HACETTEPE ÜNİVERSİTESİ
EĞİTİM BİLİMLERİ ENSTİTÜSÜ

Department of Foreign Language Education

English Language Teaching Program

THE EFFECT OF AN IN-SERVICE TECHNOLOGICAL PEDAGOGICAL AND CONTENT KNOWLEDGE TRAINING ON DEVELOPING TECHNOLOGY INTEGRATION SKILLS OF EFL TEACHERS

Esra ÖZTÜRK ÇALIK

Ph.D. Dissertation

Ankara, 2024

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HİZMET İÇİ TEKNOLOJİK PEDAGOJİK VE ALAN BİLGİSİ EĞİTİMİNİN İNGİLİZCE ÖĞRETMENLERİNİN TEKNOLOJİYİ DERSLERİNE ENTEGRE ETME BECERİLERİNE ETKİSİ

Esra ÖZTÜRK ÇALIK

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Ankara, 2024

Acceptance and Approval

To the Graduate School of Educational Sciences,

This thesis / dissertation, prepared by **Esra ÖZTÜRK ÇALIK** and entitled “The Effect of an In-Servıce Technologıcal Pedagogıcal and Content Knowledge Training on Developing Technology Integratıon Skills of EFL Teachers” has been approved as a thesis for the Degree of **Ph.D.** in the **Program of English Language Teaching** in the **Department of Foreign Languages** by the members of the Examining Committee.

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Prof. Dr. İsmail Hakkı MİRİCİ

Director of Graduate School of Educational Sciences

Abstract

TPACK has provided researchers with a framework for effective technology integration. Previous studies have mostly explored TPACK in pre-service teacher education but to date no known empirical research examined the role of TPACK in a professional development program on English language teaching. This study aims to fill this gap by exploring the impact a TPACK in-service training program on developing technology integration skills of English language teachers. Twenty teachers participated in this quasi-experimental research and data collected from multiple sources including surveys, interviews, lesson plans and in-class observations. Findings indicated the positive impact of TPACK in-service training program on developing the technology integration skills of English language teachers from the aspects of web tool selection, frequency of technology use in their instruction and increased motivation for using technology. The research enriches the TPACK literature by uncovering the role of contextual knowledge in technology integration. It provides pedagogical implications in designing professional development programs and integrating technology into English language instruction.

Keywords: technological pedagogical and content knowledge, professional development, technology integration, contextual knowledge, English language teaching.

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Öz

Teknolojik Pedagojik ve Alan Bilgisi etkili bir teknoloji entegrasyonu için araştırmacılara çerçeve sunmaktadır. Mevcut çalışmalar TPAB'i çoğunlukla hizmet öncesi öğretmen eğitiminde araştırmıştır fakat bugüne kadar İngilizce öğretimi alanında TPAB'in mesleki gelişim programlarındaki rolünü inceleyen deneysel bir çalışma olmadığı bilinmektedir. Bu çalışma, bir TPAB hizmet içi eğitim programının İngilizce öğretmenlerinin derslerine teknolojiyi entegre etme becerilerini geliştirmeye etkisini araştırarak bu boşluğu doldurmayı amaçlamaktadır. Bu yarı deneysel araştırmaya yirmi öğretmen katılmış ve veriler anket, görüşme, ders planları ve sınıf içi gözlemler dahil olmak üzere birçok kaynaktan toplanmıştır. Bulgular, TPAB hizmet içi eğitim programının İngilizce öğretmenlerinin teknolojiyi entegre etme becerilerini geliştirmede web aracı seçimi, öğretimde teknoloji kullanım sıklığı ve teknoloji kullanımına yönelik motivasyonu artırması açılarından olumlu etkisini göstermiştir. Bu çalışma, teknoloji entegrasyonu konusunda bağlamsal bilginin rolünü ortaya koyarak mevcut TPAB alanyazınını zenginleştirmiştir. Mesleki gelişim programlarının tasarımı ve teknolojinin İngilizce öğretimine entegre edilmesi konusunda pedagojik çıkarımlar sunmuştur.

Anahtar kelimeler: teknolojik pedagojik ve alan bilgisi, mesleki gelişim, teknoloji entegrasyonu, bağlamsal bilgi, İngiliz dili öğretimi.

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Symbols and Abbreviations

TPACK: Technological Pedagogical and Content Knowledge

TPK: Technological Pedagogical Knowledge

TCK: Technological Content Knowledge

PCK: Pedagogical Content Knowledge

TK: Technological Knowledge

CK: Content Knowledge

PK: Pedagogical Knowledge

XK: Contextual Knowledge

CPD: Continuous Professional Development

EFL: English as a Foreign Language

Chapter 1

Introduction

Rapid developments in educational technology have transformed the way learners learn and teachers teach. Today, the concept of school no longer refers to only brick and mortar schools. Even the school-related terminology has expanded with the addition of words such as virtual classroom, open education resource, learning management system, etc. Educational technology has transformed the time and space limited learning into online learning which refers to learning anytime and anywhere. The outbreak of Covid-19 crisis accelerated this transformation process and the necessity of teacher education for digital competency and digital literacy emerged. European Profile for Language Teacher Education points out this necessity in one of the items in the profile list which is “Training in information and communication technology for pedagogical use” (item no: 17). Besides, one of the priorities of the 2021-2027 Digital Education Action Plan (European Commission, 2021) is announced as building a well-established digital education ecosystem. Training the teachers in order to make them digitally-competent and confident has been determined as a sub-component of this mission. When the requirements of being a 21st century teacher are considered, it is necessary to be an effective technology user (Carrier & Nye, 2017; Saavendra & Opfer, 2012).

Statement of the Problem

Technology integration into instruction has become an important concern in the field of teacher education. Initially, the main focus of teacher education was to develop subject matter knowledge among teacher candidates which is also named content knowledge (CK). Later, knowledge of teaching techniques –pedagogical knowledge (PK)- gained importance as different methodologies emerged. In 1987, Shulman proposed a knowledge category known as pedagogical content knowledge (PCK) as an intersection between knowledge of subject matter and knowledge of teaching techniques (Shulman, 1987). With the

emergence of educational technologies, Mishra and Koehler (2006) added the technology component and introduced the technological pedagogical and content knowledge (TPACK) framework.

TPACK framework indicates the relationship between the three knowledge domains in successful technology integration. Ever since it was announced, TPACK has been a highly-explored issue among researchers from diverse disciplines.

In terms of language teacher education, most of the TPACK research has been conducted in pre-service teacher education (e.g. Abbitt, 2011a; Santos & Castro, 2021; Schmid et al., 2021; Smith, 2010).

However, far too little attention has been paid to the TPACK development among in-service language teachers. Among the few studies that exist, some of them explores the effective use of TPACK in language instruction (e.g. Alemleh, 2019) while others are concerned with the variables that impact TPACK such as technostress level (Atan, 2021), ICT usage (Kabakci Yurdakul & Çoklar, 2014), web usage (Lee & Tsai, 2010) and informal technology usage (Yıldız, 2020). In spite of the growing awareness on the necessity of educational technology use in language instruction, surprisingly the existing literature lacks clarity regarding the impact of a TPACK training on in-service EFL teachers' TPACK level and their technology use in language instruction. The present study attempts to fill this gap in the TPACK literature by exploring the impact of an in-service training on TPACK development through collecting data from multiple measures.

Aim of the Study and Research Questions

This study sets out to explore the impact of TPACK-in-Action training program on developing technology integration skills of EFL teachers. Specifically, the following issues are addressed:

1- What is the impact of in-service TPACK training on developing the technology integration skills of EFL teachers?

a- What is the impact of in-service TPACK training on the frequency of technology use in EFL teachers?

b- What is the impact of in-service TPACK training on tech-integrated lesson plan development of EFL teachers?

c- What is the impact of in-service TPACK training on the EFL teachers' awareness for web tool selection?

2- What is the impact of in-service TPACK training on the teaching methods and techniques that the EFL teachers employ?

3- What is the impact of in-service TPACK training on content knowledge of the EFL teachers?

4- Is there a significant difference between pre-test and post-test scores of EFL teachers before and after the TPACK training has been implemented?

Significance of the Study

The success of an education system is closely related to the importance attached to teacher education. In other words, teachers' effectiveness is dependent on the extent and the quality of teacher education (Darling-Hammond, 2000). Teacher skills and competencies change in accordance with the needs and the requirements of the century. What was expected from the teachers of 1900s does not apply to teachers in today's knowledge society. At present, more sophisticated set of competences than before are demanded. In addition to the skills for subject expertise and teaching techniques, teachers are expected to have command of digital devices in their profession.

Recently, developing teachers' technological competence has been high on the agenda of policy makers and teacher educators. In that scope, tangible steps for teacher education are taken throughout Europe. For example, UNESCO redesigned the ICT Competency Framework for Teachers which was developed as a tool to guide pre- and in-service teacher training on the use of ICTs across the education system (UNESCO, 2018).

Another action towards the enhancement of teachers' digital competences is the development of the European Framework for the Digital Competence of Educators named as DigCompEdu (Redecker, 2017). The DigCompEdu framework is based on six areas in which educators' digital competence is expressed with a total of 22 competences. The areas focus on using, managing, creating, sourcing and orchestrating the digital technologies skillfully in teaching. Additionally, the Digital Education Action Plan (2021-2027) sets a vision for improving digital literacy, skills and capacity at all levels of education and training including teacher education (European Commission, 2021). All these policy reports and documents indicate the growing awareness and research for developing digital competency both for the teachers and the learners. This study aims to contribute to this flourishing area of research by exploring the impact of TPACK training on in-service language teachers.

The importance and originality of this study is based on three factors. First, this is the first study to investigate the impact of TPACK-in-Action training on in-service EFL teachers in Turkey. Previous studies have largely focused on TPACK development in pre-service teachers (Santos & Castro, 2021; Tomte et al.,2015; Valtonen et al.,2020) and the number of the experimental studies that explore the impact of a TPACK training is too rare (For scarce exceptions see Ansyari,2015; Drajati et al.,2018; Janssen et al.,2019). Second, the training was designed according to TPACK-in-Action Model (Tai, 2013) which is based on learning-by-doing approach and hands on experience. This way, meaningful learning in authentic teaching context is ensured (Mishra & Koehler, 2006). Last, this research provides the first extensive examination of language teachers' TPACK development by incorporating multiple instruments. Most of the previous studies have suffered from an over-reliance on a single instrument for data collection. They have predominantly utilized self-report data from interviews and surveys since they present a relatively straightforward and cost-effective way to collect quantitative data. Different from the previous research, data were collected from multiple sources in order to ensure reliability and triangulation.

Chapter 2

Theoretical Basis of Research and Literature Review

This chapter starts with the historical background and conceptual framework of TPACK and its sub-dimensions. Then, information about TPACK-in-Action Model and its steps are shared. The chapter concludes with a snapshot of the previous research on TPACK.

TPACK Framework

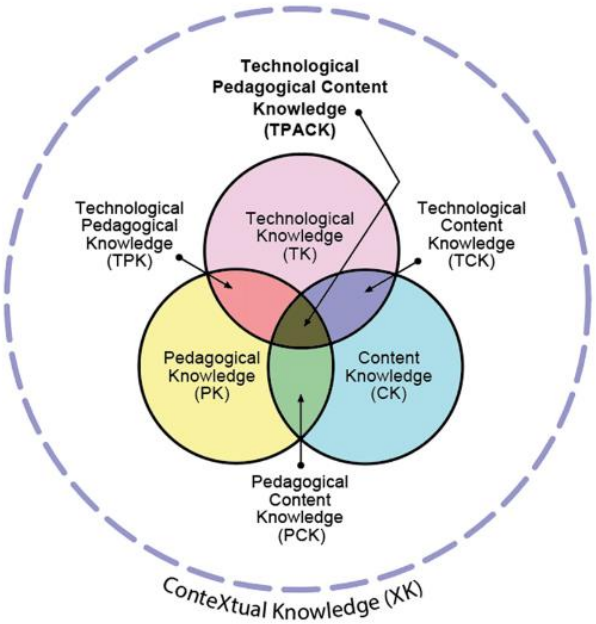
Teaching is notably a complex activity which requires knowledge in multiple areas. Earlier, the basis of teacher education was the expertise in subject matter knowledge. In later years, the focus on content knowledge shifted to pedagogical knowledge which means the knowledge of teaching techniques. These two kinds of knowledge bodies were treated separately until Shulman (1986) introduced Pedagogical Content Knowledge (PCK) which is described as a "missing paradigm" (p.7). Shulman's work aroused great interest and made him one of the most cited researchers in the field of teacher education (Murray, 1996; Segall, 2004).

Different from the 1980s, a great deal of change has occurred in the education. Educational technologies have come to the forefront and teacher education has demanded a new kind of knowledge area. Initially, this new knowledge area, technology knowledge, was treated as an isolated entity and the relationship between technology knowledge and pedagogical content knowledge was ignored. Teacher education departments opened isolated courses for developing technology. However, seeing the need for an interconnected knowledge between the three knowledge domains, Mishra and Koehler (2006) developed the Technological Pedagogical Content Knowledge (TPCK) framework which later became TPACK (Thompson & Mishra, 2007). The TPACK framework is made up of three core knowledge domains, their intersections and one triad. Even though the framework has provided sound structure for technology integration and has been utilized

for both pre-service and in-service teacher development, it is not without criticism. Some researchers claim that the framework is incomplete since it ignores the role of the context in technology integration. They maintain that successful technology integration does not only dependent on the CK, PK, TK and their combinations. There are organizational and situational constrains that force teachers to act within limits no matter how high their TPACK is. Therefore, TPACK framework is revised in a way to represent Contextual Knowledge (Mishra, 2019). The knowledge components in the TPACK framework are shown in Figure 1 and detailed information about them is presented below.

Figure 1

The TPACK Framework (Mishra, 2019)



Technological Knowledge

Technological knowledge (TK) refers to the knowledge of how to use and operate technological devices. More specifically, knowledge of how to install and uninstall programs, create documents, write and respond to the e-mails and use word processors are in the scope of technological knowledge. Even though Mishra and Koehler (2006) accept book, chalk and blackboard as “standard technologies” of that time, it is hard to put them into the

technology category of today's world. Since new technologies are introduced day by day, the scope of technology knowledge changes accordingly.

Pedagogical Knowledge

Pedagogical knowledge (PK) is in-depth knowledge about the teaching methods, strategies for classroom management, evaluation techniques and learner characteristics. It is a generic form of knowledge that applies to any discipline. Teachers who are equipped with pedagogical knowledge have a better understanding of their learners' motivations, attitudes and learning styles (Mishra and Koehler, 2006). Pedagogical knowledge is wide in scope since it encompasses knowledge of social, intellectual and psychological learning processes.

