is no longer required to carry course materials to the classroom. In terms of negative aspect, IWB makes teacher lazy from time to time.

Using IWB has positive impacts on students. First of all, students are more interested, more motivated, more enthusiastic, more creative and more participative/attentive in lessons. Besides, students express themselves more easily and more comfortably. Also, students developed themselves about technology by using IWB. In addition, students write less anymore, so IWB reduced the time spent by students to take notes during lessons. Accordingly, IWB facilitated and enhanced learning of students by supporting more visually and more auditory way, so it increased the success of these students. It also provides opportunity for students to learn complex and difficult concepts more easily. Similarly, it provides various resources for various learning styles of his students because it is easier to reach different sources with IWB. On the other hand, there are also some negative aspects of using IWB for students. Firstly, students became accustomed to literal and pushed their laziness. In addition, they are dealing with extracurricular activities at breaks and disturbing other students and teachers at school such as listening music at high volume. The use of IWB provides advantages in terms of time. Initially, time is flowing fast in his lessons. Also, IWB is gaining time for him. When he wants to do extracurricular activities for students, in such cases, he can have time problems. So, he needs to be careful about managing time in such circumstances. Additionally, initially IWB required more preparation time for him, but later it reduced time spent on lesson preparation. Likewise, IWB reduced the time he spends on teaching of the subjects. Using IWB increased his interaction/communication with students because students come to the IWB and participate in the lessons more. Relatively, students can express themselves more, so the dialogue develops between teacher and students. IWB also increased interaction among students. Besides, IWB increased his interaction as a teacher with course content and enriched resources diversity. Likewise, IWB increased students' interaction with course content because students can reach much more different content easily. He interacts and communicates with other teachers in the school about sharing idea/opinion, sharing resource, and supporting for the use of IWB.

He has developed some course materials for his lessons because he had previously course material development trainings about PowerPoint, Photoshop and Flash

animations. While using IWB he encounters some kind of problems. These problems consist of damaged, distorted, out of order board; virus problems; visibility problems; internet/network connection problems; touch panel problems/unresponsive boards; and resource (material) problem. He firstly tries to solve these problems by himself and sometimes he gets technical support by his students. If he cannot handle the problem by himself, then ICT teacher makes immediate intervention. Besides, if ICT teacher may not overcome the problem, then technical support is provided by authorized technical service. He made some suggestions and requests for using IWB more effectively and more efficiently in the teaching process. First of all, teachers need to improve themselves about IWB. He needs for adequate resources made by MoNE. In addition, he suggested that EBA (Educational Informatics Network) website needs to be improved in terms of content diversity, quality and number of materials.

***Individual Structural Description - Participant #7 – HS1T7
(High School 1 – Teacher 7 – Biology – Male)***

He had one-week training with respect to use of IWB. The training was inadequate for him. Because the training is theoretical instead of practical and hands on. For this reason, he tried to improve himself as learning by doing at lesson and gain some experience about using IWB. Therefore, he needs and want more practical training about using IWB. Relatively, he also wants in-service training on an annual basis to update and improve themselves as teachers. Accordingly, he needs the number of trainings be increased. He uses IWB for some purposes. First of all, he is using IWB for teaching/lecturing and problem/question solving. In addition, he uses IWB for visualization and in order to show videos, show animations, show images/visuals, show experiments, indicate sections that have difficulty in drawing, and concretizing abstract concepts. His resources while using IWB consist of images, videos (movie etc.), animations, websites, EBA (Educational Informatics Network), and IWB compatible e-books/documents. Students involve and participate in making presentations, making/showing videos, and in-class performance work cases with using IWB. Having IWB in the classroom means to him as supporting course in terms

of visuals/visualization, concretizing abstract concepts, get information instantly, and more richness in terms of being able to reach different sources. The climate of the lessons is positively affected after start using IWB with regard to increase participating/attending in the lessons. While using IWB in his lessons, he feels uncomfortable/nervous from time to time if he encounters problems. But, except that he feels comfortable usually. In comparison with the past, he feels so much more comfortable than before. Besides, in the classroom, the students reacted positively to his use of IWB because visual appeal of IWB attracts students. When he first started using IWB in his lessons, he was inexperienced and getting anxious about using IWB. But, now, he made more progress and improved himself and begins to master about using IWB. In addition, he uses IWB more comfortable and more relaxed than before. Consequently, at first, he was novice and inexperienced, but as time passes he became more experienced about using IWB.

The teacher's role in the lessons has been affected by using IWB somehow. While IWB makes teacher's work easier, it pushed the role of the teacher somewhat secondary and passivated him. Besides, it not also made teacher lazy but only led to forgetfulness of the teacher. Likewise, using IWB has influence on the student's role in regard to passivate the students. The main reasons for him to start using IWB in lessons varies. First of all, he started to use IWB in order to visualize the lesson. Secondly, he started to use IWB when he did not have a chance to make lab work. Lastly, he started to use IWB in terms of time-related purposes such as using the time correctly, saving time, and gain time. He uses IWB more often in lecturing basically. In detail he uses IWB in visually related topics and when he needs to give visibility prominence in some subjects. He also uses IWB more often in complicated and more visually require cases. In addition, he uses IWB more often in order to show/do laboratory experiments when no chance and when subjects need to be supported by IWB. On the other hand, he uses IWB less when he does not find materials (visuals etc.) in the internet and where topics that do not require the use of IWB. Besides, he uses IWB less in some part of the subjects where students are easy to grip.

Using IWB has some positive impacts on his teaching process. First of all, IWB allows him to transfer more information to students. In addition, it provides opportunity to watch experiments. It also concretizes abstract concepts and revive a three-dimensional. Besides, IWB enable him to reach information instantly and more easily. IWB enriched material/resources diversity and provide enrichment in the visual sense by supporting subjects in terms of visuality. Additionally, using IWB altered his habits and teaching styles positively. Despite all these positive effects on teaching process, there are also some negative ones. Firstly, if he encounters problems related to IWB, then he continues his lesson with classic method. Similarly, sometimes he encounters unwanted situations and facing strange information on IWB in lesson, so in such cases, he remains in a difficult situation.

The benefits of using IWB for him as teacher can be grouped under several headings. Initially, IWB allows him to master subjects and have more comprehensive knowledge about them. Next, it reduced workloads in the later stages by eliminating difficulties of preparation. Thus, it makes teacher's work easier and facilitates teacher's work. Also, he is no longer require to draw because of using IWB. Lastly, it reduced his effort during the lesson. Even though these benefits on teachers, there are also a few negative impacts on them. First of all, IWB makes teacher lazy and reduce activeness of him during the lessons. Also, it sometimes increased his effort during the lesson. Besides, it reduces his mastery of subjects from time to time.

Using IWB has some advantages for students. Firstly, IWB facilitated and enhanced students' learning and allow them to learn better. With this respect, it increased success of the students. It also provides ease of understanding for students. It is easier to access information with IWB for students by providing reaching information instantly. Besides, using IWB reduced the learning time of students because they are more interested and more motivated. Thus, it increased students' focus on the course. Relatively, IWB increased students' participation in the lessons. It also gives opportunity for students to make presentation. Furthermore, IWB reduced the time spent by students to take notes. Lastly, students are more creative by using IWB during the lessons. Even though these advantages, IWB has some negative impacts

on students. Initially, IWB reduces students' effort and makes students lazy. Then, students forget more quickly with IWB and they are not hold information in their memory because they always think they can easily access information whenever they want. Sometimes, it affects students' creativity negatively. Using IWB has some impacts on times. First of all, using IWB required more preparation time in the beginning but later it reduced the time spend on lesson preparation for him. Besides, it reduced the time his spend on teaching of the subjects. In addition, while he is using IWB, the time is flowing fast for him. As a result, using IWB is a time-saving and gaining time process for him.

His interaction/communication with students and course content is affected by using IWB. Accordingly, while his interaction/communication with students increased, IWB decreased interaction/communication and sharing of information among students. Besides, his interaction with course content increased and IWB changed the source he is looking for. Furthermore, he interacts and communicate with other teachers in the school in regard to share idea/opinion and support for the use of IWB. He has not developed any course materials to use in his lessons on IWB because he thinks that those materials will be inadequate for his course so he tries to use prepared materials that are ready.

He faces some problems and difficulties while using IWB. These problems consist of virus problems; trouble on internet/weird strange things happen on internet; internet/network connection problems; power failure/electricity cut; restricted internet (access-banned websites) by MoNE; visibility problems; touch panel problems/unresponsive boards; damaged, distorted, out of order board; not supporting resource formats to run or open; and resource (material) problem. He tries to intervene and solve the problem himself first. Then, sometimes he gets technical support by his students. If he cannot handle the problem, then he calls ICT teacher in order to make immediate intervention to solve the problem. Accordingly, if ICT teacher cannot handle the problem, then technical support by authorized technical service is provided.

For using IWB more efficiently in his teaching process he stated some his needs. First of all, he needs adequate resources made by MoNE and need to be increased/enriched the number of materials in EBA. Besides, he needs to be increased the number of trainings and needs to receive in-service training on an annual basis. Also, he needs to be reduced the number of students in classes. Moreover, he needs removal of blocking access to certain sites by MoNE to access more recourses. Lastly, he thinks that teachers should develop themselves about more effective use of IWB.

***Individual Structural Description - Participant #8 – HS2T1
(High School 2 – Teacher 1 – Religious Culture – Male)***

He had one-week training about use of IWB before start actively using it. This given training was inadequate, so he improved himself through the time by hands on practice. But, he still wants to take more training about IWB in order to keep himself updated on this topic. He uses IWB so as to teach/narrate/lecture, to solve problems/questions, to show images/visuals, to show videos, to make presentations, to show animations, and to concretize abstract concepts. In his teaching process he uses images, videos (movie etc.), sound (song etc.), PowerPoint slides, EBA (Educational Informatics Network), IWB compatible e-books/documents, websites, text (PDF, Word, Excel, etc.), and animations as resources on IWB. Students participate and use IWB when open game/animation related to subjects such as filling crossword puzzles. Also, they involved in problem/questions solving and doing exercises/drills by using IWB. During the semester, students are sometimes be part of the subject narrative and make presentations related to it by using IWB. Having IWB in the classroom means to him as productivity. The climate of the class has been affected by using IWB. Initially, use of IWB provided positive atmosphere and save the lesson from becoming a boring lecture. Students also reacted positively towards using it. IWB had a positive effect in terms of taking attention and increasing interest of students. Comfort level of the teacher has changed over time. He feels uncomfortable/nervous from time to time when he encounters problems or there's no IWB. On the other hand, he feels very comfortable while using IWB and it comforts

himself. There are some differences between when he first started to use IWB in his lessons and now because he made some progress about using IWB. Initially, he has difficulty with technical problems because he was inexperienced. But after a while, he made more progress and improved himself and he is now better about using IWB. He uses it more professionally and he is more experienced now. He enjoys and desire to use more as he gains experience.

Use of IWB has influenced teacher's role but he is still in the lead and he is still active. However, now he is in a better position to control the students. Use of IWB has also influenced student's role. Students are listening and focus more during lecturing with the help of using IWB. Main reasons for him to start using IWB includes some internal and external motivations. First of all, he started to use IWB because of his curiosity. Then, wanted to increase curiosity, interest, and success of the students. He also needed to visualize the lesson. In addition, he wanted to not to miss any part of the topic and be more organized for his lessons. He also desired to increase his own performance. He uses IWB more often in lecturing and solving problems/exercise. He also uses IWB more often in more verbal subjects/issues and when there is something to watch. IWB provided a lot of advantages over his teaching process. First of all, lessons are more efficient because of enrichment in visuality and auditory sense. Moreover, IWB enriched course contents by enriching material/resources diversity and created opportunity to use more resources. IWB also makes subjects/learning more permanent and allows to transfer more information to students. He teaches more topics/information in less time with using IWB. Lesson environment is more fun and more pleasant, so he is better at classroom management and about to control students. Moreover, IWB somehow changed his habits and teaching style.

Using IWB is beneficial for him as a teacher. He is more motivated after start using IWB in his lessons. He also has more enjoyable teaching/lecturing process and he think he is more effective and teaches better with IWB. IWB allows him to master subjects and have more comprehensive knowledge about his subject matter. In addition, he writes less on the board. Although initially IWB increased his workload

and effort, it reduced his workloads and effort during the lesson in the later stages. Using IWB has positive effects on students like teachers. First of all, students are more interested and more motivated. Also, IWB increased students' participation in the lessons, so they are more attentive now. In addition, it helps to satisfy students' curiosity. Gathering attention of students is increased by using IWB. Besides, students grasp the subject better and more easily. Likewise, IWB provides better understanding of the subjects and better retention for students. Furthermore, students are more creative. Moreover, IWB facilitated and enhanced learning of students. Thence, it increased success of them. It also provides ease of understanding and shorten the learning time of students. Students are better concentrate, so listening time of lesson increased. Additionally, IWB reduced the time spent by students to take notes, because they write less. In addition, students have more comprehensive knowledge of the subjects. It also provides advantage for students with visual intelligence. Thus, students learn better with use of IWB.

Using IWB has some advantages in terms of time. Firstly, time is flowing fast in lessons while using IWB. When he encounters problem related to IWB, then it is a waste of time while struggling with the problem. But, in general, IWB saves time and provide better time management for him. Besides, IWB requires more preparation time in the beginning, then the time spend on lesson preparation is decreased. Similarly, it reduces the time spend on teaching of the subjects for him. His and students' interaction/communication with course content has increased because course content and resources have been enriched by using IWB. Likewise, his interaction/communication with students increased after starting use of IWB. He is better in the eyes of students. Also, while IWB causing declining conversations among students about extracurricular, it increased interaction among students with respect to subjects. He also has some interaction/communication with other teachers in the school with respect to share idea/opinion, share resource, and support for the use of IWB. Furthermore, he did not develop any materials to use in his lessons. While using IWB he encounters some kind of problems such as internet/network connection problems, virus problems/not function flash memory, deleted

files/programs related to course from IWB, power failure/electricity cut, visibility problems, touch panel problems/unresponsive boards, takes time to open the IWB (open slowly, time issues), and resource (material) problem. He tries to solve these problems by himself firstly. Then, he got immediate intervention by ICT teacher to solve them. If ICT teacher cannot handle the problem, she calls and gets technical support by authorized technical service. So, If IWB is damaged or out of order, he continues his lessons in spare classroom.

For using IWB more effectively and more efficiently in teaching process he has requested some needs. Firstly, he needs to increase the number of trainings. Likewise, he needs for trainings to learn new things. Also, he needs for adequate resources made by MoNE. Besides, he needs resources prepared more professionally and needs to increase resources/materials. In addition, he needs training for developing/preparation of course material for his subject matter. Furthermore, he needs to be increased/enriched the number of materials in EBA. Lastly, he thinks teachers should develop themselves, and teachers should be motivated in this way.

