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THE ROLE OF ENGLISH LANGUAGE TEACHERS' TPACK REGARDING HIGH SCHOOL STUDENTS' ACCEPTANCE OF MOBILE LEARNING TOOLS

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Eğitim Bilimleri Enstitüsünce
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TUTANAK

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Adayın kişisel çalışmaya dayanan tezini savunmasından sonra 45 .....dakikalık süre içinde gerek tez konusu, gerekse tezin dayanağı olan anabilim dallarından sorulan sorulara verdiği cevaplar değerlendirilerek tezin **kabul** edildiğine...oybirliği.. ile karar verilmiştir.

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- Tez içinde sunulan veriler, bilgiler ve dokümanların akademik ve etik kurallar çerçevesinde elde edildiğini,
- Tüm bilgi, belge, değerlendirme ve sonuçların bilimsel etik ve ahlak kurallarına uygun olarak sunulduğunu,
- Tez çalışmasında yararlanılan eserlerin tümüne uygun atıfta bulunarak kaynak gösterildiğini,
- Kullanılan verilerde ve ortaya çıkan sonuçlarda herhangi bir değişiklik yapılmadığını,
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Bu tezde kullanılan ve başka kaynaktan yapılan bildirişlerin, çizelge, şekil ve fotoğrafların kaynak gösterilmeden kullanımı, 5846 sayılı Fikir ve Sanat Eserleri Kanunu'ndaki hükümlere tabidir.

ABSTRACT

THE ROLE OF ENGLISH LANGUAGE TEACHERS' TPACK REGARDING HIGH SCHOOL STUDENTS' ACCEPTANCE OF MOBILE LEARNING TOOLS

DERYA BOSTAN

Master Thesis / Department of Foreign Languages Teacher Education / English Language Teaching Education Department

Supervisor: Assist.Prof. Sabriye ŞENER

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Educational technology has been applied in all areas of education and mobile learning tools are one of the components of educational technology. That is why knowing how to apply technology in accordance with content, and pedagogy has gained more importance. Teachers should have adequate knowledge to integrate technology into learning and teaching process with suitable methods and techniques. This study aimed to understand mobile tool use of high school EFL learners, student-perceived technological pedagogical content knowledge (TPACK) and mobile learning tools acceptance of the students. To collect and analyze data, a quantitative research design with survey methodology was employed. Quantitative data were collected from 352 high school students in Muğla city center in the spring term of 2017-2018 Academic Year. The participants were determined by via convenience sampling techniques and only one state school with all students was included in the study. The data were collected by means of two scales. One of them was TPACK scale developed by Tseng (2016) and the other was Mobile Learning Tools Acceptance Scale (MLTAS) developed by Özer and Kılıç (2017). The findings revealed that high school students agreed EFL teachers' content knowlegde, but they were unsure about other knowledge domains. They were also found to have positive perception of mobile learning tools. The study concluded that the higher knowledge the students perceived the higher acceptance of mobile learning tools they developed. In order to have more generalizable results, further studies with a mixed method and more participants should be conducted.

Keywords:TPACK, mobile learning, mobile learning tools, Mobil Learning Tools Acceptance Scale (MLTAS)

ÖZET

İNGİLİZCE ÖĞRETMENLERİNİN TPAB'NİN LİSE ÖĞRENCİLERİNİN MOBİL ÖĞRENME ARAÇLARINI KABUL DÜZEYİ ÜZERİNDEKİ ROLÜ

DERYA BOSTAN

Yüksek Lisans Tezi / Yabancı Diller Eğitimi Ana Bilim Dalı / İngiliz Dili Eğitimi Bilim Dalı

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Eğitim teknolojisi eğitiminin her alanında uygulanmaktadır ve mobil öğrenme araçları da bu teknolojinin bir parçasıdır. Bu nedenle alan ve pedagojik bilgiyle bağlantılı olarak teknolojinin kullanılması daha çok önem kazanmıştır. Öğretmenler, uygun yöntem ve teknikler ile teknolojiyi öğretme ve öğrenme sürecine harmanlayabilmek için gerekli bilgiye sahip olmalıdırlar. Bu çalışma lise öğrencilerinin mobil araç kullanım alışkanlıklarını, öğrencilerin algısıyla İngilizce öğretmenlerinin teknolojik pedagojik alan bilgisini (TPAB) ve öğrencilerin mobil öğrenme araçlarını kabul düzeyini anlamayı amaçlamaktadır. Bu amaçla, nicel araştırma modeli benimsenmiştir. Nicel veriler Muğla şehir merkezindeki bir lisenin 352 öğrencisinden toplanmıştır. Çalışmaya yalnızca bir okul dahil edilmiştir ve bu okul uygun örnekleme tekniği ile kararlaştırılmıştır. Veriler iki ölçek aracılığı ile toplanmıştır. Bu ölçeklerden ilki Tseng (2016) tarafından geliştirilen TPACK ölçeği, bir diğeri ise Özer ve Kılıç (2017) tarafından geliştirilen mobil öğrenme araçlarını kabul ölçeğidir (MÖAKÖ). Çalışmanın bulgularına göre lise öğrencileri İngilizce öğretmenlerinin alan bilgisine dair olumlu yargılar taşımaktadır. Ancak öğretmenlerinin diğer bilgi türleri hakkında kararsız kalmışlardır. Öğrenciler mobil öğrenme araçlarını olumlu algıyla kabul etmişlerdir. Çalışma öğrencilerin algısındaki TPAB arttıkça mobil öğrenme araçlarını kabul düzeyinin de arttığı sonucuna varmıştır. Daha genellebilir sonuçlar için karma araştırma modeli ve daha çok katılımcının yer aldığı çalışmalar yapılmalıdır.

Anahtar kelimeler:TPAB, mobil öğrenme, mobil öğrenme araçları, Mobil Öğrenme Araçları Kabul Ölçeği (MÖAKÖ)

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Derya BOSTAN

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LIST OF ABBREVIATIONS

PK: Pedagogical Knowledge

TK: Technological Knowledge

CK: Content Knowledge

PCK: Pedagogical Content Knowledge

TCK: Technological Content Knowledge

TPK: Technological Pedagogical Knowledge

TPACK: Technological Pedagogical Content Knowledge

ICT: Information and Communication Technologies

EFL: English as a Foreign Language

ELT: English Language Teaching

MALL: Mobile Assisted Language Learning

M-learning: Mobile Learning

LIST OF APPENDICES

CHAPTER I

INTRODUCTION

This chapter firstly gives information about the background of the study. Next, the problem and the aims of the study are explained. Then the significance of the research and contribution to the field is also mentioned. Finally, the definitions of key terms are given at the end of the chapter.

1.1. Background of the Study

The world has experienced four industrial revolutions.The first was in the 1780s with shifting from animals to mechanical powers. The second revolutions were in the 19th century with the generation of power and mass production. In the 1970s, the third revolution brought digital developments and social media to our lives with the improvements in computer technology. In the 21st century, the fourth industrial revolution is on the stage with the advent of artificial intelligence, cyber-physical systems, 3D holograms and nanotechnology. Industrial revolutions have created massive changes in every field of modern world including education, teacher training programs and foreign language teaching or learning (Younus, 2017).

Information and Communication Technologies (ICT), in the 21st century, suggest new ways to access and manipulate information in every field. ICT changes pedagogy by offering new ways to engage students. Technological developments are also changing the expectations from the teachers. Such improvements have brought one key term to educational discussions: Technological Pedagogical Content Knowledge (TPACK). An expert teacher must create proper connections between his or her knowledge (content),

how it is taught (pedagogy) and appropriate tools to teach (technology). This combination is known as Technological Pedagogical Content Knowledge (TPACK) (Mishra and Koehler, 2008).

Another key term in today's educational process is mobile learning (m-learning). Technologies such as smart phones or tablet PCs constitute an important part of our lives. They are also important for educational applications. Today using smart tools to facilitate learning is a usual process (Kenning, 2007). According to Hu and McGrath (2011), how we learn has changed; so should the way we teach a language. The change in teachers' professional practice is also unavoidable. M-learning provides teachers with a more interesting and flexible way of teaching language. M-learning does not cost much and helps students to learn without physical borders (Sung, Chang and Yang, 2015). The main feature of m-learning is that there is no time and place restriction due to the use of mobile technology in language learning. Therefore, it is important for language learning process inside or outside the classroom (Jovanović, 2017). M-learning comes with m-learning tools some of which are smart phones, laptops, mobile phones, PDAs, MP3 players. Each of them has its own advantages and disadvantages. In order to adopt and integrate new technologies and tools, learners and teachers are to update themselves continuously.

1.2. Problem and Research Questions

ICT are developing very fast and they are included in many fields as well as education. Because of the increasing influence of technology on education, it is a great responsibility for teachers to combine technology and education effectively. However; today's teachers are no longer able to meet the needs of growing students with technology (Karalar and Aslan, 2017). This is an increasing concern for trainees. According to Usta and Korkmaz (2010), the training given at the undergraduate level to the teachers on the inclusion of the technology in the education process is inadequate. Teachers see themselves as inadequate for the students of the new century (Özer and Kılıç, 2017).

TPACK is related to having depth knowledge of how ICT can be used to access and manipulate the subject and how it can support and enhance learning with the

pedagogical content knowledge (PCK). When the components covered by TPACK in this sense are evaluated; it has been known that technology involves materials such as the computer, the Internet and so on; pedagogy involves teaching methods and strategies, and finally content consists of target topic to learn. TPACK provides a teacher with the decision of suitability among curriculum, pedagogical strategies and the use of digital or non-digital technologies (Kuşkaya Mumcu, Haşlaman and Usluel, 2008).

There are studies about English teachers' or prospective English teachers' self-reported TPACK. However; few studies have been carried out to understand the perceptions of students regarding teachers' TPACK (Tseng, 2016). Teachers may have theoretical knowledge or components of TPACK but they may not use that knowledge in classroom practices. That's why students' views gain importance.

As a subset of m-learning, mobile assisted language learning (MALL) is defined as using mobile technologies to teach or learn a language. It is not necessary to be in the classroom in MALL and it gives learners the sense of free time and place (Miangah and Nezarat, 2012). Since the 1990s, lots of mobile technologies such as pocket e-dictionaries, PDAs, mobile phones, MP3 players have been used in the scope of MALL. Research showed both positive and negative sides of mobile learning inside and outside classrooms. Flexibility, individuality, portability are among useful sides while small screens, connection problems, distraction by non-academic websites are considered as disadvantages of m-learning. The general perception of m-learning seems positive, however; there are still disadvantageous aspects to handle (Jovanović, 2017). Students perception, acceptance of m-learning and m-learning tools are very important since language learning can be facilitated by the motivation of the learners. Students acceptance of m-learning tools should be known by teachers so that they can organize the practices in language classrooms.

The main hypothesis of this thesis is that students perceptions of teachers' TPACK may affect their acceptance of m-learning tools. The purpose of this research is to understand the relationship between how high school students evaluate their English teachers' TPACK and to what level they accept mobile learning tools.

Based on this, the research questions with sub-problems of the study are as follows:

1. What are mobile tool use habits of high school students?

2. What are the high school EFL learners' perceptions regarding English teachers' TPACK?
3. What is students' acceptance level of mobile learning tools?
4. What is the role of English language teachers' TPACK regarding high school students' acceptance of mobile learning tools?

1.3. The Significance of the Study

Historically, the development of the TPACK concept does not date back to old times. After 2005, the TPACK approach emerged and gave a new direction to educational teaching approaches. Giving importance to this issue after 2010, Turkey remained behind implementing TPACK approach. According to the statement of the Ministry of National Education (MEB), new approaches in 2013 were arranged according to TPACK Model. In today's world where technology is involved in many areas of life, this model has become an important component of the educational approaches and curricula (MEB, 2013).

Effective and efficient teaching is the primary goal for teachers. For this purpose, they want to present the information that should be conveyed through the most appropriate methods, tools, and techniques. Nevertheless, even if they report themselves otherwise, practically teachers can be lack of necessary skills and information to integrate technologies in or out of EFL classes. How they are perceived by the learners may affect learners' motivation while learning a foreign language.

The focus of the studies on TPACK (Angeli and Valanides, 2009; Chai, Koh, and Tsai, 2010, 2013; Chen and Jang, 2014; Jang and Tsai, 2012) is mostly pre-service teachers and in-service teachers. Self-reported TPACK scales or questionnaires do not present what teachers genuinely have but what they think or report that they have (Kaya and Kaya, 2013). According to Tuan, Chang, Wang, and Treagust (2000), student perceptions of teachers' knowledge may provide rich information about students' cognition and classroom processes. That increases the significance and uniqueness of this study. This study, on the other hand, concentrates on students' perceptions regarding teachers' TPACK and students acceptance of m-learning tools.

Many universities around the world prefer to use mobile technologies (mobile phones, tablets, handhelds, etc.) to select and change course schedules and to contact the student in the registration process or management related processes. In addition to this purpose, mobile learning applications are being utilized to provide teaching-related tasks such as course summary sharing and course tutorials and to maintain the entire course through mobile technology. These applications have the advantages of time and space independent learning, lifelong learning, learning that can be arranged according to the location and conditions. This approach, which has transformed learning into the individual effort, has resulted in the permanence in the learning process. Özer and Kılıç (2017) claimed that there is discrepancy in the literature regarding m-learning tools acceptance of students while there have been many studies on m-learning perception, and readiness.

In this sense, the study aims to understand high school students' perceptions of EFL teachers regarding TPACK and their acceptance of m-learning tools in the central district of Muğla. It also aims to contribute to the literature on TPACK and m-learning tools studies in Turkey. Furthermore, this research can lead to improvements and adjustments in this area based on the participants' perceptions.

1.4. Assumptions

Participants have been assumed to have same level of English. The students have been assumed to read and comprehend all the items in the scales before responding them.

1.5. Definitions

Pedagogical Knowledge (PK):

PK is teachers’ deep knowledge about the processes and practices or methods of teaching and learning. They encompass, among other things, overall educational purposes, values, and aims. This generic form of knowledge applies to understanding how students learn, general classroom management skills, lesson planning, and student assessment. (Koehler and Mishra, 2009, p.64).

Content Knowledge (CK):

Teachers' knowledge about the subject matter to be learned or taught. ... As Shulman (1986) noted, this knowledge would include knowledge of concepts, theories, ideas, organizational frameworks, knowledge of evidence and proof, as well as established practices and approaches toward developing such knowledge" (Koehler and Mishra, 2009, p.63).

Technology Knowledge (TK): "The knowledge about certain ways of thinking about, and working with technology can apply to all technology tools and resources." (Koehler and Mishra, 2009, p.64).

Technological Pedagogical Knowledge (TPK):

An understanding of how teaching and learning can change when particular technologies are used in particular ways. This includes knowing the pedagogical affordances and constraints of a range of technological tools as they relate to disciplinarily and developmentally appropriate pedagogical designs and strategies (Koehler and Mishra, 2009, p.65).

Pedagogical Content Knowledge (PCK):

Consistent with and similar to Shulman's idea of knowledge of pedagogy that is applicable to the teaching of specific content. Central to Shulman's conceptualization of PCK is the notion of the transformation of the subject matter for teaching. " (Koehler and Mishra, 2009, p.64).

Technological Content Knowledge (TCK):

An understanding of the manner in which technology and content influence and constrain one another. Teachers need to master more than the subject matter they teach; they must also have a deep understanding of the manner in which the subject matter (or the kinds of representations that can be constructed) can be changed by the application of particular technologies (Koehler and Mishra, 2009, p.65).

Technological Pedagogical Content Knowledge (TPACK):

The basis of effective teaching with technology, requiring an understanding of the representation of concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how technology can help redress some of the

problems that students face; knowledge of students' prior knowledge and theories of epistemology; and knowledge of how technologies can be used to build on existing knowledge to develop new epistemologies or strengthen old ones" (Koehler and Mishra, 2009, p.66).

Mobile learning (m-learning): "language learning via mobile telephones and other means of wireless communication" (Richards and Schmidt, 2010, p.369).

Mobile Assisted Language Learning (MALL): "an approach to language learning that is assisted or enhanced through the use of a handheld mobile device." (Valarmathi, 2011, p.2).

Mobile Learning Tools (MLT): "mobile devices that help students make their individual learning easier" (Özer, 2017, p.9).

CHAPTER II

LITERATURE REVIEW

This chapter supplies detailed information regarding main concepts and theoretical background of the study. Then, the importance of technology for education, technological pedagogical content knowledge of teachers, mobile learning and conducted studies are explained in this chapter.

2.1. Technology and Education

Technology is an indispensable part of education in today's rapidly changing world. Education and the use of technology in education are two concepts that cannot be regarded as independent of each other (Simon, 1983; McCannon and Crews, 2000; Komis, Ergazakia, Zogzaa, 2007). Technology is a field that encompasses all the economic and social activities and organizations which envisage the realization of technical knowledge. Technology is defined as the application of innovations and scientific principles to the solution of problems and facilitation of life. Meanwhile, technology changes the relationship between disciplines and knowledge areas and influences the growth of knowledge (Goetsch, 1984, Middlehurst, 1999, Williams and Kingham, 2003). One of the most significant fields where technology is benefitted for the future of societies is training and education. Therefore, all societies, particularly the developed countries, are trying to improve the quality of education by using technology.

Important elements of education are the students, teachers, teaching-learning processes and teaching materials. The realization of the aims of teaching depends on the good organization of all these.

Educational technology, which ensures rich learning and teaching environments in terms of auditory and visual, has been applied in all areas of education. Educational technology has begun to take the place of programmatic learning and become an integral part of educational environments. This is a whole system that enables the use of the data, method and tools of different sciences in the broad areas of education for solving the problems of education, raising the qualifications and increasing the productivity (Rıza, 2000). As the number of senses and the level of experience increases, the level of learning also increases.