Content Knowledge

Content knowledge (CK) is the knowledge about the subject matter that teachers teach. It corresponds to the conceptual knowledge about the theories, facts, frameworks and rules of the field.

Technological Pedagogical Knowledge

Technological Pedagogical Knowledge (TPK) refers to the knowledge about the strengths, weaknesses and features of various technologies used for educational purposes. In other words, it means the intellectual competency to choose the most appropriate technology to suit the needs of the learners and the learning environment.

Technological Content Knowledge

Technological Content Knowledge (TCK) is based on the premise that content representations change as a result of using different technologies. The affordances of newer technologies expand the number of the examples given during the instruction; therefore, help teachers for a more effective teaching.

Pedagogical Content Knowledge

Pedagogical Content Knowledge (PCK) and pedagogical knowledge (PK) may sound similar but what they refer to shows the difference between them. Pedagogical knowledge is the generic knowledge that all teachers have with regard to teaching techniques. However, pedagogical content knowledge is about the expertise for using specific strategies when teaching specific content areas. PCK is concerned with the knowledge about what makes a topic easy or difficult to learn, what background knowledge learners have and how are the learning steps organized. Therefore, PCK is wider in scope and shows variety from subject to subject.

Technological Pedagogical and Content Knowledge

Mishra and Koehler (2006) describe Technological Pedagogical Content Knowledge (TPCK) as “an emergent knowledge type” (p.1028) since it is placed at the intersection between the three knowledge domains and does not refer to any of them on its own. It encompasses all the three knowledge components and seeks answers for a balanced integration among them. It is concerned with how technology can help the instruction of a particular subject considering the learner needs, in what ways technology is integrated into the curriculum and how the technology can make up for the learning problems that learners face. An outstanding feature of TPACK is its giving equal importance to the knowledge domains, not giving priority to technological knowledge. Contrary to the misconception that technology drives teaching, what lies behind the TPACK framework is the balanced relationship between technology, pedagogy and content (Mishra & Koehler, 2006).

Contextual Knowledge

Contextual Knowledge (XK) refers to the knowledge of contextual factors that impact the success of technology integration. These factors involve the teacher’s awareness of the technologies, knowledge of the school policy, district or even the national policies (Mishra, 2019). Contrary to the other knowledge components the abbreviations of which come from

the first letters, contextual knowledge is abbreviated as XK for two reasons. First, the initial letter ‘C’ has already been in use for content knowledge and the other reason is the logic behind the idea that ‘X’ can be used as a representation of the variables that impact technology integration.

Definition and examples of each knowledge domain are provided in Table 1.

Table 1

Definition and Examples of the TPACK Components

Knowledge component	Definition	Example
CK	Knowledge of the subject matter	Knowledge of passive voice
PK	Knowledge of practices, methodologies, process and strategies for teaching	Knowledge of how to implement group work activities
TK	Knowledge of using the technological tools	Knowledge of Padlet
PCK	Knowledge of implementing specific pedagogical strategies for specific content	Knowledge of implementing group work activities for teaching writing
TCK	Knowledge of selecting and using specific technologies for teaching specific topics	Knowledge of using Padlet for teaching group writing
TPK	Knowledge of pedagogical affordances and constrains of tools	Knowledge of using Padlet for collaborative learning
TPACK	Knowledge of integrating the technology in a suitable way to teach a specific subject matter	Knowledge of using Padlet as a collaborative learning activity for teaching group writing
XK	Knowledge of the interior and exterior factors that may impact the success of technology integration	School policy on not to use mobile devices in the classroom

Even though the framework appears clear and it has long been utilized for technology integration, researchers have conceptualized it differently. Voogt et al. (2011) identified the three views as the following:

1- *TPACK as extended PK:* Some researchers have conceptualized TPACK as an extension of PCK (Cox & Graham, 2009; Niess, 2005). They hold the view that TPACK is the simple addition of technology to Shulman’s PCK framework.

2- *TPACK as the interplay between three domains of knowledge and their intersections:* The commonly accepted view of TPACK is *integrated view* which

rests on the assumption that TPACK should not be separated from its sub-domains (Koehler & Mishra, 2009). According to the integrated view, TPACK development is dependent on the development in its sub-components.

3- *TPACK as a distinct body of knowledge:* The *transformative view*, on the other hand, suggests that TPACK is a unique body of knowledge and it is more than the sum of its individual knowledge bases (Angeli & Valanides, 2008; Jang & Chen, 2010; Jin, 2019). Therefore, growth in a knowledge domain does not necessarily result in the growth of overall TPACK. According to the transformative view, a teacher's TPACK is the total combination of the knowledge domains and contextual factors such as teacher beliefs, school vision and practical experiences. Therefore, TPACK development follows a continuous growth along with the personal and professional experiences.

This study draws mainly on a transformative perspective on account of the fact that the professional development program was conducted in a certain context.

Previous Research on TPACK

Since its introduction by Mishra and Koehler (2006), TPACK has been the focal point of a growing body of literature. There is a large volume of published studies on developing TPACK, assessing TPACK and the relationship between TPACK and some variables (beliefs, ICT use etc.). Detailed information about them is provided below.

Research on Developing TPACK

A detailed review of previous research on TPACK was found to be conducted with pre-service teachers with the aim of developing their TPACK (Ozturk Çalık & Mirici, 2024). Intervention methods such as TPACK-focused trainings (Ansyari, 2015; Brinkley-Etzkorn, 2018; Mouza et al.,2014), design frames (Koh & Chai, 2016; Koh & Divaharan, 2013), TPACK modules (Lachner et al.,2021) and workshops (Tai, 2015, Yangın-Ersanlı, 2016) were applied to detect their impact for TPACK development.

To begin with, in their study with pre-service teachers, Koh and Divaharan (2013) followed design-based research which included tutor modelling, hands-on exploration and group-based design. First, the student teachers received theoretical information about the TPACK framework, then they explored the pedagogical affordances of the tools with the instructor. Then they practiced the technical functions of the selected tool, explored the lesson samples and finally designed an ICT-integrated lesson. The findings highlighted the importance of tutor modeling and hands-on exploration for TPACK development.

Lee and Kim (2014) conducted a case study to develop an instructional design model for enhancing the pre-service teachers' TPACK. The learning-by-design approach was considered in developing the model which allowed participants to create their own teaching artefacts collaboratively. The model was applied in a multi-disciplinary technology integration course and involved the stages as introduce, demonstrate, develop, implement, reflect and revise. Data were collected from the adapted version of Schmidt et al. (2009)'s survey, groups' lesson plans and the researcher's field observation notes. Findings indicated that the participants developed a basic understanding only for single knowledge domains (TK, CK, PK), the development of TPK, TCK and TPACK was not observed and it was concluded that TPACK was the combination of the single knowledge domains.

Another intervention study for TPACK development was conducted with Indonesian tutors (Ansyari, 2015). A three-week professional development program for technology integration was conducted. The program was designed in a way to offer authentic learning experiences in a collaborative environment. The participants worked in groups to design their technology-integrated lesson plans, to reflect on them and to develop solutions for their problems related to instruction. Data collected from interviews, survey and logbook. The professional development program was found to be effective in facilitating the participants' TPACK and technology-integrated lesson plan development.

Similarly, Tai (2015) conducted a study in order to detect the impact of TPACK workshop on EFL teachers' CALL competency. The workshops followed the steps of modeling, analyzing, demonstrating, applying and reflection. Data from the various sources

such as surveys, interviews, observations and reflections indicated the positive influence of the 5-week-workshop on teachers' CALL competency. Specifically, the participants showed increased performance in using cloud computing for student interactions and discussions. It was concluded that the workshops helped teachers look beyond technology itself and match technology to their instructional goals and pedagogy. The participants felt more confident in selecting appropriate technology for teaching specific subjects and meeting individual student needs. Overall, the workshops had a strong impact on improving teachers' CALL competency and integrating technology into their teaching practices.

Another example of workshop for TPACK intervention research is the one conducted by Yangin Ersanlı (2016). 59 pre-service EFL teachers attended the five-week-workshop as a part of the methodology course. Quantitative data were collected from the TPACK scale (Solak & Çakır, 2014) before and after the workshop. Qualitative data, on the other hand, were collected from the journal entries that the participants developed before and after the workshop. The journal entries involved the participants' descriptions about the integration of ICT into English language teaching activities in addition to their opinions about the functions of software and applications. The findings indicated that the workshop had a positive influence on developing the TPACK level of the participants. Particularly, the post-workshop journal entries of the participants demonstrated that the workshop increased the knowledge of the participants with regard to the pedagogical affordances of the soft wares and applications.

In a more recent TPACK development study, a quasi-experimental design was preferred (Lachner et al.,2021). The researchers developed a TPACK module with the aim of enhancing TPACK and technology-related motivation of the participants. Reflection, collaboration and feedback were determined to be the backbones of the module. The pre-service teachers in the experiment group attended the three-week-course with TPACK module whereas the students in the control group received instruction without the TPACK module. It was concluded that technology-related self-efficacy and TPACK level of the student teachers in the experiment group were higher than those in the control group.

As mentioned previously, majority of the intervention studies employ modules, workshops or courses. Each study has their own strengths and weaknesses for a much broader understanding of TPACK. What they have in common is their focus on productivity. In other words, the participants had to develop an end product as an indication of their learning such as lesson plans. Instructor-led courses in which participants were not given an active role have proven to be ineffective when compared to the design-based trainings that require creating lesson plans or other artefacts. In their research, Alsofyani and his colleagues (2013) point out the same issue and came up with the finding that the participants preferred a training with more active participation. In the same vein, Angeli and Valadines (2009) emphasize that a TPACK training need to be both learner-centered and responsive to teacher beliefs. Additionally, the need to professional development programs with subject matter-pedagogy and technology integrated design was called upon (Niess, 2005; Polly et al.,2010). All these highlights were considered in the design of the current training.

Research on TPACK Assessment

As the research on TPACK development has flourished, assessing TPACK has become an issue of concern. Early attempts for TPACK measurement were rather few owing to the validity and reliability issues. However, the increasing number of TPACK research has paved the way for the development of TPACK instruments. Different ways of TPACK measurement exist in the literature including the surveys, observation forms, lesson plan evaluation rubrics and performance assessments. Among them surveys are the most preferred instruments owing to their cost-effectiveness and practicality for large audiences (Graham, 2011). However, surveys for assessing TPACK have received criticism on certain aspects. For instance, the first survey for TPACK assessment was developed by Koehler and Mishra (2005) but the 14-item-survey had a problem of generalization owing to the fact that it was contextualized for the courses of the participants. Another instrument to assess TPACK was developed by Schmidt et al. (2009). With the participation of 124 pre-service teachers from various departments, the researchers completed the survey with 47 items

which represent seven knowledge domains in the framework. It has turned out to be one of the most-frequently employed instruments in the field (e.g. Abbitt, 2011b; Chai et al., 2010; Turgut, 2017), however, it was criticized for not being valid (Archambault & Barnett, 2010; Chai et al.,2011) and discipline-specific (Baser et al., 2016). Since the subject itself has impact on CK, PCK, TCK and TPCK sub-domains, researchers worked on subject-dependent surveys (for English language teaching see Bagheri, 2020; Baser et al. 2016; Bostancıoğlu & Handley, 2018; Tseng, 2016; Wang, 2022). This time, the existing surveys were criticized for not being clear in measuring the TPACK sub-domains owing to the fact that the boundaries between the TPACK constructs were blurry (Archambault & Bannett, 2010). Another important point about the surveys stems from their self-reporting nature. As Abbitt (2014) explains, self-reporting TPACK instruments truly measure TPACK constructs to the extent of the respondent's ability to assess his own knowledge. To overcome the risk of gaining unreliable and inconsistent results, data triangulation is preferred (Ansyari, 2015; Brinkley-Etzkorn, 2018; Lee & Kim, 2014; Pamuk, 2012; Santos & Castro, 2021; Yangın Ersanlı, 2016).

In a number of the studies, lesson plan evaluation rubrics, interviews and observation forms are employed with the aim of triangulating survey results. In their case study, Lee and Kim (2014) collected data from group lesson plans, field notes and supported them with survey results in order to detect the impact of TPACK-based instructional design model on pre-service teachers' TPACK. Similarly, in their small-scale study with 10 participants, Baran and Uygun (2016) analyzed the data from reflection reports, researcher observations and TPACK workshop design guides and identified the steps of design-based learning in technology integration.

Collectively, these studies inform about the multiple ways for TPACK assessment. They provide important insights into the validity, reliability and practicality of TPACK measures. Taken together, these studies support the notion that TPACK is a multifaceted construct; therefore, employing different instruments and collecting both qualitative and

quantitative data are suggested. In support of this view, this study will collect and analyze both qualitative and quantitative data in order to get a broader view of TPACK development.

Research on TPACK and Some Variables

To date, a number of studies have explored TPACK from several aspects such as ICT use, teacher beliefs and self-efficacy. What they have in common is the question of what could determine the successful technology integration. Among the variables that language researchers explore in the field of TPACK, self-efficacy, conceptualized as the teachers' perceptions of their own competence at teaching, has been a highly-investigated area. Several studies have confirmed the effectiveness of teachers' self-efficacy beliefs on their TPACK development and technology integration (Abbitt, 2011b; Caner & Aydin, 2021; Isler & Yıldırım, 2018; Lee & Tsai, 2010).

For example, Abbitt (2011) employed single group,pre-test-posttest design to detect the relationship between self-efficacy beliefs for technology integration and perceived TPACK of pre-service teachers. Participants attended a 16-week course for technology integration during which they were presented activities for technology integration. Before and after the course they were surveyed in order to measure their perceived TPACK (Schmidt et al.,2009) and self-efficacy beliefs (Wang et al.,2009) for technology integration. The findings suggested that there is a dynamic and evolving relationship between the participants' TPACK level and self-efficacy beliefs for technology integration.

In his multi-dimensional study, Saraç (2015) explored the correlation between TPACK and gender, teaching experience and white board use. Data were collected from 105 in-service EFL teachers indicated that there was a statistically meaningful positive relationship between TPACK levels and white board use; however, gender and year of experience variables have been found to be a non-predictor of TPACK. Conversely, there are studies that pinpoint the negative correlation between teaching experience and TPACK. In other words, it has been revealed that novice teachers have higher TPACK level in comparison to teachers with 20-year-of-experience (Ay,2015; Akturk & Ozturk, 2019).

In his correlational study, Ay (2015) investigated the relationship between TPACK and year of teaching experience, gender and teaching at a school where FATIH project is implemented. Data collected through Technological Pedagogical Content Knowledge-Practical Scale and Technology Attitude Scale from 296 teachers from various disciplines, school types and year of teaching experience. According to the scores of TPACK-Practical Scale, teachers' TPACK level varies according to their school types, year of teaching experience and implementation of FATIH Project in their schools. It was revealed that teachers with less than thirty years of teaching experience, teachers who teach at a school where FATIH project was implemented and teachers who teach at high schools got higher scores than the other teachers. However, no significant differences were found between the TPACK levels of male and female teachers.

