AN EXPLANATORY INVESTIGATION ON THE TURKISH EFL TEACHERS' TPACK AND THEIR ATTITUDES TOWARD THE USE OF INTERACTIVE WHITEBOARDS

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TÜRK İNGİLİZCE ÖĞRETMENLERİNİN TEKNOLOJİK PEDAGOJİK ALAN BİLGİLERİ VE AKILLI TAHTA KULLANIMA YÖNELİK TUTUMLARI ÜZERİNE BETİMLEYİCİ BİR ARAŞTIRMA

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ABSTRACT

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The present study aimed to investigate (a) TPACK of Turkish EFL in-service teachers; (b) the attitudes of the in-service Turkish EFL teachers towards the use of Interactive Whiteboards (IWBs) in their classes; (c) the relationship between TPACK and teachers' attitude toward IWB use; (d) the relationship between gender of the participants and their TPACK levels; (e) the relationship between gender of the participants and their attitude toward IWB use; (f) the relationship between teaching experience and TPACK; and (g) the relationship between teaching experience and attitude toward IWB use.

The research was carried out in the contexts of 24 Anatolian High Schools in Gebze, Darıca and Çayırova municipalities of Kocaeli at the beginning of the second term of 2014/2015 academic year. A total of 106 in-service EFL teachers from these schools responded to all of the questions in the instruments. Data was collected through two main instruments: (1) Attitude questionnaire; (2) ELT-TPACK questionnaire gathering information combining technology, pedagogy, and content knowledge. Additionally, teachers' demographic characteristics were also used in order to detect the participants profile in detail and to get information for investigating the relationships between the results of questionnaires and some of these variables. Quantitative data

were analysed by descriptive statistics including frequency, percentage, mean and standard deviation, correlation analysis, and regression methods.

The findings of the analysis of descriptive statistics indicated high levels of TPACK of the Turkish EFL in-service teachers. Additionally, the participants reported positive attitudes toward Interactive Whiteboard use in their classes. Furthermore, correlation analysis demonstrated a statistically meaningful positive relationship between the TPACK levels and attitudes of the teachers. In terms of the effect of gender and teaching experience on TPACK and attitude, further analysis were conducted. The results showed no meaningful relationship between gender and TPACK and similarly between gender and attitude. On the other hand, the analysis of the relationship between teaching experience and TPACK and teaching experience and attitude showed statistically meaningful relationships.

As it was carried out to investigate the TPACK levels of the Turkish EFL in-service teachers in a certain geographical area and the attitude of the teachers' towards using IWB in their classes, and additionally exploring the effect of gender and teaching experience on TPACK and attitude for the first time, this study proved to have valuable contributions in getting a complete picture of TPACK levels of EFL teachers in a certain area and revealing the attitudes of these teachers towards using this technology in their classes. At the end of the study, there are some implications for educators, educational authorities and educational researchers.

ÖZET

TÜRK İNGİLİZCE ÖĞRETMENLERİNİN TEKNOLOJİK PEDAGOJİK ALAN BİLGİLERİ VE AKILLI TAHTA KULLANIMA KARŞI TUTUMLARI ÜZERİNE BETİMLEYİCİ BİR ARAŞTIRMA

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Bu çalışmada, (a) Türk İngilizce öğretmenlerinin Teknolojik Pedagojik Alan Bilgisi düzeyleri, (b) derslerinde akıllı tahta kullanımına yönelik tutumlarını, (c) Teknolojik Pedagojik Alan Bilgisi düzeyleri ile akıllı tahta kullanımına yönelik tutumları arasındaki ilişki, (d) öğretmenlerin cinsiyetleri ile Teknolojik Pedagojik Alan Bilgisi düzeyleri arasındaki ilişki, (e) öğretmenlerin cinsiyetleri ile akıllı tahta kullanımına yönelik tutumları arasındaki ilişki, (f) öğretmenlik deneyimleri ile Teknolojik Pedagojik Alan Bilgisi Düzeyleri arasındaki ilişki ve (g) öğretmenlik deneyimi süreleri ile akıllı tahta kullanımı arasındaki ilişkilerin araştırılması hedeflenmiştir.

Araştırma, 2014-2015 Eğitim Öğretim Yılı ikinci döneminde Kocaeli ilinin Gebze, Çayırova ve Darıca ilçelerinde 24 Anadolu lisesinde gerçekleştirilmiştir. Bu okullarda çalışan 106 İngilizce öğretmeni veri toplama araçlarında yer alan soruların tamamına cevap vermiştir. Veriler, (1) Tutum Ölçeği (Öz, 2014) ve (2) Teknolojik Pedagojik Alan Bilgisi Ölçeği (Bostancıoğlu, 2014) kullanılarak toplanmıştır. Bunun yanında, öğretmenlerin demografik özellikleri de katılımcıların özelliklerinin detaylı tespit edilebilmesi ve anket sonuçlarının bazı değişkenlerle kıyaslanabilmesi amacıyla

toplanmıştır. Nicel veriler, sıklık/frekans, yüzdelik, ortalama ve standart sapmayı içeren betimleyici istatistik; korelasyon analizi ve regresyon metotları ile incelenmiştir.

Betimleyici istatistik analiz sonuçları, çalışmaya katılan Türk İngilizce öğretmenlerinin yüksek düzeyde Teknolojik Pedagojik Alan Bilgisine sahip olduklarını göstermiştir. Bununla birlikte katılımcıların akıllı tahta kullanımına yönelik olumlu tutuma sahip oldukları tespit edilmiştir. Korelasyon analizi bulguları ise İngilizce öğretmenlerinin Teknolojik Pedagojik Alan Bilgisi düzeyleri ile etkileşimli beyaz tahta kullanımına yönelik tutumları arasında orta şiddette pozitif bir ilişki olduğunu göstermektedir. Öğretmenlerin cinsiyetlerinin ve öğretmenlik deneyimi sürelerinin tutum ve Teknolojik Pedagojik Alan Bilgisi düzeyleri üzerindeki etkisini incelemek için de veri analizi yapılmıştır. Yapılan veri analizi hem cinsiyet ve tutum arasında hem de cinsiyet ve Teknolojik Pedagojik Alan Bilgisi düzeyleri arasında anlamlı bir ilişki göstermemiştir. Öte yandan, öğretmenlik deneyimi süresinin tutum ve Teknolojik Pedagojik Alan Bilgisi arasındaki ilişki analizi bu değişkenler arasında istatistiksel olarak anlamlı negatif yönlü ilişkiler ortaya koymuştur.

Belirli bir coğrafi bölgede görev yapan Türk İngilizce öğretmenlerinin Teknolojik Pedagojik Alan Bilgisi düzeylerini ve bu öğretmenlerin akıllı tahta kullanımına yönelik tutumlarını ve bu bilgi düzeyleri ve tutumları ile cinsiyet ve öğretmenlik deneyimi süreleri arasındaki ilişkiyi araştıran ilk araştırma olma özelliği taşıyan bu çalışmanın, belirli bir bölgede çalışan İngilizce öğretmenlerinin Teknolojik Pedagojik Alan Bilgisi düzeyleri ve bu teknolojiyi kullanmaya yönelik tutumlarının tam bir resmini elde etmek açısından değerli katkılar yapacağı ortadadır. Çalışmanın sonunda, eğitmenlere, eğitsel otoritelere ve eğitim bilimlerine yönelik araştırma yapanlara yönelik öneriler bulunmaktadır.

JÜRİ VE ENSTİTÜ ONAYI

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I dedicate this thesis to my precious son,

Alptuğ Aras Saraç

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LIST OF ABBREVIATIONS

ELT : English Language Teaching

EFL : English as a Foreign Language

ESL : English as a Second Language

TPACK : Technological Pedagogical Content Knowledge

IWB : Interactive Whiteboard

CK : Content Knowledge

PK : Pedagogical Knowledge

PCK : Pedagogical Content Knowledge

TK : Technology Knowledge

TCK : Technological Content Knowledge

TPK : Technological Pedagogical Knowledge

MNE : Ministry of National Education

CHAPTER 1

INTRODUCTION

1.1. Background of the Study

With the advent of computer technologies in the field of education and English as a Foreign Language (EFL) classes, teachers need to be able to use technology in order to increase their professional development and to increase the efficiency of their contact with students on a regular basis. The technological elements that an EFL teacher can use in the classroom are various, but probably interactive whiteboard (IWB) is the most inclusive one which covers auditory and visual facilities together with the internet connection and connection with some other electronic devices in the classroom, such as printers and audio devices. An interactive whiteboard (IWB) is a large, touch sensitive board that is typically mounted on a wall and connected simultaneously to a computer, or mostly including a fixed computer inside. Any software or files that are available on the computer or in any electronic versions can be accessed and worked on by tapping the board manually. The use of IWB according to Bacon (2011) affects learning in several ways, including increasing the level of student engagement and motivation in a classroom, making flexible use of teaching materials possible, and finally promoting enthusiasm for learning. What is more, interactive whiteboard supports many different learning styles as the teacher can adapt the activities and materials many different shapes and styles and these materials can be used in a variety of learning environments again and again.

Researches in the field (Elaziz, 2008; Türel, 2012; Öz, 2014) show that designing lessons with interactive whiteboards helps educators smooth their preparation, become more efficient in their Information and Communication Technology (ICT) integration and increase their productivity overall.

Depending on the studies in the field, it can be deduced that some important changes have been observed in education with the use of IWBs for educational purposes, such as the easy use of electronic materials in different classes, engagement of more students in the lesson, flexible and effective use of multimedia sources, and

motivating learners easily. As they make it possible to bring in different kinds of multimedia resources, to access Internet sources with ease, and to increase student interest, IWBs could be useful supplementary tools for education, but maximum benefit from this technology, especially in language teaching and learning settings, requires further background knowledge and research. In our country, Turkey, a great deal of money is being invested in this technology by the Ministry of Education. Approximately 1.4 billion Turkish Liras have been invested so far and this project is supported with some other ministries such as Ministry of Transport, Maritime Affairs and Communications. So this process should be examined and supported with academic studies. This study has the potential of helping authorities and programmers to discover both positive and negative aspects of the use of IWBs in real classroom settings from the teachers' perspective. This can be achieved by gathering the opinions of teachers who are the end users of this technology in their classes, and some pedagogical advice can be provided for the effective use of IWBs.

In the literature of English Language Teaching (ELT), there are numerous studies which focus on the benefits of IWBs and also which tries to explain the role of teacher attitude towards IWB use. One of those studies is that of Bakadam and Asiri (2012). In their study, the researchers state that teachers have highly positive attitudes towards IWB use in their classes and also they report that the majority of the respondents viewed the IWB as a good instructional tool. Additionally, most of the participants in the study were in support of teaching and learning with the IWB.

Emeagwali and Naghdipour (2013) concluded in their study that nearly all of the participants in their study state that the lessons with IWB were more fun and the teachers felt more comfortable when he/she planned the lesson depending on IWB. In the same study, the researchers also report the practicality of IWB use from the teachers' perspective. The participant teachers in this study stated that they spend less time with writing and preparing worksheets with IWBs, which creates more time for the teachers for activities to be organised in the lessons.

There are also studies favouring IWB towards other Information and Communication Technology (ICT) tools. For example Bidaki & Mobasheri (2013) states that all the participant teachers believed that there were important differences between IWB and other ICT tools. All the teachers agreed that the range and the

frequency of use of other resources including the Internet, digital camera and some presentation programs such as PowerPoint has been affected by the installation of IWBs. Cakiroglu (2015) investigated teachers' views on the use of IWBs and in that research, the analysis of data revealed that 87 % of the teachers agreed with overall contribution of IWB use in classrooms to their teaching practices. The main advantages of IWB for teaching process are that it helps to contribute as much as possible teachers' whole-class teaching. Using IWB provides comfortable atmosphere to enhance classroom teaching. Abuhmaid (2014) conducted a study in order to capture teachers' perspectives on the integration of IWBs in four private Jordanian schools. As the results of the study showed, IWBs were indeed in place in these school with teachers expressing satisfaction with its presence.

Al-Saleem (2012) reports that an interactive whiteboard supports the teaching process of foreign languages in three main ways: it supports interaction and conversation in the classroom; it helps with the presentation of new cultural and linguistic elements; and it promotes the oral skills.

Ghislandi & Facci (2013) point out in their research that the role of the teacher in the classroom on the efficiency of IWB use is of great importance and the more motivated and trained the teachers are the more effective will the IWB use be. In this study most of the teachers reported positive attitudes toward IWB use.

Unlike traditional blackboards, different teaching and learning styles are supported by IWBs, thanks to their special features, such as the functions of emphasising, capturing, storing, annotating and modifying, and linking (Beauchamp & Parkinson, 2005). With its technological integration, IWBs are capable of serving as a facilitative technological tool in classroom to promote teaching effectiveness and to help teachers develop various pedagogical approaches (Jang & Tsai, 2012; Winzenried, Dalgarno & Tinkler, 2010). The integration of the functions of interactive whiteboards into pedagogical strategies to improve teaching effectiveness has been studied with pre-service teachers (Murcia, 2008) and with in-service teachers of science (Hennessy, Deaney, et al., 2007; Jang, 2010; Murcia & Sheffield, 2010; Warwick, Mercer, Kershner & Staarman, 2010) and mathematics (Miller et al., 2005).

Apart from the studies which emphasize the benefits and advantages of this technology, in the literature there are also some studies which show some disadvantages

of IWB. For example researchers found in a study conducted by Gray, Hagger-Vaughan, Pilkington and Tomkins (2005) that some teachers complained about IWB-based lesson preparation and planning is time-consuming, the teachers found it difficult to find appropriate materials for varying degrees of student levels. Other teachers stated that too much PowerPoint use could lead to a "show and tell" style of teaching and this may result in changing the role of the teacher in the classroom. In this case, the teacher can be considered as more passive and as less involved in the teaching and learning processes. Smith,.et al. (2005) revealed that in order to use IWBs to their full potential and avoid such problems, there is enormous need for training and technical support for teachers. Teachers need to be confident enough in using this technology, and this can only be achieved by special training. If teachers are not provided adequate and effective training, it is hard to attain certain beneficial results both for teachers and students. The idea that lack of training on overall ICT results in inadequate use of IWBs is supported by some studies. One of those studies is Glover and Miller (2001), in the study the researchers emphasized many teachers' lack of overall ICT competence or lack of training for the IWBs specifically and they concluded that overall competencies of the teachers have important effects on their attitudes and the way of their use.

1.2. Technological Pedagogical Content Knowledge (TPACK)

Technological Pedagogical Content Knowledge (TPACK) is a framework developed by Mishra and Koehler in order to integrate technology in teaching, and it is one of the most comprehensive models related to technology integration in education. The Turkish Education Association, explained TPACK as ''having knowledge about the integration of technology with curriculum and subject area, how to teach it and its' relationship with the other disciplines recent developments in the subject area, its basic concepts, instruments, structures and content'' (TED, 2009, pp. xix-xx). In addition to this explanation, it was emphasized in the same study that TPACK is a qualification that teachers should hold to be successful in their teaching professions. With the explanation of Pedagogical Content Knowledge, Shulman provided a basis for TPACK in 1987 as follows;

It represents the blending of content and pedagogy into an understanding of how particular topics, problems, or issues are organised, represented, and adapted to the diverse interests and abilities of learners, and presented for instruction (p.8.)

As the general technology competencies cannot be thought regardless of content knowledge, Technology Pedagogy and Content Knowledge (TPACK) is being used and emphasised in numerous studies. Technological Pedagogical Content Knowledge (TPACK) attempts to identify the nature of knowledge that the teachers need for technology integration in their teaching practices, while addressing the complex, multifunctional and situated nature of teacher knowledge. At the heart of the TPACK framework, is the complex interplay of three primary knowledge forms: Content (CK), Pedagogy (PK), and Technology (TK). As must be clear, the TPACK framework builds on Shulman's idea of Pedagogical Content Knowledge (Mishra and Koehler, 2008)
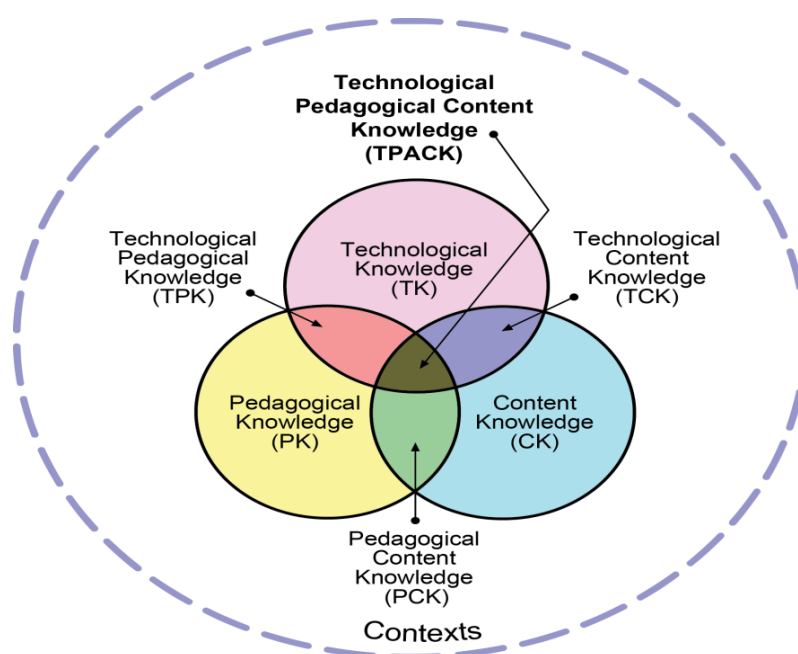
Figure 1. *Technological Pedagogical Content Knowledge (Koehler & Mishra, 2009)*

1.2.1 Content Knowledge

According to Mishra and Koehler (2008), content knowledge (CK) can be defined as the subject matter that is to be learned or taught such as science or history. As teachers

have to know concepts, theories and discipline to a great extent, Content Knowledge (CK) has a major importance for teachers. Additionally, Mishne (2012) states that it is possible for teachers to use content knowledge for real life experiments provided that they comprehend the subject area.