2.2. Technological Integration in Foreign Language Learning

Language teaching is firstly introduced to technology through Behavioral Psychology, which emerged in the first quarter of the 20th century. American Structuralism is considered to be a reflection of Behavioral Psychology in language teaching. The premises of Behaviorist theory, which was put forward by the American psychologist Watson (1878-1958) in 1913, restricted the perception and consciousness entirely to observable behavior such as mentalism, movement, speech, and secretion. Thus, a direct observable and measurable link between the organism and the stimuli resulting from its external environment could be established. Another American psychologist who came to this thought in the past was Skinner (1904-1990). After many experiments on animals, Skinner advocates a general learning theory of instrumental / operant conditioning. Contrary to classical learning theory based on the stimulus-reinforcement theory that Watson (1916) put forward, Skinner suggests that the "reinforcement" phase for permanent learning / teaching can only be achieved by rewarding the right responses (Skinner, 1968).

The integration of technological developments into language teaching has developed over the years. Firstly, foreign language laboratories have begun to be used. The invention of television in the 1920s and the opening up to the public, followed by the

widespread use of voice recorders and radios in parallel with television, also brings mobility to the field of educational sciences. One of the areas that are most interested in these innovations is that foreign language becomes the field of teaching. Linguists agree that these audiovisual materials will help students meet their linguistic needs (Aslan, 2011).

Especially in the language laboratories, the development of listening and speaking skills has become popular in a short time period because of the desired level of efficiency. In the 1970s, language laboratories were used in dozens of educational institutions, mainly in America, Canada and other European countries (Kartal, 2005). In the 1980s, video technologies seem to have been used extensively. Computer-aided training seems to be integrated into the language teaching since the 1990s when computers were widely used. Particularly with the common use of the internet, multimedia tools and internet supported program Technologies have been used in foreign language teaching (Aslan, 2011).

The developments that occur in the area of technology have been provided innumerable contributions to educational environments in all educational fields, especially in language teaching. This is because language teaching necessitates the technology more than other social areas, and as a natural consequence these technologies are widely used in foreign language learning (Kartal, 2005). There are several reasons underlying this increase. Technology can increase motivation, improve student-centered activities, reduce anxiety, and ensure authentic materials to students (Erben, Ban, Jin, Summers, and Eisenhower, 2013).

The technologies that have emerged have brought about changes in the educational process (Pavlik, 2015). These changes affect the teacher and the student as well as the teaching methods and techniques used. Therefore, teachers should have enough knowledge and skills to enrich their learning environments and learning processes with this change of wind. The contribution of technology to language teaching depends on the skills of teachers to be more effective in the learning process. In other words, the success of technology used in language teaching is based on the language teachers' capabilities in planning, designing and implementing effective educational activities (Warschauer and Meskill, 2000). Therefore, while trying to bring existing technologies to language classes at the high cost, it is unfortunately not possible to contribute to

foreign language education, no matter how advanced the technology is, in which teachers, especially foreign language teachers, cannot integrate these technologies into their goals, rather than only using these technologies. To be more precise, it is a futile effort to see technology as a remedy in language education, while teachers are not adequately equipped and qualified. Therefore, it is necessary to equip the technology with the skills that can be integrated into the lessons of technology in foreign language teachers. Because prospective teachers with technological skills tend to use these skills more in their own language classes (Moeller and Park, 2003).

There are many technologies that are used in foreign language education or have the potential to use. Many researchers have mentioned that the effective use of technology in educational environments can provide the contribution to the quality of education (Means, 1994; Jonassen and Reeves, 1996; Çağıltay, Çakıroğlu, Çağıltay and Çakıroğlu, 2001). Technology is not an absolute solution in language teaching, and may not bring success despite all the financial and diligence; but it can provide tools to contribute to language teaching when used correctly (Warschauer and Meskill, 2000). Foreign language teachers have the most important role in using these technologies in a way that is effective and successful in teaching and learning. At this point, it is very important for foreign language teachers to acquire this qualification in related departments in universities. In this context in the following part of this study, TPACK model that explains the integration of the technology, content and the pedagogy will be investigated both in generally and particularly for EFL teaching.

2.3. Technological Pedagogical Content Knowledge (TPACK)

The most significant need of society in today's world is to grow qualified human power. In the last years, many researchers have dealt with the question "What knowledge should a qualified teacher have?" because the training of qualified individuals is only possible in the educational environments prepared by qualified teachers. Educational researchers have attached importance to content knowledge for qualified teacher concept in teacher education until 1980 (Shulman, 1986). The best teacher was described as the one with the most content knowledge. However, in the 1980s, in addition to teachers' knowledge of the field, it was understood that pedagogical methods

and their use in the classroom had a positive effect on learning outcomes. Education researchers and reformists have the view that it is important for teachers to have both pedagogical knowledge and content knowledge for providing meaningful and lasting learning (Feiman-Nemser and Buchman, 1987).

As the new developments in technology become available in education, the understanding of teacher competence has been replaced with the understanding that combines technological, pedagogical and content knowledge. Shulman (1986) states that in the study of teachers' knowledge and skills, pedagogical knowledge is neglected, domain knowledge is foregrounded and content knowledge is focused. Teachers should aim to make effective teaching by combining the course content with appropriate methods, techniques, materials and tools.

The concept of "pedagogical content knowledge" (PCK) has emerged by combining the content knowledge (CK), one of the desired dimensions that teachers have to possess, with pedagogical knowledge (PK) by Shulman (1986). Koehler and Mishra (2005a) proposed "Technological Pedagogical Content Knowledge" (TPACK) by adding technology dimension to the concept of Shulman (1986). Through this concept, which elements of the TPACK should be formed in a teacher has been revealed (Mishra and Koehler, 2006). In Figure 1, the concept of TPACK asserted in Koehler and Mishra's (2009) work are outlined.

TPACK constitutes the intersection of the mentioned model. This interdisciplinary knowledge field is a combination of the knowledge scopes mentioned in the separate categories (Koehler and Mishra, 2005b).TPACK is a kind of knowledge that is above all the other three key components: technological knowledge (TK), pedagogical knowledge (PK) and content knowledge (CK). In this sense, TPACK not only expresses the intersections of pedagogy, technology and content knowledge with each other but also their interactions with each other (Mutluoğlu, 2012).

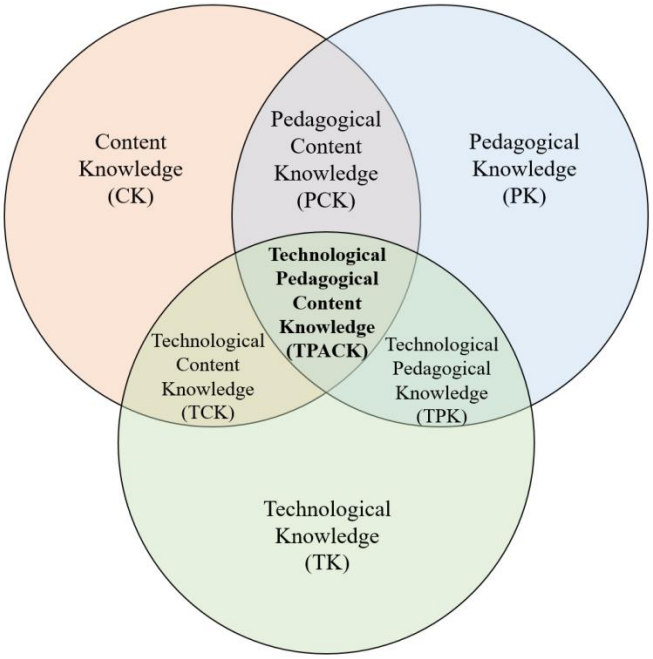

Figure 2.1. The Concept of TPACK (Koehler & Mishra, 2009)

With the onset of the information technology trends, models that increase technology support in the educational dimension have been developed. Computer-aided training is one of them. Computer-assisted instruction facilitates students to experience the contemporary educational environment, lesson-driven activities, non-economic experiments such as observation, experiments (Engin, Tösten and Kaya, 2010). Computer-assisted instruction also includes teaching methods and techniques such as simulation programs, web-based instruction, practice and application methods, educational content, instructional tests, and self-teaching programs. In order to be able to use these methods and techniques, it must be known how to relate to specific technology and learning environment. TPACK is seen as an important competence that teachers should have at these points.

A teacher with TPACK is the person who knows how to use educational technologies in teaching, how to fix the misconceptions that the students will live with and how to solve possible problems with specific technologies and how to organize the educational environment according to technology (Atasoy, Uzun and Aygün, 2015). The fact that teachers have these qualifications and that they can use this knowledge in the teaching and learning process has contributed to the learning process of the students positively. In this regard, TPACK is a kind of information that facilitates learning specific topic-

specific activities through topic-specific tools and presentations (Cox and Graham, 2009).

2.3.1. Content Knowledge

As the first component of TPACK, Content knowledge (CK) is explained in this part of the study. CK is the body of knowledge which covers the targeted subject matter and is determined in the teaching process (Koehler and Mishra, 2008). Shulman (1986) defined this kind of knowledge as concepts and theories, ideas, knowledge of theoretical frameworks, pieces of evidence, as well as existing applications and approaches to developing this knowledge which varies according to each course.

Content knowledge is the subjects that are to be taught, for instance in the field of science, scientific facts and theories, scientific methods and methods based on evidence are in the field of the content knowledge. The lack of comprehensive content knowledge in teachers is a very restrictive and negative situation, as learners will learn misinformation and create misconceptions (Koehler and Mishra, 2008). Teachers should have the understanding of the philosophy of the subjects that they will teach (Harris, Mishra and Koehler, 2009). According to Pamuk, Ülken and Dilek (2012), content knowledge is more than just knowledge of subject-related formulas, relics, concepts, or definitions, therefore teachers must have comprehensive knowledge about their respective fields. As Shulman (1987) stated, since teachers are the primary resource for learners, they have special responsibilities in terms of content knowledge.

2.3.2. Pedagogical Knowledge

Pedagogy is described as in-depth knowledge of teachers about knowledge, practices, processes or learning and teaching methods. Pedagogical knowledge (PK) covers all of educational objectives and values. This knowledge is about how learners learn general classroom management skills, student evaluations and lesson plans (Koehler and Mishra, 2009). Pedagogical knowledge indicates the knowledge and skills covered by the teaching profession and it includes knowledge of planning, conducting and evaluating and deals with teaching in accordance with learning profiles of learners (Koehler and Mishra, 2005b). Pedagogical knowledge, which is also related to what,

where, how, when, and how much teachers teach, is of great importance to the effective learning of students. Teachers need to know their students and choose appropriate methods and strategies according to their characteristics and plan teaching-learning processes in this direction. Avcı (2014) emphasized that pedagogical knowledge is an important type of knowledge in the acquisition of target behaviors, and stated that teachers need good pedagogical knowledge in order to transfer their content knowledge.

2.3.3. Technological Knowledge

The third component of TPACK concept is technological knowledge. Technological knowledge (TK) includes the use of information and communication technologies, called digital technologies (Yurdakul, 2013). With each passing year, technology is developing rapidly, making it difficult to make a clear definition of technological knowledge. With the constant change in nature, the knowledge of technology is constantly changing within itself. In this regard, Mutluoğlu (2012) emphasized that the information about technological software tools can be out of date rapidly even in today's information age which is rapidly and constantly renewed and even cannot be used, and therefore teachers should be renewed in terms of technological knowledge over time.

2.3.4. Technological Content Knowledge

Technological content knowledge (TCK) is a type of information which is developed in relation to technology and content, and influenced by each other in a mutual way of technology and content field. In other words, it is information about the ability of a teacher to know and analyze technologies in any subject field (Mishra and Koehler, 2006; Koehler, Mishra and Yahya, 2007). Teachers should be able to shape the subject field according to the practices of the technology as well as the subject field they should teach (Mishra and Koehler, 2006). Two sub-dimensions of the TCK are presented below (Graham et al., 2009);

i. Knowledge about the technologies that scientists use to collect, record in the research process related to a specific topic (global warming, acid rain and depletion of the ozone layer).

ii. Knowledge about the technology that scientists use in analyzing, visualizing and presenting the data they collect about a specific topic as mentioned above.

2.3.5. Pedagogical Content Knowledge

Integrating pedagogical knowledge with content knowledge is an essential competency for a teacher. Shulman (1987) stated that one of the types of knowledge that a teacher should have is Pedagogical Content Knowledge (PCK) in his model, which he defines as "knowledge-base for teaching". In many types of research, it is emphasized that PCK, which is among the types of knowledge teachers should have, is as significant as knowledge of the field and vocational knowledge (Shulman, 1987; Van Driel, De Jong, and Verloop, 2002; Boz, 2004). The items that constitute the pedagogical content knowledge are instructional strategies and activities related to the subject field and information about the learning difficulties of the students (Shulman, 1987). In addition to knowing the content knowledge and pedagogical knowledge taught by a teacher, pedagogical content knowledge, which is a mixture of field pedagogy and content knowledge, must also be known by a teacher (Shulman, 1987). According to Shulman (1986), in order to train a more qualified teacher, content knowledge and pedagogical knowledge in teacher training programs should be treated as items that need to be integrated rather than competing with each other. In this sense, pedagogical knowledge can be regarded as the most important factor that distinguishes a teacher from a scientist. For example, a scientist constructs the same knowledge from the perspective of a researcher, in order to construct a new knowledge in the course of research, while an experienced science teacher constructs a content knowledge in an instructional way to support students understand their science concepts (Cochran et al., 1993).

Shulman (1987) defined PCK as "a special mix of subject matter and pedagogy, and only teacher-specific" knowledge. Accordingly, PCK includes knowledge of teachers on a specific subject field and knowledge of teaching strategies related to students' learning (Van Driel et al., 2002). PCK is defined as "the transformation of much different knowledge for teaching" (Magnusson et al., 1999). These types of knowledge include knowledge of subject fields to be taught, pedagogical knowledge (learning difficulties of learners, instructional strategy, methods and activities, program and evaluation knowledge), and learning environment knowledge (school and student). Shulman

(1986-1987) stated that the PCK, or the knowledge of the teacher, constituted seven categories. These 7 categories can be sorted as follows:

i. General pedagogical knowledge,
ii. Private content knowledge,
iii. Program knowledge,
iv. Knowledge of learning difficulties and characteristics of students,
v. Educational objectives, values and historical, philosophical foundations of education,
vi. Learning environment knowledge,
vii. Pedagogical content knowledge.

2.3.6. Technological Pedagogical Knowledge

Teachers should develop themselves continuously. Pedagogical knowledge of them should be integrated with technology in order to catch developments and trends in education. Technological pedagogical knowledge (TPK) is knowledge about the use of specific technologies in the teaching process and how teaching and learning change (Harris et al., 2009). It is a knowledge of how a teacher can use his / her technological knowledge in a pedagogically meaningful manner in classroom practices and how he/she can evaluate the result of these practices (Çoklar, Kılıçer and Odabaşı, 2007; Mishra and Koehler, 2006).

Teachers should be able to analyze, plan and evaluate these technologies so that they can use any kind of technology in the classroom environment (Mishra, Koehler and Yahya, 2007). In addition, Mishra and Koehler (2006) state that by means of this knowledge, teachers apply the material used in the teaching-learning process according to each student group. It is a knowledge how the learning and teaching change when technologies are used. This knowledge area depends on the creativity of the teacher. For example, Microsoft programs (Word, Excell) are designed for the business environment. However, teachers should use them in their class by reshaping them for pedagogical purposes. This is the type of knowledge that needs teachers to be open-minded, creative and visionary so that the teacher can integrate technology into the lecture. For example, while using the smart board in teaching is TPK, using traditional blackboard is considered to be PK (Cox, 2008). It is the type of knowledge that the

teacher uses to integrate and use special pedagogical strategies and techniques while teaching. For example, teachers can evaluate their students using appropriate computer programs and electronic portfolios (Mishra and Koehler, 2006; Çoklar, Kılıçer and Odabaşı, 2007). According to the literature survey, the two sub-dimensions of the TPACK are given below (Graham et al., 2009):

i. Knowledge of learning environment enriched by technology,
ii. Knowledge of building evaluation environment enriched by technology.

2.3.7. Technological Pedagogical Content Knowledge

TPACK is different from the pedagogical content knowledge, technological pedagogical knowledge and technological content knowledge. TPACK consists of the intersection of the content knowledge, pedagogical knowledge and technological knowledge. At the same time, TPACK is a kind of knowledge that emerges from content, pedagogy and technology, and replaces this knowledge. In other words, TPACK is different from technology, pedagogy and content knowledge but is not independent of them (Harris et al., 2009).

TPACK is the knowledge of the advantages of developing technological tools and how these tools should be actively used by both learners and teachers at every stage of learning and teaching (Çoklar, Kılıçer and Odabaşı, 2007). A teacher who has sufficient technologically pedagogical content knowledge should use his/her knowledge and experience of technology in strategy, method, technique and evaluation stages of the lecture, and also need to know what kind of technology to use in the classroom environment. Kohler and Mishra (2008) state that TPACK components have interaction with each other. While the TPACK was created, its components determined in the direction of Magnusson et al. (1999)'s PCK model. In this regard, TPACK consists of knowledge written below:

i. The purpose knowledge of teaching science topics with technology,
ii. The curriculum knowledge by which technology is integrated to science topics, and the material knowledge of curriculum,
iii. Knowledge of the technology used to determine the parts of learning disability (e.g. partial understanding, misconceptions, etc.),

iv. Knowledge of technology-supported strategy and methodology used in teaching science subjects,
v. Knowledge of technology-based evaluation used to assess students' understanding of science issues.