Kozikoglu and Babacan (2019) conducted a study to investigate the relationship between TPACK, attitude towards computers, gender and year of experience. 715 Turkish EFL teachers participated into the study and it was revealed that the attitude towards computers do not show difference according to the gender and year of experience. However, positive relationship was detected between the TPACK level and positive attitude towards computers. Besides, male teachers were found to have higher TPACK levels than female teachers.

In a recent study, the challenges faced by the Austrian teacher educators, the relationship between personal and contextual factors and the teachers' TPACK are explored (Wagner et al.,2024). Teacher educators were interviewed online about the challenges, roles, and needs in digital transformation. Based on the findings from the interview, an online survey was developed and distributed to 179 teacher educators from various universities in Austria. Findings from the quantitative and qualitative data revealed two main factors of challenges as institutional (e.g. lack of incentives for professional development) and lecturer level (e.g. high workload, time constrains, lack of basic digital skills, lack of knowledge on legal aspects of digitalization). With regard to the relationship between TPACK and personal and contextual factors, the findings indicated that teacher

educators' age, gender and professional qualification (experience, participation in CPD) did not significantly predict their TPACK scores. However, perceived challenges at the lecturer level were found to have negative correlation with TPACK scores. Additionally, the study found out the positive relationship between higher frequency of technology use and higher TPACK.

TPACK-in-Action Model

For years, even before the development of the TPACK framework, researchers have conducted studies in teacher education contexts with the aim of enhancing technology integration knowledge of teachers. Based on the findings, majority of the researchers have called for teacher education programs with hands-on experiences in an authentic teaching context (Chapelle, 2003; Johnson, 2012). First, the framework of TPACK-in-Practice was developed to provide foundational knowledge for designing professional development workshops for technology integration (Figg & Jaipal,2012). However, it was criticized for lack of collaborative learning and reflective practice (Tai,2013). It is highlighted that reflective practice is an indispensable component of teacher professional development since it enables teachers to comprehend the content better and, most importantly, raises their awareness (Liou,2001). Therefore, TPACK-in-Action Model (Tai, 2013) was developed as an attempt to provide a comprehensive framework for professional development programs on technology integration. Both the instructor and the participants play an equally active role in TPACK-in-Action model which follows a design-based approach.

Figure 2 shows the flow of the TPACK-in-Action model. As pointed out in the figure, the training starts with the instructor initiation, it allows for instructor-participant collaboration and in the last two steps, participants are at the center of the learning process.

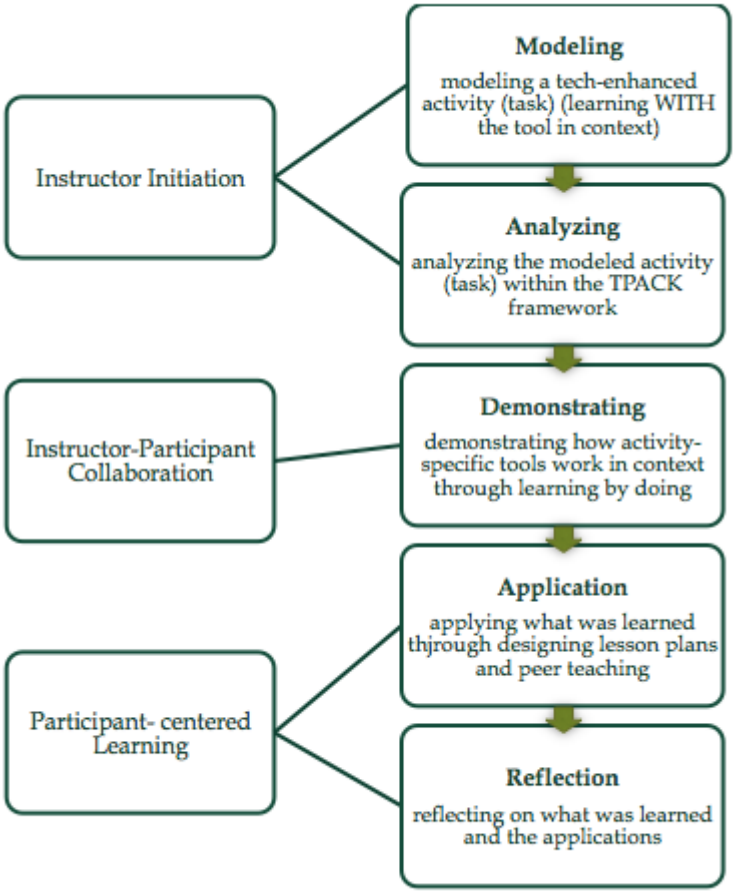
According to this model, a teacher education program involves these five steps:

a) **Modeling:** The instructor initiates the workshop by modelling a tech-integrated lesson plan from start to end. The purpose of modelling is to enable the participants to experience the technology integration in its real context. Tai (2013) informs that

modeling is advantageous both for the participants and the instructor. Participants benefit from the modeling since they witness technology integration from a holistic perspective. Similarly, it allows for the instructor to experience how context impacts the teaching of content.

Figure 2

The TPACK-in-Action Model



b) Analyzing: In the second step, the instructor analyzes the modeled lesson within the TPACK principles. Explanations regarding the reasons for selecting a particular tool based on what pedagogical principles are given. Besides, the strengths and weaknesses of the selected technology are analyzed. This step is critical since it aims to present the connection between the technology, pedagogy and content.

c) Demonstrating: In this step, the instructor demonstrates using the selected tool. Then, time is allowed for the teachers to explore the tool through learning-by-doing approach. The goal of demonstrating step is to help participants navigate the tool. Thereby, participants develop the necessary skills and competences for using the target technology.

d) Application: The teachers put what they have learned into practice and come up with tangible teaching artifacts like lesson plans. Then, they peer-teach and have a discussion on the lesson plans.

e) Reflection: The teachers reflect on the four steps that they have gone through. They self-evaluate their development throughout the workshop.

Summary

This section has attempted to provide a brief summary of the literature relating to TPACK. Overall, the studies reviewed here indicate the dynamic and multifaceted nature of the TPACK construct. Although TPACK literature is wide in scope, this review presents an evidence for the scarcity of research on EFL teachers' TPACK development in the context of Turkey. Addressing the need, the present research aims to unravel the impact of TPACK focused in-service teacher training on EFL teachers' TPACK.

Chapter 3

Methodology

This chapter aims to inform readers about the methodology of the research in five sections. The first section explains the research design and lists the research questions. The second section gives information about the research setting and the participants. The training process is explained in the third section. The fourth section introduces the instruments used for data collection and the final section provides the details about the process of data analysis.

Research Design

The present research adopts quasi-experimental research design without control group. Unlike true experimental designs which employ both experimental and control groups, quasi-experimental research design without control group aims to identify the impact of the intervention on a single group. The researcher compares the performance of the group prior to the intervention and following the intervention. As Creswell (2012) explains, the subject becomes its own control in the experiment.

This study sets out to explore the impact of TPACK training program on developing technology integration skills of EFL teachers. Specifically, the following issues are addressed:

1- What is the impact of in-service TPACK program on developing the technology integration skills of EFL teachers?

d- What is the impact of in-service TPACK training on the frequency of technology use in EFL teachers?

e- What is the impact of in-service TPACK training on tech-integrated lesson plan development of EFL teachers?

f- What is the impact of in-service TPACK training on EFL teachers' awareness of web tool selection?

2- What is the impact of in-service TPACK training on the teaching methods and techniques that EFL teachers employ?

3- What is the impact of in-service TPACK training on content knowledge of EFL teachers?

4-Is there a significant difference between pre-test and post-test scores of EFL teachers before and after the TPACK training has been implemented?

Research Setting and Participants

The current study was conducted in the academic year of 2022-2023 with twenty EFL teachers from a private school in Ankara. They were selected through purposeful sampling since it is a prerequisite for them to have graduated from ELT departments with the same year of teaching experience and to have technological facilities at school. The school in which the participants teach is located in the city center and it is one of the most prestigious private schools all around the city. It is equipped with high-tech teaching materials and there are 15 students in each classroom. Unlike the state schools, the language of the instruction in Maths and Science classes is English. The students start to learn English in the kindergarten level. The students in the primary school receive up to 8 hours of English classes weekly. According to the school policy, English language teachers have to speak in English all the time. Besides, the syllabus is planned before the semester begins and all of the teachers have to teach according to the syllabus. The primary teaching material is a coursebook and all of the teachers follow the same coursebook for the same grades.

Before the training, an online participant information form was sent to the participants in order to get background information about their gender and the grades they are experienced in teaching.

Table 2 shows the background information about the participants.

Table 2

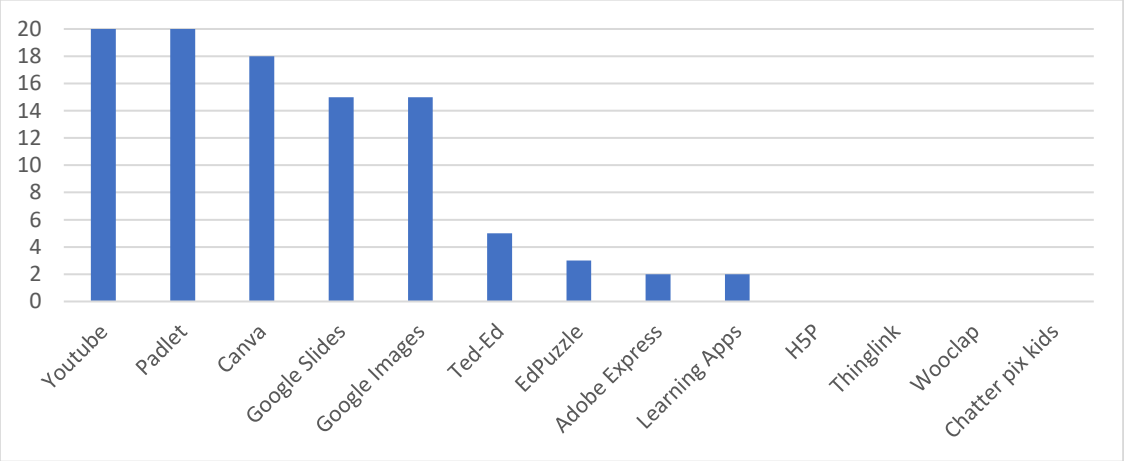
Background Information about the Participants

Gender	female	18
	male	2
Grade level hey teach	kindergarten	5
	primary	7
	secondary	8

As indicated in the table, most of the participants (n=18) are female. 5 of the participants teach at the kindergarten, 7 of them teach at the primary school (the 1st,2nd, 3rd and 4th grades) and 8 of them teach at the secondary school (the 5th,6th,7th and 8th grades). Another online form about the web tools was shared with the participants in order to learn to what extent they were familiar with the web tools. The participants were requested to put a tick near the tool that they knew. Table 3 presents the results.

Table 3

Participants' Knowledge about the Web Tools



As demonstrated in the table, Youtube (n=20), Padlet (n=20), Canva (n=18), Google Slides (n=15) and Google Images (n=15) are quite popular among the teachers. However, Ted-Ed (n=5), EdPuzzle (n=3), Adobe Express (n=2) and Learning Apps (n=2) are known

by a small minority while H5P, Thinglink, Wooclap and Chatter pix kids are not known by anybody.

TPACK-in-Action Training

The training was designed in accordance with the TPACK-in-Action Model which was developed by Tai (2013). The five steps of the model which are modeling, analyzing, demonstrating, applying and reflection were followed during the training. The training was conducted face to face and lasted for six weeks, two-hours each week. The training setting was equipped with digital devices and there was not any problem related to Internet connection. Google classroom was utilized with the aim of sharing documents and staying in contact. In the first week, background information about TPACK framework and TPACK-in-Action Model was given to the teachers so that they would know what was expected from them in each step. In the following weeks TPACK-integrated lesson plans for four language skills and vocabulary were introduced. According to the TPACK-in-Action Model, the first two steps of the lesson -modeling and analyzing- are instructor-initiated; therefore, the instructor implemented the tech-integrated lesson (*modeling*). Then, the web tools, their features and their pedagogical use were discussed (*analyzing*). Following, the instructor and the participants worked in groups. The instructor demonstrated how to use the tool (*demonstration*). Next, the participants took more active roles and designed some activities in alignment with the language objectives (*application*). In the last step, whole-class discussion about the overall flow of the lesson was conducted. The instructor asked some reflection questions such as “What do you think about the reading activity and Thinglink (web tool)?”, “If you had chance, which part of the lesson would you change?” etc.(*reflection*).

A sample lesson plan for reading skill and web tool analysis form are shared in Appendix A. At the top of the lesson plan, information about the language objective, grade, target vocabulary items, web tools and the duration of the lesson is given. Then, the activities that have to be done are explained step by step. For example, as pointed out in

the lesson plan for reading skill, the teacher starts the lesson through a video on Youtube about tourist attractions in Turkey. After watching the video, the teacher asks whether the learners have visited any of them. As the learners mention about the attractions, the teacher tries to pick up some key words/phrases in order to present the target vocabulary as it is the case in the word “ancient”. Having presented all of the target vocabulary, the teacher opens a gap filling activity on Wooclap in order to practice. Then, as a pre-reading activity, a brief discussion about the tourist destinations in Antalya is conducted. Next, the teacher shows an interactive reading text on Thinglink and she asks some comprehension questions in order to check the understanding. For homework, the learners are assigned to prepare a travel brochure about a city that they choose. The teacher presents options for doing the homework either online (Padlet) or face-to-face groups. In the next class, the teacher asks which of the target vocabulary that the learners remember from the previous lesson. Thus, the teacher aims to have them recall and revise the vocabulary. Then, she asks whether they could show the location of Sydney on world map. Thus, the teacher aims to develop their interdisciplinary knowledge by combining geographical knowledge with pre-reading language objectives. Next, the teacher tells the title of the text, asks learners to fold a paper. On one side of the paper, the learners write 5 words that they expect to find in the text and on the other side of the paper they write 5 questions that they expect to find the answers. Then, in groups they have a discussion about the activity. Thus, the teacher aims to have learners recall vocabulary, activate the schemata about the reading activity and enhance interpersonal communication skills. At the end of the discussion, the learners scan the text on Adobe Express and check their answers. The lesson ends with asking and answering the comprehension questions on Learning Apps.

The most important aspect of the tech-integrated lesson plan is the careful and balanced combination of online and face-to-face activities. As indicated in the sample lesson plan, both online and face-to-face activities are designed in an equal distribution and in a way to complete each other with a smooth transition. The pedagogical rationale behind

each tool and each activity is explained along with the features of the tools in the web tool analysis form in Appendix B.