1.2.2. Pedagogical Knowledge

Pedagogical knowledge (PK) is described as profound knowledge about the processes of educational methods including general educational purposes, values and goals. Disposition of learners, learning assessment strategies which teachers use in their classes can be given as the examples of pedagogical knowledge (Mishra and Koehler, 2008). Mishne (2012) states that certain strategies help in technology integration such as managing the classroom, evaluate students' learning and behaving in a flexible way. What makes the teachers' job of analysis and interpretation of their teaching performance easier is the Pedagogical Knowledge.

1.2.3. Pedagogical Content Knowledge

Pedagogical Content Knowledge (PCK) includes knowing what teaching approaches are suitable for the content, and likewise, knowing how elements of the content can be adapted for better teaching. PCK concerns with the representation of concepts, pedagogical techniques, and knowledge of what makes concepts easy or difficult to learn, and knowledge of students' prior knowledge. It also includes knowledge of teaching techniques that complies appropriate conceptual representations, to address learner difficulties and misconceptions and foster meaningful understanding. It also includes knowledge of the learning situations that the students bring. This knowledge of students includes their learning strategies, prior conceptions and misconceptions students might have about a particular domain and potential misapplications of prior knowledge (Mishra & Koehler, 2008; Mishne, 2012).

PCK exists at the intersection of content and pedagogy. Thus it not only refers to a simple consideration of content and pedagogy, together but in isolation; but it also refers to an amalgam of content and pedagogy thus enabling transformation of content into pedagogically powerful forms. How particular aspects of subject matters are

organized, adapted, and represented for instruction is represented by PCK, (Mishra&Koehler, 2008; Mishne, 2012).

1.2.4. Technology Knowledge

Technology knowledge (TK) covers the knowledge about standard technologies as well as more advanced technologies such as the Internet and digital video. This knowledge involves the necessary skills which are required to operate these technologies. In the case of digital technologies this would include knowledge of operating systems, and computer hardware, as well as the ability to use standard set of software tools such as word processors, spreadsheets, browsers, email etc. TK would also include knowledge of how to install and remove devices, install and remove software programs and drivers, create and archive documents. Most standard technology workshops and tutorials tend to focus on the acquisition of such skills (Mishra and Koehler, 2008).

1.2.5. Technological Content Knowledge

The manner in which Technology Knowledge (TK) and content knowledge (CK) are reciprocally related to each other is called Technological Content Knowledge (TCK). Although technology constrains the kinds of representations possible, newer technologies often afford newer and more varied representations and greater flexibility. Teachers need to know not just the subject matter they teach, but also the manner in which the subject matter can be changed by the application of technology (Mishra and Koehler, 2004, 2008).

1.2.6. Technological Pedagogical Knowledge

Technological Pedagogical knowledge is knowledge and capabilities of various technologies as they are used in teaching and learning settings, and conversely, knowing how teaching might change as the result of using those particular technologies. This might include an understanding that a range of tools exist for a particular task, the ability to choose a tool based on its fitness, strategies for using the tool's affordances, and knowledge of pedagogical strategies and the ability to apply those strategies for use of technologies. This would include knowledge of tools for maintaining class records,

attendance and grading, as well as knowledge of generic technology-based ideas such as Web Quests, discussion boards and chat rooms (Mishra and Koehler, 2008).

1.2.7. Development of TPACK

Technology integration in educational settings has been a matter of many studies. First Mishra (1998) pointed out the point of three components which are content, pedagogy, and technology. An educational computer program whose arrangement was founded on the nature of subject area and educational theory for an ill-structure domain was aimed to be improved in this study. In addition, Pierson (1999, 2001) explained the relationship among content, pedagogy and technology with the following diagram.
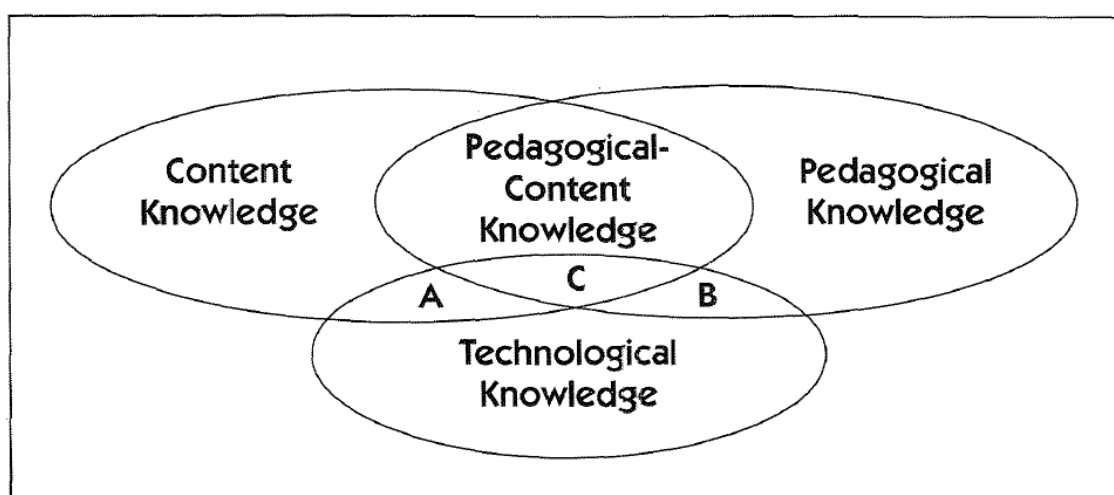
Figure 2. *Relationship among Content, Pedagogy and Technological Knowledge.* (Pierson, 2001, p.427)

In this diagram, ''a'' demonstrates content knowledge related to technology knowledge, ''b'' demonstrates pedagogical knowledge related to technology knowledge and ''c'' demonstrates the integration of content, pedagogical and technological knowledge, as in the diagram of TPACK. Technology knowledge includes the fundamental technology competency and comprehension of the specific properties of various types of technology.

According to Pierson, (2001) teachers can use of the advantage of huge majority of content knowledge and pedagogical knowledge to integrate technology into their teaching practices effectively.

Additionally, Angeli and Valanides (2005) reported five principles about knowing the ways to: (1) identify topics to be taught with ICT; (2) identify representations to transform the content; (3) identify teaching strategies; (4) select ICT tools to afford content transformation and support teaching settings; and (5) infuse ICT activities in classroom instruction. Correspondingly, Niess conducted a study to explore pedagogical content knowledge development of pre-service teachers in terms of technology integration. In the study four integral parts of pedagogical content knowledge were modified to identify technology-enhanced pedagogical content knowledge which is called TPCK. Those integral parts are (1) what it means to teach particular subject in a technology-integrated way, (2) knowledge of instructional strategies and representations of teaching particular topics with technology, (3) knowledge of students understanding, and (4) knowledge of curriculum and materials (Niess, 2005).

To evaluate the TPACK model, there have been various tools in the literature. Firstly, Koehler, Mishra, et al. (2004) carried out a study about the development of TPACK. In this study the researchers put forward a framework and explained the combinations among content, pedagogy, and technology for an effective technology integration. Apart from that study, Koehler and Mishra (2005) developed a survey to evaluate the design seminar for creating online courses prepared by the faculty members and master students. It was put forward by the results of the study that participants seemed to improve both their knowledge of the use of technology and TPACK (Koehler and Mishra, 2005; Kabakçı-Yurdakul, Odabaşı, Çoklar, Birinci, and Kurt, 2012).

Archambault and Barnett (2010) also investigated the nature of TPACK framework. It is stated by the researchers in the study that TPACK framework is useful for organizational stances, but it is difficult to divide into its components raising question related to being presence in practice. In the same study, the validity of TPACK was also explored, it was found that it is entangled to evaluate these components depending on the feature to inseparability.

Kabakçı-Yurdakul, Odabaşı, Kılıçer, Çoklar, Birinci and Kurt (2012) also emphasized that TPACK components were investigated one by one instead of as a whole in the studies related to TPACK development. Depending on the scarcity of

instruments, Kabakçı-Yurdakul et al. (2012) developed a scale to measure TPACK components not separately but together.

1.3. Teachers' Attitude toward ICT

Someone's attitudes refer to one's perception of an object favourably or unfavourably (Panagiotis, et al., 2005). Attitudes represent mental evaluations about an object based on one's proximity or distance of it. In other words, teacher attitudes towards computer technologies in their classes then stand for teachers' evaluation and perceptions of self-regarding how they feel about utilizing computers in their own teaching practices. Investigating teacher attitudes is essential because teachers take on a major role in deciding on the extent to which computer use is allowed or hindered in the classroom. The effect of the teacher attitude is not only limited to the present time, in a way teachers' attitudes towards IWBs may determine students' future computer use, for example Teo (2008) supports this view and lays extensive emphasis on studying teacher attitude toward ICTs and states that teachers pass their own beliefs on their students. The importance of teacher attitude is also emphasized in some other studies such as Gilakjani and Leong (2012), in this study the researchers state that if any success is to be expected from integrating computer facilities into the classroom, it is an obligation that teachers' negative and positive attitudes be identified and refined. Most researchers agree that no technology has the potential to contribute to the lesson on its own. The effectiveness of the technology in the class depends on the previously well-prepared conditions, in which the teacher carries out the most primary and important function. Thus, the teacher should consider new teaching ideas, methods and tools that can make his/her lessons more efficient. On the other hand, he/she should also stick to the traditional methods that proved successful in his/her class, and in which teachers have experience and acquaintance, and attitude of the teacher has a critical role in these choices and overlaps between the methods to use (Sang, et al.,2009).

The effects of the attitudes of teachers on their use of ICT have been a matter of some other studies. One of them is Deniz (2007), according to this study, the attitudes of teachers towards technology greatly influence their adaptation and integration of computers into their lessons. In the same study, the researcher states that when the

teacher lacks of motivation, acceptance and readiness towards the ICT integration, they prefer to use the traditional method for teaching English language in their classrooms.

Achieving a meaningful use of computer technology cannot be considered regardless of the teachers' attitudes, which have direct influence of the actual use in teaching and learning settings (Albirini, 2006). Research shows that the success of technology use in educational settings depends on the teachers' attitudes to a great extent.

Teachers' positive views of computer assisted technologies or denying them all together are affected by their attitudes (Tondeur & Valcke, 2007). In addition to their attitudes, other important factors such as the training received for ICT and experience with ICT are considered to be effective. Bingimlas (2009) argues that the main problem in teachers' decision to use or not to use ICT concerns their attitudes. The results of that study showed that teachers' attitudes have significant impact on their behaviours in ICT use.

There are also studies conducted with Turkish EFL teachers like the present study. One of them is Capan (2012), the researcher conducted a study to investigate the Turkish EFL teachers' attitudes towards the integration of ICT into their lessons. In this study, the researcher revealed that Turkish EFL teachers had significantly positive attitudes towards ICT in their lessons.

Depending upon much research in the literature, it can be stated that there is a significant positive correlation between the teachers' attitude toward ICT and their tendency to use them in their teaching practice. In other words, the more positive attitudes teachers have towards computers, the more likely they are to use computers in the classroom. In a study investigating the users' perceptions about computers and World Wide Web, Liaw (2002) states that the success of computer use heavily depends on positive user attitudes towards it. Similarly, Kim (2002) asserts that teachers' attitudes significantly influence their use of computers in the classroom.

Teachers' attitudes towards using ICT tools in their classes are effected by different factors. For example Egbert, et al. (2002) reported that several factors effects the attitudes. Similarly, much research highlights that the teacher's personal experience with computers is a significant impact on their attitudes. What is more, Denis (2007)

indicates that teachers' overall computer competence and familiarity with these technological devices play important roles on their attitudes towards ICT.

Although there is correlation between attitude and use, there some studies which report conflicting results for example Razak & Eswaran (2010) illustrates cases in which teachers who have low levels of computer integration are observed with considerably positive attitudes. One more example of such a study is Al-Zaidiyeen, Mei & Fook (2010). In this study the researchers indicated that the participants had minimal use of computers in their classes although they reported highly positive attitudes towards using them for their teaching practices.

However the number of the studies focusing on the teacher attitude toward IWB use is not sufficient, and this might be one of the reasons of the low level of achievement in computer integration despite the huge investments made into this technology, in terms of money and effort (Sahin & Kizil, 2011).

For a successful ICT integration in the classroom environments, teachers are undoubtedly the main players. As the intensity of computer technologies increases in the curriculum, the need for teachers who are experts in ICT implementation is growing accordingly, attitudes of teachers are key determiners of teachers` future intentions. Therefore, the present study aims to investigate Turkish EFL in-service teachers' TPACK levels and their attitudes towards the use of interactive whiteboards (IWB), and the relationship between their attitude and TPACK levels and additionally with a few variables such as gender and years of teaching experience.

1.4. Interactive Whiteboard in Turkey

In Turkey, the use of Interactive Whiteboards is a huge project all around the country and a great deal of money is being invested in this technology. There is a nation-wide project which is being conducted by the Ministry of National Education (MNE). The project is called the FATIH Project (Movement of Enhancing Opportunities and Improving Technology).

FATIH, is among the most significant educational investments of Turkey. FATIH Project proposes that "Smart Class" project is put into practice in all schools around Turkey. Starting from the Anatolian High Schools, most of them have already been equipped with this facility. Now that teachers who are working in the schools

equipped with these boards do not need to carry computers and projectors from classroom the classroom as these boards combine all of them. Figure 3 shows how IWB looks and works;

Figure 3. *The Interactive Whiteboard (IWB)*

Turkey has initiated FATIH Project with the aim of enabling equal opportunities in education and improving technology in our schools for the efficient usage of ICT tools in the learning-teaching processes by appealing to more sensory organs in all 42.000 schools and 570.000 classes that are in the preschool education, the primary education and the secondary education through providing tablets and LCD Interactive Boards. In-service Trainings for teachers are going to be held in order to provide effective usage of the ICT equipment in the classrooms in the learning- teaching process (Kayaduman, Sırakaya & Seferoğlu, 2011).

According to the Ministry of Education, in this transformation process, educational e-contents are going to be formed in accordance with the current teaching programs. In this regard, FATIH Project can be regarded as being composed of 5 different components and these components can be listed as:

- Providing Equipment and Software Substructure
- Providing Educational e-content and Management of e-content
- Effective Usage of the ICT in Teaching Programs

- In-service Training of the Teachers
- Conscious, Reliable, Manageable and Measurable ICT Usage

The aims of this project are mentioned as follows by the Ministry of Education; '' In this project, it is aimed to provide ICT equipment to classes in order to achieve the ICT supported teaching in relation to the goals that take place in the Strategy Document of the Information Society, the Development Report, the Strategy Plan of our Ministry and The Policy Report of ICT that have described all activities of our country in the process of being an information society and have been formed within the scope of the e-transformation of Turkey.''(MEB 2012)

Considering the number of the institutions, teachers and students to be affected by the project, it has a wide scope of application, the scope of the project is defined as;

'' The goal has been declared as "Information and Communication Technologies will be one of the main instruments of the education process and it will also make teachers and students use these technologies effectively" in the Strategy of Information Society that has been prepared by the State Planning Organization. In this context, it has been wished that complement of the infrastructure of the information and communication technologies in the institutions in which Formal Education and Informal Education, improving competency of the students' usage of the information and communication technologies in these institutions, and development of the programs that are supported by the information and communication technologies. Moreover, in the Information Society Strategy, in order to transform our society to information society, described goals in the below list are aimed within the scope of our Ministry's work space (MEB, 2012).

- Lifelong learning approach, development of the proper structures in which all individuals can improve themselves through e-learning, and development of the e-content.
- All students that graduate from secondary education should have the ability to use the basic information and communication technologies.
- One of the three individuals in society should benefit from e-education facilities through the effective usage of Internet.
- Providing equal opportunities to everybody on learning and usage of the information and communication technologies.

- One of the two individuals in society should be Internet user
- Internet should be made reliable for society

Apart from the general benefits of this project, the expectation to promote and enrich foreign language teaching and learning is also high as the language teaching methods and the language levels of the students after long learning processes is a matter of a wide discussion both in the ministry and academic surroundings.

1.5. Statement of the Problem

Use of technology in educational settings has been increasing worldwide. With this increased rate and frequency of use, teaching and learning processes have started to be enhanced by the computer facilities such as wireless net, interactive whiteboards and other multimedia devices. In Turkey this is a relatively new technology but the integration process is quite fast as the FATİH Project is being conducted by the ministry itself all around the country and it covers all school types, rather than the initiatives of the institutions individually. This project is worth investigating as there is not a great deal of scholarly literature relating to attitudes towards their use especially with respect to IWB use in the area of language instruction. There is also a very limited number of studies with EFL in-service teachers about their TPACK levels.

Research studies may be helpful to educators deciding whether or not to invest in this new technology, this study will contribute to the overall picture of IWB use in Turkey, as it investigates the attitudes of all EFL teachers in a certain geographical area at all of the Anatolian High Schools in Gebze, Çayırova and Darıca. Teacher openness to IWB use and their overall potential for language instruction will be observed and discussed in detail. Also, Technological Pedagogical Content Knowledge of the Turkish EFL in-service teachers in the area is measured with a TPACK questionnaire. Additionally, the relation between TPACK and attitudes of Turkish EFL in-service teachers towards IWB use is examined, and finally, the effect of gender and teaching experience on TPACK and teachers' attitude are investigated.

1.6. The Purpose of the Study

The present study aims to investigate the TPACK levels of the Turkish EFL in-service teachers and their attitudes toward the use of interactive whiteboards (IWB) in EFL classes. Furthermore, the relation between the TPACK levels of teachers and their attitudes toward the use of IWBs is also investigated. In addition, the present study also tries to reveal the relationship between gender and attitude, between gender and TPACK, and between teaching experience and attitude, and finally between teaching experience and TPACK.

1.7. Research Questions of the Study

This study addresses the following questions in order to reveal the TPACK levels and attitudes toward IWB use of Turkish EFL teachers from 24 Anatolian High Schools in Gebze, Çayırova and Darıca. This study also investigates the relationship between TPACK and teachers' attitude, and the following variables;

1. What is the Technology Pedagogy and Content Knowledge (TPACK) of the Turkish EFL teachers?
2. What are the attitudes of Turkish EFL in-service teachers towards the use of interactive whiteboards?
3. What is the relationship between the attitude of Turkish EFL in-service teachers' attitude towards IWB and their TPACK?
4. What is the relationship between;
   a. Gender and TPACK?
   b. Gender and teachers' attitude towards IWB?
5. What is the relationship between;
   a. Teaching experience and TPACK?
   b. Teaching experience and teachers' attitudes towards IWB?