2.4. TPACK and EFL Teachers

Technological Pedagogical Content Knowledge in English language teaching and challenges of English teachers regarding TPACK are presented in the following sections.

2.4.1. TPACK and English Language Teaching

Teaching English as a foreign language (EFL) means teaching English non-native English language learners in a speaking environment. For instance, when Turkish students are learning English in Turkey, these students can be regarded as EFL learners.

In today's technology world, it seems that the demand to integrate technology into EFL teaching is more than ever. This demand is influenced by the presence of unlimited internet resources such as online English live news broadcast sites, chatting and speaking on the social media with native speakers and watching English movies etc. Harris and Hofer (2010) argue that digitalization causes technology to occupy everywhere. For EFL teachers, using this technology or not using it is not question anymore, it is a must to use technology. Instead of this question, teachers should discuss how well they can benefit from this technology to improve their EFL capabilities. Unless these teachers comply with the latest modern educational technology, they will absolutely fail to be an effective teacher (Mishra, Koehler and Kereluik, 2009).

On the other hand, rapid development in the internet technology has pushed EFL teachers to develop themselves in terms of the application of this technology. Particularly, in an environment where EFL teaching is carried out for non-English learners, integration of technology into the classroom becomes decisive for the effectiveness of learning and teaching (Chapelle, 2009). With economic globalization, this integration has become more important for students in order to learn English as a

foreign language to achieve pragmatic purposes such as career development (Liu and Wang, 2009).

As the integration of the technology into the classroom environment is a necessity, EFL teachers also must integrate the technology with their professional knowledge). In other words, as Koehler and Mishra (2008) emphasized in the general approach, integration of technological knowledge (TK) to the PCK is also of great importance for EFL teachers, due to the fact that there are unbounded technological resources for English learners. Apart from the other subjects, learning English is very important to facilitate other work and studies, hence listening and speaking skills are integral parts of English competence. To improve these abilities of the students, only English lexical and linguistic knowledge may not be enough; therefore the teacher needs to use additional tools and methods. They need to create a natural environment where students can experience and practice authentic English. Such an environment can be created by using technological audio and visual tools (Liu, Liu, Yu, Li and Wen 2014).

The second component of TPACK is technological content knowledge (TCK) as explained in the previous section of this study. The English language itself is the content knowledge in the EFL teaching. When EFL teachers integrate technological knowledge into their content knowledge, they can have a "deep understanding of the manner in which the subject matter can be changed by the application of technology" (Koehler & Mishra, 2008). This means that these teachers have the capability to select, edit, apply and integrate specific technology which best fits the lecture content to be taught. In other words, teachers with high TCK have the ability to decide which content to teach according to which technology is available and accessible. For instance, in China students are learning English with the help of the online video resources such as TED (technology, entertainment, design). In these lectures, students discuss the content and assert their ideas in order to improve their listening and speaking skills (Meng and Bo, 2014).

When the TPK component of the TPACK is evaluated in terms of EFL teaching, it can be stated that integration of the technology into teacher's pedagogical knowledge depends on teacher's approach and understanding of how technology can be benefitted in their lectures. Mishra et al. (2009) suggested that TPK is related with how teachers use “a range of instruments for a specific task, the ability to select a tool based on its

fitness, strategies for using the tool's affordances, and knowledge of pedagogical strategies and the ability to apply" (p.65).

2.4.2. EFL Teacher's Challenges Related to TPACK

In today's digital World, since technology is omnipresent, a teacher who is a stranger to using a computer can hardly carry out the teaching process without benefitting a technology. Therefore it is the necessity for teachers to integrate technology into the lectures and teachers have to learn technology and apply it in their lectures (Mishra et al., 2009). Mishra and Koehler (2006) stated that there is not only a single technological method which is suitable for every teacher, every lecture, or every way of teaching. Apart from conventional approaches, a strong TPACK requires EFL teachers to widen their content knowledge to different levels of teaching such as curriculum planning, curriculum implementation, and curriculum evaluation processes (Coppola, 2004).

Another challenging issue for EFL teachers is how to merge and balance the new and the old technology. There must be a successful change that gives the intended results, on the other hand, an ineffective change may have negative results. For instance, Liu (2011) carried out research on 36 EFL teachers at the university level in the 5 Chinese universities. The researcher conducted the survey on the students who got English lectures and practiced speaking and listening at the computer lab. According to the results of the study, it was observed that students' monologue in front of a computer replaced the interaction between students and teacher or among students. This situation resulted in the poor learning process by which students learned nothing substantial. Therefore, it can be concluded that the nature of the change should be regarded in order to balance old and new and provide successful technological integration.

The willingness of EFL teachers plays an important role in successful integration of the technology; this willingness emerges from the belief that the technology notably contributes to the students in learning English. On the other hand, due to the fact that it takes time to observe the outcome and the effect of the change on students, to convince teachers about the contributions of change in their students' learning process is not so easy (Liu et al., 2014). Zhao et al. (2002) expressed a caution about the change which is very hard to adapt to existing methods, due to the fact that it has very little possibility

for lecturers to comply with new technologies if it is too far from the existing teaching methods. Today many teachers have a fear of using internet technologies, because of the fact that they find themselves behind their students in terms of this technology when they see their students playing online games and using different internet technologies. Although these teachers try to introduce new technology to their students, in an unfriendly environment, it is possible for them to feel hesitated (Thurlow, 2006).

In conclusion, learners of the technology age who are described by Bennett, Maton and Kervin (2008) as “digital natives” are very close to the digital technologies. Therefore, it is challenging for the teachers to compete with their students while using technology in classes.

2.5. Mobile Learning

When the relevant literature is searched, it can be said that there is no common definition and various definitions of mobile learning are available that the researchers revealed. Harris (2001) defines mobile learning as the intersection of e-learning and mobile computing to produce learning experiences that are everywhere at all times. Traxler (2007) describes mobile learning as the training process in which the handheld computer and the palm computer are used. According to Keegan (2005), mobile learning can be accomplished by means of devices that are small enough for women to fit into handbags and men to fit in shirts or trousers pockets and carry around everywhere. As can be understood from these definitions, the rapid development of mobile technologies influenced the concept of portability in the definitions and as a result, the definitions differed. Mobile learning in general can be defined as learning through mobile technology, which can increase access to training content without being bound to any place, to benefit from dynamically generated services and to communicate with others, to increase productivity and work performance efficiency by responding to individual needs instantly (O'Malley et al., 2003; Kukulska-Hulme and Traxler, 2007).

With the rapid development of mobile devices and digital technologies, today, it can be said that mobile learning applications have become widespread. Studies in the field of mobile learning first started in the early 2000s. After this date, the use of effective

mobile tools and technologies in education have increased in many countries especially Turkey, Korea, India, Nigeria, Thailand and Japan, and mobile learning has been shown as an educational technology of the future (Çelik, 2013). Although mobile learning has been widespread in the 2000s, the historical development of this phenomenon is based on the concept of a device that has the name “Dynabook”, created in 1972 with the motto "personal computer for all children" (Kukulska-Hulme et al., 2009). In the 1980s, the first mobile learning applications on Microwriter (Psion Computer) handheld devices were used in schools, and in the 1990s mobile learning research projects for personal digital assistants (PDAs) and tablets began to gain interest. The most important development in the recognition of mobile learning has been the MOBILearn project, which was adopted by the European Commission between 2001 and 2003, and academic studies in mobile learning (Casey, 2009). With the widespread use of tablet devices such as smart phones and iPads after 2010, the use of mobile devices for learning has become more common and the concept of mobile learning has taken its place.

There are four basic structures in mobile learning definitions made in recent years. These definitions are the pedagogy, technology, context and social interaction. Crompton (2013) has defined mobile learning as pedagogy, technology, context, and social interaction, using personal electronic devices, learning through content and social interactions in various contexts. By developing the definition of Sharples (2007), Crompton (2013) defined mobile learning as learning that takes place in various contexts through the use of personal electronic devices, content and social interactions over these four basic structures. The use of mobile learning environments in Internet-based distance education offers learners the opportunity to learn without being dependent on time and place, on demand and place (Oran and Karadeniz, 2007). When mobile learning is considered in terms of time and space flexibility, mobile learning has become forefront according to the traditional learning, distance learning, e-learning as seen in Figure 1.2 (Akour, 2009). Wang, Wu and Wang (2009) explained mobile learning together with wireless communication technologies and mobile devices and defined the term mobile learning as the realization of learning anywhere anytime via the use of mobile devices including PDAs, tablets, smart phones and audio players, and wireless internet. O'Malley et al. (2003) emphasized that mobile learning can be

effective when learners are not at a fixed pre-determined location and learners benefit from learning opportunities offered by mobile technologies.

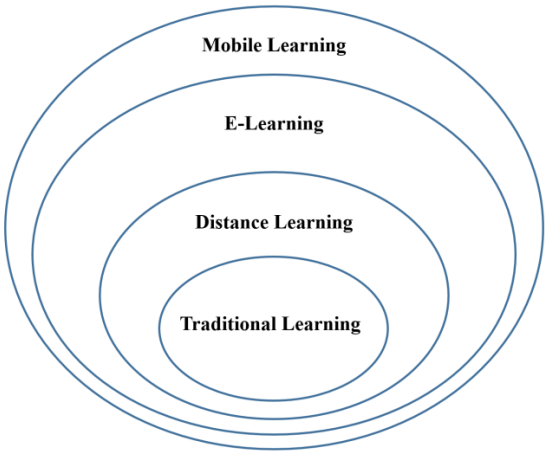

Figure 2.2. Learning Paradigms Based on Time and Space Flexibility

Source: Akour, 2009 p.26.

In the scope of the Movement of Enhancing Opportunities and Improving Technology (FATIH), internet opportunities in the schools have been increased and 700 thousands of tablets have been supplied to teachers and students till 22nd May, 2015. It has been added that 10.600.000 tablets are planned to be provided till 2019 (FATİH Projesi, 2016). Educational Informatics Network (EBA) and Dynamic Education (DynED) platforms have been good examples of Turkey's big steps to enhance technology ad mobile learning in education. EBA is an online social educational program and it enables students and teacher to access data at anywhere and anytime. "The purpose of the platform is to enable the integration of technology into education by using information technology tools and supporting efficient use of material. EBA has been created to offer suitable, reliable and right content and is still being developed." (EBA, 2016). DynEd is English language learning software that can be downloaded and that can be used online or offline. As a result of the agreement between Ministry of Education (MEB) and Sanko Company, DynEd has been used in Turkey since 2006-2007 Educational Year (Baş, 2010). Such implementations show that mobile learning has a future in Turkey.

2.6. Mobile Assisted Language Learning (M-learning in EFL Context)

The effects of technology on learning become more and more important with each passing day, and therefore teachers have to think about how to use technology and technological tools in class and what strategies to use when using these technological tools and software (Sardone and Devlin-Scherer, 2009). The use of technology for foreign language teaching has also become an increasingly important factor. The role of technology as a source of learning for foreign language learners is to enhance the ability of educators to build collaborative and independent learning environments where learners will be successful and new language practice (Butler-Pascoe and Ellen, 1997).

The use of these mobile learning tools for EFL has become inevitable because it provides educational opportunities everywhere and every time. The reasons for using technology in foreign language teaching can be listed as follows (Cangil, 1999);

i. Due to their generation, almost every young student is technology literate, and they are accustomed to using computers and other technological devices and watching videos.
ii. Visual effects, graphics, sounds used in technology can be fun even the most tedious work.
iii. Students have different learning styles. Teachers benefit technology to reach all students in various methods and to train in the direction of multiple intelligence theories.
iv. Working with foreign languages with the help of technology helps students become practical and meaningful in their lives.
v. The students' ability to communicate with people in foreign countries by using the internet and technology possibilities is an enhancement of technology's language education.
vi. Technology provides several dimensions to foreign language learning through the multimedia applications.
vii. Technology allows students to participate worldwide in activities such as interpersonal change, problem-solving, information gathering.
viii. In foreign language lessons, teachers can benefit from computer software to improve hearing-understanding and reading-writing skills.

ix. Students who use computer-aided learning materials continue their studies longer and students learn faster.

2.7. Advantages and Disadvantages of m-learning

The mobile learning method has both disadvantages and advantages. The advantages and disadvantages of mobile learning in the literature have been explored in different ways by some researchers.

Attewell (2005) lists the benefits of mobile learning as follows:

i. It helps students improve their reading, writing and numerical skills.
ii. It helps learners become aware of their existing skills.
iii. It can be used for collaborative and independent learning environments.
iv. It helps in determining where students need help and support.
v. It helps to overcome the problem of the digital divide.
vi. It provides informal learning.
vii. It helps the students to focus on the course longer.
viii. It helps to improve self-esteem and self-confidence.

The advantages of using mobile devices in teaching can be listed in terms of mobile learning (López, Royo, Laborda and Calvo, 2009: 2674) as follows:

i. ***Easy access:*** Provides up-to-date and free access to information. Access to learning environments can be provided almost anywhere.
ii. ***Self-study options:*** M-learning flexibility allows you to work anytime and anywhere. It is more convenient than using a desktop computer or even a laptop computer.
iii. ***Evaluation and Feedback:*** M-learning tools may include some assessment tools instead of controlling the learning process. It is possible to measure what the learner learned during the course.
iv. ***Access to various online materials:*** The M-learning system provides a constant interaction between students and teachers. Materials that are useful for student exams can be accessed from online sources.

The disadvantages that mobile learners bring with can be listed as follows (Yousuf, 2007):

i. There is a lack of personal communication and a lack of immediate teacher feedback that some students prefer.
ii. The difficulty of meeting the pre-course orientation requirement for helping to manage the lessons is problematic.
iii. Meeting the need for teacher support sessions during coursework is a big problem.

2.8. Mobile Learning Tools

Mobile learning tools can be classified as servers, mobile phones, PDAs, tablet computers, laptop computers, and Internet-based mobile learning tools. The features of the mentioned tools are explained below (Oran and Karadeniz, 2007).

i. ***Servers:*** These consist of a database server, a web server, an SMS server, and an e-mail server. Servers are the most important tools for sharing data in the realization of mobile learning.
ii. ***Mobile Phones:*** Nowadays internet connection compatible mobile phones are easily available at very affordable prices. These phones could cause disruptions in learning the screen size, memory status and connection speed in the past, but today these problems have been overcome with the use of smart mobile phones with huge screen size and adequate memory and connection capabilities.
iii. ***PDAs:*** Today's mobile computers are technologically close to personal computers and can do a lot of the work they do. Pocket PCs have a larger screen size than mobile phones, which is seen as an advantage for mobile learning. However, the models that cannot be used as mobile phones are no longer preferred but they prefer smart phones instead of PDAs. Smart phones, which have become more popular in recent times and are more affordable than their predecessors, are no different from personal computers in terms of features except for screen size. In

particular, the Android and IOS operating systems today bring the features of smart phones to the extreme.

iv. ***Tablet PCs:*** They are heavier than Pocket PCs, but they are more useful than pocket PCs when screen sizes are considered and they are lighter than laptop PCs. In addition, with the help of the Android and IOS technology, it can meet all the requests of the user.

v. ***Laptops:*** Nowadays, the usage rates of laptop computers are higher than those of desktop computers. Laptops provide access to independent information through wireless connections. However, when considering that mobile learning should be possible at all times and everywhere, the weight of the laptop computers is one of the limitations of mobile learning.

2.9. Mobile Learning Tools Acceptance

Technological developments not only bring new technological tools in education but also affect teaching and learning styles. According to Hu & McGrath (2011), changes in learning styles lead to the need to use teachers' in-class practices as well as occupational and educational knowledge. Foreign language teaching places different responsibilities on teacher and teacher candidates in an environment where learners do not have smart phones in their hands. It is important that teachers not only use mobile learning tools effectively but also how much they accept mobile tools. Acceptance of technology points to the adoption and use of a technology by a user while performing tasks (Teo, 2010). Technology acceptance has become a field of research in both technology systems and in business disciplines since the 1970s, (Legris, Ingham & Collerette, 2003). However, in the following years, technology acceptance has become a fundamental concern in some areas other than business and computing. Particularly, in the area of education in the 2000s, research on the technology acceptance has gained speed (Teo, 2014). Within the scope of these researches, various models and theories such as causal behavior theory and technology acceptance model which deal with the behavior of accepting and using technology by way of the attitudes and intentions of individuals towards using technology have been developed (Menzi, Önal & Çalışkan, 2012).

Looking at scale developments abroad, it is seen that Hung et al. (2010) created a five-dimensional measurement tool for university students. These dimensions can be defined as follows; self-regulated learning, internet/computer self-efficacy, the motivation for learning, learning control and online communication self-efficacy. According to the results, students' readiness levels, the motivation for learning, internet/computer self-efficacy, and online communication self-efficacy were found high. It is also observed that Teo (2010) formed a technology adoption scale for candidate teachers and this scale can be generalized to both graduate and still-learning teachers. Pynoo et al. (2011) conducted a 21-item Likert-type scale development study on secondary school teachers' acceptance of digital learning environments.

When it is investigated the related studies about technology acceptance in Turkey, it is seen that Demir and Akpınar (2016) developed an attitude scale for mobile learning. A scale with four sub-dimensions and five Likert types were implemented on students from different departments attending educational faculties. Subscales that appear in the scale are satisfaction, learning effect, motivation and usability. Another scale development work was domestically carried out by Uzunboylu and Özdamlı (2011). They did a scale development study on teacher perceptions for m-learning and found that teachers showed m-learning-related perceptions on m-learning. Nevertheless, these scales do not focus on mobile learning tools acceptance. Such a scale was developed by Özer and Kılıç (2017) to understand high school EFL learners mobile learning tools acceptance.