Data Collection and Instruments

In order to get a broader view about the impact of the TPACK training on the technology integration skills of the EFL teachers, both quantitative and qualitative data collected from multiple sources. Detailed information regarding the data collection instruments is provided below.

TPACK-EFL Survey

TPACK-EFL survey (Baser et al., 2016) which was developed specifically for the field of English Language Teaching was utilized prior to and after the training (Appendix C). The survey is made up of seven sub-sections and 39 items in total which were developed in line with the seven domains of TPACK namely technological knowledge (TK), pedagogical knowledge (PK), content knowledge (CK), technological pedagogical knowledge (TPK), technological content knowledge (TCK), pedagogical content knowledge (PCK) and technological pedagogical and content knowledge (TPACK). The survey was developed to address the need for designing a measurement tool specific to language teachers. The validity and the reliability of the survey have been proven through Cronbach's alpha and exploratory factor analysis. The reason for selecting the EFL-TPACK survey for the current research is that "it is among the first developed and validated specifically for the teaching of EFL" (Baser et al., 2016, p.13). The scores were treated as pre and post scores and were compared in order to get a numerical proof of the impact of the training on teachers' self-conceived TPACK development.

Lesson plans

In the application stage of the TPACK-in-Action model, each participant developed a lesson plan based on what they had learned throughout the training. They were not given a specific topic and language objective to prepare a lesson plan. Instead, they determined

the topic, the objective and the grade level. Besides, they were given freedom to select the web tools. Then, they shared their lesson plans on Google Classroom and made comments on others'.

Interviews

One-on-one and focus group semi-structured interviews were conducted with the participants in order to get in-depth knowledge about the impact of the training on their technology integration skills and their self-conceived TPACK development. Before the interview, informed consent was taken and they were assured of the confidentiality of the responses. The interview process was applied according to the interview protocol (Appendix D). One-on-one interviews were conducted with the three participants who volunteered to be observed when teaching. Each of the three participants was observed in their classrooms when teaching according to the lesson plans they had prepared. Following the observation, they were interviewed about their opinions regarding the impact of the training on their technology integration skills. One-on-one interviews lasted for about 15 minutes. Focus group interviews were carried out with the rest of the participants who were grouped homogenously in terms of the classroom grade they teach. The interviews lasted for about half an hour and the whole process was audio-recorded.

Data Analysis

A paired sample t-test on SPSS was employed in order to compare the survey results from pre and post training. Data from the interviews were transcribed and subjected to content analysis. Data from the classroom observations were analyzed through *Technology Integration Observation Instrument (*Hofer et al., 2011) and data from the lesson plans were analyzed through *Technology Integration Assessment Rubric* (Harris et al.,2010).

Technology Integration Observation Instrument

Three participants volunteered to be observed in the classroom before and after the training. The aim of pre-training observation was to have an idea about the teachers'

existing technology integration skills, whether or not they use different tools and what teaching methods and techniques they employ. On the other hand, post-training observation aimed to find out whether the training had any contribution to the technology integration skills of the teachers. In post-training observation, the participants were observed on the lesson plans that they had developed. Their classroom performance was assessed through the Technology Integration Observation Instrument developed by Hofer et al. (2011) (Appendix E). The instrument is made up of two sections. The first section allows the observer to take notes on the topic, key instructional strategies used and the technology employed during the instruction. The second section is the four-likert rubric with seven subtitles which are curriculum goals, instructional strategies, technology selection, fit, instructional use and technology logistics.

Technology Integration Assessment Rubric

The lesson plans developed by the participating teachers were assessed through the Technology Integration Assessment Rubric- TIA (Harris et al., 2010) (Appendix F). The four-likert-rubric includes four sub-sections which are curriculum goals, instructional strategies, technology selection and fit.

In the TIA instrument, "curriculum goals & technologies" (the first row of the rubric) represents the lesson plan-writer's TCK. "Instructional strategies and technologies" (the second row of the rubric) refers to how well the selected technology/ies support the instructional strategies that are planned. On the other hand, "technology selection(s)" refers to how compatible the particular selected technology/ies are with the curriculum goals and instructional strategies that have been specified for the less, project, or unit being planned. Therefore "instructional strategies & technologies" represents the lesson plan-writer's TPK, while "technology selection(s)" represents the lesson plan-writer's TPACK. Also, "fit," the fourth row of the rubric, like the third row of the rubric, represents the lesson plan-writer's TPACK. The difference between the "technology selections" and "fit" rows is that "technology selections" focuses upon the selected technoloy/ies' compatibility with the

curriculum goals and instructional strategies, while "fit" emphasizes curriculum goals, instructional strategies and selected technologies equally.

Procedure

The research was conducted in eight steps which are presented in the following:

- Step 1 (pre-test): Prior to the TPACK-in-Action training, all of the participants were surveyed in order to detect their existing self-conceived TPACK. The TPACK-EFL Survey (Baser et al., 2016) was used and the survey results were treated as pre-test results.

- Step 2 (pre-training observation): On obtaining written informed consent, three volunteers were observed in the classroom before the training in order to have an idea to what extent they incorporated technology into the instruction.

- Step 3 (conducting the training): The TPACK-in-Action training was implemented for six weeks and face-to-face. In the first week the participants were informed about the TPACK framework and the TPACK-in-Action Model so that they would know what is expected from them. Then, each week a TPACK-integrated lesson plan for four skills and vocabulary were presented and the training was conducted according to the steps in the TPACK-in-Action Model.

- Step 4 (lesson plan development): In the applying stage of the-TPACK-in-Action training, the participants developed lesson plans and uploaded them on Google Classroom. Besides, they wrote reflection papers about the web-tools and the training process.

- Step 5 (post-test): On completion of the training, the participants were surveyed (Baser et al., 2016) and the survey results were treated as post-test results.

- Step 6 (post-training observation): The three participants were observed on the lesson plans they had created after the training.

- Step 7 (interview): Following the classroom observation, all of the participants were interviewed in order to gain insight into their opinion of the training period and their self-conceived TPACK development.

- Step 8 (data analysis): Data from the classroom observation were analyzed through *Technology Integration Observation Instrument* (Hofer et al., 2011) and data from the lesson plans were analyzed through Technology Integration Assessment Rubric (Harris et al., 2010). Data from the interviews were recorded, transcribed, coded and analyzed through content analysis. Survey data, on the other hand, were analyzed on SPSS.

- Step 8 (reporting the findings): The findings were discussed in the light of the existing studies and the context of the research.

Chapter 4

Findings

This chapter presents the findings obtained for each research questions. Research questions and data sources are presented in Table 4.

Table 4

Research Questions, Data Sources and Data Analysis

Research Questions	Data Sources	Data Analysis
1) What is the impact of in service TPACK training on the technology integration skills of EFL teachers?	• Lesson plan • Classroom observation • Interview	• Technology Integration Assessment Rubric • Technology Integration Observation Instrument • Content analysis
a) What is the impact of in service TPACK training on the frequency of technology use in EFL teachers?	• Interview	• Content analysis
b) What is the impact of in service TPACK training on EFL teachers' technology- integrated lesson plan development?	• Lesson plan	• Technology Integration Assessment Rubric
c) What is the impact of in-service TPACK training on the EFL teachers' awareness of web tool selection?	• Lesson plan • Interview	• Technology Integration Assessment Rubric • Content analysis
2) What is the impact of in-service TPACK training on the teaching methods and techniques that EFL teachers employ?	• Classroom observation • Interview	• Technology Integration Observation Instrument • Content analysis
3) What is the impact of in-service TPACK training on EFL teachers' knowledge of English?	• Interview • TPACK-EFL survey	• Content analysis • SPSS (*paired sample t-test*)
4) Is there a significant difference between pre-test and post- test scores of EFL teachers?	• TPACK-EFL survey	• SPSS (*paired sample t-test*)

Findings for the First Research Question

The first research question concerns to find out the impact of the TPACK-in-Action training on the technology integration skills of EFL teachers. In the current study, the three indicators of technology integration skill are determined to be the frequency of technology use during the instruction, technology-integrated lesson plan development and the teachers' awareness for web tool selection. Therefore, as shown in Table 4, the first research question is divided into three sub-questions and the findings for each are presented below.

Findings Related to the Frequency of Technology Use in EFL Teachers

The first sub-research question concerns the impact of the TPACK-in-Action training on the frequency of technology use in EFL teachers. Data for this question were collected from the interviews. The codes and the themes identified from the analysis of the interviews are provided in Table 5.

Table 5

The Themes and the Codes Related to the Frequency of Technology Use

Interview Question	Themes	Codes / Sub-themes	Example Sentences
Has there been a change in the frequency of technology use in your instruction after the training?	No change in terms of the frequency of technology use	Digital Coursebooks	*"We already use technology very often since we use digital coursebooks. Therefore, no change has happened in terms of the frequency but I am certain that it has broadened my perspective as a teacher."*
		Challenging in young learners' classes	*"In the past, I used to teach to adult learners and using technology was easier and more fun for me. But now I teach young learners and I use technology less because I don't like noise. Classroom management is hard in young learners' classes."*
	Future plans for using technology more often in the next semester	Time limitation between the training and the interviews	*"Currently, I cannot say that thanks to the training I use technology more often because we have just completed the training. There has not been a time interval. Our lesson plans have already been prepared for this semester."*
		Motivating and fun	*"I am planning to integrate technology more often in the next semester since both the learners and I find it more motivating and fun."*

In response to the question which aims to unravel the impact of the training on the frequency of technology use, the participants reported that there has not been a significant change since they had already been using digital coursebooks. According to the school policy, the lesson plans must be prepared before the semester; therefore, the teachers stated that they could not find the opportunity to prepare a new syllabus full of tech-integrated lesson plans. Therefore, one more interview was conducted with five of the participants six months after the training in order to observe the long-term impact of the training and to eliminate the risk of limited time interval. This time, the participants reported that they used some of the web tools regularly for making more practice. Independent of the training, one interviewee indicated that the reason for her avoiding the technology in the classroom was the challenge of classroom management in young learners. However, what the respondents were unanimous was that they would use the tools in their future classes since they are fun and motivating for the learners. To conclude, the TPACK-in-Action training has increased the frequency of technology use in the long run.

Findings Related to the Technology-Integrated Lesson Plan Development in EFL Teachers

The lesson plans developed by the participants were subjected to two cycles of analysis. In the first round, all of the lesson plans were analyzed in terms of the web tools and the pedagogical strategies utilized.

Table 6 provides a detailed list of the tools and the pedagogical strategies covered in the training and in the lesson plans that have been developed by the participants.

Table 6

The Tools and the Pedagogical Strategies Covered in the Training and in the Lesson Plans

Tools covered in the training	Tools covered in the lesson plans and in-class observations	Pedagogical strategies covered in the training	Pedagogical strategies covered in the lesson plans
Ted-ed	Ted-ed	Questioning	Questioning
Edpuzzle	Edpuzzle	Pair work	Pair work
Canva	Canva	Group work	Brainstorming
Padlet	Padlet	Brainstorming	Mind mapping
H5P	H5P	Problem solving	
Google slides	Learning Apps	Differentiated instruction	
Learning Apps	Youtube	Mind mapping	
Thinglink	Mentimeter		
Adobe express	Power point		
Wooclap			
Youtube			
Chatter pix kids			

As indicated in the table, twelve web tools were covered in the training and the participants utilized seven of them in their lesson plans. It was observed that Ted-ed, Edpuzzle, Canva, Padlet and H5P were quite popular among the participants and they were quite skillful in implementing those tools. For example, one of the participants used Canva for his mind mapping activity whereas another one conducted a discussion about an environmental pollution via a poster she created on Canva. Another example relates to Edpuzzle which allows for creating video-based tests. It was observed that the participants could successfully integrated questions into the videos and tested the students' understanding of the language objective. It was also observed that some of the participants utilized tools (i.e. Mentimeter, Power Point) that had not been introduced in the training. When asked the reason of this, one of the participants said that it was the first time she used Power Point as a tool for integrating audio into text. She maintained that she had been using Power Point as a traditional presentation tool before but following the training she got motivated to explore the different aspects of the tools that she had already known. As for the analysis of the pedagogical strategies, it can be said that the participants frequently employed strategies as questioning, mind mapping, brainstorming and pair-work in the lesson plans but they ignored problem-solving and differentiated instruction.

In the second round, the lesson plans were analyzed through Technology Integration Assessment Rubric (Harris et al., 2010). From twenty participants five of them (two from the kindergarten, two from the secondary and one from the primary level) were selected based on the grade they teach. The results are shown in Table 7.

Table 7

The Results of the Lesson Plan Analysis

Participants	Curriculum Goals & Technologies (Curriculum-based technology use) -TCK-	Instructional Strategies & Technologies (Using technology in teaching/ learning) -TPK-	"Fit" (Content, pedagogy and technology together) -TPACK-
P1	2	2	2
P2	4	2	3
P3	4	3	3
P4	4	4	4
P5	4	2	3
Total	18	13	15

As demonstrated in Table 7 the highest score belongs to the domain of Curriculum Goals & Technologies (Curriculum-based technology use) which refers to the knowledge of the relationship between content and technology and the way technology effects content representations. Analysis of the lesson plans shows that the participants could successfully match the tool with the language objectives. P4, for example, utilized Edpuzzle and integrated comprehension questions into the video about disasters in response to the objective "Students will be able to identify the main points of TV news about natural forces and disasters". On the other hand, participants received the lowest score on *Instructional Strategies & Technologies* which represents TPK. This result stems from the participants' failure to match the affordances of the web tools with the pedagogical strategies and learner characteristics. For instance, the analysis of P1's lesson plan shows that he utilized H5P (a tool for creating HTML5 content and requires literacy) for kindergarten. However, the fact that young learners cannot read and write makes it an unsuccessful attempt in terms of TPK. As another example, in her lesson plan, P5 used Ted-ed (a platform which allows for both creating video-based lessons and adapting the

previously-created designs) for the language objective “Students will be able to identify the names of wild animals in simple oral texts”. The video itself was appropriate in terms of the language level and the topic but it was presented to the learners at the very beginning of the lesson without a warm-up activity. Students were directly assigned to watch the video and identify the names of the animals. Overall, findings from the lesson plan analysis indicate that the TPACK-in-Action training has a positive impact on TCK of the participants while the improvement in TPK is rather weak.

Findings Related to the Impact of the Training on EFL Teachers' Awareness of Web Tool Selection

Teachers' awareness of web tool selection has been determined as the third dimension of technology integration skill. What is looked for through the criteria of web tool selection awareness is to uncover whether the training has contributed to the participants in terms of the things to consider when selecting a web tool. In other words, this dimension reflects the critical eye of the teacher. Does the teacher utilize the technology for its own sake or does s/he consider the parameters related to the learner, to the topic and to the objective? It is an undeniable fact that the same objective can be achieved through utilizing more than one tool and there is not only one correct tool for achieving a particular objective. Therefore, what is looked for in this dimension is to consider the lesson as a whole and to assess the relevancy of the selected tool to the objective, to the learners and to its place in the lesson plan.