1.8. Significance of the Study

In the 21st century, effects of technology in almost all parts of language education can be observed. Teachers and students are spending an important amount of time after school with technological tools such as mobile phones, computers and so on.

Considering the aims of their lesson and method of instruction, teachers of the present time should consider the sustainability of technological tools (Okojie, Olinzock, 2006). Technological tools provide a valuable opportunity for educators because they are becoming important elements of students' life. Taking this opportunity into consideration, Technological Pedagogical Content Knowledge (TPACK) gains a crucial role in teaching content and pedagogy with technology.

One of the aims of the present study is to find out the Turkish EFL in-service teachers' TPACK levels. The results of the analysis will show the in-service teachers' TPACK levels. This is important for education planners and managers to find out the levels and make the necessary arrangements in order to improve these levels because combining content, pedagogy and technology in an effective way is an important part of teaching the profession. As FATIH project is being applied all over the country, a great amount of money and effort is being invested in interactive whiteboards. Therefore, it would be a good source of information for education planners and managers to know teachers' TPACK levels. This could make it possible for them to find ways to develop these components together for the purpose of increasing the effectiveness of technology use in real classroom settings.

Another significance of the present study is that it is trying to find out the attitudes of in-service EFL teachers in a certain geographical region toward the use of IWBs. In achieving meaningful and effective technology use in teaching and learning environments, teachers are considered as one of the main factors, and their attitudes are considered to be effective on the actual use of educational technologies. The results will show the attitudes of the participant in-service teachers toward using IWB in EFL classes. Attitudes are also compared with some individual characteristics such as gender and teaching experience. These results will create an opportunity to get the real picture of IWB use in classes from the teachers' perspective.

In the current study, the relationship between EFL teachers' TPACK and attitude will also be examined and discussed. This will make it possible to find out the potential sources of insufficient use and perceptions of teachers.

The present study will broaden our knowledge on TPACK and its relation to teachers' attitude toward IWB use in Turkish contexts suggesting valuable information about teachers' perception about their own competences in English Language Teaching.

1.9. Definitions of Terms

Technological Pedagogical Content Knowledge (TPACK) is explained as "how teachers' understanding of technologies and pedagogical content interact with one another to produce effective teaching with technology" (Koehler & Mishra, 2008, p. 12).

Interactive Whiteboard (IWB) is a large interactive display that connects to a computer. The computer's desktop is on the board's surface where users control the computer using a pen, finger, stylus, or other device. The board is typically mounted to a wall or floor stand (Moss & Armstrong, 2007).

Attitude is an expression of favor or disfavor toward a person, place, thing, or event. Someone's attitudes refer to one's perception of an object favourably or unfavourably Attitudes represent mental evaluations about an object based on one's proximity or distance of it, (Panagiotis, George, Nikos & Ioannis, 2005).

CHAPTER 2

REVIEW OF LITERATURE

2.1. Introduction

Technology use for educational purposes has been an important interest for a remarkably long time. With the aim of familiarizing teachers and students with educational technologies, a great number of new projects have been launched in different countries so far. In Turkey a great majority of schools have already had computer labs and internet access, but nowadays the Ministry of National Education (MNE) has launched a pioneering project by providing an interactive whiteboard in every classroom. The effect of such a project cannot be considered regardless of the teachers who are the actual users of these facilities in their classes. The British Educational Communications and Technology Agency (BECTA) states in one of its literature review that the key benefits of IWB as a tool of pedagogy that it "encourages more flexible, creative and seamless use of teaching materials; increases students' engagement, enjoyment, and motivation to a greater extent than conventional whole-class teaching; and facilitates students' participation through the ability to interact with materials on the board" (BECTA, 2003, p. 1). In addition to this, there is some evidence in the literature that the use of IWB can influence students' achievement (Dhindsa & Emran, 2006; Swan, Schenker & Kratcoski, 2008; Zittle, 2004).

For example, Dhindsa & Emran (2006) explored the effects of IWB on six college classes taught either with or without IWBs. Student achievement was evaluated using a test consisting of sections on multiple choice, short answers and essay type questions. The results of the study revealed that the mean gain in achievement score for an IWB group compared to the traditional group was statistically significantly higher on the total test as well as on the sections of the test. Several other studies such as Gilakjani & Leong (2012); Kim (2002) have well-established the role of teacher attitudes in the use of educational technologies in the classroom. The present study tries to reveal the attitudes of the Turkish EFL in-service teachers in a certain geographical area. Turkish

EFL teachers' attitudes towards computers may have a vital impact on the success of the project. This study, thus, intends to explore Turkish EFL teachers' attitudes towards IWB use in the classroom and their TPACK levels. It further seeks for relationships between teacher attitudes and Technological Pedagogical Content Knowledge (TPACK), gender and teaching experience.

2.2. Studies on TPACK in ELT and in Various Contexts

Using technology in education is a relatively recent and popular issue in the related literature, and have generated a great deal of interest in most parts of the world. The studies which investigates TPACK are coming from many different fields. Not only the studies in the field of EFL but also some examples of the studies from different fields are mentioned here in order to get a clear understanding of development and evaluation of TPACK in education. As displayed in the following part, most of the studies in the literature focuses on the investigation of pre-service teachers, while relatively fewer studies take the in-service teachers into consideration.

Some of the studies conducted on in-service teachers with regards to the subject areas as follows: science (Guzey and Roehring, 2009), chemistry (Karakaya, 2013), mathematics (Landry, 2010) and a group of teachers from various fields (Archambault and Crippen, 2009; Uygun, 2013). In these studies, some variables such as teaching styles, a set of activities and their effect of TPACK have been investigated.

In the field of chemistry, Karakaya (2013) conducted a study to find the TPACK levels of 103 chemistry teachers who are working in 17 different cities in Turkey. The study revealed the effect of previous education. Because the researcher reported that teachers who received education about TPACK during their undergraduate education have higher confidence when compared to the ones who did not have such kind of education. Another surprising result of this study was that the teachers do not pursue the developments in educational technology.

One of the researches carried out in the field of mathematic is Laundry (2010). In this research, the primary aim was to develop a survey for the purpose of mathematic teachers' TPACK. The results of this study showed that participants of the research have trust and willing for technology integration in their courses. On the other hand, the participants emphasized their inadequacy in terms of technology use. Another study

from this field is Mutluoğlu (2012). In this study the researcher explored in-service mathematic teachers' TPACK in terms of teaching styles. According to the findings of this research, there is a significant relationship among TPACK components and teaching styles. In addition, differences in content knowledge, technology knowledge and technological pedagogical knowledge were detected providing the advantage to the teachers with computers.

There are also numerous studies conducted in the field of science teaching. One of those studies is Guzey and Roehrig (2009). The researchers designed the study to investigate teachers' development in content, pedagogy and technology knowledge. The researchers reported positive influence of professional development program on the participants' development of TPACK in different levels. Another research in the same field was Kaya (2010). In this study, like most of the studies, the TPACK components were examined separately and the relationship among them was aimed to be explained. The aim of the study was to examine pre-service science and technology teachers' TPACK and their classroom practices related to a specific topic. The results of this study revealed a significant relationship between the teachers' pedagogical knowledge and technological knowledge. On the other hand, between content knowledge and technological knowledge, there was not a significant relationship.

Similarly, Timur (2011) conducted a study with pre-service science teachers. This study was planned to investigate TPACK developments of the participants. The results of this study revealed that, technology integrated teaching promotes particular TPACK components. Savaş (2011) also conducted a research with the aim of exploring the relationships among components of TPACK of pre-service science teachers and their knowledge on topic. The results reported positive significant relations among TPACK components.

Lin et al. (2013) investigated the pre-service science teachers' perceptions of TPACK and the relationships between the science teachers' TPACK perceptions and their demographic characteristics such as teaching experience, gender, and age. Like most of the studies in the literature, also in this study the researchers considered TPACK components separately. The findings indicate that female science teachers perceive higher self-confidence in pedagogical knowledge but lower self-confidence in technological knowledge than males. Further, female in-service science teachers'

perceptions of TK, TPK, TCK, and TPCK significantly and negatively correlate with their age.

Combined group of teachers from different fields have also been participants of some studies. For example, Archambault and Crippen (2009) investigated three main TPACK components with a group of 596 teachers in the US. They concluded that the highest scores were detected in content, pedagogy and pedagogical content knowledge. In other words, the participants felt less confident in these areas when combined with technology. What is more, the correlation between pedagogy and content (.690) was higher the ones between technology and pedagogy (.289), and also technology and content (.323). In a different context, Uygun (2013) carried out a study at Middle East Technical University in Turkey. The aim of this research was to investigate the development of technological pedagogical content knowledge (TPACK) of students who engaged in learning by design activities in the context of Research and Practice on Technology in Teacher Education course offered at a public university in Turkey in spring 2013. With a case study method, the research implemented learning by design (LBD) module that included TPACK game activities developed specifically to examine students' TPACK development in the course. Research participants consisted 10 graduate students from different disciplines in the Faculty of Education such as Mathematics Education, English Language Education, Computer Education and Instructional Technologies (CEIT), Primary School Education, and Science Education. Data sources included the TPACK-deep survey, researcher observations, reflection papers, and LBD artifacts. The research revealed that students used two major strategies in their design process, namely orientation, and focus. The result of the analysis of data indicated that there were multiple pathways of reaching TPACK.

In English language teaching, there are only a few studies in the literature. Two studies can be handled here because there are only two studies with EFL teachers. One of them is Kurt (2012). The purpose of this research was to examine the TPACK development of Turkish pre-service English teachers. The results of this study revealed that combination of TPACK and the design approach could be utilized to develop technology integration skills of pre-service teachers efficiently in the scope of programs at university.

Another study with the pre-service EFL teachers is Tunçer (2014). This thesis was carried out in order to investigate the relationship between teacher efficacy and TPACK. The findings of the analysis of descriptive statistics indicated high levels of teacher efficacy beliefs of the Turkish EFL pre-service teachers. Furthermore, the participants reported high levels of TPACK. Also, there was a meaningful relationship between overall teacher efficacy and TPACK competence.

The studies which try to explore the relationship between TPACK and teachers' attitude should also be mentioned here as the present study tries to explain the relationship between TPACK and teachers' attitude.

One of the studies that focuses on the relationship between TPACK and attitude is Avidov et al. (2011). In this study, the researchers analysed the inter-relationships between the major pedagogical factors that act in a technology-implementation process: (1) the teachers' attitudes towards change, (2) the teachers' technological-pedagogical content knowledge, and (3) the teachers' perception of school as a learning organization. Data was gathered using questionnaires that captured the teachers' level of "Technological Pedagogical Content Knowledge" (TPACK), their perception of school as a learning organization, and their attitude towards change. Findings indicate a positive correlation between TPACK and the teachers' attitudes towards change, and a positive correlation between teachers' attitudes towards change and their perception of school as a learning organization. Participants who scored high in TPACK and in perceiving their school as a learning organization also scored high in their positive attitudes towards change.

As explained above, TPACK has been matter of research in various fields, but only two of them are related to English language teaching which is not enough. What is more, most of the studies from different fields and both of the studies from EFL are carried out with pre-service teachers. There are very few studies in the literature with in-service teachers and none with the in-service EFL teachers.

In this context, investigating the TPACK of in-service EFL teaches gains great importance. Unlike most of the studies in the literature, this study considers TPACK components as a whole, rather than investigating the relationship among the TPACK components, the present study tries to investigate the relationship between teachers' attitude and TPACK as a whole.

2.3. The Effect of Teachers' Attitude on ICT Integration

Especially over the last decade, providing schools with better teaching and learning environments by equipping them with the latest technology has been a primary aim for educational institutions almost all over the world. This process includes various assistive technologies such as computers and internet in the classrooms. This process is called integration of information and communication technologies (ICT) (Hsu, 2010). According to Türel (2010), interactive whiteboard (IWB) has been one of the most invested especially by European countries among the technologies which can be considered as ICT investments in classrooms.

As IWBs are promising benefits to learning and instruction, their popularity has increased, and the use of IWBs has been a matter of numerous researches in the literature. The use of IWBs has been investigated from many aspects in different fields. There are two main perspectives in those researches; teachers' perspective and students' perspective, while some studies tries to explore both perspectives together (Türel, 2012). The exact success of IWBs depends highly on how they are used by teachers in a learning context, although researchers emphasize the positive effects of this technology when appropriately integrated into classrooms. Thus, researchers, who have attempted to evaluate IWB use, have relied on perceptions of teachers as the main data source to determine the effectiveness of this technology for teaching and learning purposes (Slay, Siebörger, & Hodgkinson-Williams, 2008).

One of the studies trying to investigate teachers' beliefs in IWBs is Türel (2012). The primary aim of this research was to evaluate both teachers' perceptions and their use of IWBs. A questionnaire was implemented to the participants for collecting data. The participants of the study consisted of 174 teacher-participants, who were actively using IWBs for instruction from various educational levels (from grade 6 to 12). The results of the analysis of the data coming from the questionnaire indicated that teachers believe that IWBs can be used for different subject domains. Also, teachers believe that IWBs can be used to facilitate learning and instruction with the condition that collaboration with colleagues is maintained; teachers are provided with training about effective instructional strategies using IWB; and more frequent teacher use is applicable at schools.

Another study that investigates the teachers' acceptance of interactive whiteboards (IWBs) is a case study conducted by Saltan (2010). The purpose of this case study was to explore teachers' acceptance and attitudes towards the use of IWBs in school settings, in a primary school with 34 Turkish teachers from different subject matters. A questionnaire measuring perceived usefulness, perceived ease of use and attitude towards IWBs was used to collect data for the study. To analyse the data, descriptive statistics were used. The results indicated that teachers found interactive whiteboards relatively easy to use and useful, and they have a positive attitudes towards the use IWBs for their teaching practices. On the other hand, means of perceived ease of use and attitude toward IWB was found to be lower than perceived usefulness. Taking these e results into consideration, it can be inferred that there is a usability problem of using IWB for teachers which required further research.

Akkoyunlu and Erkan (2013) investigated the views of students and teachers on technology use. This descriptive study collected data with 3-point Likert type questionnaire from the teachers. The results of the teacher questionnaire reported positive views and attitudes of teaches towards technological facilities. It is found that teachers generally chose between *"undecided"* and *"agree"*. Those items that were marked as "Agree" and "Completely Agree" were: "interest and motivate students", "visualize the learning environment and bring concrete learning", "make students understand better with audio-visual materials", and "make my classes better planned and organized". On the other hand, teachers also highlighted that smart boards were not appropriate for every course and that they caused time loss when there are some technical problems.

Şahin and Kızıl (2011) also investigated the attitudes of Turkish EFL teachers toward the use of Information and Communication Technologies (ICT) in their classes. The data was gathered through a questionnaire from Turkish EFL in-service teachers (n=76) who were working at state schools. Descriptive statistics and Pearson Correlations were implemented to analyse the data. The results of the analysis showed that Turkish EFL teachers had positive attitudes towards the use of ICT for educational purposes: they thought that computers were advantageous and more effective than traditional methods of instruction and finally, ICT tools were perceived as being more suitable for their curriculum goals. In addition to these positive attitudes, there were also

some obstacles in the process of ICT integration mentioned such as insufficient class time and inadequate training opportunities.

Another study investigating the attitudes of teachers toward computer technologies from the field of ELT is Gilakjani and Leong (2012). This study investigated how teachers perceive the use of computer technology resources in English Language Teaching. The study was conducted with the aims of defining teachers' attitude, discussing the aspects of attitude, explaining teachers 'attitudes and computer technology training, elaborating teachers' attitudes and computer technologies, and finally reviewing the teachers' attitudes and computer literacy. It was concluded by the researchers that simply providing technology resources does not guarantee their use or effective use for language instruction. In other words, it is necessary to convince teachers of the usefulness and benefits of these resources in improving teaching and learning. This situation addresses the need for effective guidance, support and training for teachers in integrating computer technology resources into language instruction. According to the conclusions of the study, teachers need to be provided with explanation, guidance and assistance from trainers and other colleagues, and also the opportunities to reflect and discuss the integration, share outcomes and possible problems with each other in order to get an effective use of computer technologies in classroom settings need to be supplied for the teachers who are expected to use those facilities for their practices.

Like the present study, there are also some studies in the literature with Turkish EFL teachers within the scope of the FATİH project. One of those studies is Pamuk, et al. (2013). The primary purpose of this study was to evaluate the early implementation results of the "Movement of Enhancing Opportunities and Improving Technology", abbreviated as FATIH project from the perspectives of participating teachers and students. Data was collected from 181 teacher form 11 schools in 4 different cities in Turkey. A number of data collection instruments (teacher and student questionnaires, semi-structured interviews, in-class observations, and focus groups) were used to collect data.

The data coming from these various data recourses were analysed using the techniques and procedures of mixed method approach. The results revealed that the majority of the participating teachers and students were positive in general about the

having access to IWBs in their schools and classrooms. It was observed that the majority of the participant teachers considered IWBs as "Internet-Supported Projection Device" and, as a result; their use of those technologies in the classroom settings were mostly limited with demonstrating the lecture presentations or some other e-materials which they had prepared beforehand.

Elaziz (2009) also studied the effect of attitude on IWB use with Turkish teachers, students and administrators, the data of this thesis were collected through questionnaires distributed to 458 students and 82 teachers in different institutions across Turkey, ranging from primary schools to universities. According analysis of data coming from those questionnaires, both students and teachers have positive attitudes towards the use of IWBs in language instruction and they were reported as being aware of the potential of this technology for educational purposes. The statistical analysis also revealed that the more teachers use IWBs, the more they like this technology. According to the statistical analysis of the data, the highest mean score belonged to question, which indicates that nearly all of the teachers (90%) agree or strongly agree that IWBs can be a good supplement for the language teaching process.

Albirini (2006) conducted a study to investigate the attitudes of EFL teachers in Syrian high schools toward technology in education. To collect data both qualitative and quantitative methods were employed. Depending on the analysis, the researcher concluded that teachers had positive attitudes toward technology use in education, and more specifically, in language teaching.