2.10. Studies in the Field

In this part, studies on TPACK and studies on mobile learning are examined. Both studies abroad and studies in Turkey are included. Survey and scale development studies, adaptation studies, meta-analysis studies, quantitative and qualitative studies are mentioned.

2.10.1. Studies on TPACK

Koehler and Mishra (2005) attempted to determine teachers' TPACK development with a questionnaire that they applied at different times during a period. In another study, Koehler and Mishra (2006) used a questionnaire consisting of 35 items (33 Likert questions and 2 short answer questions) to assess TPAB development of teachers. In particular, it was emphasized that teacher and teacher candidates should possess the technological knowledge and should use this knowledge in a harmonious manner in the classroom environment.

Archambault and Crippen (2009) carried out a survey of 596 teachers in different states of the US and examined the relationships of 7 dimensions of TPACK. As a result of this study authors found that pedagogical content knowledge, pedagogical knowledge and content knowledge scores were the highest, while teachers were observed very confident in these areas, but they were found less confident when combined with technology. According to this study, there is a low correlation between pedagogy and technology, technology and content, a high correlation between pedagogy and content.

Hervey (2011) used both quantitative and qualitative research methods in a doctoral dissertation on vocational aspects of senior teachers' TPACK practices. At the quantitative stage, a questionnaire called "Teaching and Technology Information of Teachers" was developed and validity and reliability studies were conducted and the quantitative research method was applied by the author. In the qualitative stage, two proposals have been made with the results of the observations made at the end of TPACK qualification training in practice by middle school teachers who are the vocational senior. First, the need for training should be addressed as to how teachers will use the technologies that will enhance their learning. Secondly, opportunities should be provided for the vocational development of teachers in schools. It was suggested that teachers should continuously improve themselves according to new technologies by benefiting from these development opportunities at the end of each semester in order to develop TPACK competencies.

There have been some scale development or adaptation studies. The study of Schmidt et al. (2009) explains the questionnaire development process, carried out with 124 teacher candidates and the results of this process. The questionnaire used in this study was

designed to collect data on the self-evaluations of the teachers' candidates by using the “Survey of Preservice Teachers’ Knowledge of Teaching and Technology".

Kaya et al. (2013) adapted Turkish version of the " Teaching and Technology Knowledge of the Prospective Teacher " scale, which is used to identify the TPACK level of the teacher candidates, and tested the validation and the reliability of the scale in order to investigate the usability of the scale in Turkey. A total of 407 prospective teachers (227 female and 180 male) in the last class of the Faculty of Education Classroom Teaching Programs of four different universities participated in the study. In conclusion, the authors found that the scale is not suitable for academic studies related to TPACK level of teacher candidates in Turkey.

Timur (2011) studied the development of TPACK of science teachers' candidates. 30 science teachers who are studying in the last grade have participated in the study. The TPACK self-confidence scale created by Graham et al. (2009) was adapted and applied to Turkish by the author. According to the results of the study; technology-assisted teaching helps TPACK self-efficacy and self-confidence beliefs of prospective science teachers, in using a computer for science teaching. In the study, it was also stated that technology-assisted instruction helped teacher candidates to develop purpose knowledge, curriculum knowledge and curriculum material knowledge, teaching strategies knowledge and evaluation knowledge which are the subcomponents of TPACK.

Aydın-Günbatar et al. (2017) tried to validate the factor structure of Technological Pedagogical Content Knowledge-Self Efficacy (TPACK-SE) and determine the interaction between the components of TPACK in their studies. In this context, they formed a structural equation model (SEM) in the direction of TPACK- SE literature and tested the model with LISREL 8.8. They conducted a survey of participants consist of 665 senior elementary pre-service science teachers, consist of 198 Males and 467 Females, from 7 different colleges in Turkey. As a result of the study, the authors found that there a high level of relation (R^2=0.87) between the CK, PK, TK, PCK, TCK and TPK.

Akyüz et al. (2014) carried out studies on the effects of micro-teaching practices centering on smart boards on the perceptions of science teacher candidates in terms of

their TPACK level. In this concept, 48 science teacher candidates in the final grade of the faculty attended the survey. TPACK self-confidence scale adapted to Turkish by Timur and Taşar (2011) and Student Perception Scale for Intelligent Wood Use developed by Türel (2011) were used in the data collection tool. According to the results, it has been seen that the use of smart board generally has a positive effect on the TPACK's self- confidence, while it does not have a negative or positive effect on the perceptions towards the smart board. Besides, in the view of student perceptions of the participants towards smart boards was found positive, and did not change after the experimental process.

Kurt (2011) has made a study based on the Learning Approach with the Technological Design and TPACK. 22 Turkish EFL teacher candidates participated in this study in order to investigate the development of TPACK level of these participants. Implementations lasted for 12 weeks. At the beginning and the end of the study of "Teaching and Technology Knowledge of Teacher Candidates" survey developed by Schmidt et al. (2009) was applied to participants. According to the results, it was observed that the TPACK levels of teacher candidates developed significantly after the study. In addition, it is stated that candidates reflect their TPACK to the presentations and the lessons they give.

Cahyono et al. (2016) examined the effect of TPACK-oriented teaching practice course on Indonesian EFL teachers in advancing the level of their EFL instructional teaching and designs practices. 20 secondary school teachers who were following the Teaching Practice course in their post-graduate degree participated in the research. These participants took a 16-session course that included TPACK and were given the assignment to make teaching designs based on TPACK framework. At the end of this course, participants filled a questionnaire that tries to reveal the benefit of the course in developing the level of their EFL teaching practices and EFL instructional designs. The authors concluded that participants got lots of benefits from the TPACK-oriented teaching practice course, and teachers could prepare instructional designs and perform TPACK oriented teaching practices successfully.

Shin et al. (2009) studied the developments in the TPACK perceptions of the teacher candidates as a result of the online and face-to-face training. 23 prospective teachers participated to survey and the study was conducted by a single group pretest-posttest

experimental method. As a result of analyzes, carried out, the authors found that the prospective teachers understood better the structure of TPACK.

Liu et al. (2014) focused on TPACK of EFL teachers and the significance of TPACK in EFL teaching. The authors focused on four points related to EFL teachers' challenges in developing TPACK. The challenging points determined as the relationship between old and new knowledge, integration of technology into present knowledge system, teachers' weaker position according to students in using new technology and teachers' willingness to adopt new technology. The authors concluded that the development of TPACK for EFL teachers has a connection of the formal knowledge and the practical knowledge in using technology.

Shinas et al. (2013) applied the TPACK questionnaire developed by the Schmidt et al. (2009) to 365 prospective teachers in order to better explain the structure of TPACK. The authors have organized a 15-week training course to introduce technological tools (tutorial preparation, interactive applications, internet and web 2.0 tools) which teachers can use in their teaching. As a result of the analyzes carried out, participants stated that they did not always understand the TPACK components, that there was harmony between content knowledge and technological knowledge, but that this compatibility was not among the other components and that participants could not distinguish between pedagogical field and pedagogical knowledge.

Abbitt (2011) conducted a 16-week course for a group of 45 teacher candidates in a study of teacher candidates' self-efficacy beliefs about technology integration and TPACK and investigated how the relationship between self-efficacy belief and TPACK could change over time. It was determined that there is a significant and positive correlation between the self-efficacy perception of technology integration and various known types in the TPACK model in the single group, pre-test-post-test and correlation analysis. In the multiple regression analysis of pretest-posttest data, it is stated that the estimated correlation between TPACK and self-efficacy perception varies over time. Findings show the changing nature of the complex relationship between self-efficacy belief and knowledge and emphasize the influence of teacher candidates' perceptions of technology integration on TPACK potential areas

Young (2016) aimed to determine the effectiveness of technology in the mathematics lectures using meta-analysis method. After the election of the studies, the author reduced the pool of study from 65 to 13. The author reviewed every study and coded them into 4 groups; (1) sample, (2) measurement, (3) design, and (4) source. The author used the TPACK framework to interpret the most salient moderators of effects across studies. He categorized the studies by technology type and didactical functionality. As a result of the study, the author suggested that the effects of technology vary by didactical functionality from small to medium. For the didactical function of developing conceptual understanding, it was observed that there were the largest variations.

Chai et al. (2013) sought to conduct a meta-analysis on TPACK by conducting a literature search. In the study, 74 articles that examined technology integration in the framework of TPACK, which published between 2003 and 2011 were scanned. The articles to be included in the study were selected from the Web of Science and Scopus databases. A significant part of the work was done in North America, on the other hand from Turkey only 4 studies were involved in the investigation. It has been concluded that qualitative, quantitative and mixed research approaches have been adopted, and studies have been conducted mostly in the field of instructional technology, and results have generally been obtained in which constructivist philosophy is adopted.

Voogt et al. (2013) suggested that TPACK is a complex concept, in a study that examined 56 studies published between 2005 and 2011 in a systematic literature review. Authors have observed that the main strategy for increasing the TPACK development of students and teachers is the technology-supported lessons and course designs in which teachers and students actively participate in the process. As a result of the study, it has been concluded that even though teachers have experience of technology, they are not able to exhibit it.

Tuncer and Dikmen (2018) aimed to examine the effect of gender on TPACK through meta-analysis. In order to choose researches for the data set, a specific set of criteria has been used. According to those criteria, the authors decided to use 6 meta-analyses of thesis work. As a result of the study, the effect sizes for the six studies were determined by authors at 95% confidence interval. The effect of gender on technological pedagogical field information according to the meta-analysis diagram is the fixed-effect

model (.058), random effect model (.064). In conclusion, the authors stated that gender was not a dominant independent variable in terms of TPACK competencies.

Kaleli-Yılmaz (2015) aimed to study on TPACK in Turkey with analyzing metadata using the synthesis in order to demonstrate the trend in this field. A total of 59 academic research consist of 37 articles, 15 theses and 7 papers selected by purposeful sampling method which was published between 2008 and 2014 were analyzed. In the study, it was seen that a small number of studies focused on a specific subject area, where a significant part of the work was done to examine scale development/adaptation, TPACK competence and development. It has been observed that the data collection tools such as questionnaire/scale and most of the screening methods were used in the studies. The author concluded that the courses in the education faculties have to be updated according to the TPACK and teacher or teacher candidates must be trained with the help of course or in-service training programs.

2.10.2. Studies on Mobile Learning

Lin et al. (2016) tried to develop and validate a mobile learning readiness (MLR) scale that can be benefitted in order to evaluate individuals' readiness to embrace m-learning systems. They conceptualized the construct of MLR and generate an initial 55-item MLR scale-based on previous works. In this context, a total of 319 participants responded to the survey. They conducted an empirical validation of the MLR construct and its underlying dimensionality and developed a generic MLR scale with desirable psychometric properties, including content validity, reliability, convergent validity, discriminant validity, nomological validity and criterion-related validity.

Zaminga et al. (2017) carried out the validation of a short version of the Mobile-Learning Perception Scale (MLPS) for an Italian Context for the first time. They translated the items of the scale from English into Italian and conducted a survey to the Italian primary, middle, and high school teachers (n = 985) was constructed to explore the psychometric properties of the Italian short version (13 items). According to the authors MLPS subscales were observed to be significantly associated with the scale of teacher frequency use of mobile device within the school and a scale of school orientation to student empowerment, providing evidence for both convergent and

predictive validity. In conclusion, they found that the applicability and the validity of the instrument in an Italian educational context.

Corbell and Valdes-Corbell (2007) studied the educational potential of mobile phones in their study of distance education students and instructors as to whether they are ready for mobile learning. A questionnaire was applied to 107 undergraduate students and 30 lecturers who were studying in 2006 fall semester. As a result of the research, all students and instructors stated that they have a mobile phone that they benefit in the learning process.

Studying with university students, Vyas and Nirban (2014) found that most of the participants used a laptop (84%). Laptop was followed by smart phone (64%) and finally tablet or I-pad (16%). The researchers attributed the use of laptops over smart phones or tablet to the fact that being not accustomed to small mobile devices or high prices of smart phones and tablets. They asserted that laptops were more like desktops and that’s why the participants felt more comfortable with them rather than small devices. Croop (2008) conducted a study with university students and concluded that the participants preferred to work on a laptop rather than a mobile phone.

Pettit and Kukulska-Hulme (2008) examined participants' experiences with mobile devices and the personal factors motivating their students to use these tools. The authors conducted a survey to the 40 university students and created the sample of the research by their responses. In the data obtained by the semi-structured interview method, the result is that the same mobile adaptation period is different for each student. It has been shown that students who did not use a mobile device with the same features previously regarded mobile learning as anxious and found it more appropriate to start learning mobile with simpler means.

Tayebinik and Puteh (2012) investigated the effect of mobile learning support on teaching English as a foreign language. They aimed to review the EFL teaching methods based on mobile learning approach. At the end of the study, the authors concluded that EFL teaching and mobile learning integration may provide great innovations and opportunities in the pedagogical delivery.

Alharbi and Drrew (2014) proposed a theoretical framework which unites the Unified Theory of Acceptance and Use of Technology (UTAUT) and the Information System

(IS) Success Model. According to the authors, such integration resulted in 3 success measures and 2 acceptance constructs. The success measures included the system quality and information quality, and user satisfaction; while the acceptance measures included performance expectancy, effort expectancy and social influence. Authors also introduced lecture attitude as a novel construction which is believed to moderate students' behavioral intention.

Wu et al. (2012) conducted a meta-analysis work on mobile learning with reviewing the related literature. The authors reviewed and analyzed 164 studies carried out between 2003 and 2010. According to the results, authors found that the effectiveness of mobile learning is a very popular subject among the studies; mobile learning system design is the second popular subject. Most widely used mobile learning devices are PDAs and smart phones according to the results, on the other hand, authors asserted that other emerging technologies such as tablet PC can become very common in the future.

Uzunboylu ve and Özdamlı (2011) tried to describe the development, testing and application for a suitable instrument to assess teachers' perceptions of m-learning. In 2010, the authors gathered the data from the 467 teachers from the 32 schools. They tested the final version of the Mobile Learning Perception Scale through analyzes. Reliability of the scale and internal consistency coefficient showed that this instrument could be used for the further work. In conclusion, the authors found that teachers performed above medium levels of perception towards m-learning.

Çelik (2013) conducted a study of the reliability and validity of a scale of attitude aimed at measuring m-learning attitudes of university students. As a result of the factor analyzes, 21 scale items were collected in 4 factors and 51,116% of the total variance were found in order to test validity. According to the item analysis based on the difference between the upper and lower group averages, it is determined that the scale is quite sufficient to distinguish between those with positive and negative grades. The internal consistency coefficient of the scale was found to be 0.881as a result of the reliability analysis. The relationship between the factor total scores were found to be low and moderate in the positive direction and the relationship between all the factors and the scale was found to be quite high. The findings of the study indicate that the validity and reliability characteristics of the scale are at a good level.

Özer and Kılıç (2017) aimed to develop a measurement tool to reveal students' acceptance levels of mobile learning tools in their research. For this purpose, first literature review and expert opinion prepared made on form 33-item test was administered to 407 students who are studying in six different universities in Turkey. With the findings of this study, the authors concluded that the scale was a reliable and valid measuring instrument with four sub-dimensions to determine students' acceptance levels of mobile learning tools. It has been suggested that the Mobile Learning Tools Acceptance Scale, developed by the authors and helpful in determining the degree to which foreign language learners have adopted mobile technology, will provide the contribution for further works in the field of technology in foreign language learning.

Başoğlu ve Akdemir (2010) examined the effects of using vocabulary applications in mobile phones on undergraduate students. The authors used mixed-method research design with 60 students following in the Undergraduate Compulsory Preparatory Program of a public university which is located in the Black Sea region of Turkey. According to the results, it has been concluded that using mobile phones as a vocabulary learning tool is much more effective than one of the old traditional vocabulary learning tools.

Şad and Akdağ (2010) aimed to compare the traditional written assignments with the English performance assignments produced by mobile phones. For this purpose, 112 students studying in Malatya Gazi Elementary School 8th Grade were determined as the study group. As a result of analyzes made, it has been found that mobile phones can be used much more efficiently in the preparation of English performance tasks than traditional written performance assignments.

Tılıç (2016) prepared two separate questionnaires in English and Turkish to learn whether individuals benefit from mobile applications that contribute to foreign language learning and to measure usage habits. These forms have been delivered via e-mail and Facebook to foreign language learners from different native languages and professions. A total of 75 people, 45 female and 30 male, participated in the survey. According to the findings, 84% of the participants benefited from mobile applications while learning foreign languages, and 67.6% of them preferred Duolingo named application. From here, the author examined and presented the characteristics of Duolingo application.

Ağca and Özdemir (2013) conducted a mobile learning study with the participation of 40 students from Gazi University Faculty of Education Department of English Language Teaching. In the study, a mobile application was developed to improve students' foreign vocabulary skills. In practice, the meanings of the words are expressed, the pictures related to the words are placed and the pronunciation of the sheen is presented in a loud voice. The study was designed to cover one-week course content. A significant difference was observed between the mean of the pre-test scores of participants' vocabulary skills and the post-test scores average. Researchers have pointed out that the study of mobile learning materials through internet connection should be examined in the future studies.

Güzeller and Üstünel (2016) aimed to determine the overall impact size of experimental research on mobile learning in the international arena between 2009 and 2014. For this purpose, "MetaAnalysis Method" has been used in the research. In the EBSCOhost database on the subject, the authors found 3,512 articles and analyzed 10 studies within the inclusion criteria determined by the scope of the study. Cohen's effect size was used as the effect size index in the study. As a result of the homogeneity test performed, the random effects model was converted from the fixed effect model. As a result of the analysis based on the random effect model, authors found that the mobile learner has a positive effect on the academic achievement d = 0.849 effect size and a high level of influence. The critical p-value obtained in the meta-analysis made is that mobile learning activities can be combined and the result that mobile learning should be used more in education.