***Individual Structural Description - Participant #9 – HS2T2
(High School 2 – Teacher 2 – Chemistry – Male)***

He got two-week training in terms of using IWB before he started to use it in his lessons. After the training, he thought it was not enough and he needs more practical and subject matter specific training. Likewise, he thinks these trainings should be more frequent and be longer in time. He also wants recourses prepared by MoNE. His intended use of IWB includes teaching/narration/lecturing, problem/question solving, show videos, make presentations, show experiments, show images/visuals, show animations, show simulations/to support difficult topics, and visualization. He uses PowerPoint slides, images, videos (movie etc.), animations, EBA (Educational Informatics Network), websites, and Text (PDF, Word, Excel, etc.) as resources for using on IWB. During the lessons, students participate and use IWB in making presentations and making/showing experiments activities. Having IWB in his class means for him as comfort of the teacher. When he started to use IWB, the climate of

class is very favorable and has positive effects in terms of taking attention of students. His comfort level when he uses IWB in his lessons changed through time. Initially while using IWB, he has been tension/nervous, but now, he is used to it and has no problem with using it. After a while he feels more comfortable and IWB comforts himself. However, if he encounters problems with IWB, then he becomes uncomfortable/nervous from time to time. When he first started using IWB he has some troubles in terms of using IWB and was not comfortable. But now he is more relaxed and uses IWB more comfortable. Also, he is now better about using IWB and made more progress and developed himself. The teacher's role in the lessons somehow affected by use of IWB. In relation to that he thinks IWB pushed the role of the teacher somewhat secondary and passivate the teacher. Likewise, using IWB influenced the role of the students on both positive and negative way. Accordingly, he considers while IWB makes some students more active than before, it makes some of them more passive compared to the past.

He started to use IWB in order to visualize the lesson, to visually appeal, to discard redundant/unnecessary/useless information, to enrich the course, to use time correctly, to save time, to gain time, to give more topics/information in less time and to support topics. He uses IWB more often when no chance to show/do laboratory experiments, to enrich and to diversify the subjects, when use/show animation. On the other hand, he uses IWB less when in lecturing, example/sample solving, and in solving problems. Using IWB contributed to teaching process positively. First of all, IWB provided enrichment in the visual sense/ and supports the lesson in terms of visibility. Secondly, it enriched the lesson with respect to material/resources diversity and course contents. It also made lesson more fluent. Besides, it helped to concretize abstract concepts and revive three-dimensional objects in students' mind. IWB allows to teach more topics/information in less time, so help him to teach fast. In addition, he thinks it allows to transfer more information to students. Moreover, IWB gives opportunity to use more resources for him. Lastly, using IWB somehow change his teaching habits. Using IWB positively affected him as a teacher. After start using IWB, he thinks he is more motivated. Also, IWB reduced his workloads

in the later stages after a while because he writes less on the board and re-use lesson materials anymore. Even though positive effects, there are some negative effects of using IWB on him. Firstly, using IWB increased his effort during the lesson. Also, at the beginning of using IWB, it increased his workload. But he somehow addicted to use IWB because he feels uncomfortable when not using IWB. He considers IWB makes teacher lazy and reduces activeness. Lastly, he believes IWB bring sleep of him sometimes. The use of IWB in the lessons provided various benefits and advantages for the students. According to him, students are more motivated. Also, he thinks using IWB increased success by facilitating and enhancing learning. He considers students get better understanding of the subjects and so they learn better. IWB also reduced the time spent by students to take notes. Use of IWB also made students more creative. Even though these benefits, he thinks that IWB disconnected/detached students from course sometimes.

IWB benefited in terms of time. Accordingly, he thinks time is flowing fast after started using IWB in his lessons. Also, IWB reduced the time spend on teaching of the subjects during lessons. IWB helps to deal with time problem better comparing to past. Even though benefits of using IWB on time, there are still some negative effects. For example, when he encounters problems with IWB, he has time issues. Also, at the beginning of using IWB, it requires more preparation time. Similarly, he faces some time issues when he wants to give more detailed information. He thinks his interaction/communication with students decreased a little. He also considers that IWB increased teacher's and students' interaction with course content. He communicates and interacts with other teachers in the school in regard to share idea/opinion and support for the use of IWB. He has prepared some PowerPoint presentations and video by capturing his experiments as course materials. But, he thinks these prepared materials are inadequate for his lessons.

While he is using IWB, he faces some problems in his lessons. These problems consist of power failure/electricity cut; damaged, distorted, out of order board; deleted files/programs related to course from IWB; internet/network connection problems; restricted internet (access-banned websites) by MoNE; visibility problems

(sunlight shines directly onto the board); touch panel problems/unresponsive boards; resource/material problem; not supporting resource formats to run or open; takes time to open the IWB (open slowly, time issues); problems with the size of the IWB; difficulty of use of IWB; virus problems/not function flash memory. When he encounters the problem, firstly, he tries to solve by himself. Then, if he cannot handle the problem, he calls ICT teacher and she make immediate intervention to solve it. Next, if ICT teacher cannot solve the problem, she gets technical support by authorized technical service. For instance, he solves visibility problem with using curtains to prevent sunlight. In order to use IWB more efficiently in teaching process he indicated some needs. Firstly, he needs more comprehensive and more practical training. He considers that trainings should be based on each subject matter. In addition, he needs programs related to each subject matter on IWB. Besides, he needs to be increased the number of training and training period time should be longer. He thinks MoNE should provide adequate resources developed by themselves and increase/enrich the number of materials in EBA. Also, MoNE should refresh/simplify current curriculum in order to be more compatible with IWB. He also wants to have previously loaded resources on IWB. In addition, he requires to change/update programs on IWB. Lastly, he thinks that teachers should be motivated about using IWB more effectively.

***Individual Structural Description - Participant #10 – HS2T3
(High School 2 – Teacher 3 – Mathematics – Male)***

He took two-weeks training about using IWB but this training was not enough for him. He aims to use IWB for teaching/narration/lecturing, problem/question solving, solving a large number of questions, show three-dimensional shapes, concretizing abstract concepts, show animations, and show videos. He uses text (PDF, Word, Excel, etc.), EBA (Educational Informatics Network), IWB compatible e-books/documents, animations, and videos (movie etc.) as teaching resources/materials. Students get involved and participated in problem/questions solving, and moving vectors activities with using IWB. Having IWB in classroom means for him as comfort of the teacher (comfortable), something good/important,

and concretizing abstract concepts. The climate of class has been affected positively by his start using IWB on lessons. His comfort level when using IWB has changed over years but now he feels more comfortable. There are some differences between when he was start using IWB at first and now. Initially, he was not knowing exactly what to do on IWB, but now he is more experienced; make more progress/develop/improve himself; use faster; and better about using IWB/use a better way. The role of the teacher has been influenced by using IWB on lessons. After starting use of IWB, it makes him more active, make teacher's work easier, facilitated the role of teachers, teacher still active (still in the lead position), increase efficiency/enhance productivity, and improved/developed himself. Likewise, the role of the students also has been influenced by using IWB by making students more active during the lesson. Main reasons for his using IWB include have a desire to use (used eagerly), to teach 3D and abstract concepts, to solve more problems/questions/benefit of question solutions, no longer carry a map/book/no need to carry course materials, to consolidate, and to learn more. He uses IWB more often in solving problems/exercise, and teach 3D and abstract concepts. On the other hand, he uses IWB less in lecturing, and when there is no source/not have enough sources.

Positive impacts of using IWB on his teaching process can be listed as allows to solve more questions, allows to stay on the subjects more, allows to teach more topics/information in less time/teach fast, more efficient/productive lesson, allows more students to come up to the board, enrichment in the visual sense/supports in terms of visuality, concretize abstract concepts/revive a three-dimensional, allows to show/see/solve more different types of questions, change in teaching styles, change in habits, opportunity to use more resources, enriched in material/resources diversity/visual material richness, instantly reaching information/reach information more easily, and better consolidation. Using IWB is useful and give some advantages for him. IWB provided positive impacts on him as teacher in followings; more motivated, writing less on the board, allows to master subjects/have more comprehensive knowledge, teach better/started to teach better, feel became a better

teacher, re-use lesson materials, no longer carry course materials, and not get tired/make him/her tirelessness. Similarly, using IWB has some positive impacts on students in the followings; increased solving more problems/questions, writing less, reduced the time spent by students to take notes, writing less, facilitate learning, enhance learning, more motivated/increase motivation, better concentrate/concentrations increased, better perception, better consolidate/reinforce the subject, learn better, increased participation/more participative/more attentive, raised students' knowledge levels, master a subject/have comprehensive knowledge of the subject, increase gathering/draw attention of students, increased success, increase listening time of lesson, provides advantage for students with visual intelligence, not get tired/tirelessness, and not a burden carrying course materials. Using IWB has positive impacts on time. Accordingly, after start using IWB, time is flowing fast in his lessons. In addition, it reduces the time he spends on teaching of the subjects during the lesson and reduces the time he spends on lesson preparation at home.

His interaction and communication with students and course content somehow changed with using IWB. IWB increased his interaction/communication with students and increased interaction among students. Besides he is better in the eyes of students and students are more pleased with the teacher. IWB also increased students' and teacher's interaction with course content. His interaction and communication with other teachers in the school is about support for the use of IWB, share idea/opinion among teachers, and share resource among teachers. He did not develop any course materials to use in his lessons.

He faces some issues/challenges while using IWB. These issues are touch panel problems/unresponsive boards; damaged, distorted, out of order board; resource (material) problem; internet/network connection problems; visibility problems; and takes time to open the IWB (open slowly, time issues). He tries to solve these problems by himself at first. Then, when he can't solve the problem by himself, he calls ICT teacher and she make immediate intervention in terms of technical support. But, if the ICT teacher cannot handle the problem, technical support by authorized

technical service is called by school administration. Lastly, he indicates some needs and suggestions with respect to need more practical training, need training for specific each subject matter, need individual training for old teachers, need for training to adapt to technology for later ages teacher, need special classes for each teacher, need MoNE to allow free use of resources, and need to be refreshed/simplified curriculum by MoNE.

***Individual Structural Description - Participant #11 – HS2T4
(High School 2 – Teacher 4 – Geography – Male)***

He got one-week training with respect to use of IWB before starting using it in his lessons. But he thinks that this training was inadequate. He has some reasons for using IWB for his subject matter. These reasons are; teaching/narration/lecturing, problem/question solving, show images/visuals, show videos, show animations, show maps, show three-dimensional shapes, watch movies, make presentations, concretizing abstract concepts, and visualization. He uses sort of teaching resources while using IWB in lessons to support his teaching process and they are; text (PDF, Word, Excel, etc.), images, videos (movie etc.), websites, PowerPoint slides, and animations. Students are getting involved in some cases/situations like making presentations in terms of using IWB. Having IWB in his classroom means for him as overcome problems in verbal expression, save time, use time more efficiently, and comfort of the teacher (comfortable). Start using IWB somehow affected the climate of class with respect to students more enthusiastic, come up with much preparation, more confident students, student understand more easily, more productive/produce more things, and open up students' horizon. When start using IWB in his lessons, initially, he has been tension/nervous but now he feels (more) comfortable while using IWB. There are some differences between the time he first started using IWB and the present. Initially, he was not quite know what to do, getting anxious/worried/nervous, and excited while using IWB. But, now, he made more progress/develop/improve himself, begin to master; use more comfortable; more relaxed, and more confident in terms of using IWB. The role of the teacher has been influenced somehow by use of IWB. He thinks that IWB pushed the role of the

teacher somewhat secondary and brings the teacher more directing position. Likewise, using IWB has influence on the role of the students in terms of more comfortable self-expression. He started to use IWB because he wanted to get more efficiency in terms of education, to visualize the lesson (to add visuality), in order to affect/influence/impress students, to increase participation (student contributed more), to use because of seeing as a development, for students to comprehend/grasp/grip, to solve more problems/questions/benefit of question solutions, and student can learn more easily.

He uses IWB more often in solving problems/exercise, solve more problems/questions, in lecturing, visually related topics, complicated and more visually require cases, concretize (narration of) abstract concepts, and teach 3D and abstract concepts. On the other hand, he uses IWB less where topics that do not require the use of IWB, unnecessary or less necessary to use IWB, and in concrete topics. Using IWB impacted his teaching process positively based on change in teaching styles, change in habits, concretize abstract concepts/revive a three-dimensional, allows to solve more questions, allows to transfer information more easily, allows to teach more topics/information in less time/teach fast, enrichment in the visual sense/supports in terms of visuality, opportunity to reveal aspects/things have remained hidden, opportunity to use more resources, opportunity to show/play materials, instantly reaching information/reach information more easily, increased chances going into detail/get detailed information, sharing lesson materials/course resources easily, more efficient/productive lesson, and enriched in material/resources diversity/visual material richness. Although IWB has positive impacts on teaching process, it also has some negative impacts such as encounter problems, continue lesson with classic method; encounter problems, classic lesson pass with unpleasant way; and encounter problems, not access to information. There are some positive impacts of using IWB on teachers. In detail, using IWB is beneficial for him in regard to writing less on the board, provided personal development/improvement, expanded/broaden point of view on the subjects, more motivated, reduced effort during the lesson, more productive/efficient, and reduced effort during the lesson.

Even though these positive impacts, there are some negative impacts of using IWB on teachers relating to increased effort (endeavor) during the lesson initially, increased workload; and make teacher lazy. There are some positive impacts of using IWB on students in terms of better grasp the subject/grasp more easily/comprehend, increased success, facilitate learning, enhance learning, increased solving more problems/questions, increased participation/more participative/more attentive, more relax, more creative/raised creativity, more motivated/increase motivation, better retention/more permanent in mind, more confident/gained confidence, expressed themselves more easily/more comfortable expressing, provides ease of understanding/understand more easily, reduced the time spent by students to take notes, writing less, and easier to access information/reaching information instantly. Even though these positive impacts, there are some negative impacts of using IWB on students associated with dealing with disturbing/extracurricular activities at breaks, reduce effort/not make any effort, and make students lazy/became accustomed to literal.

Using IWB contributed to him in terms of time. According to him, these positive impacts on time are; time flowing fast/time passes/moves faster, reduces time spend on writing out on the board, reduces time spend on teaching of the subjects, use time efficiently, deal with time problem, better time management/use time better, and save time/time-saving/gaining time. But sometimes it has negative impacts on time related to; initially, requires more preparation time in the beginning and time issues when want to give more information. IWB affected and changed his interaction/communication with students and course content in the following; increased interaction/communication with students, increased teacher's interaction with course content, increased students' interaction with course content, increased the distance between students and teachers, decreased/broke interaction/communication with students, increased interaction among students, and share resource among teachers. He interacted and communicated with other teachers in the school about share idea/opinion among teachers, share resource among

teachers, and support for the use of IWB. He prepared and developed PowerPoint presentations and animations as course materials to use in his lessons.