Additionally, Öz (2014) studied teachers' and students' perceptions of interactive whiteboards (IWBs) in the English as a foreign language (EFL) classroom and tried to find out differences of perceptions according to some variables such as gender, level of English proficiency, hours of weekly IWB use, and years of teaching experience. To collect data, two self-report questionnaires were given to the participants. The study included 58 EFL teachers and 164 EFL students from a private Anatolian high school in Ankara as participants. There were 25 five point Likert-scale items to measure the teachers' attitudes in the teachers' attitude questionnaire. In addition, quantitative data was further supported by qualitative data gathered from teachers through open-ended questions. According to the results of this study, both teachers and students have positive perceptions of the IWB technology and its benefits

in EFL classrooms. However, according to the results of t-test and One-way ANOVA tests, no significant difference in the teachers' perceptions of IWB use with respect to their gender and years of experience was detected. One other finding indicated that teachers with more years of teaching experience had more favourable perceptions of IWBs than less experienced teachers and that teachers who use IWBs more frequently have more positive perspectives on the use of the IWB technology. One of the major suggestions of the researcher is that teachers need training for this technology in order to acquire the essential competencies in pre-service and in-service training programs.

One more study reporting positive attitudes of the teachers toward IWBs is Alharbi (2013). This study was conducted to explore the attitudes of teachers toward integrating technology into their teaching practices in Saudi Arabia and United States. The data was collected through semi-structured interviews distributed to ten teachers from Saudi Arabia and the United States. In order to reveal the attitudes of the participant teachers the interviews were analysed. The findings of this study revealed that teachers from both countries reported positive attitudes towards using this technological facility in their lessons for educational purposes, on the other hand, most teachers seemed to lack the time needed to learn to use and apply technology in a meaningful way into the curriculum.

Like the present study Karakaya (2010) also studied the attitudes of Turkish EFL teachers, and examined whether demographic characteristics such as age, gender and experience have effect on the teachers' attitude or not. The purpose of the study was investigating the attitudes of English language teachers in Turkey toward computer technologies and the extent to which they use technology in language instruction. There were 87 Turkish EFL teachers as participants working at public schools from different parts of Turkey. A questionnaire and semi-structured, face-to-face interview were used in order to collect the data. The results of the data analysis yielded positive findings regarding English teachers' attitude toward computer technology. The findings of the study also revealed that a great majority of teachers attribute positive remarks for integrating technology in language teaching. In order to find out whether the age affects the respondents" attitudes toward ICT or not, a one-way ANOVA was also conducted. However, the analysis of the one-way ANOVA did not reveal any significant differences among the age groups. To explore the effect of gender on the participant

teachers' attitudes toward online language teaching, an independent sample t-test was conducted. The result of the t-test yielded statistically significant difference in terms of gender, *t (85) = 2,200, p= .0031*, for the attitudes of participants toward computer technologies or educational purposes. At the same time, teaching experience was another concern of this study. In order to find out whether teaching experience of English teachers is an effective factor or not, a one-way ANOVA was conducted. The analysis of the one-way ANOVA also yielded significant results, *F(3,607), p=.003*.

Perceptions of teachers about technology was also investigated in a study carried out by Wozney, Venkatesh and Abrami (2006).The study aimed to investigate the attitudes of teachers towards computer technology and their computer technology practices, and there were 764 elementary and secondary teachers from both private and public school sectors in Quebec as participants. The findings of the research indicated that teachers utilize computers mostly for informative purposes. In addition, the study also revealed that a great majority of teachers did not use computers for instructional or communicative purposes. It was also concluded that teachers who use computers outside school for personal purposes more actively tend to be more efficient in integrating computer technology in their class.

Al-Zaidiyeen, Mei and Fook (2010) investigated the attitudes of Jordanian secondary school teachers towards the use of ICT for educational purposes. The data for the study were collected through the use of quantitative data from 650 Jordanian teachers. According to the results of the study, a great number of the teachers had rather low level of computer use for educational purposes. Teachers prefer utilizing applications such as the Internet, CD-ROM, and Word Processing that do not require teachers to conduct high level applications with technology for more communicative purposes.

In the present study, two of the grouping criteria are the gender and teaching experience durations of the participant teachers. Because there are some studies in the literature that states gender and age or experience as effective factors on attitude. For instance, experience (Liaw, 2002), age (Sahin-Kizil, 2011) and gender (North, & Noyes, 2002) are frequently reported to have an impact on teacher attitudes.

However, recent findings on the relationship between gender and computer attitudes have made the proposition of previous research redundant. Teo (2006)

concludes that the more widespread use of computers by almost every member of the society has made the difference insignificant in time.

Guskey (1989) and Saye (1998) stated that exploring teachers" attitudes toward technology integration is necessary because the teacher plays the key role in classroom change and teachers tend to accept only changes which they find facilitative for their work, in other words the changes that they perceive practical for their teaching practice. If teachers are not open to the change, the proposed curricular and procedural changes will have a slight chance of success. This situation is valid for any educational innovation, but it is particularly true of technology use in education because the change involves both the acquisitions of new technology skills and pedagogies (Saye, 1998).

Apart from the attitude, there are some other variables investigated in some studies as they are thought to be effective on ICT use, for example, age, gender and experience of the teachers. Many studies have examined the impact of teacher on ICT integration, for example Hubbard (2008); Mumtaz (2000) and Park & Son (2009). These studies concluded that teachers have a crucial impact on the integration of ICT into language teaching practices. Many factors related to teachers effect the integration of ICT. The teachers' age (Teo, 2008; Yaghi, 2001), experience (Egbert, Paulus & Nakamichi 2002; Russel and Bradley 1997), and gender (Russel & Bradley, 1997; Todman, 2000) are some of these factors. One of the dimensions to be discussed in the present study is whether the experience of teacher in using ICT has effect on their attitudes or not. In the literature there are numerous studies addressing this issue. For example, according to Gaudron & Vignoli (2002), Computer experience has been the most commonly mentioned variable correlated to positive attitudes. Moreover, Chou (1997) also highlighted that computer experience influenced teacher attitudes toward computers. Ropp (1999) found that there is significant relationship between computer access and hours of computer use per week and computer attitudes. In a study Isleem (2003), stated that teachers" attitudes have been found to be a primary predictor of the use of new technologies in instructional settings.

Kumar (2014) conducted a study on the effects of individual factors on attitude and concluded that there is significant effect of teaching experience on attitude towards using ICT but gender has no significant effect on this. Furthermore it is observed that

teachers with 6-10 years of teaching experience have more favourable attitude towards using ICT for educational purposes in their teaching practices.

2.4. Studies on Interactive Whiteboards in ELT

The recourses materials that a language teacher can use in class used to be very different and various, but with the presence of IWBs in language classes, many changes have been observed as IWBs present teachers with various opportunities to teach in new and more exciting ways that far surpass the possibilities of traditional chalkboards. In fact, the IWB has been described as a combination of all previous teaching resources, which teachers used to benefit at different times for different purposes, rolled into one: chalkboard, plain whiteboard, television, video, overhead projector, CD player and classroom computer (Hall and Higgins, 2005). As a result of this combination many of the necessary materials for EFL teachers have been put into a single technology which provides teachers with an online resource library and a multimedia presentation device right in the heart of their classrooms and if it is also equipped with internet connection, teachers do not need to bring any other electronic devices to their classes.

Furthermore, the IWB allows instant access to internet in which teachers can find a numerous educational websites, audio and video clips, photos and endless textual material to vary their teaching recourses with ease. Apart from the Internet, educational software packages with interactive and electronic texts and games, electronic versions of the course books and workbooks, can also be purchased for classroom use, or they have already started to be available for teachers and students and can be downloaded from some serves free of charge.

In Language teaching and learning, some other benefits can be associated with the use of IWBs. For example, in their study Schmid and Schimmack (2010, p. 198) describe four educational benefits of using the IWB technology: a) facilitating the integration of new media in the regular language classroom, b) enhancing the scope of interactivity and learner engagement in the lesson, c) supporting the development of so-called "electronic literacies", and d) meeting the needs of students with diverse learning styles (aural, visual and kinesthetic) through the use of multiple media.

In addition to this technological support, the IWB still holds the qualities of a traditional chalkboard, allowing teachers to write and erase as they have been doing for years with the chalkboards.

In the language classroom, the IWB opens up a range of possibilities that can have important benefits for both teachers and learners. The IWB allows teachers to maximize the efficiency of time they spend on planning and preparing resources, because lessons and materials can be saved on the computer and reused again and again, can be shared with different classes easily, and can be printed at ease. Flashcards, posters, CD players or even textbooks which are traditional resources for almost all language teachers, can be replaced by images and texts chosen by the teacher with a particular group of learners in mind and easily stored for future reference. Particularly important are the multimedia and multisensory qualities of the IWB which enable teachers to access materials or pre-prepared lessons quickly and efficiently from a range of sources, and to move between visual or oral input and language practice with relative ease. Software created specifically for the IWB contains interactive texts and activities and is illustrated with colourful graphics and sound effects that engage and hold pupils' attention and these software can be downloaded form a server free of charge, and the number of those software packages is growing day by day.

Bacon (2011) and Allen (2010) suggested in their studies the positive influence of authentic documents in language learning. With Interactive Whiteboard the teacher can not only simply project a website; he/she can also overwrite it to emphasize specific linguistic and cultural elements, hide or underline any part of the web resources.

Along with these findings, we must take into consideration that placing IWBs in schools is not sufficient in benefiting from their positive outcomes on its own. In order to get the exact benefits of technology in teaching and learning environments, a combination of some other variables such as reliable technology, teachers' skills, and the variety of approaches they use should be taken into consideration.

The research literature also suggests that certain problems associated with the use of IWBs may hinder the effective use of such facility. They can be listed: teachers' negative attitude towards IWB use, teachers' lack of appropriate training in effective integration, lack of teachers' time to attend training and prepare materials, lack of

teachers' interest in using technology, and the possibility of limited student interaction with the prepared materials (Březinova, 2009; Campbell, 2010).

In their study in 2002, Glover and Miller concluded that in order to realize the potential benefits of IWB, a number of conditions related to the teacher's attitude had to be met: "(a) willingness to develop and use the technology; (b) willingness to become interdependent in the development of materials; and (c) openness to some change of thinking about the way in which classroom activities are resourced" (Glover & Miller, 2002, p.5).

CHAPTER 3

METHODOLOGY

3.1. Introduction

In this chapter, the processes of data collection and analysis are explained in detail. At the beginning of the chapter, the research model, the participants and the settings of the current study are described. Also, this part contains the detailed explanation related to tools used in the study. The data collection and analysis are offered at the end of the chapter.

3.2. Research Model

The present study is a descriptive one and tries to describe the actual IWB use in a certain geographical area and explain some relationships between some certain variables. According to Cerswell (2002), the descriptive research model attempts to describe, explain and make interpretations on the conditions of the present i.e. "what is'. Examining a phenomenon that is occurring at a specific place(s) and time is the purpose of a descriptive research. Moreover, a descriptive research tries to explain conditions, practices, structures, differences or relationships that exist, opinions being held, processes that are in progress or trends that are visible.

One of the research models that descriptive studies include is the type of correlational method, and this is the method chosen for the present study. According to Picciano (2004), a correlational research includes collecting data in order to determine whether, and to what extent, a relationship is existing between two or more quantifiable variables. For exploring relationships, a correlational research uses numerical data between two or more variables. Coefficient of correlation is used to express the degree of relationship, and if the relationship exists between variables, it implies that scores of one variable are in relation with or vary with the scores on another variable.

3.3. Participants

The present study was carried out at 24 Anatolian High Schools in three municipalities of Kocaeli, between February 27 and March 7 in 2015. These municipalities are Gebze, Çayırova and Darıca. Instead of eliciting some of the schools in these municipalities, all of the Anatolian High Schools which have Interactive Whiteboards within the scope of FATIH project were chosen. A total of 119 EFL teachers were given the questionnaires and the consent form. All of the data was collected by the researcher because the schools were accessible for the researcher. All of the schools were state schools and the necessary permission from the Local Educational Authorities were taken. All of the EFL teachers in these 24 high schools were given the questionnaires and all of the participants were required to sign the consent form. Only a total of seven teachers from varying schools refused to sign the consent form and answer the questionnaires.

Moreover, 8 questionnaires could not be taken from the participant teachers for some reasons. After these, the active participant group of the current study consisted of 106 Turkish EFL in-service teachers. Distribution of the participant teachers according to the schools they are working is demonstrated in Appendix D.

All of the participants of the present study are EFL teachers in state Anatolian High Schools and all of the schools listed in Appendix D are equipped with the Interactive Whiteboards in the scope of the FATIH project. The participant group is consisting of different experience groups, but most of the teachers are between 6-10 years of experience group. What is more, the participant group is suitable for investigating the effect of the teaching experience and gender on their attitudes toward IWB and TPACK.

There are also other schools such as Primary schools, Secondary Schools and Private Schools in these municipalities where IWBs have been used for some time but those schools were not taken into the participant group of the study, in order to attain a participant group consisting of EFL teachers from the same level of educational institutions, and all of the schools chosen have their IWBs within the scope of FATİH project, rather than their individual or institutional preferences.

There were demographic questions in the first part of the attitude questionnaire. In the following table the distribution of the participants according their age, gender,

experience, educational background and their experience with Interactive Whiteboards can be seen.

Table 1: *The Distribution of the Participants according to Their Demographic Characteristics.*

		N	%
Age	**20-25**	7	6,6
	26-30	33	31,1
	31-35	25	23,6
	36-40	15	14,2
	41-45	14	13,2
	46+	12	11,3
Gender	**Male**	52	49,1
	Female	54	50,9
Education	**English language teaching**	62	58,5
	English literature	31	29,2
	Faculty of education	12	11,3
	Literature (other lang.)	1	0,9
Experience	**1-5 years**	40	37,7
	6-10 years	25	23,5
	11-15 years	15	14,2
	16-20 years	14	13,2
	21+ years	12	11,4
Experience with interactive Whiteboards	**None**	25	23,6
	1-2 years	48	45,3
	More than 2 years	33	31,1
Frequency of use in a week	**1-2 hours a week**	44	41,5
	3-5 hours a week	32	30,2
	6-10 hours a week	12	11,3
	11+ hours a week	18	17,0
Language Skills	**Writing**	2	1,9
	Speaking	6	5,7
	Reading	9	8,5
	Grammar	56	52,8
	Integrated Skills	33	31,1

In the first question of the demographic part, the age of the participants was asked, most of the teachers (%30.1) are between 26-30 ages, whereas the least number

of teachers (%6,6) are between 20-25 ages. 26-30 and 31-35 age groups composes more than half of the total participants. In terms of gender, the percentages of the participants is very close to each other. The number of the female teachers (%54) is slightly more than the number of male teachers (%52)

In terms of their educational background, % 88 of the participants come from English Language Teaching (%58, 5) and English Literature (%29, 2). There is only one teacher from the literature of other language.

With a percentage of %37, the teacher whose experience is between 1-5 years are composing the most populated experience group in the study.

In order to explore the teachers' frequency of IWB use, the teachers were asked how many hours they were teaching with IWB in a week. It was observed that, %44 of the teachers were using IWBs between 1 or 2 hours in a week and %56 of the participants were using IWBs for grammar teaching.

3.4. Research Tools

At the first beginning of the research, all of the participants were required to sign a consent form. On the condition that they agree to take part in this study as a participant they were asked to reply the questions in Attitude Questionnaire (Appendix A). This questionnaire composed of two parts. In the first part of it there were general information questions. This part was made up of demographic information, educational background, academic career, years of teaching experience, years of experience with IWBs, their frequency of IWB use and the language skills they use the IWBs for. These questions and parts were formulated in order to get general information of the participant teachers to be used in analysis, grouping and comparisons. In the second part of the teachers' questionnaire, there were general attitudes questions. The participants were required to answer 23 question related to their attitudes on IWB. This attitude questionnaire was composed of three main parts which are; Instructional effects of IWBs, General attitudes and Motivational effects of IWBs. This teachers' questionnaire was inspired from the study of Öz (2014) Teachers' and Students' perceptions of IWBs in the EFL classroom. While preparing the instruments, the researcher reviewed similar studies that investigated the opinions, attitudes and perceptions of students and teachers

in various domains (Moss, et al. 2007; Celik, 2012; Elaziz, 2008; Türel, 2011; Türel & Johnson, 2012; and adapted a total of 23 items for the questionnaire.

There was another questionnaire in this study. That is the ELT-TPACK questionnaire (See Appendix B). This questionnaire was taken from Bostancıoğlu (2014). The development of this questionnaire aimed to measure technology pedagogy and content knowledge (TPACK) of English as a foreign language (EFL) Teachers. Permission was taken from the researcher to use this ELT TPACK questionnaire in the study (See Appendix C). There are six parts in this questionnaire and each of the parts tries to elicit information of certain knowledge types. Those are; technology knowledge, content knowledge, pedagogical content knowledge, technological content knowledge, technological pedagogical knowledge and technological pedagogical content knowledge. There are 50 questions in this questionnaire. The participants were required to answer all of the questions in this questionnaire, and while analysing the data, answers of the participants related to all these six parts of questionnaire were used.

3.5. Reliability of Attitude Questionnaire and TPACK Questionnaire

Reliability of both questionnaires was evaluated by Cronbach's alpha coefficient by the researchers who developed these questionnaires. Internal consistency results demonstrated that The Cronbach's alpha reliability of the six factors in the ELT-TPACK questionnaire varied between .81 and .89. The findings suggest that the EFL-TPACK questionnaire is a valid and reliable tool and is sensitive enough to distinguish between different groups of EFL teachers (Bostancıoğlu, 2014)

The final results of the reliability test for the Attitude questionnaire revealed an excellent Cronbach's Alpha coefficient (0.94) for the item survey (Öz, 2014; Türel, 2011).

3.6. Data Collection Procedures

Before applying the questionnaires, the researcher applied the Local Educational Authorities in the mentioned municipalities with the official letter taken from the Institute of Educational Sciences of Anadolu University. After getting the necessary

official permissions (Appendix E), all of the schools were informed about the study and questionnaires before the application.