Solmaz and Gökçearslan (2016) aimed to study on to mobile learning in Turkey by examining various aspects of the master and doctoral theses by making the content analysis. These have been determined by searching with the keywords of "mobile education", "mobile learning", "mobile class", "mobile course" from the web page of the National Thesis Center of the Council of Higher Education. According to this survey, 48 studies between 2005 and 2015 were included in the analysis. In content analysis, researches were examined in terms of thesis type, year, department, variables, study group, method, data collection tools and data analysis. It has been seen that mobile learning is a popular subject and that studies are underway in other disciplines.

Zengin et al. (2018) aimed to study mobile learning in Turkey and seeks to set forth a kind of trend in this regard. They scanned Google Scholar, University of Uludag databases and Higher Education thesis center with using "mobile learning" and "m-learning" keywords. 76 studies (theses, articles and conferences), carried out between 2007-2017 in Turkey, were examined. Most studies on mobile learning were conducted in 2015 with the share of 18.4%. The academic papers were the most used type of the research with 43.4%. In the last 10 years, it has been seen that 21.1% of the studies in the mobile learning field are studies on implementation and development. 52,6% of the researches were written by only one author. The sample size ranged from 18.4% to 0-30 persons, with a 39.5% license level. The learning area has been in mobile learning with 65.8%. It has been determined that the survey is the most used for the collection of data in the studies. Student opinions, academic success, motivation, permanence and attitude are the most preferred dependent variables. 30.3% of the studies used smart phones as mobile technology. 15,8% of the studies focus on foreign language teaching.

In this chapter, TPACK and m-learning have been presented in detail and studies abroad and in Turkey have been reviewed. Literature shows that there is need to conduct studies on student-perceived TPACK since students' ideas have been neglected in conducted studies so far. Furthermore; although there have been many research studies on m-learning in terms of perception, readiness, use; researchers should also study mobile learning tools and the acceptance of them by students.

CHAPTER III

METHODOLOGY

Chapter III includes information about research design, participants of the study, data collection procedure, instruments and data analysis.

3.1. Research Design

This study was conducted with a quantitative research design using a survey technique to collect data about high school EFL learners' ideas about EFL teachers' TPACK and acceptance of mobile learning tools. Quantitative research has practicality with objective and numerical data (Dörnyei, 2007). Descriptive research examines present situations at a specific time and place (Creswell, 2002). According to Birjandi and Mossalanejad (2016), survey methods, interrelation methods and developmental methods are three types of descriptive research.

> Survey methods deal with the current state of a phenomenon, existing conditions and the potential relationship between two conditions.... Descriptive research investigates the relationship among the present status of involved variables. (Birjandi and Mossalanejad, 2016, p.180).

3.2 Participants and Setting

Convenience sampling was employed in this study. Convenience sampling is basically defined as including participants that are available (Dörnyei, 2007; Birjandi and Mossalanejad, 2016).

> To be fair, convenience samples are rarely convenience-based but are usually partially purposeful, which means that besides the relative ease of accessibility, participants also have to possess certain key characteristics that are related to the purpose of the investigation. (Dörnyei, 2007, p.99).

According to the information gathered from Muğla Provincial Directorate for National Education, there were 109 state, 37 private high schools in Muğla. In the central district, Menteşe, there were 16 state and 6 private schools. School type; the number of students, English teachers and English class hours differ from one school to another. The universe of the study was high school learners. However; only one high school in Muğla was included in the study regarding the objectives of the research. The reason for choosing Social Sciences High School was the fact that it was the only school that had preparation class for the students. The hour of English classes per week was the highest in Social Sciences High School among the state schools in Menteşe. This resulted in the selection of it as the sample.

There were 7 English teachers in Social Sciences High School. That number was the highest one among the state and private schools in Menteşe. Registered student number is 431. According to Dörnyei (2007), minimum participant numbers are suggested 15 for experimental research, 30 for correlation research, and 100 for survey research. Similarly, Mackey and Gass (2005) cited Fraenkel and Wallen (2003) regarding participant number for research designs. For descriptive research 100 participants are mentioned as minimum sample number.

All of the students in all grades were included in the study. The universe consisted of 431 students. However, some students had been transferred to other schools until the researcher and school administration confirmed the survey time. School administration confirmed registered students number was 405. All participants were asked to take two scales voluntarily. Some students did not want to participate in the study. Some of them did not get the parents' consent form. In the end, 361 students in Social Sciences High

School participated in the study. The papers that were not filled properly were excluded before the analysis of data. Finally, there were 352 properly answered scales to analyze. Demographic information of the participants was collected in the first parts of two scales. Detailed data such as the distribution of class, gender, age can be seen in Table 3.1.

Table 3.1.

Demographic characteristics of the participants (Social Sciences High School) (n=352)

Factor	*F*	%
Gender		
Female	249	70.7
Male	103	29.3
Grade		
Preparatory Class	93	26.4
Grade-9	101	28.7
Grade-10	93	26.4
Grade-11	65	18.5
Age		
14	15	4.3
15	90	25.6
16	102	29
17	90	25.6
18	55	15.6

Out of 352 students drawn from Social Sciences High School, 103 were male and 249 were female; 93 were preparatory class students, 101 were 9th graders, 93 were 10th graders and 65 were 11th graders; 15 were 14 years old, 90 were 15 years old, 102 were 16 years old, 90 were 17 years old and 55 were 18 years old (See Table 3.1).

In this school, students get twenty hours of English class per week during the first year of school (preparatory class). In successive three years, they continue foreign language education with 4 (9th grade), 3 (10th grade), 2 (11th grade) hours per week. There were 7 English teachers during 2017-2018 Educational Year. The students in 9th, 10th, 11th grades met only one English teacher. However; in the preparatory class, students met

two English teachers. While filling TPACK scale, they were asked to focus on the English teacher that had more lessons with the class. There are interactive smart boards in each class but the students have not been distributed tablets in the scope of FATİH Project.

3.3 Data Collection Procedure

Data collection was done via two scales and analysis of them. After getting the necessary permissions from the authorities, the researcher contacted the school administration and confirmed the dates. Participants were first given information about the study and they were distributed parents approval forms. They were given time to bring the signed forms back till the actual survey date. Two English teachers accepted the responsibility of collecting and keeping the documents that were brought before the survey date. On the survey day, the participants were distributed informed consent forms and they were asked to participate in the study voluntarily. Then surveys were given to them and they answered them in time of a class (40 minutes). Teachers distributed the consent forms in the second class and surveys in the third class. Researcher wandered the classes in case there were any questions or hesitations.

3.4 Instruments

In this study, two instruments were benefitted to gather data. TPACK scale developed by Tseng (2016) and Mobile Learning Attitude Scale (MLTAS) developed by Özer and Kılıç (2017) were used as quantitative data collection tools.

3.4.1 TPACK Scale

Tseng (2016) developed a 5 point Likert-type scale in order to investigate EFL students' perceptions of their teachers' TPACK. The scale was developed in English. 35 scale statements were created through a literature review and then reviewed by experts, teachers, and students. The scale was administered to two hundred fifty-seven high school students. Exploratory factor analysis was undertaken to ensure the validity of this

scale and seven factors were revealed. Cronbach's alpha was adopted to evaluate the internal consistency of the scale and it was found reliable with 0.96. In the end, a reliable and valid TPACK instrument with 30 items was developed. Since scale was originally developed in English and the researcher aimed to adapt the scale before using it.

3.4.1.1.Adaptation and Validation of TPACK Scale

For the adaptation process, the views of experts (in Foreign Language Education Department and Statistics Department) were taken. Hambleton and Ronald K. (1996), Gjersing, John Caplehorn and Clausen (2010), Hambleton and Patsula (2004) were utilized as adaptation guidelines. Some TPACK scale adaptation studies (Kabakcı Yurdakul, 2011; Öztürk and Horzum, 2011; Altun, 2013; Kaya, Dağ, 2013; Kaya, Kaya, Emre, 2013; Öztürk, 2013) were also benefitted.

Regarding the guidelines and examining several studies, adaptation process was completed in three phases: the translation phase, administration phase and statistical phase. First of all literature review was done in order to give the translators necessary information for conceptual equivalence. Then six translators were asked to give assistance. Three of them were fluent in the target language (Turkish) and have a good understanding of the original language (English). They were Turkish EFL teachers. Other three translators, who were responsible for back translation, were fluent in English and had good understanding of Turkish. They were English people who lived in Turkey for 6-11 years. Two Turkish EFL teachers translated the scale independently from each other and gave the translation to the researcher. The third translator synthesized two versions of the translated scale and sent the final form to the researcher. For the final form of the translated scale, the expert review was elicited before administering it.

Validity and reliability of the adapted version were tested at Yatağan Anatolian High School. 30 randomly chosen students were gathered in one classroom and they have distributed the scale. They were asked to read the statements in the scale and talk about any ambiguous sentence or term. The students found the statements understandable and clear. That's why there was no need to change any statement in the scale. Those 30

students were not included in the sample group of the survey study. One hundred- sixty students were chosen randomly. Table 3.2 shows demographic characteristics (gender, grade, age) of the high school students drawn from Anatolian High School. The validity of the scale was analyzed through item analysis and Exploratory Factor Analysis (EFA). To evaluate internal consistency, Cronbach's alpha was adopted.

Table 3.2.

Demographic characteristics of the participants (Anatolian High School) (n=160)

Factor	*f*	%
Gender		
Male	80	50
Female	80	50
Grade		
Grade-9	40	25
Grade-10	40	25
Grade-11	40	25
Grade-12	40	25
Age		
14	6	3.8
15	40	25
16	44	27.5
17	49	30.6
18	20	12.5
19	1	0.6

As shown in Table 3.2, 80 of the students drawn from Anatolian High School were male and 80 were female; 40 were 9^{th} graders, 40 were 10^{th} graders, 40 were 11^{th} graders and 40 were 12^{th} graders; 6 were 14 years old, 40 were 15 years old, 44 were 16 years old, 49 were 17 years old, 20 were 18 years-old and 1 was 19 years old.

Prior to factor analysis to examine the dimensionalities of TPACK scale administrated to Turkish students (a case of Anatolian High School), item analysis of 35 items through examining item-total correlation score of each item was undertaken. the corrected item-total correlation should be $r > 0.3$ (Pallant, 2007). All items in the scale had acceptable item-total correlation score, except the item numbered "ck13" with $r = .275$. This item was excluded from the data set and Explanatory Factor Analysis (EFA) with Principle Components Analysis (PCA) was run with 34 items. EFA with PCA revealed seven factors. However, item numbered "ck14" loaded on three factors and all factor loading scores were close to each other. The item "ck14" was excluded from the

data set and then third EFA was run again with 33 items to observe the distribution of remaining items to the seven factors.

Table 3.3.

Item Total Statistics for Item Analysis.

item	Item-total correlation
tk_p1	.406
tk_p2	.478
tk_p3	.432
tk_p4	.464
tk_p5	.429
pk_p6	.600
pk_p7	.500
pk_p8	.492
pk_p9	.531
pk_p10	.455
ck_p11	.524
ck_p12	.516
ck_p13	.275
ck_p14	.588
ck_p15	.537
tpk_p16	.631
tpk_p17	.608
tpk_p18	.530
tpk_p19	.609
tpk_p20	.681
tck_p21	.558
tck_p22	.534
tck_p23	.501
tck_p24	.614
tck_p25	.516
pck_p26	.599
pck_p27	.470
pck_p28	.308

pck_p29	.396
pck_p30	.550
tpck_p31	.651
tpck_p32	.643
tpck_p33	.657
tpck_p34	.532
tpck_p35	.579

Kaiser-Meyer-Olkin (KMO) measuring sampling adequacy was .878 which is interpreted as the acceptable sample size for factor analysis. Barttlett's test of Sphericity was χ^2 (561) = 3299.082, $p< 0.05$. Seven factor model of TPACK explained the total variance of 64.032. Remaining 33 items in TPACK were adequately distributed to the seven factors. Of the items, 3 loaded on factor 1, 5 loaded on factor 2, 5 loaded on factor 3, 5 loaded on factor 4, 5 loaded on factor 5, 5 loaded on factor 6 and 5 loaded on factor 7. Factors were same or similar to original factor that is why they were named same as original ones.

Table 3.4.

Eigenvalue and Variance Explained by Each Factor

Factors	Eigen value	Variance
1	3.898	7.124
2	3.594	10.144
3	2.204	10.096
4	1.880	9.896
5	1.422	8.589
6	1.133	8.173
7	3.543	10.010

Table 3.5.

Factor Acronym and Names

Factor	Acronym	Name	Items
1	CK	Content Knowledge	3
2	TPACK	Technology pedagogy content Knowledge	5
3	TCK	Technology content knowledge	5
4	TPK	Technology pedagogy knowledge	5
5	PCK	Pedagogy content knowledge	5
6	TK	Technology knowledge	5
7	PK	Pedagogy Knowledge	5

Table 3.6.

Distribution of Items to the Factors

Items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7
ck_p12	.831						
ck_p11	.769						
ck_p15	.680						
tpck_p34		.717					
tpck_p35		.659					
tpck_p33		.656					
tpck_p32		.642					
tpck_p31		.612					
tck_p23			.775				
tck_p22			.773				
tck_p21			.733				
tck_p24			.706				
tck_p25			.618				
tpk_p19				.771			
tpk_p17				.770			
tpk_p18				.732			
tpk_p16				.648			
tpk_p20				.533			

pck_p29		.765		
pck_p28		.684		
pck_p30		.722		
pck_p26		.559		
pck_p27		.459		
tk_p3			.754	
tk_p4			.715	
tk_p1			.653	
tk_p2			.595	
tk_p5	.322		.561	
pk_p6				.735
pk_p10				.721
pk_p7				.709
pk_p9				.644
pk_p8				.639

All subscales of TPACK scale includes 5 items except for CK which consists of 3 items. Based on the third-factor analysis with 33 items, item loading scores and factorial distribution is given in Table 3.6.

Table 3.7.

Internal Consistency of Items

Reliability Statistics	
Cronbach's Alpha	N of Items
.936	33

Finally, the internal consistency of the scale was ensured through Cronbach's alpha. The results are shown in Table 3.7. and Table 3.8. To be accepted as reliable, Cronbach's Alpha of a scale should be at least .70 (Nunally 1978; Pallant, 2007). Total Cronbach's Alpha of TPACK scale is .936 which means the scale is highly reliable. There is no need to delete any item to increase the reliability of the scale. (See Table 3.8)

Table 3.8.

Item Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
tk_p1	114.74	433.601	.406	.935
tk_p2	114.82	430.967	.478	.934
tk_p3	115.41	431.426	.432	.935
tk_p4	115.27	431.635	.464	.934
tk_p5	114.44	434.538	.429	.935
pk_p6	114.36	421.715	.600	.933
pk_p7	114.41	426.494	.500	.934
pk_p8	114.94	426.877	.492	.934
pk_p9	115.01	425.553	.531	.934
pk_p10	114.56	427.443	.455	.935
ck_p11	114.10	427.839	.524	.934
ck_p12	114.14	428.552	.516	.934
ck_p15	114.21	427.061	.537	.934
tpk_p16	115.16	417.936	.631	.933
tpk_p17	114.85	421.210	.608	.933
tpk_p18	115.25	424.642	.530	.934
tpk_p19	114.68	424.520	.609	.933
tpk_p20	114.76	424.170	.681	.933
tck_p21	115.07	424.958	.558	.934
tck_p22	115.09	426.526	.534	.934
tck_p23	115.14	427.226	.501	.934
tck_p24	115.40	420.443	.614	.933
tck_p25	115.67	426.208	.516	.934
pck_p26	114.87	423.116	.599	.933
pck_p27	114.51	429.195	.470	.934
pck_p28	115.73	432.892	.408	.936
pck_p29	115.57	428.208	.406	.935
pck_p30	115.39	421.912	.550	.934
tpck_p31	115.09	419.011	.651	.933
tpck_p32	115.21	420.294	.643	.933
tpck_p33	115.21	418.131	.657	.932
tpck_p34	115.34	422.678	.532	.934
tpck_p35	115.11	421.849	.579	.933

3.4.2 Mobile Learning Tools Acceptance Scale (MLTAS)

As the second instrument, the Mobile Learning Tools Acceptance Scale (MLTAS) was used. Özer and Kılıç (2017) developed the scale designed to measure students' acceptance of mobile learning tools. The scale was developed in Turkish as a 5 item Likert scale with 19 final items. Validity and reliability of the scale were ensured with data gathered from 407 EFL students from six universities in Turkey. MLTAS was validated in four dimensions: perceived ease of use, contribution to foreign language learning, negative perception and voluntariness of use. Factor loadings of those dimensions were .78, .75, .74 and .76 respectively. The total internal consistency reliability is .83.

3.5. Data Analysis

In the analysis of the data, SPSS16v program was used. In the analysis of the data, descriptive statistics were run for describing the items and participants' tendencies. Furthermore, as inferential statistics, independent t-test and one-way-ANOVA were undertaken to compare the groups and multiple correlation was performed to assess the correlation among the factors of TPACK and MLTAS. The validity of the scale of the tests to be applied was assessed by the exploratory factor analysis and reliability was assessed by the Cronbach's alpha coefficient.

CHAPTER IV

FINDINGS

This chapter includes the quantitative findings of the study that were grouped according to the research questions.

4.1. Reliability of the Scales

Table 4.1.