Data related to the impact of the training on EFL teachers' awareness of web tool selection has been obtained from the lesson plans and the interviews. Findings from the lesson plans are presented in the table IV. The first dimension of the Technology Integration Assessment Rubric (*Curriculum Goals & Technologies*) represents TCK and measures to what extent the selected tool matches to the curriculum objectives. As indicated in the table the participants scored the highest point in TCK dimension which means that they could select the correct tool for the language objectives. However, they are not much successful in the *Instructional Strategies & Technologies* dimension which represents TPK.

Another data source for uncovering the impact of the training on the participants' web tool selection awareness are the focus group interviews. The participants were asked to share whether the training had any impact on their awareness of technology integration. The findings are provided in Table 8.

Findings presented in Table 8 indicate that the training increased the participants' awareness of selecting web tools since it (a) covered free and user-friendly tools, (b) emphasized the importance of the alignment between the tool and the language objective, (c) presented sample lesson plans and (d) motivated the participants to learn more about the tools.

As for the impact of the training on the participants' awareness of web tool selection, some interviewees mentioned about the teacher-friendly content of the training for covering free and user-friendly tools. One of the participants stated that "*We learned about a variety of tools which are free and easy-to-use. There are so many tools that have different features but the main criteria I look for when choosing a web tool is its being easy-to-use and free. When it is free, it means that it is easily accessible. The training was valuable in that respect since it broadened my web tool repertoire."*

A common view amongst the interviewees was that TPACK-integrated sample lesson plans were useful since they set an example for designing a technology-integrated lesson plan for each language skill. On this issue, one of the participants commented that "*We learned Thinglink for reading skill, Lumi H5P for vocabulary, and Ted-Ed for listening skill. Therefore, I can say that now I am informed about which tools to choose for which language skill."* Similarly, another participant emphasized the effectiveness of sample TPACK-integrated lesson plans through saying *"Before the training, the concept of technology integration was more abstract than it is now. We learned about sample lesson plans that integrate technology into the syllabus. We learned the importance of the alignment between the tool and the language objectives. The training was useful in that respect."*

Table 8

The Themes and the Codes Related to the Impact of the Training on the Participants' Awareness of Technology Selection

Interview Question	Themes	Codes / Sub-themes	Example Sentences
1- Does the training have any impact on your awareness of web tool selection? If so, how?	Increased awareness of web tool selection	Covering a variety of free and user-friendly tools	*"We learned about a variety of tools which are free and easy-to-use. There are so many tools that have different features but the main criteria I look for when choosing a web tool is its being easy-to-use and free. When it is free, it means that it is easily accessible. The training was valuable in that respect since it broadened my web tool repertoire."*
		The alignment between the tool and the language objective	*"Before the training, the concept of technology integration was more abstract than it is now. We learned about sample lesson plans that integrate technology into the syllabus. We learned the importance of the alignment between the tool and the language objectives. The training was useful in that respect."*
		Sample lesson plans that integrate technology into the syllabus	*"The lesson plans were very useful for setting an example of technology integration into each language skill. We learned Thinglink for reading skill, Lumi H5P for vocabulary, and Ted-Ed for listening skill. Therefore, I can say that now I am informed about which tools to choose for which language skill."*
		Motivation and creativity	*"The training was motivating since it covered a variety of web tools but I believe that the success of technology integration depends on the teacher's creativity. There is a saying as 'think outside of the box'. Technology selection is just the same. It depends on how creative we are. Simply using the technology is not enough."*

A further theme that emerged from the interviews is the creativity of teacher in selecting the tools for the instruction. In response to the question about the impact of the training on the participants' awareness of web tool selection, one of the interviewees mentioned that the training was motivating but she emphasized the factor of creativity saying that *"The training was motivating since it covered a variety of web tools but I believe that the success of technology integration depends on the teacher's creativity. There is a saying as 'think outside of the box'. Technology selection is just the same. It depends on how creative we are. Simply using the technology is not enough."*

Taken together, the findings for the first research question indicate that the training has contributed to the technology integration skills of the participants in the following ways:

- The participants started to consider the alignment of the tool with the language objective.
- The participants started to consider the affordances and the limitations of the tools when selecting the tools.
- The notion of technology integration has become clearer and tangible through sample lesson plans.
- The participants started to make use of some web 2.0 tools more frequently in the long run.
- The training increased the participants' awareness of technology-integrated lesson plan development through having them consider the lesson as a whole resulting from the mixture of traditional and technological tools rather than focusing merely on technology.
- The training increased the participants' web tool repertoire through introducing a variety of free and easy-to-use tools.

Findings for the Second Research Question

The second research question intends to detect the impact of the training on the pedagogical techniques that the participants employ in teaching. Classroom observations and interviews provide the data for this research question. Three volunteers were observed before and after the training. Data from the observations were analyzed through the adapted version of Technology Integration Observation Instrument developed by Hofer et al. (2011)
The results of the classroom observation are displayed in Table 9.

Table 9 presents the pre and post training scores of the participants. Data from the observations were analyzed according to five criteria. The first criterion is *Curriculum Goals & Technologies* and represents TCK. The second and the third criteria are *Instructional Strategies & Technologies* and *Technology Selection(s)* respectively and both represent TPK. The fourth criterion is *Technology logistics* and represents TK. The final criterion represents TPACK. The lowest score (p=3) of the pre-training observation belongs to the dimension of *Technology selection* and the highest scores (p=12) are related to the dimensions of *Curriculum Goals & Technologies* and *Technology logistics*. As for the post-training observation, it is pointed out in the table that the lowest score (p=8) belongs to the dimension of *Instructional Strategies & Technologies*, on the other hand, the highest score (p=12) belongs to the dimension of *Technology Selection(s*). When the pre-training scores and the post training scores are compared, the most significant progress is observed in the dimension of *Technology Selection(s*).

What stands out in Table 9 is the high rate in the TCK domain meaning that the participants were successful at selecting the appropriate tool for the curriculum objectives. For example, one of the participants designed a reading lesson on Thinglink (a web tool which allows for embedding links inside the texts so that the reader can jump into another page for extended information) and turned a text into an interactive material so that the learners were exposed to a richer content.

Table 9

Pre-training and Post-training Observation Scores

	Pre-training				Post-training			
	P1	P2	P3	Total	P1	P2	P3	Total
Curriculum Goals &Technologies (Matching technology to curriculum)	4	4	4	12	4	3	4	11
Instructional Strategies & Technologies (Matching technology to instructional strategies)	3	2	2	7	3	2	3	8
Technology Selection(s) (Considering the factor of variety depending on the limitations and affordances of the technologies)	1	1	1	3	4	4	4	12
Technology Logistics (Operating technologies effectively)	4	4	4	12	4	3	4	11
"Fit" (Considering curriculum, pedagogy and technology all together)	3	2	2	7	3	3	4	10

However, when it comes to the TPK dimension-which is the key dimension looked for in the second research question of the study- the participants were not competent enough to consider the pedagogical affordances of the tools that they would use during the instruction. For example, in the case of P2, the participant preferred using a ready-made video-integrated lesson plan on Ted-Ed website for practicing modal verbs. However, the language used in the instruction and the options in the multiple-choice questions was higher than the level of the students, so the students could not give correct answers. This was not because of their failur to understand the video, but because of the language level used in the instructions and the follow-up questions. However, the result could have been different if the teacher had adapted the language to her students' language level. This event demonstrates that P2 was not competent enough in terms of TPK since he did not utilize the editing feature of the web tool in a way to address the language level of the students.

In addition to the classroom observation, data were collected from the interviews as well. Table 10 provides the theme and the codes that emerged from the analysis of the participants' responses regarding the impact of the training on the pedagogical strategies they employ.

Table 10

The Theme and the Codes Related to the Impact of the Training on the Teaching Methods and the Techniques that the Participants Employ

Interview Question	Theme	Codes / Sub-themes	Example Sentences
1- Does the training have any impact on the teaching methods and techniques that you employ in your teaching? If so, how?	Contribution to teaching methods and techniques	Interactive and learner-based classroom environment	*"Technology makes the classroom environment more interactive. Learners become more active. I step back when they participate actively. I believe that the training is useful in that respect."*
		New perspectives	*"The training has definitely opened up new perspectives for me. For example, in one of the lesson plans geographical knowledge is integrated into the reading skill. That is, geography and language are combined. This is a different method for me. I am planning to try it in one of my classes."*
		Learner profile and the classroom atmosphere	*"Technology is not the only determinant of how I teach. Apart from technology use, learner profile and the classroom atmosphere are also important for selecting the teaching methods and techniques. The training is useful since it shows an example of combining technology with the other variables."*

Table 10 presents the analysis of the responses given to the interview question which asks the impact of the training to the pedagogical methods and techniques that participants employ during the instruction. A careful analysis of the participants' responses brings up the contribution of the training to the pedagogical methods and techniques in three aspects: (a) creating an interactive and learner-based classroom environment, (b) opening up new perspectives for teachers and (c) considering the variables such as learner profile, classroom atmosphere etc. in technology integration.

Majority of the interviewees emphasize that technology motivates the learners, makes the classroom environment more interactive; therefore, the teacher steps back and takes a less active position. Another reported contribution of the training is related to the widening perspectives of the participants. As one interviewee put it: *"The training has definitely opened up new perspectives for me. For example, in one of the lesson plans geographical knowledge is integrated into the reading skill. That is, geography and language are combined. This is a different method for me. I am planning to try it in one of my classes."* It is understood from those statements that the participant learned about an interdisciplinary approach to reading skill that he had not tried before. Throughout the training, it has been emphasized that technology does not have the magical power to overcome all of the learning problems. What is important is to combine the right tool with appropriate methods and techniques and use them in the right time and in the right place. This point was echoed by one of the respondents as *"Apart from technology use, learner profile and the classroom atmosphere are also determining factors for selecting the teaching methods and techniques."*

When the findings from the observations and the interviews were compared, some kind of inconsistency can be detected. Analysis of the participants' responses to the interview questions shows that the training enabled participants to widen their perspective in technology integration and to consider the students' needs, levels in addition to the affordances of the tool in their instruction. However, the observation findings demonstrated the limited use of effective teaching strategies.

Taken together, these findings demonstrate that the TPACK-in-Action training has impacted the teaching methods and techniques that the teachers employ in the following ways:

- The teachers started to step back and adopt a more learner-active attitude. Prior to the training, they were at the organizer and the controller position. It was observed that the teachers monitored the activities on the smart board and the learners had to follow the instructions. However, the findings indicate that the teachers started to adopt a more guiding and less dominant viewpoint allowing the learners to try and learn through active participation.
- It can be deduced from the interview findings that the training offered wider perspective to the participants in terms of exploring the web tools and employing interdisciplinary knowledge in lesson plan development.
- A common view amongst the teachers was that technology is superior to traditional teaching. However, it has been exemplified in the training through the lesson plans that the point is not about how much technology is used, rather it is about the use of technology in appropriate conditions which is determined considering the learners' needs, the curriculum objectives and the flow of the lesson. Findings from the lesson plans and the in-class observations point out the fact that the majority of the participants prefer specific tools for specific steps in a lesson. To exemplify, teachers preferred to start the lesson through a video as a warm-up activity or they avoided using technology in each step of the lesson. Instead, when they started the lesson through a video, they guided the learners to create a mind map on the board based on their conversation about the video. Thus, they aim to minimize the risk of distraction among the learners resulting from jumping to different tools for every successive exercise.

Findings for the Third Research Question

The third research question explores the impact of in-service TPACK training on EFL teachers' knowledge of English. Findings from the content knowledge category in the TPACK-EFL survey and the interviews provide the data to answer this question. Pre-training and post-training survey results were compared through paired sample t-test and the findings are presented below.

Table 11

Paired Sample T-Test Results of the Content Knowledge Category

	Pre-test	Post-test
Content Knowledge (x̄)	170	172

Paired sample t-test results from the analysis of TPACK-EFL survey demonstrate that there is not a significant difference between the pre-training and post-training survey scores in terms of the content knowledge category.

Findings from the interviews are consistent with the survey results. When asked whether or not the training has contributed to their knowledge of English, almost all of the participants stated that there was not a change in their subject knowledge. Therefore, the findings for the second research question show that the TPACK-in-Action training did not have any impact on the content knowledge of the participants.

Findings for the Fourth Research Question

The fourth research question aims to find whether there was a significant difference in the TPACK-EFL survey scores of the participants before and after the training. The survey responses were analyzed on SPSS and paired sample t-test results are presented in Table 12.

Table 12

Paired-Sample T-Test Results

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	pretest - posttest	-,11538	,24337	,03897	-,19428	-,03649	-2,961	38	,005

As shown in the table, no significant differences (p=,005) were found between the pre-test and post test scores of the participants. Looking merely at this result, one may draw the

conclusion that the training did not have a considerable impact on the participants' TPACK levels. However, the survey results need to be synthesized with the findings from the interviews, lesson plans and classroom observations in order to reach a valid conclusion. The next chapter; therefore, presents the overall synthesis of the findings both within each other and with the findings from the previous TPACK literature.

Chapter 5

Discussion, Conclusion and Suggestions

This chapter presents the discussion of the findings obtained for each research question. It begins with an overview of the research and presents the summary of the findings. Subsequently, discussion for each research question and the overall conclusion of the research are presented. Following the limitations and pedagogical implications, the chapter ends with suggestions for future researchers.

An Overview of the Research

The rationale behind this research was to examine the effectiveness of an in-service TPACK training which was designed in the light of the TPACK-in-Action model (Tai,2013). The training aimed to improve the technology integration skills of EFL teachers. To this end, twenty EFL teachers from a private school participated into the six-week face-to-face training. The training was designed according to the five steps of TPACK-in-Action model which are modelling, analyzing, demonstrating, application and reflection. The content of the training covered teaching the four language skills along with vocabulary and grammar through web 2.0 tools. Each week different web tools were introduced through tech-integrated lesson plans which were developed in alignment with the curriculum objectives. Then, learners practiced using the web tools and developed their own lesson plans, commented on the works of the others and reflected on the whole training process. Data were collected from TPACK-EFL survey, in-class observation, lesson plans and focus group interviews. Findings obtained for each research question are discussed in the light of the TPACK literature.

Discussion of the First Research Question

The first research question examines the impact of the training on the technology integration skills of EFL teachers. In that scope, participants' frequency of technology use, technology-integrated lesson plan development skills and awareness of web-tool selection were investigated.