At the beginning of the data collection process, purpose of the study was explained to the participants. It was promised that their responses would be confidential, and they could get out of the participation whenever they wished.

The study was conducted at 24 Anatolian High Schools in three municipalities of Kocaeli, between February 27 and March 7. All of the questionnaires were applied by the researcher as the schools were accessible for the researcher. Because the questionnaires included many questions, the questionnaires were distributed to the schools on February 27, at each school face to face contact was achieved with at least one EFL teacher, and preferably the head of the EFL teachers was given the questionnaires. After 2 days researcher begun collecting the questionnaires from the schools and the data collection procedure was completed on 7th of March 2015.

3.7. Data Analysis

The present study depends on quantitative data. The data was collected through Attitude Questionnaire and ELT TPACK Questionnaire. The results of these questionnaires were analysed using statistical techniques. Descriptive statistics were conducted in the study. Grounding on Turkish EFL in-service teachers' responses to the first part of the instrument related to participants' personal information, frequencies and percentages were computed in order to obtain data related to their age, gender, teaching experience, educational backgrounds and experiences in using IWBs. In addition, mean scores and standard deviations, correlation analysis, and Bivariate Regression methods were calculated for both Attitude and TPACK. Furthermore, whether there is a relationship between the variables or not further analysis was conducted. Kruskal Wallis Test was implemented for the relationship analysis The Kruskal-Wallis test (sometimes also called the "one-way ANOVA on ranks") is a rank-based nonparametric test that can be used to determine if there are statistically significant differences between two or more groups of an independent variable on a continuous or ordinal dependent variable. It is considered the nonparametric alternative to the one-way ANOVA, and an extension of the Mann-Whitney U test to allow the comparison of more than two independent groups, Kruskal and Wallis (1952); Foreman et al. (2009). Mann-Whitney U test was

also used for the data analysis because Mann-Whitney U test is the alternative test to the independent sample t-test. It is a non-parametric test that is used to compare two population means that come from the same population, it is also used to test whether two population means are equal or not. It is used for equal sample sizes, and is used to test the median of two populations. Usually the Mann-Whitney U test is used when the data is ordinal, Ruxton (2006).

In terms of mean scores and standard deviations, the researcher excluded the option "No idea" from the variables in order to see only the degree of actual agreement and disagreement among the participants expressing a clear opinion. Therefore, the calculation of mean scores ranged from 1.00 to 4.00. In this case, the scores between 1.00 and 1.75 meant that the participants showed their strong disagreement with a certain statement, 1.76-2.50 indicated disagreement, 2.51-3.25 showed agreement, and 3.26-4.00 corresponded to strong agreement.

3.8. Summary

The methodology of the current study has been explained in this chapter. Table 2 gives outline of the present study including research questions, the related instruments and data analysis.

Table 2. *Outline of the Research Questions, Related Instruments and Data Analysis.*

Research Question	Instruments	Data Analysis
1. What is the Technology Pedagogy and Content Knowledge (TPACK) of the Turkish EFL teachers?	TPACK Questionnaire	Descriptive Statistics
2. What are the attitudes of Turkish EFL teachers towards the use of interactive whiteboards?	Attitude Questionnaire	Descriptive Statistics
3. What is the relationship between the attitude of Turkish EFL in-service teachers' attitude towards IWB and their TPACK?	TPACK Questionnaire Attitude Questionnaire	Descriptive Statistics
4. What is the relationship between; a. Gender and TPACK? b. Gender and teachers' attitude towards IWB?	TPACK Questionnaire Attitude Questionnaire	Kruskal Wallis test Mann Whitney U test

5.What is the relation between; a. the teaching experience and TPACK? b. The teaching experience and teachers' attitudes towards IWB	TPACK Questionnaire Attitude Questionnaire	Kruskal Wallis test Mann Whitney U test

CHAPTER 4

RESULTS AND DISCUSSION

4.1. Introduction

The purpose of the chapter is to present the results of the data collected through (1) Attitude Questionnaire, (2) Technological Pedagogical Content Knowledge (TPACK) questionnaire. Following the results, the outcomes will be discussed.

In the first part, findings related to three research questions were analysed. For the first research question, Technological Pedagogical Content Knowledge (TPACK) questionnaire was used. For the second question the attitudes of teachers were evaluated through Teachers' Attitude Questionnaire. At third question, whether there is a relationship between the teachers' TPACK and attitude toward Interactive Whiteboards (IWBs) was revealed. For the fourth and fifth questions, the relationship between gender and TPACK, between teaching experience and TPACK, and the relationship between gender and attitude, between teaching experience and attitude were revealed and discussed. In the final part, the outcomes of the study were discussed.

4.2. Findings Related to the Research Questions

The data coming from the findings of both questionnaires are evaluated in order of research questions.

4.2.1. The Findings Related to Technological Pedagogical and Content Knowledge (TPACK) levels of the Turkish in-service EFL teachers.

ELT-TPACK Questionnaire was used to reveal the levels of EFL in-service teachers' TPACK competencies in various school settings. Table 3 indicates the analysis of the data coming from the TPACK questionnaire and analysis of the each TPACK components is demonstrated.

Table 3: *Analysis of the Scores of TPACK Components.*

TPACK Component	M	Highest Score	Lowest Score	SD
TK	3,92	5,00	2,00	0,78
CK	3,98	5,00	2,00	0,63
PK	3,84	5,00	1,92	0,66
PCK	3,73	5,00	2,25	0,67
TCK	3,70	5,00	2,00	0,71
TPK	3,66	5,00	2,00	0,64
TPCK	3,53	5,00	1,86	0,67

TK: Technology Knowledge   CK: Content Knowledge   PK: Pedagogical Knowledge

PCK: Pedagogical Content Knowledge TCK: Technological Content Knowledge

TPK: Technological Pedagogical Knowledge

TPCK: Technological Pedagogical Content Knowledge

M: Mean Score   SD: Standard Deviation

As seen in Table 3, the highest mean score is coming from the Content Knowledge (CK) component of the TPACK questionnaire while the lowest is of Technological Pedagogical Content Knowledge (TPCK). This result reveals that the participants consider themselves more competent than other components for the Content Knowledge component. The questions in the Content Knowledge part of the questionnaire are asking directly the language proficiencies of the teachers such as their ability to monitor their own writing, speaking accuracy, or their familiarity with the differences between spoken and written English. Content Knowledge is very important and can be considered as a basis for other competencies, so the high level of CK levels of the participants indicates their proficiency in their fields. Technology Knowledge (TK) of the participants is also revealed to be high. As seen in the table, the mean score of the TK component is 3, 92 which indicated high levels of technology knowledge for the teachers. This might be resulting from the general technology familiarity and frequency of technology use for the participants, especially when their ages are taken into account, they are mostly expected to be familiar with the latest technological developments and ICT tools to a great extent. The analysis of the Pedagogical Content Knowledge (PCK)

also indicated high levels (M=3, 73). PCK component of the TPACK questionnaire is eliciting information for the abilities of the teachers for combining pedagogy and content. The high levels of the participants shows their competency in abilities such as assessing students' learning in multiple ways, selecting teaching materials appropriate to the needs of the learners, choosing appropriate approach to teach learners, and adapting their teaching style to different learners.

Another component of the TPACK questionnaire was containing questions related to Technological Content Knowledge (TCK). The analysis of the related data also revealed high levels of TCK for the participants (M=3, 70). This part of the questionnaire included questions for eliciting information about the knowledge of teachers such as; knowledge about technologies that a teacher can use to teach English grammar, reading, writing, pronunciation, vocabulary and listening. Furthermore this part included a question about the knowledge of technologies that the teachers can us to teach about the differences between cultures. The final component analysed here is the Technological Pedagogical Knowledge (TPK) which tries to reveal the abilities of teachers for adapting the use of technologies to different activities, choosing technologies that enhance students' learning for a lesson, designing, using technology relevant learning experiences to promote students learning, and engaging students in solving authentic problems using digital technologies and resources. The mean score was calculated as 3, 66. This is the second least score calculated but even so it indicates high levels of Technological Pedagogical Knowledge for the participants.

After analysing the results of the TPACK components separately, the results of the TPCK component which in a way includes some properties of all other components is analysed in detail. Table 4 shows the analysis of the seven questions in this part.

Table 4: *Analysis of the TPCK Questions*

	SD		D		NI		A		SA		M	STD
	f	%	f	%	f	%	f	%	f	%		
Q1	-	-	15	14,2	23	21,7	60	56,6	8	7,5	3,58	0,83
Q2	1	0,9	12	11,3	25	23,6	57	53,8	11	10,4	3,61	0,86
Q3	1	0,9	10	9,4	22	20,8	64	60,4	9	8,5	3,66	0,80
Q4	-	-	17	16,0	20	18,9	62	58,5	7	6,6	3,56	0,84
Q5	-	-	21	19,8	18	17,0	61	57,5	6	5,7	3,49	0,88
Q6	-	-	24	22,9	20	19,0	56	53,3	5	4,8	3,40	0,89
Q7	-	-	25	23,6	16	15,1	59	55,7	6	5,7	3,43	0,92

Note: f: Frequency SD: Strongly disagree D: Disagree NI: No idea A: Agree   SA: Strongly agree
STD: Standard Deviation   Mean: Means calculated

Q1: I can use a range of technologies that enable students to become active participants
Q2: I can use a range of technologies to help students pursue their individual curiosities
Q3: I can use technology effectively to communicate relevant information to students and peers
Q4: I can facilitate intercultural understanding by using technology to engage students with different
    cultures
Q5: I can select technologies to use in my classroom that enhance what I teach, how I teach, and what
    students learn
Q6: I can provide equitable access to digital language learning tools and resources
Q7: I can teach lessons that appropriately combine English linguistic concepts, technologies, and teaching
    approaches

As it can be seen in Table 4, the highest mean score is calculated for the third item in the TPACK questionnaire. Majority of the participants (%68.5) agree or strongly agree with the statement that they can use technology effectively to communicate relevant information to students and peers. Similarly, %64.2 of the participants state that they can use a range of technologies to help students pursue their individual curiosities.

As seen in the analysis of the first question, sixty-eight out of 106 teachers find themselves able to use a range of technologies that enable students to become active participants. This finding is in accordance with the motivational attitudes of the teachers toward IWBs. Another high TPACK competency can be inferred from the scores of the fourth question as majority of the teachers (%65.1) of the participants find themselves capable of facilitating intercultural understanding by using technology to engage students with different cultures. This might be resulting from the opportunity that using IWBs provides for teachers; that is easiness in finding and presenting cultural and intercultural materials in web-based applications. While teaching a subject, teachers can find and add materials covering intercultural aspects into instruction and with a good planning, this might be successful in directing and sustaining students' attention on the desired aspect.

Finally, the analysis of the overall TPACK questionnaire is provided to illustrate the overall TPACK levels of the participants. Table 5 shows mean and standard deviation of the score from TPACK questionnaire including all components together.

Table 5. *Mean Score and Standard Deviation of Overall TPACK Questions*

	N	Lowest Score	Highest Score	M	SD
TPACK	106	2,51	5,00	3,84	0,54

It can be seen in Table 5 that mean score of EFL in-service teachers' TPACK questionnaire was 3, 84. While the highest score was 5, 00; the lowest score was 2, 51.

Depending on the descriptive statistical analysis of all data in terms of percentages, frequencies and standard deviations, it might be deduced that high levels of agreement indicate that the participant teachers have high level of TPACK.

In order to explain the results of the TPACK questionnaire in detail, the distribution of the mean scores and frequencies of the answers given to the final seven questions for the TPACK section of the questionnaire are examined.

The highest frequency for all of the questions is calculated for the ''agree'' option. For all of the questions in this part, the majority of the participants agreed with the statements and this result reveals high levels of TPACK for the participants. This finding correlates with most of the studies in the literature such as; Kaya (2010), Tunçer (2014), Savaş (2011) and Guzey and Roehrig (2009).

4.2.2. The Findings Related to the attitudes of Turkish EFL in-service teachers towards the use of interactive whiteboards.

In order to answer the second research question, the teacher attitude questionnaire was applied to the 106 participants. The questionnaire is consisted of three main parts which are; instructional effects of IWB, general attitudes towards IWB use and, finally motivational effects of IWBs. The data for these three parts were examined and discussed in detail. Before discussing the results of these parts separately, it would be

better to look at the overall attitudes of the participants. Table 6 demonstrated the analysis of the whole date coming from the three parts of the teachers' attitude questionnaire.

Table 6. *Mean Scores and Standard Deviation of Overall Teacher Attitude*

	N	Lowest Score	Highest Score	*M*	*SD*
Attitude Questionnaire	106	2,61	5,00	3,48	0,38

It can be seen in Table 6 that mean score of the EFL in-service teachers' attitude was 3.48. While the highest score was 5.00, the lowest score was 2.61.

Based on the data collected through attitude questionnaire and the analysis of this data, it can be inferred that the EFL in-service teachers have positive attitudes towards the use of IWBs in language teaching. This finding supports the results of Öz (2014), which also asserts that Turkish EFL teachers have positive attitudes towards IWB use in their classes. The findings of the present study is also in parallel with Türel (2012) in which the researchers found that teachers have positive perceptions about IWB use and teachers believe that IWBs can be used for different subject matters. What is more, teachers believe that IWBs can be used to facilitate learning and instruction in classroom settings. Additionally, Saltan (2013) supports these findings as the results of that study showed that teachers found IWBs easy to use and useful, and they had favourable attitudes toward IWB use in their classes.

To discuss the attitudes of the participants towards IWB more precisely, the answers of the participants are grouped as; (a) Instructional Effects of IWBs; (b) General attitudes and (c) Motivational effects of IWB. Table 7 demonstrates the average of the mean scores of these three parts.

Table 7. *Average of the Mean scores of the Three Parts in Attitude Questionnaire*

Attitude Questionnaire	Average Mean Scores of the Questions
Instructional Effects	3,75
General Attitude	2,99
Motivational Effects	3,82

According to Table 7, the highest average of mean score comes from the motivational effects of IWBs. The average of the mean score for the motivational effects of IWB is 3.82, which indicates that the participant teachers find IWBs effective in motivating themselves and their students. The average of the mean scores for the Instructional effects of IWBs is 3.75. This score also indicates positive attitudes of teachers for instructional benefits of IWBs for their classes, which means that teachers find IWBs as facilitative tools for their profession. Finally the average of the mean score of the General attitudes part is 2.99. This is the lowest average but this results from the existence of direct negative attitude questions in the questionnaire. To attain more precise results of the attitude questionnaire and its parts, the data coming from these parts were analysed and discussed separately.

The eleven questions in the first section of the teacher's questionnaire investigated teachers' attitudes towards the use of IWBs as teaching tools in their classes. In general, the mentioned benefits of IWBs such as saving time, enabling teachers to reach different sources easily, saving and printing students' work for future reference or examples, easing revision, and creating the opportunity to interact with the class face to face were included in the questionnaire statements to learn the teachers' feelings about these features of IWBs. The researcher also wanted to learn if the teachers feel that they are more effective, efficient, and better managers of their classes when using IWBs or not. The analysis of data for the instructional effects of IWBs are demonstrated in Table 8.

Table 8: *Analysis of the Answers Related to Instructional Effects of IWBs*

	SD		D		NI		A		SA		M	STD
	f	%	f	%	f	%	F	%	f	%		
Q1	6	5,7	27	25,5	5	4,7	30	28,3	38	35,8	3,11	1,11
Q2	12	11,3	19	17,9	24	22,6	47	44,3	4	3,8	4,15	0,93
Q3	-	-	6	5,7	21	19,8	30	28,3	49	46,2	3,68	1,13
Q4	1	0,9	22	20,8	18	17,0	34	32,1	31	29,2	3,61	1,11
Q5	1	0,9	26	24,5	9	8,5	47	44,3	23	21,7	3,52	1,00
Q6	1	0,9	22	20,8	18	17,0	51	48,1	14	13,2	4,01	0,90
Q7	-	-	6	5,7	24	12,6	39	41,8	37	39,9	3,58	1,02
Q8	-	-	23	21,7	17	16,0	47	44,3	19	17,9	3,84	0,93
Q9	1	0,9	10	9,4	19	17,9	51	48,1	25	23,6	3,75	1,03
Q10	-	-	21	19,8	9	8,5	51	48,1	25	23,6	4,04	0,84
Q11	1	0,9	7	6,6	8	7,5	61	57,5	29	27,4	3,97	0,88

Note: f: Frequency SD: Strongly disagree D: Disagree NI: No idea A: Agree SA: Strongly agree STD: Standard Deviation

Mean: Means calculated

Q1: Using the IWB resources reduces the time I spend writing on the board.

Q2: When using IWBs in the classroom, I spend more time for the preparation of the lesson.

Q3: Using IWBs makes it easier to reach different sources and display them to the whole class immediately.

Q4: IWBs are beneficial for saving and printing the materials generate during the lesson.

Q5: I can give explanations more effectively with the use of IWBs.

Q6: With the help of using the IWB, I can easily control the whole class.

Q7: I think IWBs can be a good supplement to support English teaching.

Q8: Using IWBs makes me a more efficient teacher.

Q9: Using IWBs makes it easier for an English teacher to review, re-explain, and summarize the subject.
Q10: I believe IWB is a useful technology for English teachers to learn.

Q11: Using IWB makes the English lessons more interactive.

According to the analysis shown in the table, except for the statement that when they use IWBs, teachers spend more preparation time for their lessons, the teachers agreed with all statements in this category.

The highest mean score belongs to question ten, which indicates that nearly all of the teachers (81.7%) agree or strongly agree with the statement that IWBs can be a good supplement for the language teaching process, and teachers should learn how to use it.