Cronbach's Alpha Reliability Coefficient of TPACK

Factor	**Item Number**	α
TK (Technological Knowledge)	5	.81
PK (Pedagogical Knowledge)	5	.85
CK (Content Knowledge)	3	.92
TPK(Technological Pedagogical Knowledge)	5	.91
TCK (Technological Content Knowledge)	5	.92
PCK (Pedagogical Content Knowledge)	5	.88
TPACK (Technological Pedagogical Content Knowledge)	5	.71
Whole scale – TPACK	33	.95

In order to calculate the reliability of the subscales and also the whole scale of TPACK, reliability analyses were performed. Cronbach's alpha reliability coefficient (α) of technological knowledge (TK) was .81, of (PK) was .85, of content knowledge (CK) was .92, of technological pedagogical knowledge (TPK) was .91, of technological content knowledge (TCK) was .92, of pedagogical content knowledge (PCK) was .88 and of technological pedagogical content knowledge (TPACK) was .71. Reliability of the whole scale was .95. (See Table 4.1)

Table 4.2.

Cronbach's Alpha Reliability Coefficient of MLTAS

Factor	**Item Number**	α
Perceived ease of use	4	.79
Cont. to Foreign Lang.	5	.71
Negative Perception	5	.93
Voluntariness to use	5	.80
Total Score of MLTAS	19	.93

In order to calculate the reliability of the subscales and also the whole scale of MLTAS, reliability analysis using SPSS was performed. Cronbach's alpha reliability coefficient (α) of perceived ease of use was .79, of contribution to foreign language learning was .71, of negative perception was .93 and of voluntariness to use was .80. The reliability of the whole scale was .93. (See Table 4.2)

4.2. Mobile Tool Usage Habits of High School Students

In order to answer the first research question (RQ1) series of Descriptive Statistics Analysis were undertaken and the frequencies of the answers were presented. The following sections include sub-categories of the first research question.

4.2.1. Mobile Tools that Students Use

In order to answer this question, descriptive statistics analysis were undertaken. It was found that most of the students use more than one mobile device.

Table 4.3.

Mobile Devices that Students Use

Mobile devices	***F***	***%***
Smartphone	319	90.6
Tablet	237	67.3
Laptop	227	64.4
Mobile phone	129	36.6
MP3 Player	88	25
PDA	-	-

319 (90.6%) of total 352 participants indicated that they used smart phones, 237 tablets, 227 laptops, 129 mobile phones and 88 MP3 players as mobile devices. There is not a participant who uses Personal Digital Assistant (PDA). While the most frequently used mobile tool is smart phone, the least used mobile tool is PDA. (See Table 4.3)

4.2.2. Time Dedicated to Using Mobile Tools per Day

Table 4.4.

Time Dedicated to Using Mobile Tools per Day

Hours per day	***f***	**%**
3 hours	67	19
4 hours	58	16.5
5 hours	53	15.1
6 hours	48	13.6
2 hours	41	11.6
0	25	7.1
8 hours	19	5.4
1 hour	12	3.4
7 hours	10	2.8
9 hours	9	2.6
10 hours	9	2.6

According to the analysis, the time that students spent using mobile tools per day varied. Of the students, 25 stated that they did not use any mobile device, 12 indicated that they used for 1 hour, 41 students 2 hours, 67 students 3 hours, 58 students 4 hours, 53 students 5 hours, 48 students 6 hours, 10 students 7 hours, 19 students 8 hours, 9 students 9 hours and 9 students 10 hours. (See Table 4.4)

4.2.3. Aims to Use Mobile Tools

Table 4.5.

Students' Aims for Using Mobile Tools

Mobile devices	***f***
1. Use social sharing websites	307
2. For educational purposes	306
3. Share photos	285
4. Do research	264
5. Use the internet	256
6. Chat	241
7. Take photos	200
8. Play games	144
9. Others	31

Students were asked for which aims they used mobile tools. Almost all of the students selected two or more aims. Students' aims to use mobile tools varied. They expressed that they used mobile tools for social sharing websites (n=307), for educational purposes (n=306), for sharing photos (n=285), for doing research (n=264), for the internet (n= 256), for taking photos (n=200), for chatting (n=241), for playing games (n=144), and for other purposes (n=31). (See Table 4.5)

4.2.4. Educational Activities Used for Mobile Devices

Students were asked to indicate for which educational activities they used mobile tools. Nearly all of the students selected two and more educational activities.

Table 4.6.

Types of Educational Activities for Using Mobile Devices

Mobile devices	***F***
1. Do research	276
2. Watch videos	261
3. Do homework	260
4. Use dictionaries	230
5. Solve tests	103
6. Read e-books	88
7. Play educational games	65
8. Others	4

Students indicated that they used mobile tools for doing research (n=276), watching videos (n=261), doing homework (n=260), using dictionaries (n= 230), solving test (n=103), reading e-books (n=88), playing educational games (n=65), and others (n=4). (See Table 4.6)

4.2.5. Mobile Applications and Mobile Internet Use

Regarding mobile applications to foster foreign language learning, the participants were asked to write the names of the applications. Out of 352 participants, 186 stated that they downloaded and used at least one mobile application to facilitate their English learning, but, remaining 166 students did not download any mobile application for that purpose. 82 students indicated to use two or more applications. Almost half of the participants did not use any mobile application to facilitate foreign language learning.

286 participants were found to use mobile internet of any GSM operator, but 66 of them did not have access to mobile internet. Most of the participants seemed to have internet access whenever they want. Nevertheless; the number of the participants who stated to download mobile learning application for language learning was limited to 186.

Table 4.7.

Applications Downloaded and Used by the Students

Application name	***F***
Duolingo	94
Tureng	35
Memrise	25
Google Translate	20
Dyned	19
Sesli Sözlük	16
English News in Level	11
English-Turkish Dictionary	8
Voscreen	7
Kahoot	4
My English Lab	3
Beelinguapp	2
Word	2
English Central	2
Speaky	3
Hello Talk	1
Busuu	1
Oxford Dictionary	1
Lingusta	1
Translator	1
Hello English	1
İngilizceöğren	1
Johnny Grammar's Word Challenge	1

Mobile applications that were downloaded and used to facilitate English learning were Duolingo (n=94), Tureng (n=35), Memrise (n=25), GoogleTranslate (n=20), Dyned (n=19), SesliSözlük (n=16), English News in Level (n=11), English – Turkish Dictionary (n=8), Voscreen (n=7), Kahoot (n=4), My English Lab (n=3), Beelinguapp (n=2), Word (n=2), English Central (n=2), Speaky (n=3), Hello Talk (n=1), Busuu (n=1), Oxford Dictionary (n=1), Lingusta (n=1), Translator (n=1), Hello English (n=1), İngilizceÖğren (n=1) and Johnny Grammar's Word Challenge. The most common

mobile application is Duolingo and it is followed by Tureng, Memrise and Google Translate. (See Table 4.7)

4.3. Student-perceived TPACK of English Teachers

In order to answer the second research question (RQ2), regarding student-perceived technological pedagogical content knowledge of English teachers, descriptive statistics were run.

Table 4.8.

Descriptive Statistics for Seven Subscales

Factor	Item number	M	SD
CK (Content Know.)	3	4.26	0.59
TPACK (Tech. Ped. Content Know.)	5	3.87	0.65
PK (Pedagogical Know.)	5	3.81	0.73
TK (Technological Know.)	5	3.81	0.69
TPK (Techn. Ped. Know.)	5	3.74	0.79
TCK (Technological Content Know.)	5	3.66	0.92
PCK (Pedagogical Content Know.)	5	3.57	0.89

Overall, the highest mean score was found for content knowledge (CK) while the lowest mean score was found for pedagogical content knowledge (PCK). The students nearly agreed that their teachers exhibited good knowledge in content knowledge domain while they were generally unsure about the other six domains. In particular, the teachers were thought to be more confident in content knowledge, as compared to pedagogical knowledge, technological knowledge and the intersections of three domains. Furthermore; mean scores of Content knowledge, pedagogical knowledge and technological knowledge were higher than combines of the domains, namely technological pedagogical knowledge (TPK), technological content knowledge (TCK) and pedagogical content knowledge (PCK). To conclude, the results showed that teachers were perceived proficient only in content knowledge and the students were not sure about the ways in which the three bodies of knowledge are tactfully combined to enhance learning (See Table 4.8).

Table 4.9.

Descriptive Statistics on Technological Knowledge (TK)

Items		Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	M	SD
1.My teacher knows about basic computer hardware (e.g. RAM, network cable, and projector).	*F*	1	13	51	149	138	4.16	0.83
	%	0.3	3.7	14.5	42.3	39.2		
5.My teacher keeps up with important new technologies (e.g. e-books, Facebook, and white board).	*F*	2	12	41	176	121	4.14	0.79
	%	0.6	3.4	11.6	50	34.4		
2.My teacher knows about basic computer software (e.g. media players, word processing programs, and web page browsers).	*F*	6	19	55	176	96	3.96	0.89
	%	1.7	5.4	15.6	50	27.3		
3.My teacher knows how to solve technical problems associated with hardware (e.g. setting up printers, using webcams, and changing hard drives).	*F*	8	56	78	157	53	3.54	1.01
	%	2.3	15.9	22.2	44.6	15.1		
4.My teacher knows how to deal with technical problems related to software (e.g. installing drivers, setting up Internet connection, and sharing files in the cloud).	*F*	22	56	99	148	27	3.29	1.03
	%	6.2	15.9	28.1	42	7.7		

The first subscale was student-perceived technological knowledge (TK) of EFL teachers. In this category, item 1 (My teacher knows about basic computer hardware e.g. RAM, network cable, and projector) got the highest mean score. It was followed by item 5 (My teacher keeps up with important new technologies e.g. e-books, Facebook, and white board). Item 2 (My teacher knows about basic computer software e.g. media players, word processing programs, and web page browsers) had the third highest mean. Item 3 (My teacher knows how to solve technical problems associated with hardware e.g. setting up printers, using webcams, and changing hard drives) followed it. The lowest mean score was for item 4 (My teacher knows how to deal with technical problems related to software e.g. installing drivers, setting up Internet connection, and sharing files in the cloud). (See Table 4.9)

Table 4.10.

Descriptive Statistics on Pedagogical Knowledge (PK)

Items		Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	M	SD
7.My teacher uses different evaluation methods and techniques (e.g. quiz, report, and role-playing).	*F*	1	9	16	176	150	4.32	0.71
	%	0.3	2.6	4.5	50	42.6		
6.My teacher uses a variety of teaching strategies in class (e.g. explanation, raising questions, and group work).	*F*	4	9	9	188	142	4.29	0.74
	%	1.1	2.6	2.6	53.4	40.3		
10.My teacher knows how to manage his/her class (e.g. drawing up clear class rules, creating friendly atmosphere in class, and developing a good relationship between students and the teacher).	*F*	10	18	55	185	84	3.89	0.92
	%	2.8	5.1	15.6	52.6	23.9		
8.My teacher understands students' learning difficulties.	*F*	17	68	133	88	46	3.22	1.06
	%	4.8	19.3	37.8	25	13.1		
9.My teacher adjusts the ways he/she teaches according to student performance and feedback.	*F*	18	83	73	118	60	3.34	1.16
	%	5.1	23.6	20.7	33.5	17		

Regarding the items about Pedagogical Knowledge (PK) of teachers, item 7 and item 9 got mean scores over 4.00. The students agree that their teacher used different evaluation methods and techniques, and they used various teaching strategies in class. Mean scores of other items were below 4.00 but above 3.00. Item 7 got the highest mean. It was followed by item 6, item 10 (My teacher knows how to manage his/her class) and item 8 (My teacher understands students' learning difficulties) respectively. Item 9 (My teacher adjusts the ways he/she teaches according to student performance and feedback) got the lowest mean score in this subscale. (See Table 4.10).

Table 4.11.

Descriptive Statistics on Content Knowledge (CK)

Items		Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	M	SD
11.My teacher has sufficient knowledge of English grammar	*F*	1	1	10	205	135	4.34	0.58
	%	0.3	0.3	2.8	58.2	38.4		
15.My teacher answers students' questions about English.	*F*	2	5	9	226	110	4.24	0.62
	%	0.6	1.4	2.6	64.2	31.2		
12.My teacher has good pronunciation	*F*	2	2	47	175	126	4.20	0.73
	%	0.6	0.6	13.4	49.7	35.8		

Content Knowledge subscale included three items. Item 11 got the highest mean score (My teacher conducts lectures in which I can understand English better). It was followed by item 12 (My teacher conducts quizzes in which I can practice English more). The lowest mean score was found for item 15 (My teacher conducts discussion activities in which I can use English more). Mean scores of all the items in CK subscale were higher than 4.00. These mean scores showed that students generally perceieved good content knowledge of their English teachers. Content knowledge was the only subscale that all of the items' means were higher over 4.00. (See Table 4.11)

Mean scores of the items in Technological Pedagogical Knowledge (TPK) subscale were below 4.00, except from item 16 (My teacher uses technologies to motivate me to learn) with the highest mean score in the subscale. It was followed by item 17 (My teacher uses technologies to explain clearly), item 19 (My teacher uses technologies to facilitate teaching activities) and item 20 (My teacher uses technologies appropriate for his/her teaching). The lowest mean was found for item 18 (My teacher uses technologies to interact more with us). The students were only sure that their teacher used technology to motivate them. They were unsure regarding other items in technological pedagogical knowldge domain. (See Table 4.12)

Table 4.12

Descriptive Statistics on Technological Pedagogical Knowledge (TPK)

Items		Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	M	SD
16.My teacher uses technologies to motivate me to learn.	*F*	5	18	43	189	97	4.01	0.86
	%	1.4	5.1	12.2	53.7	27.6		
17.My teacher uses technologies to explain clearly.	*F*	7	16	64	174	91	3.93	0.89
	%	2	4.5	18.2	49.4	25.9		
19.My teacher uses technologies to facilitate teaching activities.	*F*	13	23	61	190	65	3.77	0.95
	%	3.7	6.5	17.3	54	18.5		
20.My teacher uses technologies appropriate for his/her teaching.	*F*	7	19	128	134	64	3.65	0.91
	%	2	5.4	36.4	38.1	18.3		
18.My teacher uses technologies to interact more with us.	*F*	12	65	102	138	35	3.34	1
	%	3.4	18.5	29	39.2	9.9		

Table 4.13.

Descriptive Statistics on Technological Content Knowledge (TCK)

Items		Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	M	SD
21.My teacher uses digitalized teaching materials with which I can learn vocabulary better.	*f*	7	26	29	180	110	4.02	0.93
	%	2	7.4	8.2	51.1	3.2		
22.My teacher uses digitalized teaching materials with which I can learn grammar better.	*f*	12	42	33	183	82	3.80	1.04
	%	3.4	11.9	9.4	52	23.3		
23.My teacher uses digitalized teaching materials with which I can read better.	*f*	14	40	47	185	66	3.71	1.03
	%	4	11.4	13.4	52.6	18.8		
24.My teacher uses digitalized teaching materials with which I can speak better.	*f*	17	56	59	156	64	3.55	1.11
	%	4.8	15.9	16.8	44.3	18.2		
25.My teacher uses digitalized teaching materials with which I can understand the target culture better.	*f*	27	83	76	121	45	3.21	1.16
	%	7.7	23.6	21.6	34.4	12.8		

In the subscale of technological content knowledge (TCK), the only item whose mean score was over 4.00 was item 21 (My teacher uses digitalized teaching materials with which I can learn vocabulary better). The mean score of other items were between 3.00 and 4.00. Item 22 (My teacher uses digitalized teaching materials with which I can learn grammar better) was the second in the sequence of means. It was followed by item 23 (My teacher uses digitalized teaching materials with which I can read better) and item 24 (My teacher uses digitalized teaching materials with which I can speak better). The lowest mean was found for item 25 (My teacher uses digitalized teaching materials with which I can understand the target culture better). The students were sure only about vocabulary teaching materilas. and they were unsure about otheri items in TCK. (See Table 4.13)

Table 4.14.

Descriptive Statistics on Pedagogical Content Knowledge (PCK)

Items		Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	M	SD
27.My teacher conducts quizzes in which I can practice English more.	*F*	8	19	47	178	100	3.97	0.92
	%	2.3	5.4	13.4	50.6	28.4		
28.My teacher conducts games in which I can practice English more.	*F*	18	34	35	147	118	3.89	1.13
	%	5.1	9.7	9.9	41.8	33.5		
26.My teacher conducts lectures in which I can understand English better	*F*	17	37	107	135	56	3.50	1.04
	%	4.8	10.5	30.4	38.4	15.9		
29.My teacher conducts group activities in which I can use English more.	*F*	26	60	81	136	49	3.35	1.14
	%	7.4	17	23	38.6	13.9		
30.My teacher conducts discussion activities in which I can use English more.	*F*	34	81	84	111	42	3.13	1.18
	%	9.7	23	23.9	31.5	11.9		

The sixth subscale of TPACK scale was pedagogical content knowledge (PCK). The mean score of all the items in the subscale were lower than 4.00. The highest mean score was for item 27 (My teacher conducts quizzes in which I can practice English more). It was followed by item 28 (My teacher conducts games in which I can practice English more), item 26 (My teacher conducts lectures in which I can understand English

better) and item 29 (My teacher conducts group activities in which I can use English more). The lowest mean was found for item 30 (My teacher conducts discussion activities in which I can use English more). (See Table 4.14)

Table 4.15.