With regard to the impact of the training on the participants' frequency of technology use, findings from the interviews indicate that the training did not have a significant impact on the participants' frequency of technology use since the participants reported that they had already been using technology very often. However, at this point what the teachers mean by "technology" needs further exploration in order to elaborate on the findings. Therefore, data from the pre-training observation were utilized and findings indicated that technology use was limited to the digital coursebooks. It was observed that the teachers frequently used the digital coursebooks since they present the topic together with a variety of exercises. So, the teachers might not feel the need to use an extra digital or non-digital material.

Another reason for the lack of any change in the frequency of technology use of the participants is that the time between the end of the training and the time of data collection was short, as reported by most of the participants. The findings from the second interview which was conducted six months after the training verify this interpretation since most of the participants reported that they started using some web 2.0 tools more frequently in the long run.

Increased frequency of technology use is likely to be related to the affordances of the tools in terms of language teaching. The web tools selected for the training have a wide range of features like offering both ready-made and editable templates for free access. Thus, teachers can easily adapt the content of the material to the target level. Another reason behind the increased use of the web tools is most probably the increased motivation of the learners. Research shows that teacher motivation is linked to learner motivation meaning that if learners are willing to participate into the lesson activities, the teacher motivation increases (Bernaus & Gardner, 2008). Therefore, the teachers might have started to use the web tools more frequently seeing that the learners became more active participants.

As for the impact of the training on the technology-integrated lesson plan development, findings demonstrate that the teachers successfully matched the tools with the objectives and got the highest score in TCK dimension. This finding might be attributed to the content of the training which covered sample lesson plans for each language skill and each web tool. The training was designed in a way to include the language objectives in the curriculum and

presented examples of technology integrated learning activities so that the teachers would find it most relevant to their needs. Teachers get the most benefit when the training directly addresses their professional needs and allows them to participate actively. As indicated by Harris (2016), the enhancement of teachers' professional growth is most effective when characterized by being active, continuous, relevant to their job responsibilities, and centered on the educational syllabus of their students. Besides, the emphasis given to the affordances of the tools in terms of language skills might be another factor. Examples for the positive impact of the interventions on the technology-integrated lesson plan development can be seen in the previous research (Ansyari, 2012; Shinas et al.,2015; Sointu et al.,2016). For example, Ansyari (2012) developed and conducted a professional development program for technology integration in English language teaching in an Indonesian higher education setting. He collected data from multiple sources including the lesson plans from the participants and the findings indicated that there was 58% improvement in TCK dimension. In the quantitative research conducted by Shinas and his colleagues (2015), tech-integrated lesson plan development skills of pre-service teachers increased following the training.

On the other hand, findings from the lesson plans in the current study indicate that the least improvement was detected in the domain of TPK. It was found that while the participants employed the techniques such as brainstorming, question-answer and pair work frequently and appropriately, instruction which involves higher order thinking skills (HOTS) as problem solving and synthesizing was limited. A possible explanation for this outcome might be related to the challenge of teaching through the enactment of such strategies. It is highlighted in the literature that implementing HOTS activities is both time-consuming and demanding on the part of the teachers (Genapathy et al.,2017). What makes it harder is to implement them with the integration of technology. It is pointed out in the literature that teachers tend to use technology for lower-level activities rather than integrating it in HOTS-triggering strategies (Kim et al.,2007). Since TPK refers to the knowledge about pedagogical affordances and constraints of technological tools, it is necessary to create a developmentally appropriate context in which the tool is used (Koehler et al., 2013). Therefore, it is an expected outcome that the least improvement occurred in TPK. This finding is consistent with that of Brinkley-Etzkorn (2018)

who argues that improvement in TPACK dimensions happens gradually. What can be drawn as conclusion from the current research is that enhancing TPK is more time-demanding when compared to the other knowledge dimensions since it requires not only technology knowledge but also the enactment of appropriate pedagogical strategies.

Findings regarding the impact of the training on the teachers' awareness of web tool selection suggest that the training helped broaden their perspective of what technology integration is and how it can be achieved. One of the most remarkable findings of the research is that the participants are informed about the importance of the alignment between the selected technology and the language outcome which is represented by TCK. The key point behind this finding is the content of the training which was organized around the TPACK-in-Action model. Since TPACK-in-Action model requires the equal participation from both parties, the teacher and the learners, it allows for experimenting with the tool. On this issue, Baran and Uygun (2016) argue that the intricate characteristics of TPACK necessitate authentic contexts and hands-on experiences for its development.

Another significant finding is related to the increased awareness of the participants for technological pedagogical knowledge. Even though little improvement was detected in TPK in the lesson plans and the in-class observations, majority of the participants stated that technology is effective only when it is combined with the correct pedagogy. Findings from this study are in alignment with the findings from the previous research (Brinkley-Etzkorn,2018; Jaipal-Jamani et al.,2018). For years, technology and technological knowledge were at the focus of attention. Therefore, most of the professional development programs were implemented with the aim of teaching educational technologies. However, as pointed out by Harris, Mishra and Koehler (2009), approaches to teach only about the technologies are insufficient. Learning a technology is not the same as learning what to do with it instructionally. Therefore, raising the awareness of the teachers about the distinction can be accepted as an invaluable contribution of the training.

Discussion of the Second Research Question

The second research question aims to explore the impact of the training on the pedagogical techniques that the participants employ in teaching. Data were collected from the interviews and classroom observations. According to the findings from the pre-training observations, *Technology selection* dimension is the lowest scored dimension since the participants did not employ any technological tool other than the digital coursebook. They were quite skillful in operating the smartboard and the activities in the digital coursebook were in alignment with the curriculum objectives. Therefore, they scored the highest in the dimensions of *Technology logistics* and *urriculum goals & technologies*. The teachers' using only the digital coursebooks can be explained by the school policy that coursebooks and their digital versions are the primary materials to be used. Therefore, this finding surprisingly unravels the impact of Contextual Knowledge (XK) on the technology integration practices of teachers. On the other hand, findings from the post-training observation indicate that the participants scored the lowest in the *Instructional Strategies & Technologies* dimension whereas they scored the highest in the *Technology Selection(s*) dimension. Therefore, the most significant progress was observed in the *Technology Selection(s*) dimension. The observed increase in *Technology Selection(s*) could be attributed to the variety of web tools that the participants employed in the post training observation. What can be inferred from this finding is that the training had a positive impact on developing the web tool repertoire of the participants. In accordance with the findings from the lesson plans, *Instructional Strategies & Technologies* dimension is the lowest scored dimension in the classroom observations. This could be attributed to the fact that TPACK does not exist in a vacuum and requires time for its development (Koehler et al.,2014). Another data source was interviews for the second research questions. Considering the time-limited nature of classroom observations, interviews were conducted with the participants in order to obtain in-depth data for learning about their opinions for the impact of the training on their TPK development. All of the respondents unanimously stated that the training contributed to the enactment of teaching methods and techniques. Some of them emphasized that technology converts the classroom into a more interactive learning

environment in which learners are active participants. Therefore, teacher -led activities were replaced by learner-led practices. This outcome mirrors those of the previous studies that found an increase in learner motivation and participation after the TPACK training (Brinkley-Etzkorn, 2018; Çam & Koç,2024).

Discussion of the Third Research Question

The third research question intends to find out the impact of the training on the English language knowledge of the participants. Findings from the paired sample t- test scores and the interviews indicated that the training did not have any impact on the English language knowledge of the participants. The possible interference of contextual knowledge (XK) might be linked with this outcome. The participants scored themselves high owing to the fact that they were already competent in English. Since the school policy suggests that all of the EFL teachers speak English even at the corridor and in the break time, the teachers consider themselves competent in English. This finding is consistent with the earlier TPACK intervention research (Lee & Kim, 2014).

Discussion of the Fourth Research Question

The fourth research question aims to find whether there was a significant difference between the pre and post training TPACK-EFL survey scores of the participants. Surprisingly, no significant differences were found between them. Besides, survey results do not support the data from the interviews, lesson plans and the classroom observation. This inconsistency can be explained by the self-reporting nature of the survey data and the Dunning-Kruger effect (Dunning, 2011). The participants had already measured themselves high in the pretest; therefore, no significant differences were found between the pretest and post test scores. However, data from the interviews, lesson plans and in-class observation show that the TPACK training did have a positive impact on the participants in terms of designing tech-integrated lesson plans, matching the tools with the language objectives and raised their awareness of technology integration. Similar findings have been obtained in the previous research which

show that self-report data have weak correlation with data from more objective sources (Drummond & Sweeney, 2017; Lachner et al.,2021; Maderick, et al.,2016).

Conclusion and Theoretical Implications

This study sets out to explore the impact of an in-service TPACK training on the technology integration skills of EFL teachers. The training was designed in accordance with the steps in the TPACK-in-Action Model which are modeling, analyzing, demonstrating, applying and reflection (Tai, 2013). Twenty EFL teachers participated in the face-to-face training. The training covered technology-integrated teaching of four skills and lasted for six weeks. In the first week, the participants were informed about TPACK framework and TPACK-in-Action Model. In the following weeks TPACK-integrated lesson plans were introduced. First, the instructor modeled the teaching of a tech-integrated lesson plan (*modeling*). Then, the instructor and the participants analyzed the tools in terms of their pedagogical and technological affordances (*analyzing*). In the third step, the instructor demonstrated using the tool and the participants started to explore the tool through learning-by-doing approach (*demonstrating*). In the next step, the participants developed tech-integrated lesson plans and implemented technology-integrated teaching in groups (*applying*). In the last step, they reflected on the tools covered in the training (*reflection*). Data were collected from multiple sources including the TPACK-EFL survey, lesson plans, interviews and the classroom observation. The TPACK-EFL survey was conducted both before and after the training in order to detect whether there were any significant differences in terms of the participants' TPACK development. Similarly, three volunteers were observed in the classroom both before and after the training with the aim of examining the impact of the training on their technology integration skills. Then, the lesson plans developed by the participants were analyzed to find out the impact of the training on the participants' technology-integrated lesson-plan development. Last, focus group interviews were conducted with the aim of uncovering the participants' ideas regarding the contribution of the training on their professional development. The lesson plans were analyzed through *Technology Integration Assessment Rubric* (Harris et al.,2010) and the findings demonstrated that participants got the highest score in "*Curriculum Goals &*

Technologies" dimension. This finding demonstrated that they could select the appropriate tool for the language objective in the curriculum. However, they received the lowest score in "*Instructional Strategies & Technologies*" dimension which indicated that they could not implement effective teaching strategies. The performance of the participants in the classroom observation was analyzed through *Technology Integration Observation Instrument* (Hofer et al.,2011) and similar findings were obtained. On the other hand, the findings from the interviews showed that the training increased the participants' motivation for both using the technology more frequently and exploring the tools more deeply. Besides, it was reported that the training raised their awareness of selecting the web tools for technology integration. However, findings from the TPACK-EFL survey were not in agreement with the findings from other data sources. Interestingly, no significant differences were found between the pre-test and post-test scores of the participants. The majority of the participants scored themselves high before the training; therefore, a significant difference did not occur between the pre and post training survey scores. The possibility of subjectivity resulting from the participants' self-scoring impacted the survey results. Taken together, the TPACK-in-Action training had a positive impact on the technology integration skills of the EFL teachers in terms of raising their awareness of considering the match between the language objective and the selected tool, increasing their motivation to learn more about the technology and using it more frequently. These findings contribute in several ways to our understanding of TPACK and provide a basis for its development in teacher training.

First, it is highlighted that TPACK is not the sum of its components. It is a unique body of knowledge and its development is not dependent on the development of its sub-components only. Contextual factors such as national curriculum, school policy, technical facilities, attitude of the teacher, etc. play significant role on TPACK development. Therefore, one of the key strengths of the study is that it revealed the role of contextual knowledge on the technology integration practices of the teachers. Another contribution of the study is related to the principles of teacher training program which is subject-integrated, practice-oriented, design-based, reflective and allows for collaboration (Niess,2005; Polly et al.,2010). Last, the current

study provides an extended understanding of TPACK development through collecting both self-reported and objectively-measured data.

Limitations

A number of limitations need to be noted regarding the present study. First, data were collected from EFL teachers who work at a private school. As pointed out in the findings, contextual factors such as school policy have a considerable impact on technology integration practices. Therefore, it is possible that different findings might be obtained from different research settings such as a state school. Another limitation is related to the content of the training. The training covered only the language objectives up to 8th graders. A teacher training program which covers the language objectives in the high school curricula and which is conducted with the high school teachers may provide different findings. The duration of the training might be accepted as another limitation. Findings from the current research may be different from findings of a longitudinal research. Future researchers may consider implementing a training which lasts longer than six weeks.

Recommendations

This research has thrown up some questions in need of further investigation. First, further research needs to be undertaken to explore the impact of contextual knowledge such as the attitude of the teacher, school principal and even the parents towards teachers' technology integration principles within the TPACK framework. Another recommendation is related to the duration of the training. It is needed to assess the long-term effects of the training on TPACK development since it follows a gradual progress. Besides, it would be interesting to compare the impacts of a TPACK-in-Action training with some other training programs.

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APPENDIX-A: Sample Lesson Plan

LESSON PLAN FOR READING SKILL

Date	28/03/2023
Language skill / area	Reading
Grade Level	8
Unit	Tourism
Duration	40 + 40 minutes
Web Tools	Youtube (warm up) Wooclap, Google Slides (vocabulary presentation) Thinglink, Adobe Express (reading) Padlet (Homework) Learning Apps (post reading)

Learning Objectives

E8.7.R1. Students will be able to find specific information from various texts about tourism.