The questions in this section can be categorised into two subcategories: questions related to the benefits of IWBs and questions which try to elicit directly the opinions and attitudes of the participant teachers about IWBs. For example, Q7 and Q8

are questions which are directly asking the opinions of teachers about IWBs, on the other hand the rest of the questions can be mentioned in the category of benefits or drawbacks of IWBs. When examined, it can be seen in the table that the results of the third item show that majority of the teachers thinks positively that IWBs make it easier for them to reach different sources quickly and easily and to show those sources to the whole class at the same time. This might be because the IWBs are equipped with internet connection and teachers can easily switch among different types of sources easily, whether prepared beforehand or chosen at the time of teaching. Regarding the responses for the ninth question, it can be seen that majority of the teachers think that using IWBs in their lessons makes it possible for them to review, summarise, and re-explain a subject easily. This might also be resulted from the opportunities that IWBs provide for teachers, such as storing the used materials for future use. At any phase teachers can go back and re-explain the topic or replay the media for review and summarising. The analysis of the results of the first question reveal that, 64.2% of the participants agreed or strongly agreed that using IWB-based resources reduces time spent in writing on the board during the lessons. The reason why majority of the teachers think like that is probably that they do not have to write all the explanations on the board during the lesson time. If the materials are prepared before the lesson, the teacher can easily display them on IWB for unlimited times. By doing so, they have more time for activities and exercises. If we examine the results of the fourth question, 61.3% of the teachers agree or strongly agree that IWBs are useful for saving and printing out their students' work. This might be result of the ease of saving and printing with IWBs, especially if the works of the students are prepared in electronic versions, teachers can create a file on the IWB for the students works and can easily print them if needed, furthermore, the teachers have the opportunity to share the students' works with the rest of the class or even with different classes for examining and peer-correction. 66% of the teachers believe that they can give explanations more effectively by using IWBs. When it comes to the effects of IWBs in controlling the whole class, the responses given for the sixth question also addresses positive attitudes. The majority of the teachers think that they could easily control the whole class when they are in front of the class, and facing them rather than spending too much time for writing on the board. This might the resulted from the teachers' ability not spending too much time for

writing on the board and turning back to the students. When the teacher is in front of the class and presenting the lesson looking at the students, the undesired student behaviours can be handled or prevented more easily.

As it can be seen in the table, the second question has the lowest mean score in this category. The mean score for this question is 3.11 and the percentage of the teachers agree or strongly agree with this statement is 48.2%. Nearly half of the teachers think that preparing IWB-based lessons takes more time for preparation of the lesson. This might be resulted from the necessity for teachers to prepare and chose the materials to use with IWBs before the lesson. While teaching with traditional methods teachers can teach the planned topic by heart writing on the board or using the textbooks, the teacher is going to use IWB in the lesson, s/he has to prepare or chose the material beforehand, otherwise it becomes chaotic trying to decide the right materials among the available ones in electronic versions or in the internet. This may indicate that these teachers do not use special software programs designed for certain textbooks because these programs provide a lot of different activities, exercises, and tests for teachers, which eases the teachers' job in preparing extra materials. The cause of this situation might be that at present there is not enough amount of specifically designed software for most of the textbooks used in state schools.

The following eight questions aimed to investigate teachers' general attitudes towards the use of IWBs. The questions can be divided into subcategories of positive attitudes/feelings and negative attitudes/feelings. Q12 and Q14 may be thought of as positive attitudes because they directly looked at whether the teachers like using this technology and whether they have positive attitudes towards it. On the other hand, Q13, Q15, Q16, and Q18 can be considered as negative attitudes since they explored the negative feelings of the teachers while using IWBs, their negative attitudes towards this technology, their concerns about their students' readiness to use this technology, and doubts about their own readiness to use IWBs. Q17 is directly related to the preference of a traditional way of teaching over IWB technology, so it can be included in the negative attitude toward IWB category as well. Table 9 shows the distribution of the answers for the general teacher attitude questions.

Table 9: *Analysis of the Questions Related to General Attitudes toward IWBs.*

	SD		D		NI		A		SA		M	STD
	f	%	F	%	f	%	F	%	f	%		
Q12	-	-	7	6,6	21	19,8	46	43,4	32	30,2	2,48	1,35
Q13	33	31,1	32	30,2	5	4,7	29	27,4	7	6,6	3,85	1,10
Q14	-	-	23	21,7	4	3,8	45	42,5	5	34	2,11	1,31
Q15	49	46,2	28	26,4	1	0,9	24	22,6	4	3,8	2,68	1,43
Q16	24	22,6	38	35,8	12	11,3	12	11,3	20	18,9	2,28	0,94
Q17	19	17,9	53	50,0	21	19,8	11	10,4	2	1,9	2,16	0,97
Q18	30	28,3	40	37,7	26	24,5	9	8,5	1	0,9	2,42	1,15
Q19	22	20,8	49	46,2	8	7,5	23	21,7	4	3,8	3,86	1,00

Note: f: Frequency SD: Strongly disagree D: Disagree NI: No idea A: Agree SA:
Strongly agree STD: Standard Deviation
Mean: Means calculated
Q12: I like using IWB technology in my English lessons.

Q13: I feel uncomfortable using IWBs in front of my students.

Q14: I have positive attitudes toward the use of IWBs in language teaching.

Q15: I have negative attitudes toward the use of IWBs in language teaching.

Q16: I do not think my students are ready for this technology.

Q17: What I do in class with traditional methods is sufficient for teaching English.

Q18: I am not the type to do well with IWB-based applications.

Q19: There is no difference between my use of a traditional board and an IWB in terms of teaching techniques and methods.

As seen in Table 9, majority of the teachers agreed with questions twelve and fourteen, whereas they disagreed or strongly disagreed with the rest of the questions in this category. These remaining questions were actually expressing negative opinions, so the teachers' low levels of agreement with those statements implies an overall positive attitude, and thus a consistency among the participants' responses can be accepted as evident.

The results indicate that %74.6 of the participants agreed that they like using IWBs in their English lessons, and %76.5 of them have positive attitudes towards them. The analysis of the 15th question which asks about the negative attitudes of teachers' toward IWBs shows that only %3.8 of the teachers strongly agreed that they have negative attitudes toward IWBs, while %22.6 of them agreed with this statement. These findings supports the findings of Q12 and Q14 which also highlight positive attitudes. What is more, %66 of the participants disagreed or strongly disagreed with the

statement that they feel uncomfortable using IWBs in front of their students. The percentages of disagreement and strongly disagreement of the Q19 which states that there is no difference between the use of traditional board and an IWB in terms of teaching techniques and methods also gives consistent results with the positive attitudes of the teachers toward IWBs. On the other hand, the majority of the teachers agree that what they do in class with traditional methods is not sufficient for teaching English. One of the strongest supportive result for the positive attitudes of the teachers can be seen in the results of Q18. Only %9.4 of the participant teachers think that they are not the type to do well with IWB-based applications.

As it can be seen in Table 9, the lowest score among the questions in this section is that of Q16. This question finds out the idea of teachers about their students' readiness for this technology. %30.2 of the participants agree or strongly agree that their students are not ready for this technology whereas %11.3 of them have no idea about this issue. This night be because the time of IWB use varies from school to school as the schools have been equipped with this technology at different times. Also, the frequency of IWB use of the teachers might have effect on this result, because the more the teachers use IWBs in their lessons, the more the students become familiar with IWBs and this may affect the perceptions of teachers in students' readiness. But, even Q16 has the lowest score, more than half of the teachers think that their students are ready for IWB use in lessons.

The questions in the final section intended to investigate teachers' attitudes in terms of motivational issues. This section consisted of four questions in total. The questions aimed to gather information about teachers' opinions whether they think that using of IWBs makes lessons more enjoyable and interesting, helps lengthen the students' attention during the lesson time, and increases interaction, motivation, and participation of the students in the lessons.

Table 10: *Analysis of the Questions Related to Motivational Effects of IWB*

	SD		D		NI		A		SA		M	STD
Q20	-	-	18	17,0	7	6,6	53	50,0	28	26,4	3,80	0,84
Q21	1	0,9	6	5,7	14	24,5	53	50,0	20	18,9	3,97	0,71
Q22	-	-	6	5,7	10	9,4	71	67,0	19	17,9	3,87	0,81
Q23	-	-	7	6,6	21	19,8	57	53,8	21	19,8	3,63	1,35

Note: f: Frequency SD: Strongly disagree D: Disagree NI: No idea A: Agree SA:
Strongly agree STD: Standard Deviation
Mean: Means calculated

Q20: I think IWBs make learning more enjoyable and more interesting.

Q21: I can keep my students' attention longer with the help of IWB technology.

Q22: I think IWBs increase the interaction and participation of the students

Q23: I think my students are more motivated when I use an IWB in my lessons.

As it can be seen in Table 10, the scores and low standard deviations calculated show that the participant teachers agreed or strongly agreed with all the statements in this category. The agreement and strongly agreement score of the question 22 is the highest in this category (%67 agree and %17.9 strongly agree). These results show that most of the teachers think that using IWB increases the interaction and participation of the students, and %63.7 of them think that their students are more motivated when the teachers use IWBs in their lessons. The positive attitudes of teachers toward the motivational effects of IWBs on students is a supportive result for the positive attitudes of teachers toward instructional effects of IWBs.

The highest mean score is of the question 21 is the (M=3, 97). This result indicates that great majority of the teachers agreed that they can keep their students' attention longer with the help of IWB technology. This might be a result of the variety of educational sources that IWBs provide for teachers and the flexibility of shift among different kinds of materials during the lesson. Finally, %76.4 of the teachers agreed with the statement that IWBs make learning more enjoyable and more interesting for their students.

4.2.3. The Findings Related to the Relationship between the Attitudes of Turkish EFL in-service Teachers' towards IWBs and their TPACK Level.

The present study aims to investigate whether there is a relationship between Turkish EFL in-service teachers' TPACK level and their attitude towards using IWB in their classes. To investigate the relation between attitude and TPACK levels, the answers of the participants for attitude and TPACK questionnaires were compared. The analysis of the data revealed a significant relationship between TPACK level and attitudes of the teachers towards IWB use in their classes. Table 11 shows the correlation matrix of the relationship between TPACK components and teachers' attitude towards IWB separately.

Table 11. *The relation between TPACK Components and Teachers' Attitude toward IWB Use.*

	IWB Attitude
IWB Attitude	-
TK	r=0,374
	p<0,001
CK	r=0,363
	p<0,001
PK	r=0,371
	p<0,001
PCK	r=0,443
	p<0,001
TCK	r=0,371
	p<0,001
TPK	r=0,386
	p<0,001
TPCK	r=0,308
	p<0,001

As seen in table 11, there is a statistically significant positive relationship between teachers' attitude toward IWB use and their Technology Knowledge, Content Knowledge, Pedagogical Content Knowledge, Technological Content Knowledge, and Technological Pedagogical Knowledge. The higher scores the teachers got from any of the TPACK components, the more positive attitudes towards IWB use they had, or vice versa. After examining the relationship between each component and teachers' attitude toward IWB use, the comparison of data for the relationship between the overall TPACK questionnaire scores and Attitudes of teachers is demonstrated in Table 12.

Table 12. *The relation between Overall TPACK Scores and Teachers' Attitude toward IWB Use.*

	Attitude	**TPACK**
Attitude	-	.455*
TPACK		-

*Correlation is significant at the 0.01 level (p<0,001)

As it can be seen in Table 12, there is a significant moderate positive relationship between TPACK levels and teachers' attitude (r=0,455, p<0,001). This result indicates that the in-service teachers who get higher scores from TPACK tend to get higher scores from the attitude questionnaire, or vice versa. In other words the higher the levels of the participants' TPACK, the more positive attitudes they have towards the use of IWB. This positive relation is also demonstrated in Graph 1.
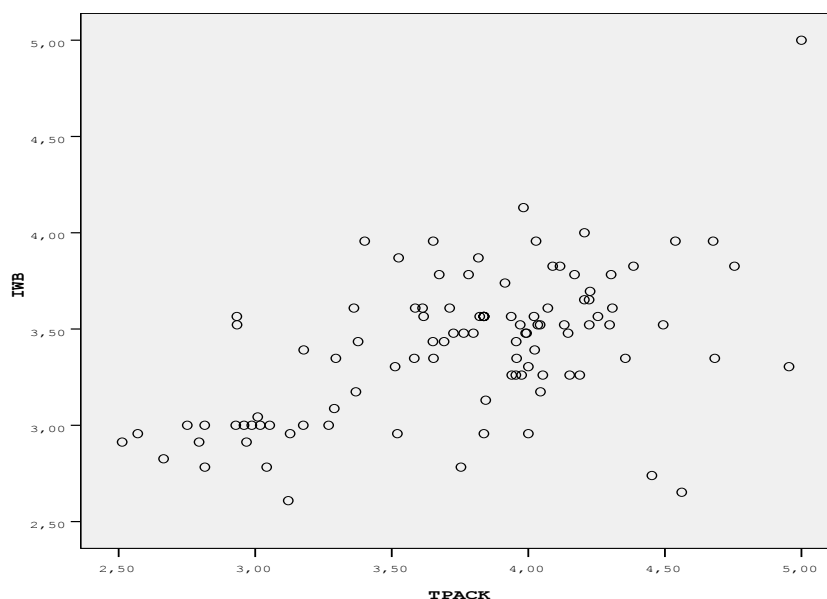
Graph 1. *The relation between TPACK and IWB use.*

Graph 1 illustrates the relationship between teachers' attitude toward IWB use and their TPACK levels. The significant relationship is evident in the Graph.

4.2.4.1. The Findings Related to Relationship between;

a. Gender and TPACK

The present study also aims to investigate whether there is a relationship between the gender of the teachers and their overall TPACK levels. All quantitative data tools aforementioned were used to explore the relationship between these variables. Table 13 shows the correlation matrix of the relationship between gender of the participants and their TPACK levels.

Table 13. *The Relationship between Gender and TPACK*

	Gender	TPACK
Gender	-	.369**
TPACK		-

*Correlation is not significant at the 0.01 level (p=0,369)

As seen in Table 13, there is not a significant relationship between gender of the participants and their TPACK levels ($p>.01$).

The participants of the present study consisted of 52 (49.1%) male and 54 (50.9%) female in-service Turkish EFL teachers. The distribution of the percentages of gender was appropriate for investigating the effect of gender on the TPACK levels of participants, but the statistical analysis of the data revealed no significant relationship between these variables. The mean scores of the both genders were very close to each other. The mean scores of the male and female teachers are very close to each other (Male 3, 84; Female 3, 81) and this finding shows no significant relationship between gender and TPACK levels of the participants.

b. Gender and Attitude

This part presents the results of data analysis regarding whether there is any statistically significant relationship between the teachers' gender and their attitudes towards the use of IWB in their classes. The results of the independent-samples t-test revealed that there were not any statistically significant differences between female (N=54) and male (N=52) teachers because the p-value for all variables was greater than the level of significance. Table 14 shows the matrix of this analysis.

Table 14. *The Relationship between Gender and Attitude toward IWB use*

	Gender	Attitude
Gender	-	.331*
Attitude		-

*Correlation is not significant at the 0.01 level (p=0,331)

As seen in table 14, there is not a statistically significant relationship between gender of the participants and their attitude towards IWB use. This finding is in parallel with the results of some recent studies in the literature such as Karakaya (2013). In the study the researchers concluded that with the spread and availability of technological tools for

everyone, gender has become a less effective factor in determining the attitudes of the individuals towards those tools. This relationship can also be observed when the mean scores of the both genders are examined. There are 52 male participants while 54 of the participants are females. The descriptive statistics revealed no significant relationship between gender of the participants and their attitudes toward IWB use. The mean score of the male participants is 3.39, and very similarly, the mean score of the female participants is 3.42.

4.2.4.2. The Findings Related to Relationship between

a. Teaching Experience and TPACK.

The present study also aims to investigate the relationship between teaching experience of the participants and their TPACK levels. The distribution of the participants according to their teaching experience is shown in Table 15.

Table 15. *Distribution of the Participants according to Total Teaching Experience Groups*

Total Teaching Experience	N	%
1-5 Years	40	37,7
6-10 Years	25	23,5
11-15 Years	15	14,2
16-20 Years	14	13,2
21+ Years	12	11,4

As seen in the table, the biggest percentage of the participants have experience between 1-5 years (*N*=40), whereas the least have more than 21 years of experience. The second largest group is between 6-10 teaching experience with 25 participants. Additionally, 15 of the participants have between 11-15 years of teaching experience and 14 of them have between 16-20 years of teaching experience. The answers of all of the participants to the TPACK questionnaire were analysed by using the Mann Whitney U Test. The

results of this analysis revealed statistically significant differences among the experience groups and the results of the analysis is demonstrated in Table 16.

Table 16. *The Data Analysis for the Relation between Teaching Experience and TPACK*

Total Teaching Experience	N	Lowest Score	Highest Score	M	SD	p
1-5	40	2,83	5,00	3,96	0.45	p<0,001
6-10	25	2,97	4,49	3,98	0.36	p<0,001
11-15	15	3,12	4,30	3,89	0.59	p<0,001
16-20	14	2,66	4,19	2,66	0.43	p<0,001
21+	12	2,51	4,19	2,97	0.59	p<0,001

As it can be seen in table 16, the statistical analysis of the experience groups revealed meaningful differences between 1-5 group and 16-20 group (p <0,001). To be able to explain this difference more precisely, it would be better to look at the ages of the participants in these experience groups. Teachers with 1-5 years of teaching experience are between 20-30 years old while the participants with 16-20 years of teaching experience are between 41-45 years old. The effect of the duration of their teaching experience on their TPACK levels, taking their age into consideration at the same time, might be explained with technology acquaintance. The teachers who have between 1 and 5 years of teaching experience find themselves more competent in using technology in their lessons as they have probably been in touch with educational technologies during their education at faculties and universities, where as it is less probable for the 16-20 teaching experience group to have such a contact with these tools during their previous educations. Another reason might be the general technological acquaintance and abilities. Exposure to technology has steadily bee increasing and mostly the younger ones are the more competent ones in using technology as they get familiar with them at early ages.

This situation might be also valid in explaining the difference between the teachers who have 1-5 years of teaching experience and who have more than 21 years of

total teaching experiences. The analysis revealed meaningful difference between 1-5 and 21+ group at the same time. The ages of the participants in 1-5 years of experience group is between 20 and 30, on the other hand the teachers with more than 21 years teaching experience are more than 46 years old. The effect of technology acquaintance and exposure to it might be greater for this age and experience group. In most of the schools, whether within the scope of FATİH project or not, IWBs have been used actively for a few years and they have similarities and common properties with the technological tools which people use in their everyday lives. This might explain the reason of the less confidence in using technology in classes for the higher experience and age groups.