While using IWB in his lesson he encounters some issues/challenges. These issues can be listed as internet/network connection problems; power failure/electricity cut; damaged, distorted, out of order board; deleted files/programs related to course from IWB; visibility problems (sunlight shines directly onto the board); not supporting resource formats to run or open; touch panel problems/unresponsive boards; and resource (material) problem. He tries to solve the problems by himself firstly. Then, ICT teacher is making immediate intervention for technical support. If there was a problem that ICT teacher cannot handle, then technical support by technical authorized service is called by administration.

He made some suggestions and indicated his needs for using IWB more effectively and efficiently for his subject matter in his lessons. In detail, these needs can be listed as; need more practical training; need training about more efficient use of IWB; need training about more efficient use of IWB; need training for specific each subject matter; need for adequate resources made by MoNE; teachers need to be trained constantly; need refreshing trainings; need to increase the number of trainings/more frequent; need to increase resources/materials; and need resources prepared more professionally.

***Individual Structural Description - Participant #12 – HS2T5
(High School 2 – Teacher 5 – Mathematics – Male)***

He had one-week training under the FATIH Project. According to him, the training just enough to use some basic things at the basic stage. His intended use of IWB is based on visualization, problem/question solving, teaching/narration/lecturing, concretizing abstract concepts, show images/visuals, show videos, show three-dimensional shapes, and use to indicate sections that have difficulty in drawing. He used some teaching resources/materials in his lessons on IWB, namely, images, videos (movie etc.), animations, EBA (Educational Informatics Network), text (PDF, Word, Excel, etc.), websites, and IWB compatible e-books/documents. In his

lessons' students get involved in using IWB in problem/questions solving cases. Having IWB for his teaching means to him as support course in terms of visuals/visualization. Starting use of IWB has some effects on the climate of his classroom. Those effects can be listed as positive effect in terms of taking attention, more attractive, more motivating, and students generally reacting positively. His comfort level when using IWB in his lessons are changed throughout the time. Initially, he was uncomfortable/nervous from time to time while using IWB, but he now feels (more) comfortable. Initially when he started using IWB he was inexperienced, not learned buttons and symbols exactly good, and slower while using IWB. But now he is more prepared, make more progressed/developed/improved himself, use faster, know better symbols, better about using IWB/use a better way, habit to use IWB/get used to it, use time better, and more experienced. His role as a teacher has been influenced by use of IWB as following; pushed the role of the teacher somewhat secondary, ease teachers' burden, make teacher's work easier, and thought IWB as an auxiliary (as a resource supporting teaching). Likewise, students' role has been influenced somehow by use of UWB as following; more active (students become more active), and not affect the role of the student truly.

He has some reasons in his own way to start using IWB in his lessons. These reasons are; to increase interest, to attract the attention of students/gather attention, to increase participation (student contributed more), to make teacher's work easier, to solve more problems/questions/benefit of question solutions, because of curiosity/enthusiasm, time-related (using the time correctly, saving time, gain time), to accelerate/speed up lesson, and to teach 3D and abstract concepts. He uses IWB more often in some cases/circumstances. In detail, he uses IWB more often in solving problems/exercise, teach 3D and abstract concepts, reviving and concretize (narration of) abstract concepts. On the other hand, he uses IWB less in lecturing. Using IWB has some positive impacts on his teaching process. These positive impacts can be listed as; allows to solve more questions, concretize abstract concepts/revive a three-dimensional, allows to show/see/solve more different types of questions, enriched in material/resources diversity/visual material richness,

instantly reaching information/reach information more easily, enriched course contents, faster paced/accelerated teaching lesson, no change in teaching style, no change in habits, and make class environment quieter. Even though these positive impacts, there is a negative impact of using IWB on teaching process. This negative impact is that when he encounters problems related to IWB, he needs to continue lesson with classic method.

According to him, the positive impacts of using IWB on teachers are writing less on the board, more enthusiastic about teaching, more motivated, reduced effort during the lesson, and reduced workloads in the later stages. Even though these positive impacts, negative impact of using IWB on teachers is initially, increased workload. Similarly, there are some positive impacts of using IWB on students and they are; helps to revive subjects in students' eyes/heads, better illustrate in mind, better grasp the subject/grasp more easily/comprehend, increased success, facilitate learning, enhance learning, increase gathering/draw attention of students, increased participation/more participative/more attentive, more encouraging to come up the board, more motivated/increase motivation, more creative/raised creativity, more enthusiastic, provides ease of understanding/understand more easily, better consolidate/reinforce the subject and opportunity to see different types of questions. Even though these positive impacts, negative impact of using IWB on students is dealing with disturbing/extracurricular activities at breaks.

It can be listed the positive impacts of using IWB in terms of time as better time management/use time better, save time/time-saving/gaining time, reduces time spend on writing out on the board, reduces time spend on teaching of the subjects, reduces time spend on lesson preparation, and time flowing fast/time passes/moves faster. Even though these positive impacts, the negative impact of using IWB on time is that initially using IWB requires more preparation time in the beginning. Use of IWB affected his interaction/communication with his students and course contents in terms of declining conversations among students, increased teacher's interaction with course content, increased interaction/communication with students, increased students' interaction with course content, and increased interaction among students.

He has some interaction/communication with other teachers about IWB based on share idea/opinion among teachers, share resource among teachers, and support for the use of IWB. He did not develop any course materials by himself to use in his lessons.

He encountered some issues/challenges while using IWB in his lessons and they are internet/network connection problems, virus problems/not function flash memory, resource (material) problem, touch panel problems/unresponsive boards, damaged, distorted, out of order board, visibility problems (sunlight shines directly onto the board), and not supporting resource formats to run or open. He has some practical solutions to these problems. Firstly, he tries to solve or minimize these problems by himself. Then, if he cannot handle the problem, he gets some technical support by students if possible. Next, if the problem cannot be solved, then ICT teacher makes immediate intervention in terms of technical support. Finally, if there are more serious technical problems related to IWB, technical support by technical service (authorized service) is called by school administration. For using IWB more effectively and more efficiently in teaching process he has some needs/suggestions as follows need refreshing trainings, need training for specific each subject matter, need trainings to use IWB more actively, need to increase the number of trainings/more frequent, need to receive in-service training on an annual basis, and need training about more efficient use of IWB.

4.3.Synthesis of Composite Textural and Composite Structural Descriptions [–III–]

4.3.1. Composite Structural Descriptions & Textural-Structural Descriptions Synthesis & the Essence of the Experience [Step#7]

Rapid adoption and use of IWB in education lead to notable changes in teachers' practices. Use of IWB can be a central element in improving teaching/learning process but teacher needs to remain the most important element in this process. IWB provides appropriate learning stimuli as an auxiliary tool to support the teaching/learning process. Likewise, IWB facilitates and enhances the teaching-learning process by providing a wide range of opportunities for both teachers and students. It also enables students to connect the lesson to the technology they use every day.

There are six structural elements of the experience, which derive from the twenty core themes.

- 1. Impacts on Teachers [IoT]*
- 2. Impacts on Students [IoS]*
- 3. Impacts on Teaching Process [IoTP]*
- 4. Impacts on Interaction/Communication [IoIC]*
- 5. Issues/Challenges [I/C]*
- 6. Suggestions/Needs [S/N]*

Code System	HS1T1	HS1T2	HS1T3	HS1T4	HS1T5	HS1T6	HS1T7	HS2T1	HS2T2	HS2T3	HS2T4	HS2T5	SUM
> Intended use													206
> Teaching resources/materials													150
> Cases students get involved													64
> Mean to have IWB in the classroom													45
> Effects of start using IWB on the climate of class													49
> Comfort level when using IWB													56
> Difference between when (at) first start using IWB and now													110
> Influence on the role of the teacher													74
> Influence on the role of the students													24
> Main reasons to start using IWB													95
> When or in what circumstances start to use IWB													116
> Impacts on teaching process													284
> Impacts on teachers													180
> Impacts on students													391
> Impacts on time													156
> Interaction/Communication													204
> Developing course materials													58
> Issues / Challenges / Barriers													191
> Practical Solutions													132
> Needs / Suggestions													149
Σ SUM	246	218	225	244	215	226	233	234	214	211	255	213	2,734

Figure 5. Code Density Matrix (All Coded Segments related to twenty Core Themes)

Impacts on Teachers [IoT]

Most of the schools and classrooms are equipped with IWBs and replaced with traditional black/white boards. This massive shift from the black/white boards to the IWBs gave rise to adaptation problems to teachers and they tried to cope with adapting IWBs into their teaching process. When teachers were beginner, they did not know how to use the IWB properly. But, when they become more professional/expert, they use IWB more functional in their lessons. Initial phase of IWB use, it took time for teachers to prepare materials by gathering and adapting resources and so their workload increased. But, it reduced the time teachers spend on lesson preparation in the later stages. Hereby, after initial time investment, it also helped teachers to decrease their workload and effort. At first, teachers were nervous, anxious, uncomfortable, excited, inexperienced and slower in terms of using IWB. Likewise, they did not quite know what to do with IWB and losing much time with technical problems at the beginning. After a while, teachers become more comfortable, more confident, more conscious, more practical, more proficient, more experienced and faster in their use of IWB. Additionally, they like to use IWB and they are much better/fluent about using it now. Teachers made more progress and develop/enhance their technological literacy in regard to use of IWB. They are using IWB in their lessons actively. Teachers become more competent with the technology as experiences increase by using IWB and learning through their own efforts as time goes by. Accordingly, IWB allows teachers to reach and integrate many existing electronic multimedia resources in their teaching process. Teachers aim to enhance their teaching process with the use of IWB throughout their subject matter in the school. IWB helps teachers to improve the quality of their teaching materials in order to achieve their teaching aims. IWB enables teachers to save and reuse course materials and so they are saving preparation time in the future. It also provides opportunity to teachers to share saved lesson materials with students. IWB is bringing some changes on traditional teachers' role and shifting some of their power away because of becoming focus of interest. Hereunder, it pushed the role of the teachers somewhat secondary and passivated them from time to time. At times, teachers are still active and still in the lead position as in their traditional positions. IWB is supporting teachers in a more productive working.

Positive Impacts

- **Content/Subject**
 - allows to master subjects // have more comprehensive knowledge
// expands/broaden point of view on the subjects
- **Effort/Workload**
 - later, reduces workload
 - later, reduces effort/endeavor during the lesson
 - makes teacher's work easier // facilitates teacher's work // ease teacher's burden
 - no longer needed to write/draw on the board // writing less on the board
 - no longer needed to carry course materials [e.g. maps, books]
 - not get tired
- **Motivation**
 - focus/concentrate better
 - more motivated/enthusiastic/eager
- **Resources/Materials**
 - allows to use/show images/visuals/videos/documentary/movies/animations
/experiments /maps/simulations/schemes/diagrams/tables/paintings
/3D shapes/auditory
- **Teaching**
 - later, comfortable/confident/conscious/practical/proficient/experienced/faster
/better about using IWB
 - more involved with technology
 - more productive/efficient/effective
 - more organized
 - provides opportunity to personal development/improvement
 - teach better/faster
- **Time**
 - later, reduces the time spent on lesson preparation
 - later, reduces the time spent on teaching of the subjects

Negative Impacts

- initially, requires more lesson preparation time
- initially, increases the time spent on teaching of the subjects
- initially, increases workload
- initially, increases effort/endeavor during the lesson
- initially, nervous/anxious/uncomfortable/excited/inexperienced/slower about using IWB
- makes teacher stagnate/lazy
- pushed the role of the teacher somewhat secondary
- reduces activeness // passivate // inactive

Impacts on Students [IoS]

Utilizing IWB in the classroom adds value to learning processes and has a lot to offer for students by simplifying the teaching processes. Associated with it, IWB provides opportunities for students to better engage with course content. IWB has a positive effect on students' motivation but in order to maximize it IWB should be used in subject-specific cases in teaching/learning process. IWB creates a motivating classroom environment. When students interact with IWB, their motivation, concentration, attention, participation and engagement also increase. Audiovisual aids of IWB promote raising concentration, curiosity, interest and participation in lessons. IWB leads to higher levels of students' active participation and engagement in different circumstances. Motivation is one of the underlying factors in students' success. Thence, IWB contributes to increase in the affective domain of students such as motivation or attention. In time, because of more attractive presentation of materials, IWB becomes the focal point of the lesson and draws more attention of the students and creates a desire to come up to the board in lessons. IWB is very effective in gaining, maintaining and keeping students' attention span for much longer time on the subject compared to old. So, it helps students to concentrate more and to pay better attention to lessons. Using IWB also makes it easier to understand lesson content, learn better and remember for students.

IWB provides opportunity to learn better for different learning styles of students. IWB supports different learning styles by providing variety of resources and a wide range of media. IWB attracts and captivates students' visual, auditory and kinesthetic learning styles. Accordingly, IWB links teaching and learning style to student's needs. So, students become more willingness/eagerness about taking part in the teaching/learning activities. Using IWB helps students to learn subjects better, easier and faster. The advantage of IWB in terms of visibility helps students grasp better abstract or complex concepts/subjects by filling the gap between abstraction and concreteness through animations, simulations, and etc. IWB provides opportunity to facilitate learning process by providing audiovisual lesson materials to students. Each student is learning in their own different ways. While some of the students are

able to learn better with visual, some others are able to learn better with audio, and some of them are tactile learners and they are able to learn by touching and manipulating on IWB. In this respect, IWB helps teachers to draw student's attention and facilitate student's understanding and retention related to course subjects by including audiovisual materials/elements in their teaching process. Thus, it allows students to learn better, remember more and enjoy the lesson by ensuring learning needs of each student are met adequately. Thereby, use of IWB in teaching has yielded improvements in students' comprehension and achievement. Consequently, it provides opportunity to personalization of the learning experience.

Teacher uses IWB and increases the students' participation and engagement in lessons by integrating images, videos and/or audio instead of making one-way presentation. Thus, lessons become more engaging and more productive for both teacher and students.

Students use IWB mainly for making presentations and engage in problem/question solving cases during the lesson. Using IWB promotes, facilitates and enhances students' learning. Thus, use of IWB contributes and increases students' success. In addition, IWB allows students to access/download lesson materials easily and to follow the sequentiality of teaching without the need for writing/taking notes during the lesson. Thus, it reduces the time spent by students to take notes and allows them to pay better attention and better concentrate in order to better understanding of the subjects rather than focusing on taking notes. In addition, being easily accessible to the previous lessons content/materials provides an opportunity for students to go through what was previously covered. Using IWB is also beneficial in terms of answering students' questions and satisfy their curiosity through internet search instantly.

There may be some detrimental effects of using IWB on students such as making them lazy and reducing their efforts. Also, students become engaged in dealing with disturbing/extracurricular activities at breaks. Accordingly, necessary changes need to be made in order to set right these effects.