Target Vocabulary

ancient, attraction, fascinating, incredible, historic, destination, rural, urban

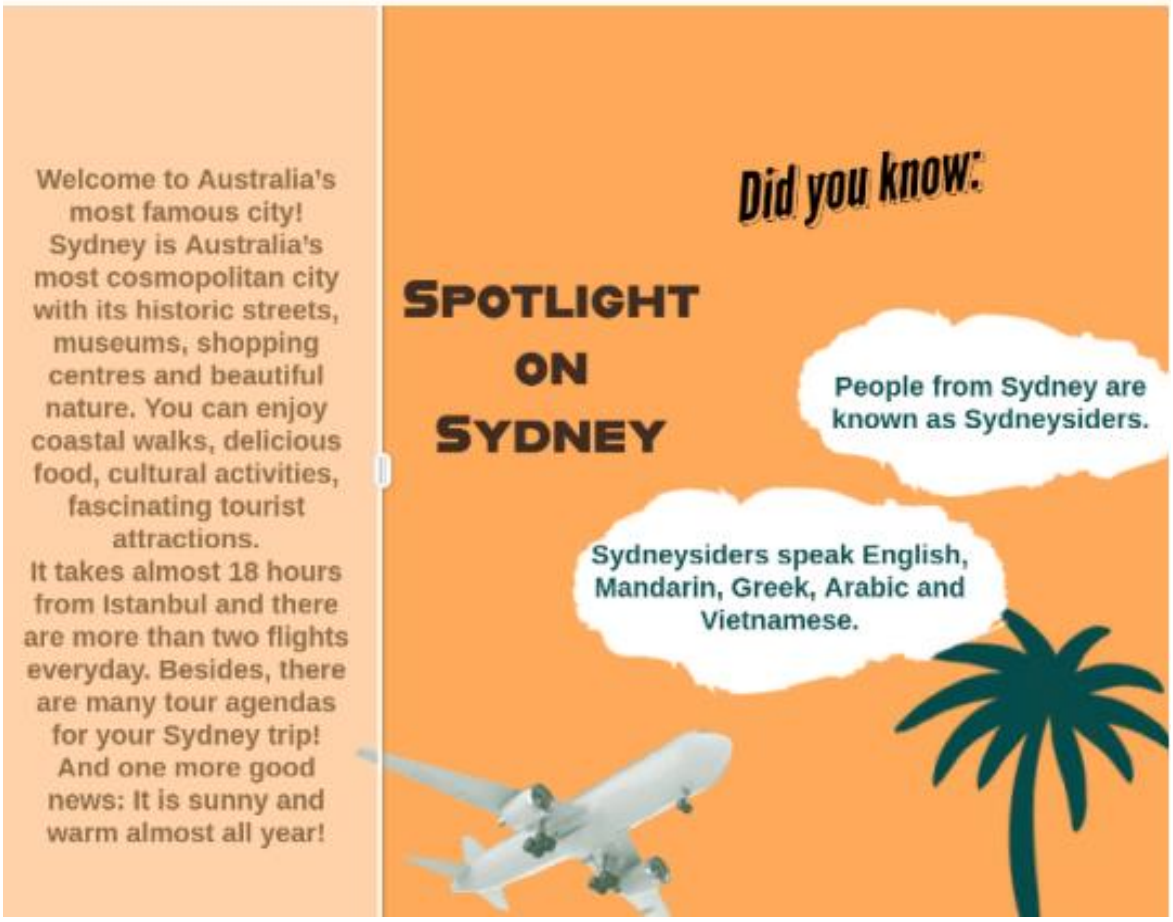
Duration	Process	Materials / Web Tools
5 minutes	As a warm up activity, have learners watch the video and ask them what the video is about, whether they enjoy travelling and which tourist attractions they have visited before. 	Youtube
10 minutes	In the previous discussion part, as the learners mention about some tourist attractions, write them on the board in order to give them as an example for the target vocabulary. For example, when one of the learners talks about Ephesus, write "Ephesus was a city in ancient Greece." and explain the meaning of 'ancient'. After explaining the meaning of a few more vocabulary, go to your Wooclap account and repeat the target vocabulary through interactive presentation.	Wooclap (Google Slides integrated presentation)
5 minutes	In your Wooclap account practice the vocabulary items through fill-in-the-gaps exercise.	Wooclap
5 minutes	As pre-reading activity, start a brief discussion about the most popular tourist destinations in Turkey. Elicit the answer of Antalya and ask learners whether they have been in Antalya and which attractions they have visited there.	Face to face discussion

10 minutes	As reading exercise, go to your Thinglink account https://www.thinglink.com/scene/1672616102611386371 and have learners read the text about Antalya.	Thinglink
5 minutes	Ask comprehension questions about the text. e.g. 1- Why is Antalya the most popular tourist destination? 2- Which tourist attractions are mentioned in the text? 3- What makes Aspendos special?	Face to face discussion
Homework	Assign learners to prepare a travel brochure about a city that they choose. Then, have them share their work on Padlet and make comments on the works of others.	Padlet
Homework Version 2	Assign learners to prepare a travel brochure about a city that they choose. Then, in the next lesson, they present their work to the class and have a brief discussion. Ask them questions about their preferences for the holiday destinations.	Face to face discussion
10 minutes	Ask learners which words they remember about the previous class. Write the answers on the board and encourage learners to make sentences with them.	Face to face discussion
5 minutes	Ask learners which cities they know/have heard about abroad. Then, ask them to show Sydney on the map.	Face to face discussion
10 minutes	Tell learners that the title of today's reading text is 'Spotlight on Sydney'. In groups of two, ask them to take a piece of paper and fold it. On one side of the paper, tell them to write at least 5 words that they expect to find in the text. On the other side of the paper, have them write 5 questions that they believe the title of the text sould answer.	Face to face, collaborative work
5 minutes	Go to your Adobe Express https://www.adobe.com/express/ account and ask learners to skim through the text and check the vocabulary items.	Adobe Express
5 minutes	This time, have learners scan the text to check whether the answers of the 5 questions are there. Then, have a	Face to face discussion

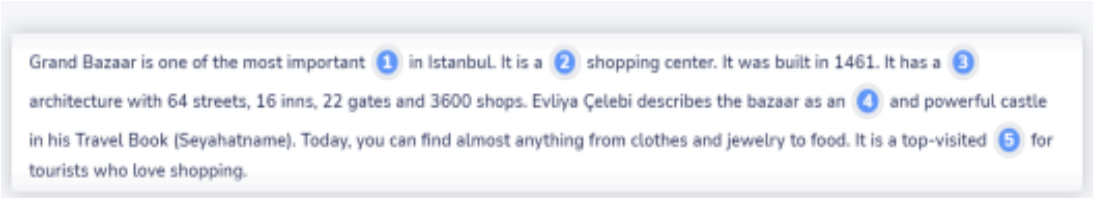
	whole class discussion about their findings.	
10 minutes	After reading the text, go to your Learning Apps https://learningapps.org/login.php account and have your class answer the comprehension questions.	Learning Apps

Screenshots of the Web Activities

Reading Texts in Adobe Express



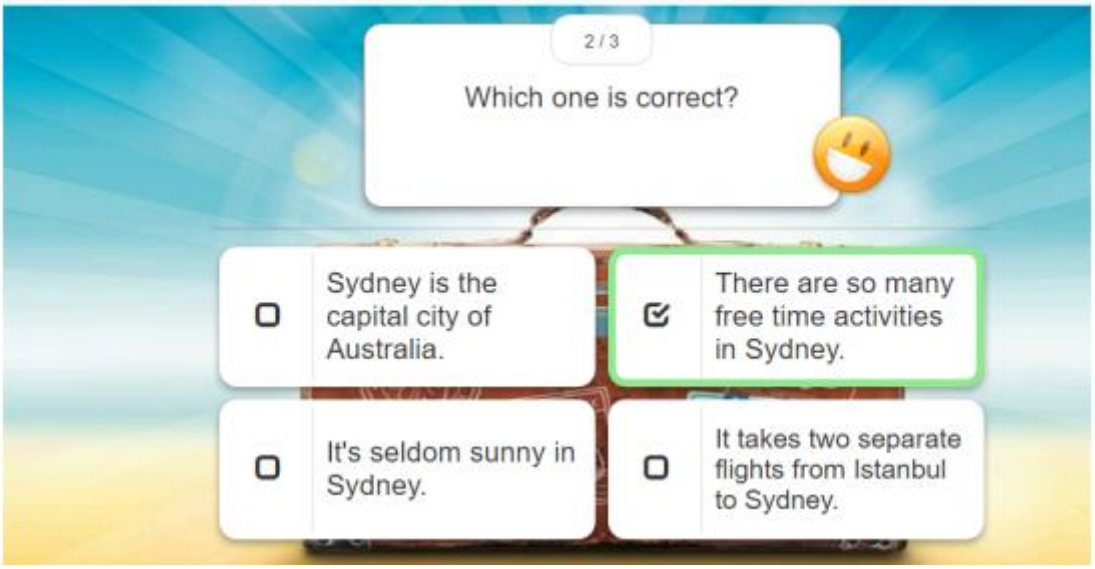
Fill in the Blanks Exercise in Wooclap




Things to do in Sydney
Visit Australia's most famous landmark, the Sydney Opera House. With its fantastic view both in the daylight and at night, it is the perfect destination to start your trip.
Don't come back before climbing the Sydney Tower Eye! It is 305 metres tall so you can get a panoramic view of the city.
The Sydney Fish Market is an ancient fish market in the Southern Hemisphere. Taste different seafood!

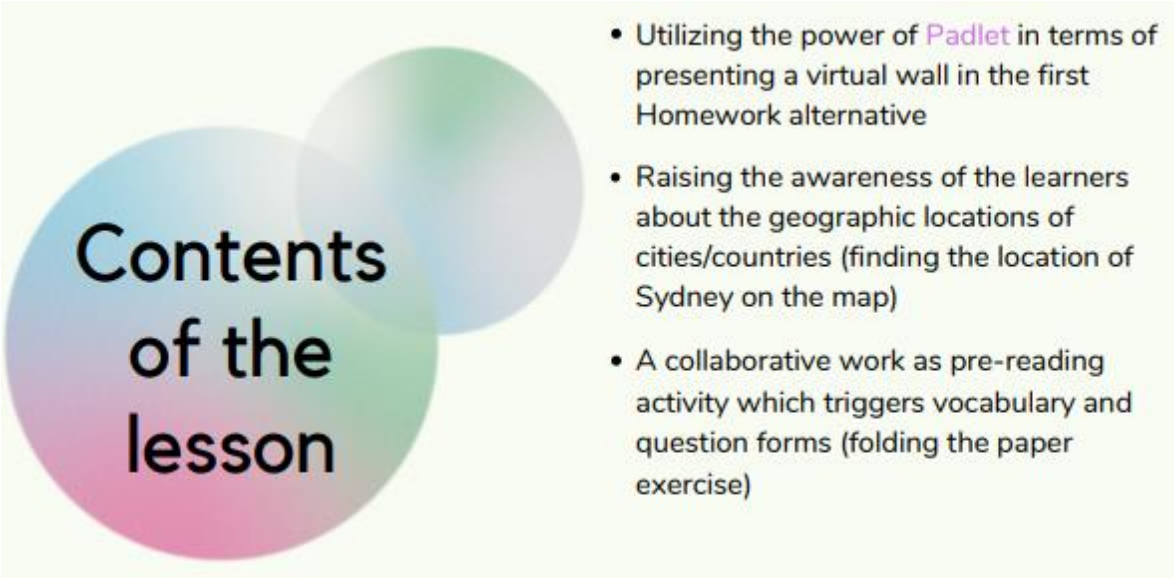

Göbeklitepe is a ..... site because it is the first temple.
1 historic 0% 0
2 destination 100% 1
3 rural 0% 0

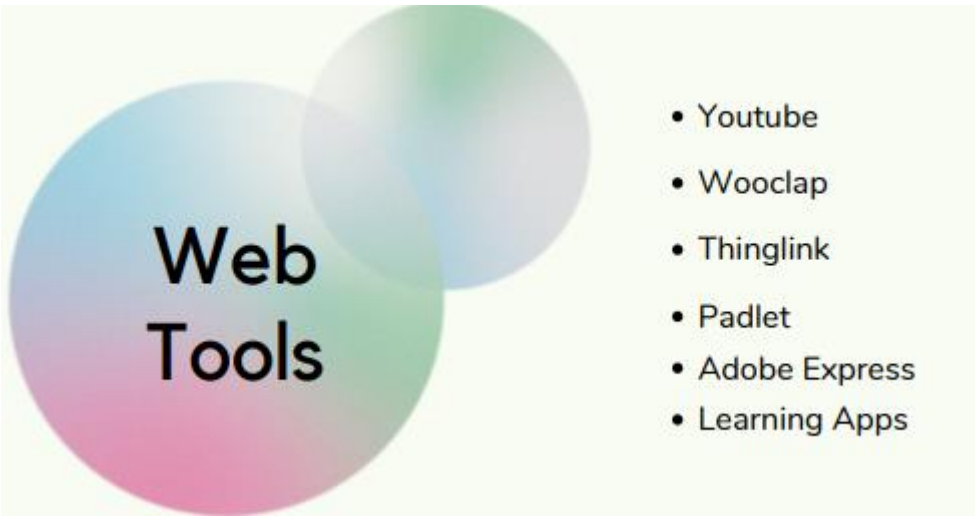
Comprehension Questions



Reading Text in Thinglink

APPENDIX-B: Sample Web Tool Analysis Form





What can you do with Wooclap?

- You can get the opinion of the class through a **poll** activity. For example, when you want to learn whether they prefer to have the exam this week or that week, you can use the poll activity.

- You can start the lesson through a **word cloud question**.

e.g. How do you feel when you listen to the birds singing?
e.g. What is the most dangerous animal in the world?

- You can test whether they retrieve the vocabulary from the previous class.

e.g.Write 3 vocabulary items you remember from the previous class.

- You can start a discussion through **brainstorming** question type.

e.g. What are your ideas for a greener environment?
Recycling
Less plastic
Preferring local products

- You can teach vocabulary through **label an image** activity.

e.g. Label the clothes in the picture.

- You can embed Powerpoint slide or Google slides into Wooclap and make them interactive through adding questions.

What can you do with Padlet?

- You can use Padlet for getting feedback for the lesson.

e.g. What was the funniest part of today's class?
Is there anything unclear?

- You can use Padlet for encouraging communication among learners.

e.g. Write your preferences for holiday destinations. Make comments on your classmates' posts.

- You can use Padlet for encouraging collaboration among learners.

e.g. Divide students into groups of three. Assign an important day (such as Christmas, 30th August, Mother's Day, etc.) to each group. Groups prepare an info wall for their assignments.

APPENDIX-C: TPACK-EFL Survey

Constructs	Items
Technological knowledge (TK)	(1) I can use basic technological terms (e.g. operating system, wireless connection, virtual memory, etc.) appropriately. (2) I can adjust computer settings such as installing software and establishing an Internet connection. (3) I can use computer peripherals such as a printer, a headphone, and a scanner. (4) I can troubleshoot common computer problems (e.g. printer problems, Internet connection problems, etc.) independently. (5) I can use digital classroom equipment such as projectors and smart boards. (6) I can use Office programs (i.e. Word, PowerPoint, etc.) with a high level of proficiency. (7) I can create multimedia (e.g. video, web pages, etc.) using text, pictures, sound, video, and animation. (8) I can use collaboration tools (wiki, edmodo, 3D virtual environments, etc.) in accordance with my objectives. (9) I can learn software that helps me complete a variety of tasks more efficiently.
Content knowledge (CK)	(10) I can express my ideas and feelings by speaking in English. (11) I can express my ideas and feelings by writing in English. (12) I can read texts written in English with the correct pronunciation. (13) I can understand texts written in English. (14) I can understand the speech of a native English speaker easily
Pedagogical knowledge (PK)	(15) I can use teaching methods and techniques that are appropriate for a learning environment. (16) I can design a learning experience that is appropriate for the level of students. (17) I can support students' learning in accordance with their physical, mental, emotional, social, and cultural differences. (18) I can collaborate with school stakeholders (students, parents, teachers, etc.) to support students' learning. (19) I can reflect the experiences that I gain from professional development programs to my teaching process. (20) I can support students' out-of-class work to facilitate their self- regulated learning.
	(21) I can manage a classroom learning environment. (22) I can evaluate students' learning processes.