The statistical analysis of the data revealed significant difference between the 6-10 and 16-20, and 6-10 and 21+ experience groups probably for similar reasons.

There were no significant differences between the other experience groups, for example between 16-20 and 21+ groups. The ages of the participants are also close to one another in these groups. Participants in both groups are likely to have the least technology acquaintance and exposure whether in their personal lives or in teaching and learning settings.

To examine the differences among all experience groups, it might be useful to examine the mean sores of the groups together. As seen in the table the mean scores of the experience groups decrease steadily. The highest men score is of the 1-5 years of teaching experience group with 3, 84 mean score. The other groups' mean scores are; 6-12 years (3, 76), 11-15 years (3, 32), 16-20 years (2, 97), 21+ years (2, 95).

Some implications, mentioned in the following chapter, can be deduced from these results about the need for in-service training courses and assistance for teachers who are expected to use IWBs actively in their classes.

b. Teaching Experience and Attitude

The final relationship that the present study tries to reveal is the relationship between the total teaching experiences of the teachers and their attitudes towards using IWBs in their classes. Statistical analysis was conducted to find out whether EFL teachers' teaching experience does have any impact on their attitudes towards IWB use. The

results showed significant differences for the participants' attitudes in relation to their years of teaching experience. As given in Table 14 in the previous question, the biggest percentage of the participants have experience between 1-5 years (*N*=40), whereas the least have more than 21 years of experience. The second largest group is between 6-10 teaching experience with 25 participants. Additionally, 15 of the participants have between 11-15 years of teaching experience and 14 of them have between 16-20 years of teaching experience. Table 17 shows the differences among groups.

Table 17. *The Data Analysis for the Relation between Teaching Experience and Attitude toward IWB Use.*

Total Teaching Experience	N	*M*	*SD*	*p*
1-5	40	3,54	0.35	p<0,001
6-10	25	3,50	0.36	p<0,001
11-15	15	3,43	0.39	p<0,001
16-20	14	3,07	0.25	p<0,001
21+	12	3,14	0.22	p<0,001

As seen in Table 17, the relationship between 1-5 and 6-10 teaching experience groups are not statistically significant. The age ranges of the participants in these two groups are close to one another and they are likely to have similar attitudes towards IWBs. Their age cannot the only reason, in addition to age, their acquaintance duration with IWBs or other educational technologies are also close to each other. When we take into consideration that these teachers have been working in their present schools for varying durations, the participants in these two groups might have been using IWBs for almost the same time.

To examine the effect of total teaching experience on teachers' attitude towards using IWBs, it would be better to look at the relationship between the groups whose teaching experience differs for more ten years. One of these comparisons can be made for 1-5 and 16-20 years of experience groups, as there are more than ten years difference in terms of teaching experiences of these participant teachers. For these

groups statistical analysis revealed meaningful negative relationship between teaching experience and attitude towards the use of IWBs. One of the reasons for such relationship could be experience with IWBs, educational backgrounds and general technology familiarity. The teachers within 1-5 years' experience group have been working as teachers for 3 years on average and this means that most of them started using IWBs in their teaching practices since the beginning of their profession. Additionally, they might have had instruction for such educational technological tools at universities. On the other hand, the teachers within 16-20 teaching experience group have 17 years of teaching experience on average which means that IWBs are relatively a new technology for them. And the teachers in this group might find it more difficult to adapt new technologies into their teaching practices for either personal reasons such as lack of interest in technology and general technological incompetence, or for more professional reasons such as feeling secure with their traditional ways of teaching language. The distribution of the mean scores of participants for the attitude questionnaire according to their teaching experiences is also demonstrated table 14. The mean score of the participants and their experiences have a negative correlation, in other words the more higher the experience span of the teachers, the less positive attitudes they have towards using IWBs in their classes.

As seen in the table, the mean scores steadily decreases with experience. One conflicting result is seen between the 16-20 and 21+ experience groups. The teachers who have more than 21 years of teaching experience have more positive attitudes towards IWB than the teachers who have teaching experience between 16 and 20 years. To explain this conflicting finding, the participants in the 21+ experience group were examined in terms of their schools and it was found that most of the participants in this group (N=8) were working in the pilot schools of FATİH project in the research area. In other words, they have been working with IWBs from the very beginning of the project and they have been exposed to more intensive and longer in-service training for IWBs. Because, the project was implemented at the pilot schools at first, and the teachers of those schools were provided a more detailed instruction about the IWBs.

4.3. Discussion

In this study, the aims were to investigate (a) TPACK levels of Turkish in-service EFL teachers, (b) their attitudes towards the use of IWBs in their classes, (c) the relationship between TPACK level and attitude of the teachers, (d) the relationship between gender and TPACK, (e) the relationship between gender and attitude, (f) the relationship between teaching experience and TPACK, (g) the relationship between teaching experience and attitude toward IWB use.

First, this study revealed high TPACK levels of Turkish in-service English teachers. The participants were given ELT-TPACK questionnaire (Bostancıoğlu, 2014) in order to find their TPACK level. The results of the descriptive statistics showed that the participants have scores ranging between 2, 51 and 5, 00 and the mean score was 3, 76. These findings demonstrated that the participants of the present study have high levels of TPACK. The findings of the study are congruent with the findings of other studies (Guzey and Roehring, 2009; Karakaya, 2013; and Landry, 2010) The reasons for this result can be that they were all in-service teachers working at schools which all have IWBs within the scope of FATİH project, and they had teaching practices in their branches and they believed in their competencies in teaching English.

After revealing the TPACK levels of the participants, the present study also aimed to investigate the attitudes of the Turkish in-service EFL teachers' attitude towards using IWBs in their classes. To investigate attitude, an attitude questionnaire was implemented. The data coming from this questionnaire were analysed and statistical analysis showed that the participants had positive attitudes towards IWB use. The questionnaire consisted of three main parts; (a) instructional effects of IWB; (b) general teacher attitudes towards IWBs; (c) motivational effects of IWBs. The data was analysed for each section separately, and the results showed that except for the statement that using IWBs requires more preparation time, the teachers agreed with all the statement in the instructional effects category. Nearly half of the participants (%47.1) agreed with the statement that they spend more time for preparation of the lesson with IWBs. The reason for this result can be that most of the teaching materials available for teachers in classes are not yet easily adaptable to electronic use, or they are not specifically designed for using with IWBs. If the teachers prefer to include IWB use

dominantly for instruction, they have to spend time for finding and preparing appropriate teaching materials. With the increasing number of e-materials compatible with the course books and with the spread of educational applications available for teachers this finding may change in time in further studies.

When it comes to the general teacher attitudes part of the attitude questionnaire, this section included direct positive and negative attitude questions and %76.5 of the participants agreed or strongly agreed with the statement that they have positive attitudes towards using IWBs, which indicated a high positive attitude of the participant teachers towards IWB use. On the other hand, only %23 of the participants stated negative attitudes towards IWBs. This findings of the study supports the finding of other researchers (Öz, 2014; Elaziz, 2008; Türel, 2012; Glover & Miller, 2001). This positive general attitude is important in achieving successful results from IWB use in classes, because when the teachers have positive attitudes towards them they are expected to be more volunteering in integrating the tool into their teaching processes. On the other hand, the reasons of negative attitudes can be investigated and the teachers who have negative attitudes towards IWBs can be supported with supplementary instruction or teaching materials so they can use the facility actively in their classes.

After analysing the results of instructional effects and general attitudes parts, the questions related to the motivational effect of IWBs were analysed. The questions in this part included questions about motivational issues such as making learning more enjoyable, keeping students' attention longer and increasing the interaction and participation of the students. The statistical analysis revealed that teachers have positive attitudes for the motivational effects of using IWBs in their classes. Most of the teachers (%67 agree, %17.9 strongly agree) that IWB increases interaction and participation of their students. Additionally, majority of the teachers (%68.9) agreed that they can keep their students' attention longer with the use of IWB technology. Similarly, %76.4 of the teachers found IWBs effective in making learning more enjoyable and more interesting for their students. The reason for this result can be that teachers can include interactive and varying activities and materials in addition to web-based activities during lessons. If well-planned, authentic materials can be adopted to the teaching purposes and teachers can differentiate the type and difficulty level of the activities, which makes the lesson

more enjoying for the students. Another factor they may affect the teachers' attitudes in this part can be that their students are actively in contact with technological tool in their school and personal lives so the teachers' use of technology in the lesson may affect their perception of the quality of lessons. Similar to the results of previous IWB studies (Beeland, 2002; Moss et al., 2007; Erduran & Tataroğlu, 2009; Mathews-Aydinli & Elaziz, 2010; Saltan, Arslan, &Gök, 2010; Alharbi, 2013; Mouza, 2008), it is apparent that teachers have positive attitudes (3.41/5.0) towards t the use of IWBs in general.

When compared with the studies with pre-service teachers, the findings of the present study also shows a parallelism with the findings of Niess (2005). It was concluded in the study that technology use as a part of lesson increases students' motivation and boosts their learning.

Having attained the results and analysis of the TPACK and attitude questionnaires, the present study focused on investigating the relationship between TPACK levels of the participants and their attitudes towards using IWBs in their classes. The analysis revealed a moderate positive relationship between TPACK level and attitude. The higher the level of TPACK, the more positive attitudes the teachers have toward IWB use (r=0,455 & p<0.001). The reason for this result might be that when teachers find themselves confident and competent in using IWBs, they have more positive attitudes towards using it or when they have positive attitudes towards them they feel themselves more confident and capable in using this tool for their teaching practices. The results pointed that the in-service teachers who have higher score from TPACK tend to get higher score from attitude scale. The finding showed TPACK has an influence on the attitudes of teachers. When it is compared with the studies in field, especially with the studies which focus on teacher efficacy, the findings of the present study conforms to the outcomes of Sahin et al. (2009) who concluded that a significant relation was detected among pre-service teachers' vocational self-efficacy beliefs that refer to teacher efficacy and their varying levels of knowledge in content, pedagogy, and technology. Furthermore, the same study exhibited that pre-service teachers who have high scores in content, pedagogy, and technology knowledge bases report to have self-efficacy beliefs for their jobs providing the knowledge of content, pedagogy, and technology at the same time in the framework of teacher education programs (Sahin, et al., 2009). As teachers attitude and competence in using technology in their classes in

related also with teachers' professional development, the findings of the present study can be thought as supported by Abbit (2011) which states that an increase in teachers' technology, pedagogical content, and technological pedagogical knowledge caused an increase in levels of their professional development and competency

The attitude questionnaire also includes questions related to instructional effects of IWBs such as controlling the class more easily, the positive relationship between TPACK and attitude can have effect on classroom management for teachers. This positive relation has the potential to yield more effective classroom management. In this sense, Zhao (2003) supports the findings of the present study related to both classroom management and instructional strategies with the explanation that:

> Instead of threading technology knowledge as a separate entity of teacher knowledge, I suggest that we view it as an integrated part of teacher pedagogical knowledge and pedagogical content knowledge. In other words, technology becomes an element of instructional and classroom management strategies. Knowledge of teaching, learning, and content includes knowledge of technology (p.8.)

Similarly, %61.3 of the participants of the present study agrees with the statement that the can control the whole class more easily with the help of IWBs.

After revealing the TPACK levels and attitudes of the Turkish in-service EFL teacher' towards the use of IWBs, and investigating the relationship between the two main variables, the present study additionally tried to explore the relationship between these two variables; gender and teaching experiences of the participants.

Firstly, TPACK levels and attitudes of the teachers were analysed in terms of the relationship of them with gender. The participants of the present study consisted of 52 male and 54 female Turkish in-service EFL teachers from 24 Anatolian high schools which were equipped with IWB technology within the scope of FATİH project. The statistical analysis for the relationship between gender and TPACK and between gender ant attitudes of the participants revelled no significant relationship between these variables. The p level was 0,369 for TPACK and gender relationship, where as it was 0,331 for the gender and attitude relationship. These findings of the study is concurrent in some other studies in the literature (Öz, 2014; Teo, 2006). In these studies the researchers conclude that the more widespread use of computers by almost every member of the society has made the difference resulting from gender insignificant.

Another aim of this study was to explore the relationship between TPACK and teaching experience, and between attitude and teaching experience. The statistical analysis revealed negative relation for both of the variables. There were meaningful differences between 1-5 and 16-20 experience groups in terms of their TPACK levels ($p>0,001$). There were also meaningful negative relationship between teaching experience and TPACK level for 1-5 and 21+ teaching experience groups. This finding conflicts with the findings of Öz, (2014), in which the researcher concludes that teachers with more years of teaching experience had more favourable perceptions of IWBs than less experienced teachers. The findings also don't show parallelism with the results of (Beauchamp, 2004). In that study, it was found that higher-level experienced teachers use more IWB features, and they have more positive perceptions for IWB. The reason for this result can be that, the more experienced teachers working at state school in the research are have mostly been working for more than 20 years, so their acquaintance with technology either for educational or for personal purposes might be less than the less experienced teachers who have more contact with technology. In addition, another reason for this result may be causing from the educational backgrounds of the participant teachers. The teachers who have teaching experience between 1-5 years are more likely to have education for educational purposes in their previous education, than the teachers who have 21+ years of experience. Having received instruction crates advantage for the less experienced teachers, whereas the more experiences teachers have to rely too much on in-service training courses organised for them by the educational authorities and programmers.

4.4. Summary

This chapter has demonstrated the analysis of the data obtained from the Attitude Questionnaire and TPACK questionnaires. Reliability analysis, descriptive statistics, correlation analysis, Bivariate Regressions were assessed to reveal the outcomes about the level of TPACK and attitudes of the participants toward IWB use, and the relationship between TPACK and teachers' attitude toward IWB use in their classes.

Consequently, the data analysis revealed high levels of TPACK and positive attitudes of teachers toward IWB use in EFL classes, additionally the results

demonstrated that a meaningful relationship was detected between the level of TPACK and attitude of the teachers, and teaching experience and TPACK, teaching experience and attitude relatively. However, no significant relationship was detected between gender and TPACK and between gender and attitude.

The following chapter gives details of the conclusions, implications for English language teaching, for teacher trainings, and recommendations for further studies.

CHAPTER 5

CONCLUSIONS AND IMPLICATIONS

5.1. Summary

Numerous studies have been conducted on the impact of technology on various fields. (TPACK) was explained as '' having knowledge about the integration of technology with curriculum and subject area, how to teach it and its' relationship with the other disciplines recent developments in the subject area, its basic concepts, instruments, structures and content'' (TED, 2009, pp xix-xx).

The TPACK model was implemented by Koehler and Mishra (2008). This model emphasizes the knowledge of different technological tools for specific fields which require teachers to integrate it into their subject areas effectively. There are three main components of the TPACK model; content, pedagogy and technology. Necessary technology, curriculum, pedagogy, abilities of teachers, and organizational preparedness are the main points in technology integration (Tinio, 2003).

TPACK and teacher attitude are popular issues of research in the literature, and from an educational point of view, it is possible to explain that technology integration into teaching practices refers using available tools and materials for the purpose of developing learning (Okojie, Olinzock, and Okojie-Boulder, 2006). However, the researcher of the present study has not found a study in the literature related to the relationship between the TPACK levels of Turkish EFL in-service teachers' and their attitudes.

5.2. Conclusions

There are five research questions in the current study as follows: (1) What is the Technology Pedagogy and Content Knowledge (TPACK) of the Turkish EFL teachers? (2)What are the attitudes of Turkish EFL teachers towards the use of interactive whiteboards? (3)What is the relation between the attitude of Turkish EFL teachers' attitude towards IWB and their TPACK? (4) What is the relation between; (a) Gender

and TPACK? (b) Gender and teachers' attitude towards IWB? (5)What is the relation between; (a) the teaching experience and TPACK? (b) The teaching experience and teachers' attitudes towards IWB.

The first research question examined TPACK levels of Turkish EFL in-service teachers. The findings suggested that the group of participants in the study reported to have high levels of TPACK. This outcome concurs the Tunçer's finding for pre-service EFL teachers, and Laundry (2010) from the field of mathematic.

The second research question investigated the attitudes of Turkish EFL in-service teachers' toward the use of IWBs in their classes with an attitude questionnaire consisting three main parts which are the instructional effects of IWBs, general attitudes towards IWBs, and the motivational effects of IWB. The participants declared to have positive attitudes toward IWB use. Additionally, data analysis revealed that most of the participants agreed on the positive effects of IWB use for educational purposes, and they used it for different purposes.

The third research question tried to explore whether there was a meaningful relationship between TPACK level and attitude. Analysis of data showed statistically meaningful relationship between TPACK and attitude. The teachers who got higher scores from the TPACK questionnaire indicted more positive attitudes, as well. There were not any studies about the relationship between TPACK and attitude, but there are some between TPACK and teacher efficacy, and those researchers detected a positive relationship between TPACK levels of pre-service or in-service teacher and their efficacy beliefs (Sahin et al., 2009; Abbitt, 2011; Tunçer, 2014).

For the fourth research question and its sub-questions, the relationship between gender and TPACK, and the relationship between gender and teachers' attitude were investigated. The analysis demonstrated that there were not a meaningful relationship between gender and TPACK, and similarly between gender and teachers' attitude. This finding is concurrent also in Teo (2006) and Öz (2014). This insignificant relation might be a result of that with the fast spread and availability of technological tools in society, the effect of gender loses is validity.

In respect to the relationship between teaching experience and TPACK, and between teaching experience and attitude, statistically meaningful relations were detected. There was a negative relation between teaching experience and TPACK levels

of the participants. In other words the more experienced were the teachers, the lower scores they got from the TPACK attitude. Additionally, a similar negative relation was detected between teaching experience and attitude towards IWB use. Teachers who constitute the least experienced group had the most positive attitude towards IWB use whereas the most experienced group of teachers had the least positive attitudes. This results were not showing parallelism with some studies which indicates a positive relationship between experience and attitudes of teachers. For example, Öz (2014) investigated the relationship between teaching experience and perceptions of educational technology and found that the more experienced the teachers, the more positive attitudes and perceptions they have for the use of technological tools for educational purposes. The results of the current study is also in conflict with the results of Deniz (2005) which reported that the more experienced teachers had relatively more positive attitudes for technology use in their classes.