Positive Impacts

- **Creativeness**
 - more creative
- **Curiosity**
 - helps to satisfy students' curiosity
 - more curious
- **Interest/Attention**
 - more interested/involved
 - more focused // better concentrate
 - pay better attention/increase attention
- **Learning**
 - better grasp/comprehend/grasp more easily
 - better perception
 - better retention // more permanent learning
 - enhance learning
 - facilitate learning
 - helps to revive subjects in students' eyes/heads // better illustrate in mind
 - increase pace of learning
 - learn better/faster/easier
 - more successful // increases success
 - provides ease of understanding // better understanding of the subjects
- **Motivation**
 - more enthusiastic/willingness/eagerness
 - more motivated
- **Participation**
 - more active
 - more confident // more relaxed // more comfortable
 - more participative // enhancing engagement // increases participation
- **Resources/Materials**
 - access/use more and variety of resources // easier to reach different resources
 - easier to access information // reaching information instantly
- **Time**
 - increase listening time
 - reduces/shorten learning time of students
 - reduces the time spent by students to take notes
- **Individually**
 - increase/raise awareness
 - more involved with technology // improved themselves on technology
 - not get bored
 - not get tired // not a burden carrying course materials
 - writing less

Negative Impacts

- dealing with disturbing/extracurricular activities at breaks
- makes students stagnate/lazy
- reduces effort of the students

Student's Access & Use of IWB

- creating/making visual presentations
- doing exercises/drill and practice
- in-class performance work [e.g. make/show experiments/videos]
- inclusion in the subject narrative/engaging in subjects [e.g. moving vectors]
- listen/repeat the pronunciations
- playing games/animations related to subjects [e.g. filling crossword puzzles]
- solving problems/questions



Impacts on Teaching Process [IoTTP]

IWB is a tool to enhance teaching and to support learning. IWB offers flexibility, sequentiality, versatility and convenience in learning. Using IWB brings efficiency, convenience and flexibility in learning by providing opportunity to integrate and display various media/resource types such as images, graphs, shapes, figures, maps, illustrations, sounds, songs, videos, movies, documentaries, animations, educational websites, PowerPoint slides, e-books, pdf and etc. IWB provides opportunity to access and use a wider range of resources/materials. In this way, IWB makes course content more visual. IWB offers a number of benefits in terms of diversifying and enriching the learning process. IWB matches teaching and learning styles to student needs. Use of IWB helps teachers to make their lessons more student-centered. In addition, IWB provides opportunity for teacher to diversification of teaching considering individual differences. IWB enhances teachers' teaching by delivering course content more effectively and efficiently. IWBs is an effective tool for enhancing and facilitating the teaching/learning process. Students tend to learn more easily by visual and auditory modalities and IWB provides enrichment in the visual and auditory sense with this regard. Multimodality feature of IWB provides convenience to combine visual, auditory and textual/verbal in terms of displaying/highlighting. IWB provides better classroom management for teacher and makes it easier them to check/control students.

Visual appeal of the displayed information increases interest in subjects and makes lesson more interesting/attractive. IWB provides different kinds of recourses for teacher in order to teach/clarify difficult, complex and abstract concepts. So, IWB makes the teaching/learning process more concrete than before. IWB enables the lessons more fluent, faster pace, quicker and smoother. It is an efficient tool to reach/solve much more and variety of problems/questions. Additionally, IWB makes review/revision/repetition of subjects easier than before for teacher. It also helps teacher explain subjects more effectively. IWB makes it easier to structure lessons for teacher and makes the teaching process more fun. IWB brings fun and enjoyment

to lessons. Also, IWB facilitates and aids in proper and more efficient classroom management for teacher.

Using IWB has beneficial impact on time management for the teacher. IWB helps teacher to manage time effectively during the lesson. Besides, it saves time in lesson preparation through the reuse of teaching materials.

Using IWB in classroom allows to instant access to various information, content and resources thanks to being connected to the internet. Thus, teachers have opportunity to support, enrich and enhance lessons with images, videos, animations and etc. to deliver effective teaching. It is beneficial the use of such available resources on the internet concerning save both effort and time while enhancing the teaching process.

While searching information on internet using IWB during the lesson, teachers may come across unwanted contents. Likewise, searching for information students are curious about using IWB can lead to loss of time for teachers during the lesson. In addition, If IWB is damaged or encountered problem with it, the teacher continues lesson in a spare classroom with IWB if there is. Otherwise, the teacher continues lesson with classic method and lessons cannot go the way planned in this regard. Also, time problems arise in such cases.

Positive Impacts

- **Content/Subjects**
 - allows/enables to embody/concretize abstract/verbal concepts
 - allows/enables to solve more/faster and different types of questions/problems
 - enables enrichment in auditory sense // supports in terms of auditory
 - enables enrichment in visual sense // supports in terms of visuality // visualization
 - enables enrichment in course content/subjects
 - increases interest in course/lesson/subjects
 - increases chances of going into detail in subjects
 - makes subject simpler // simplifies subject
- **Resources/Materials**
 - allows to access/use more resources
 - enables enrichment in resource diversity // visual material richness
 - provides ease/convenience in presenting lesson materials
 - provides opportunity to reach/show/watch/listen/play materials [e.g. videos, animations]
 - provides opportunity to reuse lesson materials
 - provides opportunity to share lesson materials/resources easily
 - provides opportunity to use materials/resources based on the student's level/learning styles
 - provides opportunity to reach information instantly/more easily
- **Teaching**
 - allows to transfer more information/more easily to students
 - better classroom management
 - better reinforce/consolidate
 - change in habits
 - change in teaching styles
 - draws/takes/attracts/gather more attention
 - enables enrichment in teaching/instruction
 - enhancing teaching
 - facilitating teaching
 - more efficient/productive lessons // more effective teaching
 - more enjoyable/fun/interesting/attractive teaching/lecturing/lesson
 - more fluent/faster pace/quicker lessons
 - more motivating/more encouraging to come up the board
 - provides ease in review/repetition
- **Time**
 - allows/enables to teach more topics/information in less time
 - better time management/use time more efficiently
 - reduces the time spent on lesson preparation
 - reduces the time spent on teaching of the subjects
 - reduces the time spent on writing out on the board
 - saves time/gaining time
 - time flowing fast // time passes faster

Negative Impacts

- encounter problems, continue lesson with classic method
- encounter problems, continue lesson in spare classroom
- encounter problems, classic lesson pass with unpleasant way
- encounter problems, declining interest/harder to gather attention
- encounter problems, lesson cannot go the way planned
- encounter problems, slower lessons
- encounter problems, unable to access information
- initially, requires more preparation time
- time issues related to intensive curriculum occasionally
- time issues when encountering problems



Impacts on Interaction/Communication [IoIC]

The use of IWB makes a difference and leads to changes in patterns of classroom interaction associated with teacher, student and course content. Teachers and students are eager to interact with multimedia course content. IWB allows students and teachers to interact with course content in this regard. Teacher and students interact with the course content by highlighting, drag-and-drop, zoom in-and-out, drawing shapes/figures, matching, moving, problem/question solving, playing educational games, sharing content over the Internet, and etc. by touching on IWB. Likewise, IWB allows students to actively engage with lesson material and manipulate learning objects in this way. So, students become more part of the lesson. IWB is promoting/enhancing and increasing teacher–student, student–student and teacher–teacher interaction/communication. Teacher is better in the eyes of students and students are more pleased with the teacher because teacher is engaged with technology like them. In addition, IWB declines conversations among students during the lesson because of providing advantage in classroom management for teacher. Additionally, IWB has changed the source teachers are looking for. In detail, previously, teachers were searching and collecting information from the books, but now instead, they are using more online resources predominantly. IWB should be used interactively and should not be used as a blackboard replacement in traditional ways. Teachers collaborate/communicate with their colleagues in regard to share idea/opinion and recourses. It is more comfortable sharing of course content and resources for teachers now. Likewise, they interact and get support for the use of IWB from other teachers at school. So, they improve their IWB skills by such means and use more IWB features.

- **Interaction**
 - increases teacher's interaction with course content
 - increases student's interaction with course content
 - changed the source teachers are looking for
- **Communication**
 - increases communication between teacher and student
 - increases communication between student and student
 - increases communication between teacher and teacher
 - declines conversations among students during the lesson
 - share idea/opinion among teachers
 - share resources/materials among teachers
 - support for the use of IWB among teachers



Issues/Challenges [I/C]

Teachers like many features of IWB but they complain about technical problems they face while using it in their lessons occasionally. These technical problems/issues/challenges are many times unexpected and unavoidable, but some of these problems may be avoided by setting up a routine maintenance program related to IWB. Teachers need to be prepared for such nuisances. Teachers try to access to the internet, but because of restricted internet or access-banned websites, they could not find necessary materials/resources. In addition, when sunlight shines directly onto the board through the windows, it could be difficult to see clearly and hard to read. In such cases, teacher may use curtains to avoid/prevent sunlight if the class has curtains. These technical problems make it difficult for teachers to teach lessons and hinder/slow down the teaching process. Technical advice, guidance and support are mainly provided by ICT teacher of the school. The key issues and challenges include:

- **Hardware**
 - damaged/distorted/out of order IWB
 - power cut/failure
 - takes time to open IWB/slowness problem
 - touch panel/unresponsive board problems
 - visibility problems [related to light/size of the IWB]
- **Internet**
 - face/come across unwanted contents on internet
 - internet/network connection problems [restricted internet/access-banned websites]
- **Resources/Materials**
 - insufficient resource/material problems
- **Software**
 - compatibility problems [not supporting file formats/types]
 - deleted files/programs related to course from IWB
 - detecting USB flash drive/mouse problems
 - virus problems
- **Technical Support**
 - trying to solve problems by herself/himself
 - getting help from students to solve problems
 - technical support provided by ICT teacher
 - technical support provided by authorized technical service

Suggestions/Needs [S/N]

Teacher training and their development is essential for the effective use of IWBs. By giving one-time training to teachers is insufficient and not result in the effective use of IWBs. So, teachers need to develop their skills on their own in this regard. Accordingly, more teacher training should be done in order to engage in the technology and help teachers to develop themselves. It is also necessary that teachers need to be trained about how to integrate the IWB into their subject matter. Teacher training is a critical contextual factor for a successful IWB implementation and teachers' suggestions need to be considered concerning their effective use of IWB. Teachers took one- or two-weeks in-service training about using IWB. These trainings were superficial/shallow and did not go beyond theoretical and basic training with IWB. In addition, these trainings are missing pedagogical and subject matter specific use of the IWB. Thus, teachers need training for specific their subject matter more comprehensively. They need more hands-on trainings and more frequently in order to keep constant track of up to date with developments related to IWB practices. Teacher trainings play a vital role in the effective and efficient use of IWBs in the classrooms. Curriculum should be revised/modified/updated in order to get better and efficient use of IWB in lessons. The effectiveness of IWB in lessons is a critical issue and depends on the teacher's knowledge and experiences with regard to IWB. Hence, it is vital to provide more training based on below suggestions and needs in order to improve teachers' IWB skills and competencies. The following suggestions and needs should be taken into consideration.

- **Curriculum**

- need to be revised/modified/updated/refreshed/simplified curriculum

- **Resources/Materials**

- need to adequate resources made by MoNE//need to increase resources/materials
 - need to increase/enrich the number of materials in EBA

- **Training**

- need to increase the number of trainings//more frequent trainings
 - need to more comprehensive/refreshing/practical/hands-on trainings
 - need to trainings for developing/preparation of course materials
 - need to trainings for specific each subject matter

To sum up, according to the teachers, the IWB they used in the teaching processes provided undeniable opportunities for both teacher and student in various topics.



CHAPTER 5

DISCUSSION & CONCLUSION

This study investigates the lived experiences of high school teachers with different subject matters pertaining to the use of IWB. The essence of the experience involves six elements and these are; (1) *Impacts on Teachers [IoT]*, (2) *Impacts on Students [IoS]*, (3) *Impacts on Teaching Process [IoTP]*, (4) *Impacts on Interaction/Communication [IoIC]*, (5) *Issues/Challenges [I/C]*, and (6) *Suggestions/Needs [S/N]*. This study has yielded a wide range of information in accordance with phenomenological method from the experiences of the teachers. Accordingly, this chapter presents a summary of the findings, a discussion of how the results differ from previous researches, and some implications for future studies.

The teachers tried to embrace IWB technology for both their and students' benefit since the beginning. Teachers' personal interest in technology leads them to use IWB in their lessons actively. Teachers' technological competence facilitates their transition to the use of IWB in their teaching process. On the other hand, the use of IWB is seen as a threat to some teachers who lack ICT literacy. In this respect, inadequate technological competency is the main obstacle for using IWB in the classrooms. They learned and used this technology in their teaching on their own because they were not adequately trained in the first place. Besides, teachers are not capable of designing and developing their course materials to use in their lessons. Therefore, most teachers prefer to use pre-prepared materials instead of developing their own materials. Thus, the continued need for trainings to develop teachers' teaching and to overcome obstacles they encounter still exists and needs to be resolved.

Having an IWB in the classroom shaped and altered the teacher's teaching and the student's learning somehow. IWB has the potential to offer many opportunities for teachers and students regarding the teaching-learning process. Using IWB makes them better teachers by allowing them to master their subject matter with having more comprehensive knowledge. Likewise, it helps teachers to broaden the point of view on the subjects. When teachers gain more experience with IWB, it led to an increase in their technological skills. So, teachers feel more confident about using IWB in their lessons. Moreover, IWB gives teachers the ability to reuse lesson materials and repetition/review lessons more easily than before. Although teachers were uncomfortable teaching with IWB at first, they got used to it and use it more comfortable afterwards. Teachers mainly used the IWB for showing images, videos, documentary, movies, animations, experiments, maps, simulations, schemes, diagrams, tables, paintings, 3D shapes. In short, they used IWB for presenting visual or auditory materials according to the lesson content.

Accordingly, Schuck & Kearney (2007) reported that teachers are more enthusiastic to teach with the help of IWB similar to my findings. Also, IWB allows teachers to teach more effectively (Kennewell, 2001; Levy, 2002; Gray et al., 2005). In addition, consistent with my findings, use of IWB increased the preparation time of teachers into their lessons at the beginning (Schuck & Kearney, 2007). But, later, it reduced the preparation time of teachers for their lessons (Bennett & Lockyer, 2008). In contrast to my findings, the teacher is the key factor and the most crucial element in teaching in terms of the role of the teacher (Miller et al., 2004). Besides, parallel with my findings, although using IWB increased workload at the beginning, now it reduced workload of the teacher (Demircioğlu & Yadigaroğlu, 2014). Additionally, the teachers are enthusiastic about their teaching tasks and save time with the help of reuse lesson materials. Teachers no longer needed to write on the board owing to electronic materials and so it leads to making the pace of lessons faster (Bennett & Lockyer, 2008).