Descriptive statistics on Technological Pedagogical Content Knowledge (TPACK)

Items		Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	M	SD
35.The way my teacher teaches English with the computer is of help tomy learning of English	*F*	2	12	41	177	120	4.14	0.79
	%	0.6	3.4	11.6	50.3	34.1		
31.My teacher represents content with appropriate strategies via the useof various technologies.	*F*	5	23	52	151	121	4.02	0.94
	%	1.4	6.5	14.8	42.9	34.4		
33.My teacher provides us with the opportunity to use English with appropriate strategies via the use of various technologies.	*F*	6	18	43	188	97	4.00	0.87
	%	1.7	5.1	12.2	53.4	27.6		
32.My teacher provides us with the opportunity to practice English with appropriate strategies via the use of various technologies.	*F*	10	73	112	112	45	3.31	1.03
	%	2.8	20.7	31.8	31.8	12.8		
34.The way my teacher teaches English with the computer is engaging.	*F*	18	33	35	148	118	3.89	1.12
	%	5.1	9.4	9.9	42	33.5		

The final subscale was technological pedagogical content knowledge (TPACK) of EFL teachers. Three items' mean scores were over 4.00 while two items' means were lower than 4.00. Item 35 (The way my teacher teaches English with the computer is of help to my learning of English) was the one with the highest mean score. IT was followed by item 31 (My teacher represents content with appropriate strategies via the use of various technologies), item 33 (My teacher provides us with the opportunity to use English with appropriate strategies via the use of various technologies) and item 32 (My teacher provides us with the opportunity to practice English with appropriate strategies via the use of various technologies). Item 34 was the one with the lowest mean (The way my teacher teaches English with the computer is engaging). (See Table 4.15)

Table 4.16.

TPACK Scale Items with Mean Scores Higher than 4.00

Items	Subscale	M	SD
My teacher has sufficient knowledge of English grammar	CK	4.34	0.58
My teacher uses different evaluation methods and techniques (e.g. quiz, report, and role-playing).	PK	4.32	0.71
My teacher uses a variety of teaching strategies in class (e.g. explanation, raising questions, and group work).	PK	4.29	0.74
My teacher answers students' questions about English.	CK	4.24	0.62
My teacher has good pronunciation	CK	4.20	0.73
My teacher knows about basic computer hardware (e.g. RAM, network cable, and projector).	TK	4.16	0.83
My teacher keeps up with important new technologies (e.g. e-books, Facebook, and white board).	TK	4.14	0.79
The way my teacher teaches English with the computer is of help to my learning of English	TPACK	4.14	0.79
My teacher uses digitalized teaching materials with which I can learn vocabulary better.	TCK	4.02	0.93
My teacher represents content with appropriate strategies via the use of various technologies.	TPACK	4.02	0.94
My teacher uses technologies to motivate me to learn.	TPK	4.01	0.86
My teacher provides us with the opportunity to use English with appropriate strategies via the use of various technologies.	TPACK	4.00	0.87

The items with mean scores higher than 4.00 were presented regarding TPACK scale. The results showed that there were 12 statements that the students generally agree about their English teacher's knowledge. The students generally agreed that their teacher's knowledge regarding three individual knowledge domains (CK, PK and TK) were better as compared to intersections between them (TPK, TCK, TPACK). (See Table 4.16)

The number of the items with mean scores higher than 4.00 was twelve. 3 of these items were in content knowledge (CK) domain, 2 were from pedagogical knowledge (PK) domain, 2 were from technological knowledge (TK) domain, 1 was from technological content knowledge (TCK) domain, 1 was from technological pedagogical knowledge (TPK) domain and 3 were from technological pedagogical content knowledge (TPACK) domain.

4.3.1. Gender Effect on TPACK Scale

In order to examine the differences between male and female high school students in terms of technology pedagogy content knowledge, series of independent sampled t-test were undertaken for subscales of TPACK.

Table 4.17.

Effect of Gender on Student-Perceived TPACK of EFL Teachers

Factor	Gender	n	M	SD	t-test
TK	female	249	19.29	3.38	t(350) = 1.708, *p*> 0.05
	male	103	18.61	3.53	
PK	female	249	19.26	3.58	t(350) = 1.536, *p*> 0.05
	male	103	18.60	3.84	
CK	female	249	12.82	1.8	t(350) = .730, *p*> 0.05
	male	103	12.66	1.77	
TPK	female	249	18.67	3.92	t(350) = -.107, *p*> 0.05
	male	103	18.72	3.98	
TCK	female	249	18.13	4.58	t(350) = -.972, *p*> 0.05
	male	103	18.66	4.62	
PCK	female	249	17.87	4.34	t(350) = .226, *p*> 0.05
	Male	103	17.75	4.72	
TPACK	female	249	19.48	3.30	t(350) = 1.064, *p*> 0.05
	male	103	19.07	3.21	

None of t-test results were significant at alpha level of 0.05, for the subscales of technology knowledge [t(350) = 1.708, *p*> 0.05], pedagogy knowledge[t(350) = 1.536, *p*> 0.05], Content knowledge [t(350) = .730, *p*> 0.05], technology pedagogy knowledge [t(350) = -.107, *p*> 0.05], technology Content knowledge [t(350) = -.972, *p*> 0.05], pedagogy Content knowledge [t(350) = .226, *p*> 0.05] and technology pedagogy Content knowledge [t(350) = 1.064, *p*> 0.05]. (See Table 4.17)

4.3.2. Grade Effect on TPACK Scale

In order to assess high school students' technology pedagogy content knowledge in terms of their grade level, one-way analysis of variance (ANOVA) was performed for subscales of TPACK. Significant and non-significant ANOVA results are presented in the following section.

Firstly, ANOVA result was significant for the subscale of technology knowledge, [F (3, 348) = 3.797, $p< 0.05$]. Prep class students' technology knowledge was found to be higher than other groups and the highest difference was observed between the ones in prep class and 11th graders.

ANOVA result was significant for the subscale of technology pedagogy knowledge, [F (3, 348) = 2.965, $p< 0.05$]. 9th-grade students' technology pedagogy knowledge was found to be higher than other groups and the highest difference was observed between 9th graders and 10th graders.

ANOVA result was significant for the subscale of technology content knowledge, [F (3, 348) = 2.740, $p< 0.05$]. Prep class students' technology content knowledge was found to be higher than other groups and the highest difference was observed between the ones in prep class and 10th graders.

ANOVA result was significant for the subscale of technology pedagogy content knowledge, [F (3, 348) = 4.969, $p< 0.05$]. Prep class students' technology pedagogy content knowledge was found to be higher than other groups and the highest difference was observed between the ones in prep class and 10th graders.

ANOVA results were not found to be significant for the sub-dimensions of pedagogy knowledge general MLTAS [F (3, 348) = 0.072, $p> 0.05$], for subscale of content knowledge [F (3, 348) = 1.806, $p> 0.05$] and for the subscale of pedagogy content knowledge [F (3, 348) = 1.749, $p> 0.05$].

Table 4.18.

Effect of Grade Level on Students' Perception of TPACK

	Grade	n	M	SD	ANOVA results	Comparison
TK	Prep	93	19.74	3.19	F (3, 348) = 3.797	Prep class > 11th graders
	9	101	19.54	2.87	*p*< 0.05	
	10	93	18.52	3.73		
	11	65	18.29	3.59		
PK	Prep	93	18.92	3.63	F (3, 348) = 0.072	-
	9	101	19.14	3.31	*p*> 0.05	
	10	93	19.12	3.97		
	11	65	19.06	3.86		
CK	Prep	93	12.75	1.83	F (3, 348) = 1.806	-
	9	101	13.07	1.95	*p*> 0.05	
	10	93	12.48	1.70		
	11	65	12.76	1.51		
TPK	Prep	93	19.18	3.84	F (3, 348) = 2.965	9th graders > 10th graders
	9	101	19.29	3.43	*p*< 0.05	
	10	93	17.87	4.07		
	11	65	18.23	4.42		
TCK	Prep	93	19.05	3.80	F (3, 348) = 2.740	Prep class > 10th graders
	9	101	18.73	4.64	*p*< 0.05	
	10	93	17.32	4.93		
	11	65	17.89	4.88		
PCK	Prep	93	17.55	3.96	F (3, 348) = 1.749	-
	9	101	17.86	4.26	*p*> 0.05	
	10	93	17.35	5.17		
	11	65	18.90	4.19		
TPACK	Prep	93	20.15	2.66	F (3, 348) = 4.969	Prep class > 10th graders
	9	101	19.75	2.98	*p*< 0.05	
	10	93	18.53	3.65		
	11	65	18.83	3.62		

To sum up the ANOVA results showing grade effect on perceptions of students, there were significant differences among grades in terms of technological knowledge (TK), technological content knowledge (TCK), technological pedagogical knowledge (TPK) and technological pedagogical content knowledge (TPACK). For three subscales namely TK, TCK and TPACK; Preparatory class students' perceptions were significantly different from other classes. (See Table 4.18)

4.4. Mobile Learning Tools Acceptance of High School Students

In order to examine high school students' mobile learning tool acceptance level, descriptive statistics were run.

Table 4.19.

Students' Mobile Learning Tools Acceptance Level

Subscale	Item number	M	SD
Perceived ease of use (PEtoU)	4	3.86	0.67
Voluntariness to use (VtoU)	5	3.78	0.72
Cont. to Foreign Lang. (CtoFLL)	5	3.63	0.67
Negative Perception (NP)	5	2.09	0.83
Total Score of MLTAS	19	3.79	0.64

The results showed that among the four domains of MLTAS, perceived ease of use got the highest mean score. It was followed by voluntariness to use and contribution to foreign language learning. The lowest mean score was found for negative perception subscale. The mean of the whole scale was 3.79 and the only subscale that had mean lower than 3.00 was negative perception. These results showed that the statements regarding perceived ease of use, voluntariness to use and contribution to foreign language learning were moderately accepted by the students. The statements regarding negative perception of mobile tools were slightly true for high school EFL learners. (See Table 4.19)

Table 4.20.

Descriptive Statistics on Perceived Ease of Use

Items		Not true for me	Slightly true for me	Moderately true for me	True for me	Extremely true for me	M	SD
2.It is easy for me to use a mobile tool in terms of my learning purposes	*F*	1	8	41	129	173	4.32	0.79
	%	0.3	2.3	11.6	36.6	49.1		
1.Mobile tools improve my learning	*F*	10	19	46	175	102	3.97	0.95
	%	2.8	5.4	13.1	49.7	29		
4.Mobile tools make it easy to comprehend the content of a class.	*F*	12	29	50	207	54	3.74	0.93
	%	3.4	8.2	14.2	58.8	14.3		
3.When I hear about a new mobile application for foreign language learning, I get excited to download and use it	*F*	3	30	149	159	11	3.41	9.73
	%	0.9	8.5	42.3	45.2	3.1		

As the first subscale of MLTAS, perceived ease of use of the mobile tools by learners was examined. Only item 1's mean score was over 4.00. The results showed that the highest mean was for item 2 (It is easy for me to use a mobile tool in terms of my learning purposes). Item 1 (Mobile tools improve my learning) and item 4 (Mobile tools make it easy to comprehend the content of a class.) followed it. The lowest mean was presented for item 3 (When I hear about a new mobile application for foreign language learning, I get excited to download and use it). (See Table 4.20).

Table 4.21.

Descriptive Statistics on Contribution to Foreign Language Learning

Items		Not true for me	Slightly true for me	Moderately true for me	True for me	Extremely true for me	M	SD
19.Using mobile tools increases my productivity in creating outputs in a foreign language.	*F*	16	31	63	131	111	3.82	1.11
	%	4.5	8.8	17.9	37.2	31.5		
11.Using my mobile tool in foreign language learning process makes me academically more successful.	*F*	12	30	75	149	86	3.76	1.02
	%	3.4	8.5	21.3	42.3	24.4		
14.Mobile tools have a positive effect on my note-taking ability	*F*	4	57	68	149	74	3.66	1.02
	%	1.1	16.2	19.3	42.3	21		
13.While learning a foreign language, I can't wait the circumstances in which I can use a mobile tool.	*F*	3	29	133	159	27	3.51	0.79
	%	0.9	8.2	37.8	45.2	7.7		
15.My mobile tool helps to improve my verbal-communication skills.	*F*	4	71	96	133	48	3.43	0.99
	%	1.1	20.2	27.3	37.8	13.6		

Secondly, items in contribution to foreign language learning were presented in Table 4.20. The results showed that the mean scores of all items in this subscale were lower than 4.00. The students were moderately voluntary to use mobile tools for their learning process. The highest mean was for item 19 (Using mobile tools increases my productivity in creating outputs in a foreign language). It was followed by Item 11 (Using my mobile tool in foreign language learning process makes me academically more successful), item 14 (Mobile tools have a positive effect on my note-taking ability) and 13 (While learning a foreign language, I can't wait the circumstances in which I can use a mobile tool). The lowest mean was presented for item 15 (My mobile tool helps to improve my verbal-communication skills). (See Table 4.21)

The third subscale was negative perceptions of the students regarding mobile learning tools. The results showed that the mean scores of all items in this subscale were lower than 3.00.

Table 4.22.

Descriptive Statistics on Negative Perception

Items		Not true for me	Slightly true for me	Moderately true for me	True for me	Extremely true for me	M	SD
16.Using a mobile tool does not cause a big change in my effectiveness in the class.	*F*	79	182	57	21	13	2.17	0.96
	%	22.4	51.7	16.2	6	3.7		
17.My friends do not lead me to use mobile tools.	*F*	79	181	58	21	13	2.17	0.97
	%	22.4	51.4	16.5	6	3.7		
8.Although I use my mobile tool in/out of the class, I cannot acquire the expected success.	*F*	79	181	58	20	14	2.17	0.97
	%	22.4	51.4	16.5	5.7	4		
12.A mobile tool makes it difficult to concentrate on the class.	*F*	79	183	56	21	13	2.16	0.96
	%	22.4	52	15.9	6	3.7		
18.Using a mobile tool is difficult for me.	*F*	159	139	37	16	1	1.75	0.84
	%	45.2	39.5	10.5	4.5	0.3		

The students generally did not have negative perception for mobile learning tools in their learning process. The highest mean was for item 16 (Using a mobile tool does not cause a big change in my effectiveness in the class). It was followed by Item 17 (My friends do not lead me to use mobile tools), item 8 (Although I use my mobile tool in/out of the class, I cannot acquire the expected success) and 12 (A mobile tool makes it difficult to concentrate on the class). The lowest mean was presented for item 18 (Using a mobile tool is difficult for me). (See Table 4.22)

As the last subscale, the findings regarding voluntariness to use were presented. The results showed that the means of item 5 and item 6 were over 4.00. The means of other items were over 3.00. The highest mean was for item 5 (Studying with a mobile tool is enjoyable). It was followed by Item 6 (While learning vocabulary, I usually prefer learning with mobile tools rather than with traditional methods), item 7 (I want to use my mobile tool if my teacher allows me to) and 9 (When I download a new application for foreign language learning, I easily learn how to use it). The lowest mean was presented for item 10 (I often use mobile tools in classes that are appropriately planned for the use of mobile tools). (See Table 4.23)

Table 4.23.

Descriptive Statistics on Voluntariness to Use

Items		Not true for me	Slightly true for me	Moderately true for me	True for me	Extremely true for me	M	SD
5.Studying with a mobile tool is enjoyable.	*F*	3	14	45	123	167	4.24	0.88
	%	0.9	4	12.8	34.9	47.4		
6.While learning vocabulary, I usually prefer learning with mobile tools rather than with traditional methods.	*F*	3	23	74	113	139	4.03	0.97
	%	0.9	6.5	21	32.1	39.5		
7.I want to use my mobile tool if my teacher allows me to.	*F*	15	34	63	133	107	3.8	1.10
	%	4.3	9.7	17.9	37.8	30.4		
9.When I download a new application for foreign language learning, I easily learn how to use it.	*F*	4	43	114	147	44	3.52	0.9
	%	1.1	12.2	32.4	41.8	12.5		
10.I often use mobile tools in classes that are appropriately planned for the use of mobile tools.	*F*	4	79	109	124	35	3.3	0.97
	%	1.4	22.4	31	35.2	9.9		

Table 4.24

MLTAS Items with Mean Scores Higher than 4.00

Items	Subscale	M	SD
It is easy for me to use a mobile tool in terms of my learning purposes.	PEtoU	4.32	0.79
Studying with a mobile tool is enjoyful.	VtoU	4.24	0.88
While learning vocabulary, I usually prefer learning with mobile tools rather than with traditional methods.	VtoU	4.03	0.97

In MLATS, items with mean scores higher than 4.00 were from the subscales of perceived ease of use and voluntariness to use. The students were pretty sure that using mobile tools for educational purposes was easy and enjoyful. They preferred learning with mobile tools rather than with traditional methods and techniques. (See Table 4.24)

Table 4.25

MLTAS Items with Mean Scores Lower than 3.00

Items	Subscale	M	SD
Using a mobile tool does not cause a big change in my effectiveness in the class.	NP	2.17	0.96
My friends do not lead me to use mobile tools.	NP	2.17	0.97
Although I use my mobile tool in/out of the class, I cannot acquire the expected success.	NP	2.17	0.97
A mobile tool makes it difficult to concentrate on the class.	NP	2.16	0.96
Using a mobile tool is difficult for me.	NP	1.75	0.84

The items with mean scores lower than 3.00 were all in negative perception subscale. The results showed that the students' negative perception level of mobile learning tools was low. They generally perceived mobile tools positively. (See Table 4.25)

4.4.1. Gender Effect on MLTAS

Table 4.26.