In conclusion, the findings of the current study indicated that Turkish EFL in-service teachers' TPACK were high, additionally they had positive attitudes towards IWB in their classes. The relation between TPACK levels and attitudes of teachers found to be statistically meaningful. In parallel with some recent studies the gender of the teachers were not statistically effective on their TPACK and attitude, but total teaching experiences of the participants were found to be effective. Bot teaching experience and TPACK, and teaching experience and attitude were detected to be in negative correlation. These results have raised the concern about the role of TPACK and teacher attitude, the relationship between them and finally possible effective factors on them.

5.3. Implications

The findings of the present study suggest both empirical and practical implications for educators and educational researchers. The results of the current study have shed light on the TPACK levels of Turkish EFL in-service teachers and their attitudes towards using IWB, and the relationship between TPACK level and attitude. The outcomes of the study revealed that there is a positive relationship between teachers' attitude toward IWB use and TPACK, the higher TPACK levels the teachers have the more positive attitudes they have towards using IWB in their teaching practices or vice versa.

As emphasized in many parts of the present study, there is an intertwined relationship between TPACK level and attitude. It is possible to develop content, pedagogical and technological knowledge during teacher preparation programs or during in-service teacher training programs. Investigating various experiences of technology integration at different stages can result in a more complex and intensive comprehension of this knowledge types (Abbitt, 2011). The first implication of the present study can be that all members of teacher education programs and education programmers for in-service teachers should be informed about the role of TPACK on teachers' attitudes towards technology use for better results in English language teaching. Another can be integrating tech-integration in ELT teacher training programs. Departments of English Language Teaching at universities can equip their classes with IWBs which have similar properties with the ones at schools, so that teachers start their teaching career with the necessary competencies. By doing so teachers do not need in-service training and this result in efficient use of time, money and effort.

Educational institutions should take into consideration the role of TPACK level and teachers' attitude, and the relationship between them as important and beneficial. The educational planners and managers have the duty of planning in-service training programs or courses for in-service teachers with the purpose of assisting teachers in gaining or improving knowledge relevant to technology and pedagogy in their fields.

There can also be some implications for the educational programs of pre-service teachers. Sahin (2009) states that the probability of pre-service teachers use technology and pedagogy future increases on the condition that they observe and experience the integration of suitable educational technologies in their subject areas when they are students. The present study also supports this statement as the participants who probably received education for educational technologies showed more positive attitudes toward using IWBs and they attained higher score from the TPACK questionnaire, as well.

However, another crucial point to consider carefully by the researchers is the development of a subtle comprehension of the relationship among content, pedagogy, and technology. That is to say ''there is no single technological solution that applies for every teacher, every course, or every view of teaching'' (Koehler, Mishra, Hershet, and Peruski, 2004, p. 31). Every language class has its own characteristics and teachers

should be aware of this situation. Teachers should know the abilities and success of their students in one class, and also the dynamism of the classroom for making appropriate choices among technological tools for the classroom.

As meeting the needs of modern teaching environments is of vital importance, education planners and managers should be aware of in-service teachers' TPACK levels and attitudes in order to improve these levels. The education mangers should find ways to develop level of TPACK in order to increase the efficiency of the technological investments in schools. As discussed in the relevant parts pf this study, the older or more experienced teachers seem to be in need of improving their TPACK, and this can be achieved by in-service training programs in parallel with the needs of the teachers. Consequently, language teachers will be more confident in using technology in their classes, and language education will also be more effective.

5.4. Suggestions for Further Research

This study was carried out in three municipalities at 24 Anatolian High Schools with 106 Turkish in-service English teachers. Therefore, it gives a clear picture of teachers' TPACK levels and their attitudes in a certain geographical area but even so it is not possible to generalize the outcomes of this study for the all Turkish EFL settings. However, this study can be seen as the first step to reveal the relationship between TPACK and teachers' attitude toward IWBs in Turkish EFL in-service settings. Therefore the same study could be conducted with more participants in various teaching settings. Furthermore, it might be beneficial to collect data in an extended period and observing in-service teachers during classroom settings.

The participants of this study were in-service EFL teachers. There are some studies with pre-service EFL teachers in the literature but there is not much with in-service teachers, carrying out similar studies with in-service teachers could have more suggestions for both in-service training programs and pre-service teacher education programs.

In a recent article, Abbitt (2011) asserts that TPACK is necessary for efficient and innovative educational environment when they teach using technology. Furthermore it was also suggested that teachers' attitude have impact on whether using technology in the classroom or not. Therefore further study could be conducted to

reveal the impact of teacher attitude on TPACK or the impact of TPACK on teacher attitude.

As mentioned earlier, there are some factors detected to influence TPACK and attitude. However, there may be others that have an effect on these variables. Thus, there is need for further studies to discover new elements. Furthermore, TPACK is a new issue in the literature, and possible factors should also be studied in further research.

APPENDICES

APPENDIX A

Attitude Questionnaire

Dear participant,
This study is conducted in Master of Arts (MA) Teaching English as a Foreign Language (TEFL) Program at Anadolu University. It aims to investigate attitudes of Turkish EFL teachers towards the use of Interactive Whiteboards (IWB) in EFL classrooms. You can be sure that all the personal data provided from questionnaires will be kept strictly confidential in my reports. Thank you in advance for your help and contribution.

<div align="right">

Mehmet SARAÇ
Graduate Student
Department of English Language

</div>

Teaching

Section I: General Information

1. Your age: 20-25 ☐   26-30 ☐   31-35 ☐   36-40 ☐   41-45 ☐   46- Above ☐

2. Gender: Male ☐   Female ☐

3. Are you a graduate of;

English Language Teaching ☐   English Literature ☐

Other_____

4. Do you have Maters or PhD Degree?

No ☐   M.A ☐   PhD ☐

5. Have you ever been in a country where English is spoken, in the scope of European Projects or for other reasons?   ☐Yes   ☐No

6. Years of teaching experience:

1-5 years ☐   6-10 years ☐   11-15 years ☐   16-20 years ☐   ☐
21- above

7. Years of experience with Interactive Whiteboards;

None ☐   1-2 years ☐   More than 2 years ☐

8. How many hours do you teach with an interactive whiteboard in English classes in a week?

1-2 hours a week ☐   3-5 hours a week ☐   6-10 hours a week ☐

11 or more hours ☐

9. For which language skills do you use IWB technology most?

Writing ☐   Speaking ☐   Reading ☐   Grammar ☐   Integrated Skills ☐

Section II: General Attitudes

For the following items, please circle the answers that best show your opinion.

1= Strongly disagree   2= Disagree   3= No idea   4= Agree   5= Strongly agree

	TEACHERS' ATTITUDE TOWARDS INTERACTIVE WHİTEBOARD (IWB)					
	Instructional Effects of IWBs					
1	Using the IWB resources reduces the time I spend writing on the board.	1	2	3	4	5
2	When using IWBs in the classroom, I spend more time for the preparation of the lesson.	1	2	3	4	5
3	Using IWBs makes it easier to reach different sources and display them to the whole class immediately.	1	2	3	4	5
4	IWBs are beneficial for saving and printing the materials generate during the lesson.	1	2	3	4	5
5	I can give explanations more effectively with the use of IWBs.	1	2	3	4	5
6	With the help of using the IWB, I can easily control the whole class.	1	2	3	4	5
7	I think IWBs can be a good supplement to support English teaching.	1	2	3	4	5
8	Using IWBs makes me a more efficient teacher.	1	2	3	4	5
9	Using IWBs makes it easier for an English teacher to review, re-explain, and summarize the subject.	1	2	3	4	5
10	I believe IWB is a useful technology for English teachers to learn.	1	2	3	4	5
11	Using IWB makes the English lessons more interactive.	1	2	3	4	5
	General Attitudes					
12	I like using IWB technology in my English lessons.	1	2	3	4	5
13	I feel uncomfortable using IWBs in front of my students.	1	2	3	4	5
14	I have positive attitudes toward the use of IWBs in language teaching.	1	2	3	4	5
15	I have negative attitudes toward the use of IWBs in language teaching.	1	2	3	4	5
16	I do not think my students are ready for this technology.	1	2	3	4	5
17	What I do in class with traditional methods is sufficient for teaching English.	1	2	3	4	5
18	I am not the type to do well with IWB-based applications.	1	2	3	4	5
19	There is no difference between my use of a traditional board and an IWB in terms of teaching techniques and methods.	1	2	3	4	5
	Motivational Effects of IWBs					
20	I think IWBs make learning more enjoyable and more interesting.	1	2	3	4	5
21	I can keep my students' attention longer with the help of IWB technology.	1	2	3	4	5
22	I think IWBs increase the interaction and participation of the students	1	2	3	4	5

23	I think my students are more motivated when I use an IWB in my lessons.	1	2	3	4	5

Consent Form

I have read the above information. I hereby give my consent for the data acquired to be used by Mehmet SARAÇ in this survey.

Name:

Date:

Signature:

APPENDIX B

Technological Pedagogical Content Knowledge (EFL-TPACK) Questionnaire

	Technology Knowledge					
1	I know how to save data into/from a digital device (i.e. flash disk, USB stick, CD)	1	2	3	4	5
2	I know how to play audio and video files on my computer.	1	2	3	4	5
3	I know how to use computer mediated communication (CMC) technologies (e.g. email, chat)	1	2	3	4	5
4	I know how to record video files (i.e. using a video camera)	1	2	3	4	5
5	I know how to create images on my computer (i.e. using Windows Paint)	1	2	3	4	5
6	I know how to record audio files (i.e. using a dictaphone)	1	2	3	4	5
7	I know about basic computer hardware (i.e. CD-Rom, mother-board, RAM) and their functions.	1	2	3	4	5
8	I know how to use generic office applications (i.e. Word, Powerpoint, Excel)	1	2	3	4	5
9	I know how to edit images on my computer (i.e. using Photoshop)	1	2	3	4	5
10	I know how to use electronic / online dictionaries	1	2	3	4	5
11	I know how to use web 2.0 technologies (e.g. blogs, social networks, and wikis)	1	2	3	4	5
	Content Knowledge					
1	I can monitor my own writing for accuracy	1	2	3	4	5
2	I can comprehend English speech accurately	1	2	3	4	5
3	I can monitor my own speech for accuracy	1	2	3	4	5
4	I can comprehend English texts accurately	1	2	3	4	5
5	I am familiar with the culture(s) of target language communities	1	2	3	4	5
6	I am familiar with the differences between spoken and written English	1	2	3	4	5
	Pedagogical Content Knowledge					
1	I can assess student learning in multiple ways	1	2	3	4	5
2	I can select teaching materials appropriate to the needs of learners	1	2	3	4	5
3	I can choose an appropriate approach to teach learners (i.e.communicative approach, direct method)	1	2	3	4	5
4	I can adapt my teaching style to different learners	1	2	3	4	5
5	I can facilitate learning through individual, partner, group, and wholeclass activities	1	2	3	4	5
6	I can plan when and how to use the target language, including meta-language I may need in the classroom	1	2	3	4	5
7	I can keep students on task	1	2	3	4	5
8	I can identify linguistic problems experienced by learners (i.e.phonological, lexical or grammatical problems)	1	2	3	4	5

9	I can design language courses around the requirements of the curriculum	**1**	**2**	**3**	**4**	**5**
10	I can facilitate learning by creating a comfortable environment in which learners are willing to take risks	**1**	**2**	**3**	**4**	**5**
11	I can react supportively to learners' interaction	**1**	**2**	**3**	**4**	**5**
12	I am aware of the contextual factors that could inhibit/promote English teaching	**1**	**2**	**3**	**4**	**5**
	Technological Content Knowledge					
1	I know about technologies that I can use to teach English language grammar	**1**	**2**	**3**	**4**	**5**
2	I know about technologies that I can use to teach reading in English	**1**	**2**	**3**	**4**	**5**
3	I know about technologies that I can use to teach writing in English	**1**	**2**	**3**	**4**	**5**
4	I know about technologies that I can use to teach English vocabulary	**1**	**2**	**3**	**4**	**5**
5	I know about technologies that I can use to teach pronunciation of English words	**1**	**2**	**3**	**4**	**5**
6	I know about technologies that I can use to teach listening in English	**1**	**2**	**3**	**4**	**5**
7	I know about technologies that I can use to teach about the differences between cultures	**1**	**2**	**3**	**4**	**5**
	Technological Pedagogical Knowledge					
1	I can adapt the use of the technologies that I am learning about to different teaching activities	**1**	**2**	**3**	**4**	**5**
2	I can choose technologies that enhance students' learning for a lesson.	**1**	**2**	**3**	**4**	**5**
3	I can choose technologies that enhance the teaching approaches for a lesson	**1**	**2**	**3**	**4**	**5**
4	I can design, using technology, relevant learning experiences to promote student learning	**1**	**2**	**3**	**4**	**5**
5	I think critically about how to use technology in my classroom	**1**	**2**	**3**	**4**	**5**
6	I can engage students in solving authentic problems using digital technologies and resources	**1**	**2**	**3**	**4**	**5**
7	I can choose technologies to be used in assessment	**1**	**2**	**3**	**4**	**5**
	Technological Pedagogical Content Knowledge					
1	I can use a range of technologies that enable students to become active participants	**1**	**2**	**3**		**5**
2	I can use a range of technologies to help students pursue their individual curiosities	**1**	**2**	**3**	**4**	**5**
3	I can use technology effectively to communicate relevant information to students and peers	**1**	**2**	**3**	**4**	**5**
4	I can facilitate intercultural understanding by using technology to engage students with different cultures	**1**	**2**	**3**	**4**	**5**
5	I can select technologies to use in my classroom that enhance what I teach, how I teach, and what students learn	**1**	**2**	**3**	**4**	**5**

6	I can provide equitable access to digital language learning tools and resources	1	2	3	4	5
7	I can teach lessons that appropriately combine English linguistic concepts, technologies, and teaching approaches	1	2	3	4	5

APPENDIX C

Ali Bostancioglu <ab1007@york.ac.uk>   15 12 2014

Alıcı: bana

Gunaydinlar Mehmet Bey,

Su an icin benim bildigim calismayi ekledim. Bir konferansta sunuldu ve 'inservice teacher' konusu uzerine odakli.

Fatih projesi calismak icin guzel bir proje takip edebildigim kadariyla. Umarim istediginiz bir sekilde ilerler calismalariniz.

Kolayliklar dilerim

...

PDF KulavuzOnal_Va...

APPENDIX D

Distribution of Participants Related to Schools

School	N
Gebze	
Cumhuriyet Anadolu Lisesi	7
Fatih Sultan Mehmet Anadolu Lisesi	4
Gebze Anadolu Lisesi	5
Gebze Anadolu Öğretmen Lisesi	4
Gebze And. Tek.And.Mes. Tek. Lise ve End. Mes. Lis.	9
Gebze Anibal Anadolu Lisesi	5
Gebze Atatürk Anadolu Lisesi	6
Gebze Süleyman Demirel Anadolu Lisesi	4
Sarkuysan Lisesi	5
Yücel Boru Fen Lisesi	3
Ticaret Odası Vakfi Ticaret Meslek Lisesi	4
Ticaret Mes. ve Anad. Tic.Meslek Lisesi	4
Gebze Anadolu İmam Hatip Lisesi	5
Çayırova	
Ertuğrul Kurdoğlu Anadolu Lisesi	5
Şehit İlhan Kartal Anadolu Lisesi	5
Şehit İlhan Küçüksolak Anadolu Lisesi	4
Fevzi Çakmak Anadolu Lisesi	4
Darıca	
Darıca Anadolu Lisesi	5
Darıca Anadolu Öğretmen Lisesi	4
Deniz Yıldızları Endüstri Meslek Lisesi	7
Gökşen Mustafa Yücel Anadolu Lisesi	5
Neşet Yalçın Anadolu Lisesi	5
Ülkün Yalçın Anadolu Lisesi	5
Darıca Anadolu İmam Hatip Lisesi	5

APPENDIX E

T.C.
ÇAYIROVA KAYMAKAMLIĞI
İlçe Milli Eğitim Müdürlüğü

Sayı : 67594981/20/6537192   16/12/2014
Konu: Tez Çalışması (Mehmet SARAÇ)

İLÇE MİLLİ EĞİTİM MÜDÜRLÜĞÜNE
ÇAYIROVA

İlgi:01/12/2014 tarihli dilekçe.

Anadolu Üniversitesi Yüksek Lisans Öğrencisi Mehmet SARAÇ'ın (T.C Kimlik No:62461055166) "An Investigation of Turkish EFL Teachers ' Beliefs and Attitudes Towards the Use of Interactive Whiteboards in EFL Classes" başlıklı yüksek lisans tez çalışması için İlçemiz İngilizce Öğretmenleri ile anket çalışması ve görüşmeler yapılması ile ilgili dilekçe incelenmiş olup;

Müdürlüğümüzce uygun görülmüştür.

Köksal TURAN
Şube Müdürü

OLUR
16/12/2014

Şener DOĞAN
İlçe Milli Eğitim Müdürü

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GEBZE KAYMAKAMLIĞI
İlçe Milli Eğitim Müdürlüğü

Sayı : 42339145/774/6862208   24/12/2014
Konu: Anket Çalışması.

KAYMAKAMLIK MAKAMINA
GEBZE

     Anadolu Üniversitesi Rektörlüğü Eğitim Fakültesi Dekanlığı Yabancı Diller Eğitimi Bölümü yüksek lisans öğrencisi Mehmet SARAÇ'ın "An Investigation of Turkish EFL Teachers'Beliefs and Attitudes Towards the Use of Interactive Whiteboards in EFL Classes " başlıklı yüksek lisans tez araştırması için okullarımızda görevli İngilizce öğretmenleri ile anket çalışması yapması ile ilgili 01/12/2014 tarihli yazısı incelenmiş olup,adı geçenin anket çalışması yapması Müdürlüğümüzce uygun görülmektedir.
     Makamlarınızca da uygun görülmesi halinde olurlarınıza arz ederim.

Durak DEMİREL
İlce Milli Eğitim Müdürü

OLUR
24/12/2014

Mehmet ARSLAN
Gebze Kaymakamı

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