Pedagogical content knowledge (PCK)	(23) I can use appropriate teaching methods and techniques to support students in developing their language skills. (24) I can prepare curricular activities that develop students' language skills. (25) I can adapt a lesson plan in accordance with students' language skill levels.
Technological content knowledge (TCK)	(26) I can take advantage of multimedia (e.g. video, slideshow, etc.) to express my ideas about various topics in English. (27) I can benefit from using technology (e.g. web conferencing and discussion forums) to contribute at a distance to multilingual communities. (28) I can use collaboration tools to work collaboratively with foreign persons (e.g. Second Life, wiki, etc.).
Technological pedagogical knowledge (TPK)	(29) I can meet students' individualized needs by using information technologies. (30) I can lead students to use information technologies legally, ethically, safely, and with respect to copyrights. (31) I can support students as they use technology such as virtual discussion platforms to develop their higher order thinking abilities. (32) I can manage the classroom learning environment while using technology in the class. (33) I can decide when technology would benefit my teaching of specific English curricular standards. (34) I can design learning materials by using technology that supports students' language learning. (35) I can use multimedia such as videos and websites to support students' language learning.
Technological pedagogical content knowledge (TPACK)	(36) I can use collaboration tools (e.g. wiki, 3D virtual environments, etc.) to support students' language learning. (37) I can support students as they use technology to support their development of language skills in an independent manner. (38) I can use Web 2.0 tools (animation tools, digital story tools, etc.) to develop students' language skills. (39) I can support my professional development by using technological tools and resources to continuously improve the language teaching process.

(Baser et al., 2016)

APPENDIX-D: Interview Protocol

Date:

Place:

Interviewer:

Interviewee (s):

Describe here the project, telling the interviewee (s) about (a) the purpose of the study, (b) what will be done with the data to protect the confidentiality of the interviewee, and (c) how long the interview will take. Have the interviewee (s) read and sign the consent form. Turn on the tape recorder and test it.

Questions:

1- How do you evaluate the development of your TPACK throughout the training?
2- Has there been a change in the frequency of technology use in your instruction?
3- Did the TPACK training contribute to your technology selection according to curriculum objectives? If so, how?
4- Did the TPACK training contribute to your preference of teaching methods and techniques? If so, how?
5- Did the TPACK training contribute to your subject (English) knowledge? If so, how?

(Thank the individuals for their cooperation and participation in this interview. Assure them of the confidentiality of the responses.)

APPENDIX-E: Technology Integration Observation Instrument

Observer …….. Teacher ……. Date ……

Grade Level ……

Primary Learning Goals ……

Curriculum Topic	Key Instructional Strategies/Learning Activities	Digital Technologies

Directions: Referring to the notes you made, please complete the following rubric, considering the lesson as a whole.

	4	3	2	1
Curriculum Goals & Technologies (Matching technology to curriculum)	Technologies used in the lesson are strongly aligned with one or more curriculum goals.	Technologies used in the lesson are aligned with one or more curriculum goals.	Technologies used in the lesson are partially aligned with one or more curriculum goals.	Technologies used in the lesson are not aligned with one or more curriculum goals.
Instructional Strategies & Technologies (Matching technology to instructional strategies)	Technology use optimally supports instructional strategies.	Technology use supports instructional strategies.	Technology use minimally supports instructional strategies.	Technology use does not support instructional strategies.
Technology Selection(s) (Matching technology to both curriculum and instructional strategies)	Technology selection(s) are exemplary, given curriculum goal(s) and instructional strategies.	Technology selection(s) are appropriate, but not exemplary, given curriculum goal(s) and instructional strategies.	Technology selection(s) are marginally appropriate, given curriculum goal(s) and instructional strategies.	Technology selection(s) are inappropriate, given curriculum goal(s) and instructional strategies.
"Fit" (Considering curriculum, pedagogy and technology all together)	Curriculum, instructional strategies and technology fit together strongly within the lesson.	Curriculum, instructional strategies and technology fit together within the lesson.	Curriculum, instructional strategies and technology fit together somewhat within the lesson.	Curriculum, instructional strategies and technology do not fit together within the lesson.
Instructional Use (Using technologies effectively for instruction)	Instructional use of technologies is maximally effective in the observed lesson.	Instructional use of technologies is effective in the observed lesson.	Instructional use of technologies is minimally effective in the observed lesson.	Instructional use of technologies is ineffective in the observed lesson.
Technology Logistics (Operating technologies effectively)	Teachers and/or students operate technologies very well in the observed lesson.	Teachers and/or students operate technologies well in the observed lesson.	Teachers and/or students operate technologies adequately in the observed lesson.	Teachers and/or students operate technologies inadequately in the observed lesson.

Comments

(Hofer et al., 2011)

APPENDIX-F: Technology Integration Assessment Rubric

Criteria	4	3	2	1
Curriculum Goals & Technologies (Curriculum-based technology use)	Technologies selected for use in the instructional plan are strongly aligned with one or more curriculum goals.	Technologies selected for use in the instructional plan are aligned with one or more curriculum goals.	Technologies selected for use in the instructional plan are partially aligned with one or more curriculum goals.	Technologies selected for use in the instructional plan are not aligned with any curriculum goals.
Instructional Strategies & Technologies (Using technology in teaching/ learning)	Technology use optimally supports instructional strategies.	Technology use supports instructional strategies.	Technology use minimally supports instructional strategies.	Technology use does not support instructional strategies.
Technology Selection(s) (Compatibility with curriculum goals & instructional strategies)	Technology selection(s) are exemplary, given curriculum goal(s) and instructional strategies.	Technology selection(s) are appropriate, but not exemplary, given curriculum goal(s) and instructional strategies.	Technology selection(s) are marginally appropriate, given curriculum goal(s) and instructional strategies.	Technology selection(s) are inappropriate, given curriculum goal(s) and instructional strategies.
"Fit" (Content, pedagogy and technology together)	Content, instructional strategies and technology fit together strongly within the instructional plan.	Content, instructional strategies and technology fit together within the instructional plan.	Content, instructional strategies and technology fit together somewhat within the instructional plan.	Content, instructional strategies and technology do not fit together within the instructional plan.

(Harris et al.,2010)

APPENDIX-G: Ethics Committee Approval

Tarih: 09/02/2024 16:49
Sayı: E-66777842-300-00003369270

T.C.
HACETTEPE ÜNİVERSİTESİ REKTÖRLÜĞÜ
Sosyal ve Beşeri Bilimler Araştırma Etik Kurulu

Sayı : E-66777842-300-00003369270 09/02/2024
Konu : Etik Kurulu İzni (Esra ÖZTÜRK ÇALIK)

EĞİTİM BİLİMLERİ ENSTİTÜSÜ MÜDÜRLÜĞÜNE

İlgi : 29.01.2024 tarihli ve E-51944218-300-00003342182 sayılı yazınız.

Enstitünüz Yabancı Diller Eğitimi Anabilim Dalı İngiliz Dili Eğitimi Doktora Programı öğrencilerinden **Esra ÖZTÜRK ÇALIK**'ın, **Prof. Dr. İsmail Hakkı MİRİCİ** danışmanlığında yürüttüğü ***"Hizmet İçi Teknolojik Pedagojik ve Alan Bilgisi Eğitiminin İngilizce Öğretmenlerinin Teknolojiyi Derslerine Entegre Etme Becerilerine Etkisi"*** başlıklı tez çalışması Üniversitemiz Sosyal ve Beşeri Bilimler Araştırma Etik Kurulunun **06 Şubat 2024** tarihinde yapmış olduğu toplantıda incelenmiş olup, etik açıdan uygun bulunmuştur.

Bilgilerinizi ve gereğini rica ederim.

Prof. Dr. İsmet KOÇ
Kurul Başkanı

APPENDIX-H: Declaration of Ethical Conduct

I hereby declare that…

- I have prepared this thesis in accordance with the thesis writing guidelines of the Graduate School of Educational Sciences of Hacettepe University;
- all information and documents in the thesis/dissertation have been obtained in accordance with academic regulations;
- all audio visual and written information and results have been presented in compliance with scientific and ethical standards;
- in case of using other people's work, related studies have been cited in accordance with scientific and ethical standards;
- all cited studies have been fully and decently referenced and included in the list of References;
- I did not do any distortion and/or manipulation on the data set,
- and **NO** part of this work was presented as a part of any other thesis study at this or any other university.

(26)/(07)/(2024)

(Signature)

Esra ÖZTÜRK ÇALIK

APPENDIX-I: Thesis/Dissertation Originality Report

26/07/2024

HACETTEPE UNIVERSITY
Graduate School of Educational Sciences
To The Department of Foreign Language Education

Thesis Title: THE EFFECT OF AN IN-SERVICE TECHNOLOGICAL PEDAGOGICAL AND CONTENT KNOWLEDGE TRAINING ON DEVELOPING TECHNOLOGY INTEGRATION SKILLS OF EFL TEACHERS

The whole thesis that includes the *title page, introduction, main chapters, conclusions and bibliography section* is checked by using **Turnitin** plagiarism detection software take into the consideration requested filtering options. According to the originality report obtained data are as below.

Time Submitted	Page Count	Character Count	Date of Thesis Defense	Similarity Index	Submission ID
23/07/2024	100	126869	28/06/2024	30%	2421274256

Filtering options applied:
1. Bibliography excluded
2. Quotes included
3. Match size up to 5 words excluded

I declare that I have carefully read Hacettepe University Graduate School of Educational Sciences Guidelines for Obtaining and Using Thesis Originality Reports; that according to the maximum similarity index values specified in the Guidelines, my thesis does not include any form of plagiarism; that in any future detection of possible infringement of the regulations I accept all legal responsibility; and that all the information I have provided is correct to the best of my knowledge.

I respectfully submit this for approval.

Name Lastname: Esra ÖZTÜRK ÇALIK

Student No.: N20144052 Signature

Department: Foreign Language Education

Program: English Language Teaching

Status: ☐ Masters ☒ Ph.D. ☐ Integrated Ph.D.

ADVISOR APPROVAL

APPROVED
(Title, Name Lastname, Signature)

APPENDIX-K: Yayımlama ve Fikrî Mülkiyet Hakları Beyanı

Enstitü tarafından onaylanan lisansüstü tezimin/raporumun tamamını veya herhangi bir kısmını, basılı (kâğıt) ve elektronik formatta arşivleme ve aşağıda verilen koşullarla kullanıma açma iznini Hacettepe Üniversitesine verdiğimi bildiririm. Bu izinle Üniversiteye verilen kullanım hakları dışındaki tüm fikri mülkiyet haklarım bende kalacak, tezimin tamamının ya da bir bölümünün gelecekteki çalışmalarda (makale, kitap, lisans ve patent vb.) kullanım hakları bana ait olacaktır.

Tezin kendi orijinal çalışmam olduğunu, başkalarının haklarını ihlal etmediğimi ve tezimin tek yetkili sahibi olduğumu beyan ve taahhüt ederim. Tezimde yer alan telif hakkı bulunan ve sahiplerinden yazılı izin alınarak kullanılması zorunlu metinlerin yazılı izin alınarak kullandığımı ve istenildiğinde suretlerini Üniversiteye teslim etmeyi taahhüt ederim.

Yükseköğretim Kurulu tarafından yayınlanan **"Lisansüstü Tezlerin Elektronik Ortamda Toplanması, Düzenlenmesi ve Erişime Açılmasına ilişkin Yönerge"** kapsamında tezim aşağıda belirtilen koşullar haricince YÖK Ulusal Tez Merkezi / H.Ü. Kütüphaneleri Açık Erişim Sisteminde erişime açılır.

- Enstitü/ Fakülte yönetim kurulu kararı ile tezimin erişime açılması mezuniyet tarihinden itibaren 2 yıl ertelenmiştir. (1)
- Enstitü/Fakülte yönetim kurulunun gerekçeli kararı ile tezimin erişime açılması mezuniyet tarihimden itibaren … ay ertelenmiştir. (2)
- Tezimle ilgili gizlilik kararı verilmiştir. (3)

26 /07 /2024

(imza)

Esra ÖZTÜRK ÇALIK

"Lisansüstü Tezlerin Elektronik Ortamda Toplanması, Düzenlenmesi ve Erişime Açılmasına İlişkin Yönerge"

(1) Madde 6. 1. Lisansüstü tezle ilgili patent başvurusu yapılması veya patent alma sürecinin devam etmesi durumunda, tez danışmanının önerisi ve enstitü anabilim dalının uygun görüşü Üzerine enstitü veya fakülte yönetim kurulu iki yıl süre ile tezin erişime açılmasının ertelenmesine karar verebilir.

(2) Madde 6. 2. Yeni teknik, materyal ve metotların kullanıldığı, henüz makaleye dönüşmemiş veya patent gibi yöntemlerle korunmamış ve internetten paylaşılması durumunda 3. şahıslara veya kurumlara haksız kazanç; imkânı oluşturabilecek bilgi ve bulguları içeren tezler hakkında tez danışmanın önerisi ve enstitü anabilim dalının uygun görüşü üzerine enstitü veya fakülte yönetim kurulunun gerekçeli kararı ile altı ayı aşmamak üzere tezin erişime açılması engellenebilir.

(3) Madde 7. 1. Ulusal çıkarları veya güvenliği ilgilendiren, emniyet, istihbarat, savunma ve güvenlik, sağlık vb. konulara ilişkin lisansüstü tezlerle ilgili gizlilik kararı, tezin yapıldığı kurum tarafından verilir. Kurum ve kuruluşlarla yapılan işbirliği protokolü çerçevesinde hazırlanan lisansüstü tezlere ilişkin gizlilik kararı ise, ilgili kurum ve kuruluşun önerisi ile enstitü veya fakültenin uygun görüşü Üzerine üniversite yönetim kurulu tarafından verilir. Gizlilik kararı verilen tezler Yükseköğretim Kuruluna bildirilir.*

Madde 7.2. Gizlilik kararı verilen tezler gizlilik süresince enstitü veya fakülte tarafından gizlilik kuralları çerçevesinde muhafaza edilir, gizlilik kararının kaldırılması halinde Tez Otomasyon Sistemine yüklenir

**Tez danışmanının önerisi ve enstitü anabilim dalının uygun görüşü üzerine enstitü veya fakülte yönetim kurulu tarafından karar verilir.*