Use of IWB in lessons has yielded improvements in students' learning, success, motivation, engagement, interest, concentration, comprehension, perception, and retention. Accordingly, IWB facilitates the learning process and maintain students' interest and increase participation by stimulating curiosity. The curiosity of the students towards IWB can be seen as a distraction for them but one reason for the increase in their participation in class can be expressed as their curiosity towards IWB. Likewise, teachers also increase students' engagement levels and motivation in teaching by using IWB. So, students' willingness tends to increase with this respect. Similarly, using IWB enhances learning and makes subjects more attractive to students. In addition, IWB offers students to access/use more and a variety of resources instantly and easily. IWB enhances interaction and communication between teacher and students by making lessons more effective and granting interaction with course content. Accordingly, students' interaction with course content results in ease of understanding and better retention. Associatively, teaching with IWB is has a positive impact on improving students' success. In addition,

students are enthusiastic about multimedia capabilities and fun/enjoyment aspects of IWB that brought to the teaching-learning process.

Consistent with my findings was the studies completed by Beeland, 2002; Glover et al., 2007; Jankowska & Atalay, 2008; Morgan, 2008; Cravey, 2009; Erduran and Tataroğlu, 2010; Miller & Glover, 2010, Tirotta, Torff & Tirotta, 2010 reported that IWB helped students to concentrate and increase their participation, engagement and interest during lessons. Similarly, the audiovisual aids of IWB contribute to raising students' concentration, curiosity and active participation in lessons (Schwimmer and Gutman, 2011). IWB enables students to engage in classroom activities such as problem-solving more actively (Morgan, 2008). Besides, use of the IWB in lessons helped students to comprehend better, and increased their attention (Gursul and Tozmaz, 2010; Kaya and Aydın, 2011). Likewise, according to Chin (2004), when the teacher uses IWB in the classroom, the students pay more attention to the course content. Furthermore, my results were similar to the findings by Thompson & Flecknoe, 2003; Smith et al., 2006; Lewin et al., 2008; Slay et al., 2008; Ekici, 2008; Akdemir, 2009; Tezer and Deniz, 2009; Akçayı, 2011; Yorgancı and Terzioğlu, 2013; Tunaboğlu and Demir, 2017 reported that the usage of IWB in lessons increased the success/achievement of students when compared to the past. Visual and auditory features of the IWB ensure students to learn more easily (Rule, Stefanich, Boody & Peiffer, 2011). In addition, parallel with my findings, using IWB has a positive effect on student motivation (BECTA, 2003; Armstrong et al., 2005; Walker, 2005; Schmid, 2006; Martin, 2007; Schroeder, 2007; Schuck & Kearney, 2007; Shenton & Pagett, 2007; Lewin et al., 2008; Wood & Ashfield, 2008; Erduran and Tataroğlu, 2010; Cintia, Gheorghiu & Colibaba, 2014). Relatively, the visual appeal of the IWB is considered as one of the main stimulating aspects of motivation (Smith et al., 2006; Slay et al., 2008). In relation, motivation increases participation and attention span of students during lesson (Akbaş & Pektaş, 2011; Ermiş, 2012). According to Schroeder (2007), IWB has positive impacts on the affective domain such as student's motivation, attention, self-esteem, social interaction and etc. Similarly, Elaziz (2008) reported that use of IWB in lessons motivates students.

Besides, students are more eager about taking part in the classroom activities with the use of IWB (Gillen et al., 2007; Birişçi and Uzun, 2014).

Using IWB potentially facilitates the transfer of more information to students in terms of teaching process. Likewise, it enables to teach more information in less time and leads to save time. IWB also provides opportunity to reach information instantly and more easily but it brings about some potential risk of encountering unwanted content on the Internet during the lesson. Therefore, the teachers should consider concern regarding the use of the Internet and need to keep in mind the possibility of encountering such things. Furthermore, IWB helps teachers to select suitable materials/resources based on the student's level by considering the student's learning style. Similarly, IWB helps in bridging the differences of students regarding their learning styles, interest levels, or abilities. IWB brings a positive contribution to the teaching-learning process thanks to appealing to the multi-sensory of students, providing different learning environments for different learning styles and offering opportunities to do more exercises. In lessons, IWB provides rich learning environments regarding visibility and auditory aspects. Besides, teachers can transfer abstract knowledge to concrete knowledge by enabling them to embody abstract concepts. Moreover, using IWB allows solving more and different types of questions by enabling enrichment in resource diversity. IWB aids teachers in enhancing teaching by differentiating instruction. Furthermore, IWB allows to access/use more resources and a variety of audio and visual materials.

According to Solvie, 2007; Glover et al., 2007, using IWB has a positive effect on teaching and learning. Parallel with this, using IWB is enhancing teaching and learning (Kristian & Lynn, 2011; Yang & Teng, 2014; Ghavifekr & Rosdy, 2015). Likewise, IWB is enriching the learning process (Lopez, 2010). In accordance with, IWB has a change in the teaching styles of the teachers (Bidaki and Mobasheri, 2013). Additionally, teacher integrates and uses IWB as visual support by placing it the focal point of the lesson in order to gather the attention of the students (Glover et al., 2005a). In addition, consistent with my study, Miller & Glover, 2010; Ateş, 2010; Gülce, 2014 reported that IWB usage led to faster pace lessons and allowed teachers

to teach faster and better. Similarly, Orr (2008) indicated that using IWB increased the pace of the lessons, and allows the students to understand the subjects better. Moreover, my results were similar to the findings by Weimer, 2001; Thompson & Flecknoe, 2003; Wall et al., 2005; Schuck & Kearney, 2007; Slay et al., 2008; Miller & Glover, 2010, IWB provides opportunities to match teaching to student learning styles. Likewise, Comi et al. (2017) reported that the accessibility of the variety of teaching materials helps teachers to make their lessons more student-centered and arrange it to their students' levels. IWB provides teachers with reach to different kinds of audio and visual materials as soon as possible (Bush, 1997; Walker, 2005). Similarly, IWB provides opportunities for teachers to integrate multimedia resources into their lessons (Levy, 2002). Additionally, The IWB enables manipulation of course content and allows the presentation of spontaneous content on the board (Kurtz, Kochavi, & David, 2013). In addition, the use of IWB enables the lesson materials to be reused (Walker, 2005). With the integration of IWB into a classroom, teaching and learning are enhanced because interaction with course content physically increases students' motivation (Beeland, 2002). Thus, IWB helps students increase participation and engagement in lessons (Levy, 2002; Soares, 2010). In addition, Bettsworth (2010) noted that using IWB enhances the understanding of subjects. Moreover, IWB helps to embody abstract subjects by visualizing to the students (Birişci and Uzun, 2014; Koştur and Türkoğlu, 2017). Also, IWB provides ease in reviewing/repetition for previous subjects (Digregorio & Sobel-Lojeski, 2010). IWB also provides easy access to information/resources via Internet (Khan, Mayers, Gowen & Bergman, 2014). Using IWB provides an opportunity to reuse lesson materials (Karsenti, 2016). It saves time during the lessons for the teacher (Beauchamp & Parkinson 2005; Tertemiz, Sahin, Can & Duzgun, 2015). Furthermore, IWB makes lessons more fun and comfortable for the students (Shenton & Padgett, 2007). Also, the use of IWB makes the teaching-learning process more concrete for students who have trouble with abstract subjects (Preston & Mowbray, 2008; Bui, 2009).

Using IWB increased teacher's and student's interaction with course content by touching, writing, drawing, dragging, or manipulating an object with their hands. In addition, teachers communicate and share their experiences, ideas/opinions, resources/materials, or supports for the use of IWB with other teachers at school. This communication helps teachers in creating more effective instruction/teaching.

Accordingly, IWB helps in making lessons more interactive (Smith et al., 2006). Likewise, Digregorio and Sobel-Lojeski (2010) reported that using IWB helps not also display course content but also interacting with it. According to Davies, 2007; Hennessy, 2011; Sad & Özhan, 2012, the use of IWB helps enhance interaction between the teacher and students. Likewise, the use of the IWB contributes to the understanding of the subjects, to the interaction between students and teachers, to the interaction between students and content, and to the interaction among the students themselves (Schwimmer and Gutman, 2011). Also, IWB allows teachers to manipulate lesson materials by touching and interacting with the board physically, so this helps to enhance the communication and interaction in the classroom. (Gerard et al., 1999; Türel & Demirli, 2010). Likewise, IWB provides opportunities to students for interaction with course content and they enjoy interacting physically with it (BECTA, 2003). In parallel, IWB helps to increase student interaction with the lesson content (Kent, 2004). Furthermore, the use of IWB increased interaction and collaboration among students (Bettsworth, 2010). Consistent with my results, Mercer, Hennessy and Warwick (2010) reported that the interactive features of the IWB promotes communication in the classroom.

Teachers had some difficulties and felt uncomfortable linked with technical issues such as damaged/distorted/out of order IWB; deleted files/programs related to course from IWB; detecting USB flash drive/mouse problems; face/come across unwanted contents on internet; hardware/software compatibility problems; internet/network connection problems; insufficient resource/material problems; power cut/failure; takes time to open IWB/slowness problem; touch panel/unresponsive board problems; virus problems; and visibility problems related to IWB during the lesson. In detail, for example, there are some visibility problems related to sunlight shining

on the IWB and preventing students from seeing what is on it correctly and it is identified as problematic for teachers. In similar cases, teachers try to solve and overcome such problems by themselves at first hand. But, if the problem cannot be solved by the teacher, the ICT teacher of the school intervenes and tries to solve it. If there is a situation that exceeds the ICT teacher, the authorized technical service is called by the school administration. In such cases, teachers switch from using IWB to the classical teaching method with blackboard. But, both teachers and students are not satisfied with this situation. Hence, according to teachers, technical issues/problems are critical barriers to using IWB in their classrooms and limit their teaching process.

According to Miller et al., 2004; Glover et al., 2005a; Thompson & Flecknoe, 2003; and Schuck & Kearny, 2007, technical issues/problems and provided support are important contextual factors for a prominent IWB implementation and need to be considered. Likewise, location and visibility of the IWB are the other contextual factors to prevent visibility problems and to provide accessibility for both teachers and students (Smith et al., 2005; Glover et al., 2005b; Higgins et al., 2007; Solvie, 2007). Besides, when light shines in through the windows onto the screen of the IWB, students are not being able to see what is on the IWB (Smith 2001). Consistent with my findings DfES/National Grid for Learning, NGfL 2002; Wall, Higgins and Smith (2005) reported that encountering technical problems with IWB lead to disruption, delay, and frustration for both teacher and student. Additionally, when teachers try to overcome the technical problems regarding the use of IWB, this causes wasteful and time-consuming for their teaching process (Campbell and Martin, 2010). Besides, while using the internet with IWB to reach information during the lesson, teachers come across unwanted content (Keleş and Turan, 2015).

The needs and suggestions derive from the experiences of teachers. To address the needs, it should be provided teachers training based on their specific subject matter. Teachers need to be trained in pedagogical and technology literacy in order to use IWB more efficiently and more effectively. Because, providing a one-time training to teachers is not likely to result in the effective use of IWB. Also, it should be

provided unlimited access to the internet for teachers. In addition, the curriculum should be changed and adjust with regard to teachers' needs. Teachers' success in adapting and integrating IWB depends on the fulfillment of their needs and subject to get training to support their professional development in this regard.

My results were similar to the findings by Armstrong et al. 2005; Hall & Higgins, 2005; Glover et al., 2007; Wood & Ashfield, 2008, teacher training is vital to engage in technology and develop technological competence for the effective and efficient use of IWB in lessons. In addition, consistent with my study, Smith et al., 2006; Schuck & Kearney, 2007; Shenton & Pagett, 2007; Lewin et al., 2008 found that teachers need to be trained with respect to how to integrate the IWB into their subject matter. Besides, teachers need to do hands-on practice in order to improve their skills and keep themselves up to date (Miller et al., 2004; Hall & Higgins, 2005; Martin, 2007; Slay et al., 2008). Likewise, collaboration and sharing experiences with colleagues, and getting more training about IWB helps teachers to improve their IWB competency and teaching (Lai, 2010; Türel and Johnson, 2012). In addition, teachers need to get training in order to continue their professional development and efficient-effective use of IWB in their teaching (Reedy, 2008; Bidaki and Mobasheri, 2013). Additionally, teachers request training based on their subject matters because the training they got before was not sufficient in terms of content, duration and pedagogical (Banoğlu, et al., 2014; Birişçi and Uzun, 2014; Akcaoğlu et al., 2015). The needs in terms of in-service training, proficient technical support, and curriculum revision are listed by teachers as a sine qua non of successful integration (Somyürek et al., 2009). Similarly, teachers demand EBA (Educational Informatics Network by MoNE) website content to be enriched (Demircioğlu & Yadigaroğlu, 2014). Likewise, infrastructure deficiencies and restricted network or the internet are the other technical problems teachers encounter (Birişçi and Uzun, 2014; Akcaoğlu et al., 2015).

Teachers carry the main responsibility for the success of the teaching-learning process. In this process, the teacher navigates and manages the instruction and students as a leader of the classroom. Such technologies like IWB diversify and

enrich the teaching-learning process on the road to success. In achieving this goal depends on the adequate training of the teacher mainly. To conclude, the teacher is a vital dimension of the effective implementation of the IWB in the teaching-learning process.

To sum up, despite the issues, barriers and challenges, the overall benefits of IWB are outnumbering its detriments.



Implications & Recommendations

This study provides valuable insights and a clear understanding of the impacts of using IWB in terms of different subject matter teachers' perspectives. Also, the findings of this study have broad implications for teachers, students, administrators, and policymakers. In detail, the implications of this study include some benefits and detriments of using IWB on teachers, students, teaching process, and interaction/communication. Also, it consists of encountered issues/challenges and suggestions/needs. They are organized under the six categories and discussed in further detail above.

Practical Implications and Recommendations for Stakeholders

The practical implications of this study would be helpful to *School Administrators/Principals* and *Policy Makers/Ministry of National Education (MoNE)* by giving a better insight according to needs of the teachers. Utilization of IWB in the classroom in order to improve conditions for teaching and learning is not just about the hardware. It is also about spending a great deal of time and effort in terms of teachers. Accordingly, successful integration of IWB into education depends on the critical factors. In this respect, teacher quality is the key in order to ensure the desired results.

Improving the quality of the teachers and meeting the needs/demands of the teachers are the important determinants for the successful integration of IWB into education. Otherwise, it gives rise to having unhappy and frustrated teachers in their classrooms. For this reason, the demands/needs/suggestions of teachers should be taken into consideration by the stakeholders in regard to using IWB effectively in the lessons.

For Teachers

In terms of in-service trainings, MoNE should give more frequent trainings with a more comprehensive/refreshing way to the teachers. Additionally, MoNE should provide teachers more practical/hands-on trainings related to IWB. Besides, MoNE should give teachers trainings for developing/preparation of course materials for

their subject matter. Lastly, MoNE should provide trainings for specific each subject matter.

For School Administrators/Principals

Necessary improvements should be made in terms of the infrastructure and technical support of schools and possible problems should be minimized by setting up a routine maintenance program related to IWB.

For Policy Makers/Ministry of National Education (MoNE)

In terms of curriculum, it should be revised/modified/updated/refreshed/simplified to keep up with in the process of technology integration. In terms of resources/materials, MoNE should provide sufficient and quality of the resources/materials. Similarly, MoNE should enrich the materials in EBA.

Limitations & Suggestions for Future Study

Since this study represents the phenomenological investigation of the lived experience of high school teachers with different subject matters pertaining to the use of IWB, additional research is needed regarding different methodologies with a similar sample. Even though many studies in the literature have shown positive impacts of using IWB; there are fewer results with respect to the true impact of it on both teacher and student. Accordingly, there is not a consensus on the effects of using IWB. Hence, conflicting and contradictory results in the literature create need conducting empirical-based studies in this respect. In addition, future researches should take into consideration the context in which IWBs are used. Because, contextual factors such as school culture, classroom setup, technical support, teacher training, and etc. are important to consider to explain the impacts of using IWB. Besides, generalization is not the focus of interest in phenomenological studies (Seidman, 1998; Creswell, 2007). Hence, generalization was not assumed in this study.

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APPENDICES

A. Human Subjects Ethics Committee Approval

UYGULAMALI ETİK ARAŞTIRMA MERKEZİ
APPLIED ETHICS RESEARCH CENTER



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15 EYLÜL 2015

Gönderilen: Prof. Dr. İbrahim Soner YILDIRIM

Bilgisayar ve Öğretim Teknolojileri Bölümü

Gönderen: Prof. Dr. Canan SÜMER

İnsan Araştırmaları Komisyonu Başkanı

İlgi: Etik Onayı

Danışmanlığını yapmış olduğunuz Bilgisayar ve Öğretim Teknolojileri Bölümü Doktora Öğrencisi öğrencisi Yunus ALKIŞ'ın "THE LIVED EXPERIENCES OF HIGH SCHOOL TEACHERS WITH DIFFERENT SUBJECT MATTERS PERTAINING TO THE USE OF INTERACTIVE WHITEBOARD (IWB): A PHENOMENOLOGICAL STUDY " isimli araştırması İnsan Araştırmaları Komisyonu tarafından uygun görülerek gerekli onay 01.10.2015 -01.10.2016 tarihleri arasında geçerli olmak üzere verilmiştir.

Bilgilerinize saygılarımla sunarım.

Prof. Dr. Canan SÜMER

Uygulamalı Etik Araştırma Merkezi
İnsan Araştırmaları Komisyonu Başkanı

This section will be filled in by the HSEC

Project No: 2015-PEN-048

HUMAN SUBJECTS ETHICS COMMITTEE
EVALUATION OUTCOME

Dear Reviewer,

Please indicate the result of your review by first marking one of the following three choices. If you mark option two ("Revision is Needed") or option three ("Reject"), please provide explanations for your decision.

Date of evaluation:

Signature:

1.	No revision is required. Data collection can be started <u>X</u>
2.	Revision is needed _____ a. The informed consent form has not been provided _____ b. The informed consent form is incomplete _____ Comments: _____ c. The debriefing form has not been provided _____ d. The debriefing form is incomplete _____ Comments: _____ e. Questions/items or procedures that can cause discomfort are involved _____ Comments: _____ f. Other _____ Comments: _____
3.	Rejected _____ Comments: _____

B. Informed Consent Letter Form

GÖNÜLLÜ KATILIM FORMU

Bu araştırma, Orta Doğu Teknik Üniversitesi, Eğitim Fakültesi, Bilgisayar ve Öğretim Teknolojileri Eğitimi Bölümü'nde Prof. Dr. İ. Soner YILDIRIM danışmanlığında, araştırma görevlisi Yunus ALKIŞ tarafından doktora tezi kapsamında yürütülmekte olan bir olgu bilim/ fenomenoloji çalışmasıdır. Bu çalışmanın temel amacı, kendi derslerinde öğretim amaçlı etkileşimli tahta kullanan farklı branşlardaki lise öğretmenlerinin yaşamış deneyimlerini derinlemesine anlamak ve tanımlamak ve bu olguyla ilgili yaşadıkları deneyimlerin özüne varmaktır. Çalışmaya katılım tamamıyla gönüllülük esasına dayanmaktadır. Görüşme süresince, sizden kimlik belirleyici hiçbir bilgi istenmeyecektir. Cevaplarınız tamamıyla gizli tutulacak ve sadece araştırmacı tarafından değerlendirilecektir. Elde edilecek bilgiler bilimsel amaçlı kullanılacaktır.

Görüşme, genel olarak kişisel rahatsızlık verecek sorular içermemektedir. Ancak, katılım sırasında sorulardan ya da başka bir nedenden ötürü kendinizi rahatsız hissederseniz cevaplama işini yarıda bırakıp çıkabilirsiniz. Böyle bir durumda araştırmacıya, görüşmeyi bitirmek istediğinizi söylemeniz yeterli olacaktır. Görüşme sonunda, bu çalışmayla ilgili sorularınız cevaplanacaktır. Çalışmaya katıldığınız için şimdiden teşekkür ederiz. Çalışma hakkında daha fazla bilgi almak için Orta Doğu Teknik Üniversitesi Eğitim Fakültesi Bilgisayar ve Öğretim Teknolojileri Eğitimi Bölümü öğretim üyelerinden Prof. Dr. İ. Soner YILDIRIM (Oda: C103; Tel: 210 4057; E-posta: soner@metu.edu.tr) ya da araştırma görevlisi Yunus ALKIŞ (Oda: SRM BIOB; Tel: 210 4982; E-posta: yunus@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).

Ad Soyad

Tarih

İmza

Branş

----/----/----

C. Demographic Information Form

DEMOGRAFİK BİLGİLER

GÖRÜŞME BİLGİLERİ

ID :

Takma Ad :

Tarih :

Yer :

Başlama Saati :

Bitiş Saati :

Kayıt Süresi :

KİŞİSEL BİLGİLER

Cinsiyet :

Yaş :

İLETİŞİM BİLGİLERİ

Telefon :

E-posta :

EĞİTİM BİLGİLERİ

Branş :

Derece (Lisans, Yüksek Lisans, Doktora) :

Öğretmenlikte geçirilen süre :

D. Data Collection Tool [Interview Questions]

GÖRÜŞME SORULARI

1. Branşınız nedir?
2. Ne kadar süredir öğretmenlik yapıyorsunuz?
3. Etkileşimli tahta kullanımı ile ilgili daha önceden herhangi bir eğitim aldınız mı?
 - Öğretmen Eğitimi, Kurs, Seminer, Çalıştay vb.?
 - Nerede ve ne zaman eğitim aldınız?
 - Ne kadar süreyle bu eğitimi aldınız?
 - Aldığınız bu eğitim yeterli miydi?
 - Aldığınız bu eğitim yeterli değil ise eksik yönleri sizce nelerdir?
 - Ne tür eğitimlere ihtiyaç duyuyorsunuz / ne tür eğitimler sağlanmalı?
 - Bundan sonraki eğitimlerde ne tür faaliyetlerin olmasını isterdiniz?
4. Derslerinizde etkileşimli tahta kullanımınız ve deneyimleriniz hakkında genel olarak bilgi verebilir misiniz?
 - Etkileşimli tahtayı ne zamandan beri kullanıyorsunuz?
 - Etkileşimli tahta kullanım sıklığınız nedir?
 - Etkileşimli tahtayı derslerinizde hangi amaçlarla kullanıyorsunuz?
 - Etkileşimli tahta kullanımına en çok hangi konularda ihtiyaç duyuyorsunuz?
 - Derslerinizde etkileşimli tahta kullanırken ne tür kaynaklar kullanırsınız? (Eğitim Bilişim Ağı (EBA), Videolar, Resimler, Animasyonlar, Word, PDF, Web siteleri)
 - Hangi kaynakları hangi amaçlar için kullanıyorsunuz?
5. Etkileşimli tahtayı kullandığınız bir dersinizi anlatır mısınız?
 - Etkileşimli tahtayı ne zaman açarsınız?
 - Etkileşimli tahtayı ne zaman kapatırsınız?
 - Etkileşimli tahtanın hangi özelliklerini kullanırsınız?
 - Etkileşimli tahtada neler yaparsınız / ne gibi etkinlikler yaparsınız?
 - Hangi durumlarda öğrenciler etkileşimli tahtayı kullanarak gerçekleştirecekleri etkinliklere katılıyorlar/dahil oluyorlar?

6. Sınıfınızda bir etkileşimli tahta olması sizin için ne anlama geliyor?

- Derslerinizde etkileşimli tahta kullanmaya başlamanız sınıfınızın havasını/iklimini nasıl etkiledi/değiřtirdi?
- Derslerinizde etkileşimli tahta kullanırken ki konfor düzeyiniz hakkında bilgi verebilir misiniz? (Gergin hissetmek vb.)
- Etkileşimli tahtayı derslerinizde ilk kullanmaya başladığınız zaman ile řu an arasında bir fark görüyor musunuz? Nasıl?
- Etkileşimli tahta kullanılması derslerde öğretmenin rolünü nasıl etkiledi?
- Etkileşimli tahta kullanılması derslerde öğrencinin rolünü nasıl etkiledi?

7. Etkileşimli tahtayı derslerinizde kullanımınız ile ilgili ne tür deneyimleriniz oldu?

- Etkileşimli tahtayı derslerinizde neden kullanmaya başladınız?
- Başlıca nedenler nelerdir?
- Bu deneyimleriniz sizi nasıl etkiledi?
- Etkileşimli tahta ile ilgili önceki deneyimleriniz sonraki deneyimlerinizi nasıl/hangi yönde etkiledi?
- Örnek verebilir misiniz?

8. Etkileşimli tahtayı derslerinizde kullanımınızla ilgili deneyimlerinizde hangi durumlar etkili oldu?

- Derslerinizde ne zaman veya hangi durumlarda daha sık etkileşimli tahta kullanmaya başladınız? Neden?
- Derslerinizde ne zaman veya hangi durumlarda daha az etkileşimli tahta kullanmaya başladınız? Neden?

9. Etkileşimli tahtayı derslerinizde kullanmanızın öğretim sürecinizin/uygulamalarınızın üzerinde ne gibi etkileri oldu?

- Derslerinizde etkileşimli tahta kullanımınızın öğretim sürecinize ne gibi katkılar sağladığından/avantajlarından bahseder misiniz?
- Derslerinizde etkileşimli tahta kullanımınızın öğretim süreciniz üzerinde ki olumsuz etkilerinden/dezavantajlarından bahseder misiniz?
- Derslerinizde etkileşimli tahta kullanmaya başladığınızdan beri öğretim stilinizin veya alışkanlıklarınızın nasıl değiştiğini açıklayabilir misiniz? Daha detaylı açıklar mısınız?
- Örnek verebilir misiniz?

10. Derslerinizde etkileşimli tahta kullanırken zaman algınız nedir?

- Zaman daha mı yavaş akıyor yoksa daha mı hızlı?
- Derslerinizde etkileşimli tahta kullanırken zaman yönetimi ile ilgili ne düşünüyorsunuz?
- Zaman sorunu ile nasıl başa çıkıyorsunuz?

11. Etkileşimli tahtayı derslerinizde kullanmaya başladığınızdan beri dersleri planlama ve konuların öğretimine harcadığınız zaman nasıl değişti?

- Etkileşimli tahtayı kullanacağınız bir dersi tasarlarken ne kadar zaman ayırıyorsunuz?
- Arttı mı yoksa azaldı mı? Neden?
- Zamanın artması veya azalmasında etkili olan şeyler nelerdir?
- Örnek verebilir misiniz? (Web tabanlı kaynakların sunumu/kullanımı, Hazır kaynaklar vb.)

12. Derslerinizde etkileşimli tahta kullanmanız öğrencilerinizle ve ders içerikleriyle olan etkileşiminizi/iletişiminizi nasıl etkiledi?

- Öğrencilerin sizinle (öğretmeniyle) etkileşiminizi/iletişiminizi nasıl etkiledi?
- Öğrencilerin kendi aralarındaki etkileşimini/iletişimini nasıl etkiledi?
- Sizin ders içerikleriyle etkileşiminizi nasıl etkiledi?
- Öğrencilerin ders içerikleriyle etkileşimini nasıl etkiledi?

13. Derslerinizde etkileşimli tahta kullanmanızın sizin için genel olarak ne gibi etkilerini (fayda veya zarar) gördünüz?

- Kaynak çeşitliliği açısından bir etkisi oldu mu? (Çok çeşitli ve hareketli kaynakları derslere entegre/dahil etmenizi sağladı mı?)
- Motivasyonunuzu nasıl etkiledi?
- Çalışma yükünüzü nasıl etkiledi? Derslerinizde harcadığınız çabayı/gayreti azalttı mı? (Etkileşimli tahtanın üzerindeki notların kaydedilmesi ve daha sonra değiştirilmesi, çıktı alınması, paylaşılması, tekrar kullanılması vb.)

14. Derslerinizde etkileşimli tahta kullanmanızın öğrenciler açısından genel olarak ne gibi etkilerini (fayda veya zarar) gördünüz?

- Derslerinizde etkileşimli tahta kullanmanıza öğrencilerinizin nasıl bir tepkisi oldu?
- Motivasyonlarını nasıl etkiledi?
- Hangi durumlarda öğrencilerin motivasyonunun ve derse katılımlarında değişimler gördünüz?
- Öğrencilerin öğrenmesi üzerine ne gibi etkisi oldu?
- Öğrencilerin başarısını nasıl etkiledi?
- Öğrencilerin not almak için harcadıkları zamanı nasıl etkiledi?
- Karmaşık ve zor kavramları öğrenmelerini nasıl etkiledi?
- Çeşitli öğrenme stillerine yönelik çeşitli kaynaklar sunmanız başarılarını nasıl etkiledi?
- Öğrencilerin derslerdeki yaratıcılıklarını nasıl etkiledi? (Sunumlarda vb.)

15. Derslerde etkileşimli tahta kullanımı ile ilgili okuldaki öğretmenlerle ne tür etkileşiminiz/iletişiminiz oldu? (Fikir alışverişi, kaynak paylaşımı vb.)

- Derslerinde etkileşimli tahta kullanan kendi branşınızdaki öğretmenlerle aranızdaki etkileşimi/iletişimi anlatabilir misiniz?
- Derslerinde etkileşimli tahta kullanan diğer branşlardaki öğretmenlerle aranızdaki etkileşimi/iletişimi anlatabilir misiniz?
- Derslerinde etkileşimli tahta kullanmayan öğretmenlerle aranızdaki etkileşimi/iletişimi anlatabilir misiniz?

16. Derslerinizde kullanmak için kendinizin geliştirdiği materyaller var mı?

- Varsa neler?
- Bu materyalleri geliştirirken yardım alıyor musunuz?
- Bu materyaller dersleriniz için yeterli geliyor mu?
- Bu materyalleri geliştirirken ne tür sorunlarla karşılaşıyorsunuz?

17. Etkileşimli tahtayı derslerinizde kullanırken ne gibi sorunlar/zorluklar/engellerle karşılaşıyorsunuz?

- Etkileşimli tahtaya erişim ve kullanım zorluğu? (Ders dışında kapalı olması, öğrencilerin kullanımına izin verilmemesi vb.)
- Etkileşimli tahtanın sınıftaki konumu?
- Etkileşimli tahta üzerindeki okunamaması, dışarıdan gelen ışıkla ekranın parlaması vb. problemler?
- Teknik destek, Ağ bağlantısı gibi sorunlar?
- Teknik problemler (donanımsal, yazılımsal), teknik altyapı problemleri?
- Kaynak sıkıntısı (yetersiz materyaller)?

18. Etkileşimli tahta kullanırken karşılaştığınız sorunları nasıl çözüyorsunuz veya en aza indirmek için neler yapıyorsunuz?

- Kendiniz mi çözüyorsunuz?
- Yetkili servis mi çağırıyorsunuz?
- Bilgisayar öğretmeninden yardım mı istiyorsunuz?
- Aldığınız bu yardımlar yeterli mi?

19. Etkileşimli tahtanın derslerde branşınız açısından öğretim sürecinde daha etkin/daha verimli bir şekilde kullanılması için önerileriniz/tavsiyeleriniz nelerdir?

- Öğretmenler açısından neler yapılmalı?
- Öğrenciler açısından neler yapılmalı?

E. Debriefing Form

KATILIM SONRASI BİLGİ FORMU

Bu araştırma, daha önce de belirtildiği gibi, Orta Doğu Teknik Üniversitesi, Eğitim Fakültesi, Bilgisayar ve Öğretim Teknolojileri Eğitimi Bölümü'nde Prof. Dr. İ. Soner YILDIRIM danışmanlığında, araştırma görevlisi Yunus ALKIŞ tarafından doktora tezi kapsamında yürütülmekte olan bir olgu bilim/fenomenoloji çalışmasıdır. Bu çalışmanın temel amacı, kendi derslerinde öğretim amaçlı etkileşimli tahta kullanan farklı branşlardaki lise öğretmenlerinin yaşanmış deneyimlerini derinlemesine anlamak ve tanımlamak ve bu olguyla ilgili yaşadıkları deneyimlerin özüne varmaktır.

Elde edilen bulgular ışığında, etkileşimli tahtaların okullarda farklı branş öğretmenleri tarafından daha etkin olarak kullanılabilmesi için nelere ihtiyaç duydukları ve bu süreçte ne tür sorunlarla karşılaştıkları çeşitli boyutlarda belirlenecektir. Bu yüzden, sınıflarda daha etkin bir öğrenme ortamı sağlanmasına yönelik katkılarından dolayı öğretmenlerin yaşanmış deneyimlerini araştırmak ve vurgulamak çok önemlidir.

Bu çalışmadan alınacak ilk verilerin Aralık 2015 sonunda elde edilmesi amaçlanmaktadır. Elde edilen bilgiler sadece bilimsel araştırma ve yazılarda kullanılacaktır. Çalışma kapsamında ortaya çıkan bulgular katılımcılarla da paylaşılacaktır. Bu araştırmaya katıldığınız için tekrar çok teşekkür ederiz.

Araştırmanın sonuçlarını öğrenmek ya da daha fazla bilgi almak için aşağıdaki isimlere başvurabilirsiniz.

Prof. Dr. İ. Soner YILDIRIM (E-posta: soner@metu.edu.tr)

Arş. Gör. Yunus ALKIŞ (E-posta: yunus@metu.edu.tr)

Çalışmaya katkıda bulunan bir gönüllü olarak katılımcı haklarınızla ilgili veya etik ilkelerle ilgili soru veya görüşlerinizi ODTÜ Uygulamalı Etik Araştırma Merkezi'ne iletebilirsiniz.

E-posta: ueam@metu.edu.tr

F. Core Themes that Emerged from Coding of Data

Core Theme 1 – Intended use

Core Theme 2 – Teaching resources/materials

Core Theme 3 – Cases students get involved

Core Theme 4 – Mean to be an IWB in the class

Core Theme 5 – Effects of start using IWB on the climate of class

Core Theme 6 – Comfort level when using IWB

Core Theme 7 – Difference between when (at) first start using IWB and now

Core Theme 8 – Influence on the role of the teacher

Core Theme 9 – Influence on the role of the students

Core Theme 10 – Main reasons to start using IWB

Core Theme 11 – When or in what circumstances start to use IWB

Core Theme 12 – Impacts on teaching process

Core Theme 13 – Impacts on teachers

Core Theme 14 – Impacts on students

Core Theme 15 – Impacts on time

Core Theme 16 – Interaction/Communication

Core Theme 17 – Developing course materials

Core Theme 18 – Issues / Challenges

Core Theme 19 – Practical Solutions

Core Theme 20 – Needs/Suggestions

Table 3

Core Themes that Emerged from Coding of Data

-
1. Intended use
 2. Teaching resources/materials
 3. Cases students get involved
 4. Mean to have IWB in the classroom
 5. Effects of start using IWB on the climate of class
 6. Comfort level when using IWB
 7. Difference between when (at) first start using IWB and now
 8. Influence on the role of the teacher
 9. Influence on the role of the students
 10. Main reasons to start using IWB
 11. When or in what circumstances start to use IWB
 12. Impacts on teaching process
 13. Impacts on teachers
 14. Impacts on students
 15. Impacts on time
 16. Interaction/Communication
 17. Developing course materials
 18. Issues/Challenges
 19. Practical Solutions
 20. Needs/Suggestions
-

Note. IWB = Interactive Whiteboard.

Table 4

Core Theme 1 with Sub Codes/Invariant Constituents

1- Intended use
Auditory
Concretizing abstract concepts
Difficult to understand/topics that cannot comprehend
Doing exercises/drills
In order to handle curriculum in the best way
Make presentations
Problem/question solving
Show animations
Show experiments
Show experiments
Show images/visuals
Show maps
Show scheme/diagrams/tables/paintings
Show simulations / to support difficult topics
Show three-dimensional shapes
Show videos
Solving a large number of questions
Teaching/ Narration / Lecturing
Use for enriching examples
Use for repetition
Use IWB as supportive purposes
Use to consolidate (for reinforcement)
Use to indicate sections that have difficulty in drawing
Visualization
Watch documentary
Watch movies
When topics not expressed in words

Note. IWB = Interactive Whiteboard.

Table 5

Core Theme 2 with Sub Codes/Invariant Constituents

2- Teaching resources/materials
Animations
EBA (Education Information Network)
Images
IWB compatible e-books/documents
PowerPoint slides
Sound (song etc.)
Text (PDF, Word, Excel, etc.)
Videos (movie etc.)
Websites

Note. IWB = Interactive Whiteboard.

Table 6

Core Theme 3 with Sub Codes/Invariant Constituents

3-	Cases students get involved
	Doing exercises/drills
	Filling crossword puzzles
	In-class performance work
	Inclusion in the subject narrative
	Listen songs / repeat the pronunciations
	Make presentations
	Make / show videos
	Make / show experiment
	Moving vectors
	Problem/questions solving
	When open game/animation

Table 7

Core Theme 4 with Sub Codes/Invariant Constituents

4-	Mean to have IWB in the classroom
	Accelerating the lesson
	Comfort of the teacher (comfortable)
	Concretizing abstract concepts
	Ease (convenience, simplicity)
	Easily accessible technology
	Easy to get a visual
	Get information instantly
	Get the chance to make small quizzes and exams
	Good thing to be able to go over the subject again
	Instantly connect to the internet more quickly
	Make His/her work easier
	Makes subject simpler / simplifies subject
	More richness in terms of being able to reach different sources
	Overcome problems in verbal expression
	Productivity
	Save time
	Something good/important
	Support course in terms of visuals/visualization
	Use time more efficiently

Note. IWB = Interactive Whiteboard.

Table 8

Core Theme 5 with Sub Codes/Invariant Constituents

-
- 5- Effects of start using IWB on the climate of class
- At first, students were happier and curious
 - At first, very favorable/ very positive effects
 - Come up with much preparation
 - Create a tremendous impression
 - Increase attending in lesson
 - Later, they are accustomed to
 - More attractive
 - More confident (Students)
 - More effective teaching
 - More enjoyable
 - More interesting to ninth graders (freshmen)
 - More motivating
 - More productive/produce more things
 - Open up students' horizon
 - Positive atmosphere (not a boring lecture)
 - Positive effect in terms of increasing interest
 - Positive effect in terms of taking attention
 - Student understand more easily
 - Students generally reacting positively
 - Students more enthusiastic
 - Students not produce excuses
-

Note. IWB = Interactive Whiteboard.

Table 9

Core Theme 6 with Sub Codes/Invariant Constituents

-
- 6- Comfort level when using IWB
- Affected by radiation consists of a psychology sometimes
 - Comforts himself/herself
 - Feel relaxed
 - Feel tense
 - Initially, has been tension/nervous
 - Not too nervous
 - Now, Feel (more) comfortable
 - Uncomfortable/nervous from time to time
 - Now, used to it / no problem
-

Note. IWB = Interactive Whiteboard.

Table 10

Core Theme 7 with Sub Codes/Invariant Constituents

7- Difference between when (at) first start using IWB and now	
Initially	Initially, be at a loss
	Initially, excited
	Initially, getting anxious/worried/nervous
	Initially, have difficulty with technical problems
	Initially, inexperienced
	Initially, losing time
	Initially, not comfortable while typing
	Initially, not learned buttons and symbols exactly good
	Initially, not quite know what to do
	Initially, slower while using IWB
Now	Now, begin to master
	Now, better about using IWB/use a better way
	Now, desire to use
	Now, enjoy (like)
	Now, habit to use IWB/get used to it
	Now, know better symbols
	Now, make more progress/develop/improve yourself
	Now, more active
	Now, more aware of how to use IWB
	Now, more confident
	Now, more conscious
	Now, more experienced
	Now, more prepared
	Now, more relaxed
	Now, satisfied/pleased
	Now, use faster
	Now, use more comfortable
	Now, use more effectively
	Now, use more practical
	Now, use more professionally
	Now, use time better

Note. IWB = Interactive Whiteboard.

Table 11

Core Theme 8 with Sub Codes/Invariant Constituents

8-	Influence on the role of the teacher
	Being dependent on technology brings some difficulties
	Brings teacher more directing position
	Decrease the adaptation to the course
	Ease teachers' burden
	Facilitated the role of teachers
	Improved/Developed Him/herself
	In a better position to control the students
	Increase efficiency/enhance productivity
	Increase respectability towards teacher
	Increase the adaptation to the course
	Lead to forgetfulness
	Make teacher's work easier
	Making lazy
	More active
	More effective
	Not miss anything
	Passivate / Inactive
	Pushed the role of the teacher somewhat secondary
	Reaching information instantly
	Teacher here in more manager status/position
	Teacher still active (Still in the lead position)
	Thought IWB as an auxiliary (as a resource supporting teaching)

Note. IWB = Interactive Whiteboard.

Table 12

Core Theme 9 with Sub Codes/Invariant Constituents

9-	Influence on the role of the students
	Being dependent on technology brings some difficulties
	Changed the activity that the student made on the board
	Changed the point of view of student to the course
	Follows the lesson more intriguingly than before
	Getting worried and shy to come the board
	Increased enthusiasm
	Learned to use technology at some point
	Listening more
	More active (students become more active)
	More comfortable self-expression
	More enjoyable to participate in an activity with IWB
	Not affect the role of the student
	Passivate / Inactive
	Student's role comes out from time to time to the forefront

Note. IWB = Interactive Whiteboard.

Table 13

Core Theme 10 with Sub Codes/Invariant Constituents

10- Main reasons to start using IWB
Because of curiosity/enthusiasm
Discard redundant/unnecessary/useless information
Felt the need to use it
For students to comprehend/grasp/grip
Have a desire to use (used eagerly)
In order to affect/influence/impress students
Intense curriculum
No longer carry a map/book / No need to carry course materials
Not have a chance to make lab work
Not to fall behind
Not to miss any part of the topic
Reach children in a better way
Started to use because of introduction of the FATIH project
Started to use for benefiting from technological opportunities
Started to use because of seeing as a development
Student can learn more easily
Time-related (Using the time correctly, saving time, gain time)
To accelerate/speed up lesson
To attract the attention of students/gather attention
To be more organized
To consolidate
To eliminate the process of taking notes by students
To enrich the course
To find/reach something instantly (reach information quickly)
To get more efficiency in terms of education
To give more topics/information in less time
To increase curiosity
To increase interest
To increase memorability
To increase participation (student contributed more)
To increase performance of the teacher (self)
To increase success
To learn more
To listen pronunciations
To make teacher's work easier
To solve more problems/questions/benefit of question solutions
To support topics
To support verbal lessons
To teach 3D and abstract concepts
To teach better
To visualize the lesson (to add visuality)
Understand the topics more efficiently
Understand the topics more quickly
Visually appealing

Note. IWB = Interactive Whiteboard.

Table 14

Core Theme 11 with Sub Codes/Invariant Constituents

11- When or in what circumstances start to use IWB
Use More Often
Use more often, reviving
Use more often, solve more problems/questions
Use more often, complicated and more visually require cases
Use more often, concretize (narration of) abstract concepts
Use more often, show/do laboratory experiments when no chance
Use more often, for reinforcement/ consolidation purposes
Use more often, for repetition
Use more often, for students to catch missed points
Use more often, in lecturing
Use more often, in matters requiring the drawing
Use more often, in more verbal subjects/issues
Use more often, in practice
Use more often, in solving problems/exercise
Use more often, teach 3D and abstract concepts
Use more often, to address different levels of intelligence
Use more often, to enrich and to diversify the subjects
Use more often, to speed up the lesson
Use more often, to watch something/something to watch
Use more often, visually related topics
Use more often, when needs to give visibility prominence
Use more often, when subjects/cases need to be supported by IWB
Use more often, when to present visuals
Use more often, when use/show animation
Use Less
Use less, in concrete topics
Use less, unnecessary or less necessary to use IWB
Use less, when there is no source/not have enough sources
Use less, example/sample solving (solution)
Use less, in lecturing
Use less, in solving problems
Use less, student's easy to grip parts
Use less, when if necessary to use hands to make practice
Use less, when IWB need to be passive
Use less, when not find materials (visuals etc.) in the internet
Use less, when to keep up topics
Use less, when virus infection cases and IWBs are taken from
Use less, where topics that do not require the use of IWB
Use less, where the internet is not secure

Note. IWB = Interactive Whiteboard.

Table 15

Core Theme 12 with Sub Codes/Invariant Constituents

12- Impacts on teaching process

Positive Impacts

Allows more students to come up to the board
 Allows to diversify lesson
 Allows to give some tricks about subject
 Allows to give student more say
 Allows to show/see/solve more different types of questions
 Allows to solve more questions
 Allows to solve questions faster
 Allows to stay on the subjects more
 Allows to teach more topics/information in less time/Teach fast
 Allows to transfer information more easily
 Allows to transfer more information to students
 Better classroom management/control students
 Better consolidation
 Better repetition / Good for repeat the course content
 Change in habits
 Change in teaching styles
 Concretize abstract concepts/Revive a three-dimensional
 Enriched course contents
 Enriched in material/resources diversity/Visual material richness
 Enriched/Support teaching process
 Enrichment in the auditory sense /Supports in terms of auditory
 Enrichment in the visual sense / Supports in terms of visuality
 Faster paced / Accelerated teaching lesson
 Increased chances going into detail/Get detailed information
 Increased interest in course/lesson/subjects
 Increased interest in the documentary
 Instantly reaching information/Reach information more easily
 Make class environment quieter
 Make course more practical
 Make lesson more interesting (attractive)
 Make subjects/learning more permanent
 More efficient/productive lesson
 More fluent lesson
 More fun lessons
 More pleasant environment
 No change in habits
 No change in teaching style
 Opportunity to reach the animations
 Opportunity to reach videos
 Opportunity to reveal aspects/things have remained hidden
 Opportunity to show/play materials
 Opportunity to use more resources
 Opportunity to use publications based on the student's level
 Opportunity to watch experiments
 Sharing lesson materials/course resources easily

Negative Impacts

- Be prepared for any situation
- Deflect main aim of the course
- Encounter problems, classic lesson pass with unpleasant way
- Encounter problems, continue lesson in spare classroom
- Encounter problems, continue lesson with classic method
- Encounter problems, declining interest
- Encounter problems, harder to gather attention
- Encounter problems, have to look for a solution
- Encounter problems, not access to information
- Encounter problems, slowing the lesson
- Encounter unwanted situations, facing strange information
- Unreliable source (internet) / Not completely reliable
- Encounter problems, lessons cannot go the way planned

Note. IWB = Interactive Whiteboard.



Table 16

Core Theme 13 with Sub Codes/Invariant Constituents

13- Impacts on teachers
Positive Impacts
Allows to master subjects/have more comprehensive knowledge
Eliminate difficulties of preparation
Expanded/ broaden point of view on the subjects
Feel became a better teacher
Focus/concentrate more attention
Makes teacher's work easier / Facilitated teacher's work
More effective
More enjoyable teaching / lecturing / lesson
More enthusiastic about teaching
More involved with technology
More motivated
More productive/efficient
No longer carry course materials
No longer require to draw
Not get bored
Not get tired / Make him/her tirelessness
Provided time to create a discussion
Provided more efficient use of courses
Provided personal development/improvement
Reduced effort during the lesson
Reduced workloads in the later stages
Re-use lesson materials
Teach better / started to teach better
Writing less on the board
Negative Impacts
Bring sleep of teacher
Feel uncomfortable when not using IWBs
Increased effort (endeavor) during the lesson
Initially, increased workload
Make teacher lazy
Reduce activeness
Reduce mastery of subject
Reduce motivation

Note. IWB = Interactive Whiteboard.

Table 17

Core Theme 14 with Sub Codes/Invariant Constituents

14- Impacts on students

Positive Impacts

Better adapted to the course
 Better concentrate / Concentrations increased
 Better consolidate/reinforce the subject
 Better grasp the subject/grasp more easily/comprehend
 Better illustrate in mind
 Better perception
 Better retention/more permanent in mind
 Better understanding of the subjects
 Developed themselves
 Easier to access information/Reaching information instantly
 Easier to keep subjects in mind
 Easier to reach different sources
 Enhance learning
 Expressed themselves more easily/more comfortable expressing
 Facilitate learning
 Good at expanding the imagination of the students
 Helps to embody/shape verbal things
 Helps to revive subjects in students' eyes/heads
 Helps to satisfy students' curiosity/Increase curiosity
 Increase gathering/draw attention of students
 Increase listening time of lesson
 Increase pace of learning
 Increased focus on the course
 Increased participation/More participative/More attentive
 Increased solving more problems/questions
 Increased success
 Increasing the awareness
 Learn better
 Master a subject / have comprehensive knowledge of the subject
 More concerned
 More confident / Gained confidence
 More creative / Raised creativity
 More encouraging to come up the board
 More enthusiastic
 More interested / Increased interest
 More motivated/Increase motivation
 More relax
 Not a burden carrying course materials
 Not get bored
 Not get tired / Tirelessness
 Opportunity to have much resources
 Opportunity to make presentation
 Opportunity to see different types of questions
 Opportunity to watch more movies
 Provides advantage for children with visual intelligence
 Provides ease of understanding / understand more easily
 Raised students' knowledge levels
 Reduced the time spent by students to take notes
 Reduced/Shorten learning time of students

	Think much faster
	Watching quieter
	Writing less
Negative Impacts	
	Dealing with disturbing/extracurricular activities at breaks
	Bring sleep of students
	Make students lazy/Became accustomed to literal
	Disconnected from the course
	Forgets more quickly / forgets easier
	Not hold information in memory/head
	Not write/draw by hand
	Weaker perception
	Reduce creativity / affect students' creativity negatively
	Reduce mastery of subject
	Reduce effort / not make any effort
	Disconnected/detached from course

Note. IWB = Interactive Whiteboard.

Table 18

Core Theme 15 with Sub Codes/Invariant Constituents

15- Impacts on time	
Positive Impacts	
	Better time management / use time better
	Deal with time problem
	More time to solve questions
	Now, accelerates things
	Reduces time spend on lesson preparation
	Reduces time spend on teaching of the subjects
	Reduces time spend on writing out on the board
	Save time / time-saving / gaining time
	Time flowing fast / Time passes/moves faster
	Use time efficiently
Negative Impacts	
	Initially, requires more preparation time in the beginning
	Time issues related to intensive curriculum
	Time issues when encounter problems
	Time issues when want to give more information
	Time issues when need to overdo with extracurricular activities
	Waste of time / time loss / stalling the lesson

Note. IWB = Interactive Whiteboard.

Table 19

Core Theme 16 with Sub Codes/Invariant Constituents

16- Interaction/Communication
with Course Content
Increased students' interaction with course content
Increased teacher's interaction with course content
Changed the source teachers are looking for
with Students
Better in the eyes of students/More pleased with the teacher
Declining conversations among students
Decreased interaction/communication among students
Decreased sharing of information among students
Decreased/broke interaction/communication with students
Differentiate the communication between students and teacher
Increased interaction among students
Increased interaction/communication with students
Increased the distance between students and teachers
Make it easier for teacher to check/control students
Melted the warm atmosphere of the old
More interactive/active students (class)
with Teachers
Share idea/opinion among teachers
Share resource among teachers
Support for the use of IWB

Note. IWB = Interactive Whiteboard.

Table 20

Core Theme 17 with Sub Codes/Invariant Constituents

17- Developing course materials
Capture video
No course materials developed
Prepared animations
Prepared materials inadequate for his/her course
Prepared PowerPoint presentations materials
Receive assistance in developing these materials by colleagues
Receive assistance in developing these materials by his/her children
Receive assistance in developing these materials by students

Note. IWB = Interactive Whiteboard.

Table 21

Core Theme 18 with Sub Codes/Invariant Constituents

18- Issues/Challenges

Damaged, distorted, out of order board
 Deleted files/programs related to course from IWB
 Detecting mouse problems / Technical problems (software)
 Difficulty of use of IWB
 Initially, insufficient material/resources problems
 Internet/Network connection problems
 Not supporting resource formats to run or open
 Power failure / electricity cut
 Problems with the size of the IWB
 Resource (material) problem
 Restricted internet (access-banned websites) by MoNE
 Takes time to open the IWB (open slowly, time issues)
 Touch panel problems / Unresponsive boards
 Trouble on internet / Weird strange things happen on internet /
 Virus problems / not function flash memory
 Visibility problems (sunlight shines directly onto the board)

Note. IWB = Interactive Whiteboard.

Table 22

Core Theme 19 with Sub Codes/Invariant Constituents

19- Practical Solutions

Solving by him/her self
 Technical support by students
 Making immediate intervention by ICT teacher/Technical support
 Technical support by technical service (authorized service)
 Use of curtains to avoid/ prevent sunlight
 If IWB is damaged, processing through lessons in spare classroom

Note. IWB = Interactive Whiteboard.

Table 23

Core Theme 20 with Sub Codes/Invariant Constituents

20- Needs / Suggestions
Need fast internet
Need for adequate resources made by MoNE
Need for removal of blocking access to certain sites by MoNE
Need for training to adapt to technology for later ages teacher
Need for trainings to learn new things
Need individual training for old teachers
Need MoNE to allow free use of resources
Need more comprehensive training
Need more practical training
Need more reliable information parallel to the curriculum
Need programs related to each subject matter on IWB
Need refreshing trainings
Need resources prepared more professionally
Need special classes for each teacher
Need to be refreshed/simplified curriculum by MoNE
Need to change/update programs on IWB
Need to have previously loaded resources on IWB
Need to increase resources/materials
Need to increase the number of lesson hours
Need to increase the number of trainings / more frequent
Need to increase/enrich the number of materials in EBA
Need to keep constant track of up to date with developments
Need to receive computer certificate
Need to receive in-service training on an annual basis
Need to reduce the number of students in classes
Need training about more efficient use of IWB
Need training for developing/preparation of course material
Need training for inadequate teachers
Need training for specific each subject matter
Need training for students
Need trainings to use IWB more actively
Students need to access information safely
Teachers need to be trained constantly
Teachers should be motivated
Teachers should develop themselves
Training period/time should be longer

Note. IWB = Interactive Whiteboard.



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2004 – 2009 **B.S.**, Middle East Technical University, Ankara, TURKEY.
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WORK EXPERIENCE

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- June 2008 **Web and Camera Specialist**
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- January 2008 – **ICT Teacher / Content Specialist**
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- January 2006 – **ICT Trainee Teacher**
June 2006 Büyük Kolej (College), Ankara, TURKEY.

FOREIGN LANGUAGES

Advanced English

AWARDS, HONORS & GRANTS

- May 2007 **Second Prize in Educational Content Website Category**
First National Congress of Computer Education and
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PROJECTS

BAP | 2017

Use of Interactive Videos for Teachers' Development of Design-Based Thinking Skills

Middle East Technical University

Project Code: BAP-05-05-2017-002

Researcher

BAP | 2017

The Lived Experiences of High School Teachers with Different Subject Matters Pertaining to The Use of Interactive Whiteboard (IWB): A Phenomenological Study

Middle East Technical University

Project Code: BAP-07-02-2017-004-005

Researcher

PUBLICATIONS

A - INTERNATIONAL JOURNAL ARTICLES INDEXED in SCI, SCI-EXPANDED, SSCI, and AHCI

A-1. Alkis, Y., Kadirhan, Z., & Sat, M. (2017). Development and Validation of Social Anxiety Scale for Social Media Users, *Computers in Human Behavior*, 72, 296-303. DOI: 10.1016 /j.chb.2017.03.011 [SSCI]

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B-1. Kadirhan, Z., Alkis, Y., Sat, M., & Yildirim, S. (2016). Publication Trends in Social Media: A Content Analysis. *Journal of Social Media Studies*, 3(1), 15–29. DOI: 10.15340/21473366311014

C - INTERNATIONAL CONFERENCE PAPERS / PROCEEDINGS FULL TEXT

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D - INTERNATIONAL CONFERENCE PAPERS / PROCEEDINGS ABSTRACT

D-1. **Alkis, Y.**, Kadirhan, Z., & Sat, M. (2015). Effects of Virtual Learning Environments on Students' Enhancement of Spatial Thinking. *Paper presented at 9th International Computer & Instructional Technologies Symposium (ICITS 2015)*, Afyonkarahisar, Turkey, May 20–22, 2015.

D-2. Kadirhan, Z., Sat, M., & **Alkis, Y.** (2015). A Content Analysis of the Studies in Distance Education Area in Turkey. *Paper presented at 9th International Computer & Instructional Technologies Symposium (ICITS 2015)*, Afyonkarahisar, Turkey, May 20–22, 2015.

D-3. Sat, M., **Alkis, Y.**, & Kadirhan, Z. (2015). Development and Validation of Formative Feedback Perceptions Scale. *Paper presented at 9th International Computer & Instructional Technologies Symposium (ICITS 2015)*, Afyonkarahisar, Turkey, May 20–22, 2015.

D-4. **Alkis, Y.**, Kadirhan, Z., & Sat, M. (2016). Development and Validation of Social Anxiety Scale for Social Media Users. *Paper presented at the American Educational Research Association (AERA) 2016 Annual Meeting*, Washington, DC, USA, April 8–12, 2016.

D-5. **Alkis, Y.**, & Yildirim, S. (2016). The Lived Experiences of High School Teachers with Different Subject Matters Pertaining to the Use of Interactive

Whiteboard (IWB): A Phenomenological Study. *Paper presented at the Association for Educational Communications and Technology (AECT) 2016 Convention*, Las Vegas, Nevada, USA, October 17–21, 2016.

D-6. Kadirhan, Z., **Alkis, Y.**, Celik, B., & Yildirim, S. (2017). Examining University Students' Cyberloafing Behaviors. *Paper presented at 4th International Eurasian Educational Research (EJER) Congress 2017*, Denizli, Turkey, May 11–14, 2017.

D-7. **Alkis, Y.** (2017). The Design and Development of a Dental Training Simulation with Head-Mounted Display Capability in Virtual Reality Environment: Determining Design Principles. *Paper presented at 4th International Eurasian Educational Research (EJER) Congress 2017*, Denizli, Turkey, May 11–14, 2017.

D-8. **Alkis, Y.**, Kadirhan, Z., Celik, B., & Yildirim, S. (2017). Investigation of College Students' Problematic Mobile Phone Usage. *Paper presented at the Association for Educational Communications and Technology (AECT) 2017 Convention*, Jacksonville, Florida, USA, November 6–11, 2017.

D-9. Can, G., Battal, A., Ilci, A., **Alkis, Y.**, Akbay, T., Kilis, S. & Arslan, O. (2018). The Design of Academic Writing Group for EFL Postgraduate Students. *Paper presented at Education, Society & Reform Research (EDUSREF) 2018 International Conference*, Ankara, Turkey, April 06–07, 2018.

D-10. Kadirhan, Z., **Alkis, Y.**, Celik, B., Dogan, S., & Yildirim, S. (2018). Investigating the Relationship between Nomophobia and Self-esteem among University Students. *Paper presented at 12th International Computer & Instructional Technologies Symposium (ICITS 2018)*, İzmir, Turkey, May 2-4, 2018.

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