Effect of Gender on Students' MLTAS Level

Factor	Gender	N	M	SD	t-test
Perceived ease of use	Female	249	15.50	2.66	t(350) = .641, *p*> 0.05
	Male	103	15.30	2.69	
Cont. to Foreign Lang.	female	249	18.26	3.43	t(350) = .703, *p*> 0.05
	male	103	17.99	3.22	
Negative Perception	female	249	10.21	3.99	t(350) = -1.492, *p*> 0.05
	male	103	10.94	4.48	
Voluntariness to use	female	249	18.87	3.57	t(350) = -.124, *p*> 0.05
	male	103	18.93	3.72	
Total MLTAS	female	249	72.43	12.17	t(350) = .673, *p*> 0.05
	male	103	71.46	12.56	

In order to examine the differences between male and female high school students in terms of their mobile learning tools acceptance, series of independent sampled t-test were undertaken for total MLTAS scales and for its sub-dimensions. None of t-test results were significant at alpha level of 0.05, for the whole scale [t(350) = .673, p> 0.05] and for the subscales of perceived ease of use [t(350) = .641, p> 0.05], contribution to foreign language learning [t(350) = .703, p> 0.05], negative perception [t(350) = 1.492, p> 0.05] and voluntariness to use [t(350) = -.124, p> 0.05] (See Table 4.26).

4.4.2. Grade Effect on MLTAS

In order to assess high school students' mobile learning tool acceptance level in terms of their grade level, one-way analysis of variance (ANOVA) was performed for general MLTAS and also for subscales of MLTAS.

ANOVA result was significant for the subscale of perceived ease to use, [F (3, 348) = 2.99, p< 0.05]. Prep class students' perceived ease of use level was found to be higher than other groups and the highest difference was observed between the ones in prep class and 11^{th} graders. The results showed that prep class students accept the items in perceived ease of use subscale more than other graders, and they thought mobile learning tools were easy to use, they helped learning and comprehension of the content.

ANOVA result was significant for the subscale of contribution to foreign language learning , [F (3, 348) = 2.64, p< 0.05]. 9^{th}-grade students' perception of the contribution of mobile learning to foreign language learning level was found to be higher than other groups and the highest difference was observed between 9^{th} graders and 10^{th} graders. 9^{th} graders accept the contribution of mobile tools to foreign language learning process more than other grades. As compared to other grades, they were more likely to think that mobile tools help learners to be more successful in language learning. Furthermore; as compared to other grades, 9^{th} grade students were more likely to want to use mobile tools during the classes, and to think mobile tools were helpful for note-taking and speaking abilities.

Table 4.27.

Effect of Grade Level on Students' MLTAS Level

Factor		n	M	SD	ANOVA results	Comparison
Perceived ease of use	Prep	93	15.84	2.50	F (3, 348) = 2.99, $p< 0.05$	Prep class > 11th grade
	9	101	15.80	2.43		
	10	93	14.97	2.97		
	11	65	14.96	2.68		
Cont. to Foreign Lang.	Prep	93	18.55	3.06	F (3, 348) = 2.64, $p< 0.05$	9th grade >10th grade
	9	101	18.67	3.37		
	10	93	17.47	3.61		
	11	65	17.92	3.29		
Negative Perception	Prep	93	10.45	4.09	F (3, 348) = 2.46, $p> 0.05$	-
	9	101	9.63	3.79		
	10	93	11.24	4.59		
	11	65	10.46	3.96		
Voluntariness to use	Prep	93	18.94	3.57	F (3, 348) = 1.46, $p> 0.05$	-
	9	101	19.36	3.35		
	10	93	18.29	3.94		
	11	65	18.95	3.52		
Total MLTAS	Prep	93	72.90	11.55	F (3, 348) = 2.57, $p> 0.05$	-
	9	101	74.20	11.24		
	10	93	69.49	14.02		
	11	65	71.67	11.68		

ANOVA results were not found to be significant for general MLTAS [F (3, 348) = 2.57, $p> 0.05$], for subscale of negative perception [F (3, 348) = 2.46, $p> 0.05$] and for the subscale of voluntariness to use [F (3, 348) = 1.46, $p> 0.05$]. Grade of the students did not create big differences on the reuslts of the whole scale. Furthermore; negative perceptions regarding mobile learning tools did not get affected from gardes of the students. (See Table 4.27)

4.5. The role of TPACK on Mobile Learning Tools Acceptance

In order to examine the role of technological pedagogical content knowledge (TPACK) on mobile learning tools acceptance of learners, multiple correlation analysis was performed. Results of the correlation analysis showed that all 55 pair wise correlations were statistically significant. The correlation coefficient scores were between -.751 and .893. According to Taylor (1990), r values that are ≤..35 represent weak correlations, .36 to .67 moderate correlations and .68 to 1.0 high correlations.

Table 4.28.

Correlation among subscales of TPACK and of MLATS

Subscales	2	3	4	5	6	7	8	9	10	11
1. Technological Knowledge	.546**	.364**	.591**	.490**	.428**	.755**	.714**	.610**	-.578**	.616**
2.Pedagogical Knowledge	-	.587**	.535**	.411**	.423**	.596**	.543**	.483**	-.456**	.510**
3.Content Knowledge		-	.498**	.333**	.285**	.491**	.414**	.366**	-.299**	387**
4. Technological Pedagogical Knowledge			-	.651**	.492**	.753**	.685**	.637**	-.604**	.658**
5. Technological Content Knowledge				-	.591**	.646**	.617**	.561**	-.526**	.583**
6.Pedagogical Content Knowledge					-	.665**	.635**	.548**	-.495**	.594**
7. Technological Pedagogical Content Knowledge						-	.893**	.791**	-.665**	.842**
8.Perceived Ease of Use							-	.749**	-.751**	.813**
9. Contribution to Foreign Language Learning								-	-.609**	.846**
10.Negative Perception									-	-.643**
11.Voluntariness to Use										-

The correlation of technological knowledge (TK) with perceived ease to use [r (350) = .714, p< 0.01] was high and positive. The correlation with contribution to foreign language learning [r (350) = .610, p< 0.01] and voluntary to use [r (350) = .616, p<

0.01] were moderate and positive. The correlation of technology knowledge with negative perception was moderate and negative [r (350) = -.578, p< 0.01]. These findings showed the higher was students-perceived TK of teachers, the more acceptance of mobile learning tools was found. Efficient technology knowledge of teachers caused lower negative perception of mobile learning tools.

The correlation of pedagogical knowledge (PK) with perceived ease to use [r (350) = .543, p< 0.01], contribution to foreign language learning [r (350) = .483, p< 0.01] and voluntary to use [r (350) = .510, p< 0.01] were medium and positive. The correlation of pedagogy knowledge with negative perception was medium and negative [r (350) = -.456, p< 0.01]. These findings indicated that if students perceive good PK of English teachers, they accepted ease of use and they felt voluntary to use mobile tools.

The correlation of content knowledge with perceived ease to use [r (350) = .414, p< 0.01], contribution to foreign language learning [r (350) = .366, p< 0.01] and voluntary to use [r (350) = .387, p< 0.01] were medium and positive. The correlation of content knowledge with negative perception was weak and negative [r (350) = -.299, p< 0.01]. These results showed that there was a moderate relation between content knowledge of a teacher and students' acceptance of mobile learning tools in terms of perceived ease of use, contribution to foreign language learning and voluntariness to use.

The correlation of technological pedagogical knowledge (TPK) with perceived ease to use [r (350) = .685, p< 0.01] was high and positive. The correlation of technological pedagogical knowledge (TPK) with contribution to foreign language learning [r (350) = .637, p< 0.01] and voluntary to use [r (350) = .658, p< 0.01] were moderate and positive. The correlation of technological pedagogical knowledge with negative perception was moderate and negative [r (350) = -.604, p< 0.01]. These findings revealed that the higher TPK a teacher had, the higher acceptance and positive perceptions the students had.

The correlation of technological content knowledge (TCK) with perceived ease to use [r (350) = .617, p< 0.01], contribution to foreign language learning [r (350) = .561, p< 0.01] and voluntary to use [r (350) = .583, p< 0.01] were moderate and positive. The correlation of technological content knowledge with negative perception was moderate and negative [r (350) = -.526, p< 0.01]. These results showed that the more TCK a teacher acquired, the more the students accepted mobile learning tools.

The correlation of pedagogical content knowledge (PCK) with perceived ease to use [r (350) = .635, p< 0.01], contribution to foreign language learning [r (350) = .548, p< 0.01] and voluntary to use [r (350) = .594, p< 0.01] were moderate and positive. The correlation of content knowledge with negative perception was moderate and negative [r (350) = -.495, p< 0.01]. These results showed that the more PCK a teacher acquired, the more the students accepted mobile learning tools.

The correlation of technological pedagogical content knowledge (TPACK) with perceived ease to use [r (350) = .893, p< 0.01], contribution to foreign language learning [r (350) = .791, p< 0.01] and voluntary to use [r (350) = .842, p< 0.01] were high and positive. The correlation of TPACK with negative perception was moderate and negative [r (350) = -.665, p< 0.01]. These results showed that the more TPACK a teacher had, the more the students accepted mobile learning tools.

To sum up the findings of multiple correlation analysis, the more knowledge teachers had regarding all of the seven domains of TPACK, the more positively the students perceived and accepted mobile learning tools. The findings are presented in this chapter according to the research questions of the study. Discussions regarding these results are given in the next chapter.

CHAPTER V

DISCUSSION, CONCLUSION, IMPLICATIONS

This chapter starts with the discussion part. After the results are discussed related to the research in the field, the conclusion of the study and implications are presented. Limitations of the study are also provided, and the chapter ends up with suggestions for further research.

5.1. Discussion

In this part, the findings of the study are discussed and compared to the results of the other studies in the field. Similar or different results are discussed regarding four research questions and sub-questions of them.

5.1.1. Mobile Tool Usage Habits of High School Students

Regarding the findings of the present study, smart phone (90.6%) was the most used mobile tool by high school learners. It was followed by tablet (67.3%), laptop (64.4%), mobile phone (36.6%) and MP3 player (25%). There was not any respondent that uses PDA. The students could think of the advantages of smart phones such as being popular and handy, as well as easy to carry.

There have been similar and different results in the literature regarding mobile tools that are used by students. Şener (2016) also found that smart phones were the most widely used mobile tool for secondary school students. Furthermore; according to Turkish Statistical Institute (2016), the most commonly used mobile device was smart phone. 96.9% of people had a smart phone or mobile phone. Laptop (36.4%) and tablet (29.6%) had lower percentage. The results of this study were different from those of Vyas and Nirban (2014) and Croop (2008).

Tablets and laptops are not as popular as smart phones, although Ministry of Education has distributed free tablets in the scope of FATIH project. These results can be interpreted that the students get accustomed to the small mobile devices in time as there is huge increase in the use of them (Mcconatha, Praul and Lynch, 2008; Kvavik, 2005). Furthermore; the rise in the adoption of m-learning in the recent years (Zengin, Şengel and Özdemir, 2018) can be a potential reason for the difference in the results. As the most used mobile device, smart phones should be utilized to foster teaching and learning English. This idea was also offered by Corbell and Valdes-Corbell (2007) and Kafyulilo (2014).

As for time spent using mobile tools per day, 34% of them spent 1-3 hours and 45.2% used mobile devices for 4-6 hours. It is clear that 89.5% of the students use mobile devices more than 1 hour per day. Similar to the present study, Şener (2016) found that 84% of high school students spare more than 1 hour each day to use mobile tools. Karaoğlan Yılmaz, Dilen and Durmuş (2018) also found corresponding results for high school students. Regarding similar findings, it is asserted that high school students can allocate time for m-learning.

The most common aim of students with mobile tools was to use social media. 87.2% of the participants stated they used a mobile device to enter social sharing websites. Şener (2016) resulted that high school students benefitted mobile devices mostly to go online, to chat, to do research and to take photos. In the present research, educational purposes (86.9%) had nearly the same incidence with social sharing websites (87.2%). However; educational purposes were chosen 58.2% of the participants in Şener (2016) and 41.5% in Kurnaz (2010). That difference may result from various reasons. Teachers' guidance or educational context may affect the learners' aims.

Regarding educational purposes, participants of this study selected ‘do research’ and ‘do homework’ mostly. The similar sequence was seen in Şener (2016) for doing research and homework. Regarding these results, the students should be guided to blend educational process with social media. They seem to have the ability to express themselves on social media. Integrating such applications into teaching or learning process may increase productivity. Moreover; this can affect the perception of m-learning of the students.

More than half of the students (52.9%) indicated that they downloaded and used mobile applications to facilitate English learning, but, remaining 47.1% did not download any mobile application for such purpose. 23% of the students stated that they used two or more applications. Only four students wrote they did not remember the name of the application. Participants mentioned various applications such as Duolingo (n=94), Tureng (n=35), Memrise (n=25), GoogleTranslate (n=20), Dyned (n=19), SesliSözlük (n=16) were some of the applications.

Different from the present study, Şener (2016) stated that high school students used Google Translate at the highest level. The researcher suggested that it was due to the familiarity of Google search engine. This difference may result from teacher guidance in high school context. Although DynEd is a MEB supported application, the number of students using it is not high. In secondary state schools; the use of DynEd is compulsory for teachers and students. Nevertheless, the frequency for Dyned was very low in the present study. It seems that making a program or application compulsory does not mean that it will be accepted and used. English teachers should supply student with adequate guidance regarding mobile applications. The reason for the fact that Duolingo may be the most mentioned application (used more than DynEd) may be English teachers’ advice.

Most of the participants use mobile internet of a GSM operator. Karaoğlan Yılmaz et al. (2018) also discussed that m-learning can include the Internet use since most of the high school learners (70%) have access to mobile internet. Similarly, 78% of Turkish people aged between 17-24 use mobile internet (IAB, 2014).

In conclusion, high school students can be said to have high interest in mobile devices for educational and socializing purposes. They have time and internet access to enhance their learning process with mobile tools. That's why Education Informatics Network

(EBA) may be a good option for English teachers in the scope of m-learning. Teachers first need to have knowledge regarding mobile applications for foreign language education and then they should supply guidance to students.

5.1.2. Student-perceived TPACK of English Teachers

The focus of TPACK studies is generally limited to in-service and pre-service teachers. Students' perceptions of teachers' TPACK have been a neglected field in the literature (Tseng, 2016). There have been a few studies concerning learners' perceptions of instructors' TPACK (Chang, Jang and Chen, 2015; Jang and Chen, 2010). That makes the present study unique to some extent. Furthermore; TPACK scale by Tseng (2016) was developed for high school context, however; conducted studies mainly focused on university students' perceptions of teachers' TPACK. Naturally; subscales, item numbers and language in such scales are different from each other. All of these factors make the comparison of the results difficult. The same scale was used by Tseng (2014) and the results are compared in the following sections.

Interpreting descriptive data, the results showed that teachers were perceived proficient only in content knowledge and the students were not sure about technological knowledge, pedagogical knowledge and the ways in which the three bodies of knowledge are tactfully combined. Using TPACK scale with 257 students in Taiwan, Tseng (2014) found different results. The highest mean score was found in content knowledge (CK) and the lowest mean score was found in technological pedagogical content knowledge (TPACK) subscale. However; the mean scores of all subscales were higher than 4.00 which meant the students in Taiwan were generally sure about their teachers' knowledge.

In the present study, there were 12 items with mean scores higher than 4.00. When the mean scores were sequenced it was found that the students thought their teacher's knowledge regarding three individual knowledge domain (CK, PK and TK) were better than the intersections between them (TPK, TCK, TPACK). On the other hand, Tseng (2014) found that the students agreed 28 of total 30 items in the scale. When top 5 items of these two studies were compared, some similarities and differences were found. There were three same items were listed in top 5 of two studies. These items were all from content knowledge domain regarding grammar, pronunciation and answering

students' questions. In this study, the rest two items were in pedagogical knowledge regarding evaluation methods and teaching strategies. In Tseng (2014), on the other hand, the other two items were about keeping up with technology and classroom management.

Regarding the items with mean scores lower than 4.00, in this study 21 statements' means were between 3.00 and 4.00. That meant Turkish high school students were generally unsure about knowledge of their teachers except content knowledge. However; in Tseng (2014), there were only two items with mean scores lower than 4.00. These items were in TPACK (The way my teacher teaches English with the computer is engaging) and TK (My teacher knows how to deal with technical problems related to software - e.g. installing drivers, setting up Internet connection, and sharing files in the cloud) subscales. These two items' mean score were lower than 4.00 in the present study, too.

The differences in the findings of this study and Tseng (2014) may result from the fact that Taiwan has a leading position in terms of mobile learning and technology integration to education. There have been still a need for studies regarding TPACK and m-learning in Turkey while Taiwan is the country where the number of studies on mobile learning is at the highest level. In Taiwan, there are few schools that forbid mobile tools. However; in Turkey, especially smart phones or mobile phones are not allowed in classes. These showed that Turkey needs to improve regarding effective teachers' education on educational technology. Supplying materials such as tablets, smart boards may be important but not enough to increase the quality of mobile learning.

5.1.3.Mobile Learning Tools Acceptance of High School Students

Data analysis in the present study showed that high school EFL learners had positive perceptions about mobile learning tools. Three subscales namely perceived ease of use, voluntariness to use and contribution to foreign language learning had mean scores higher than 3.00. That meant the students moderately accept the items in these subscales. The only subscale with mean score lower than 3.00 was negative perception. This result also showed that the students moderately accepted mobile learning tools. Similarly, positive perceptions of students have been found in different studies such as

Çavuş and Uzunboylu (2009); Yang (2012); Elçiçek (2015); and Nassuora (2012); Ozdamlı and Uzunboylu (2015).

Descriptive statistics of Mobile Learning Tools Acceptance Scale showed that high school students perceived mobile tools use as practical and useful. Perceived ease of use subscale analysis showed that students thought using mobile devices in conformity with educational purposes was easy for them and this was the item with the highest mean score. The students agreed that using mobile tools improved the learning process. They accepted mobile tools as facilitators for studying target content. 48.4% of the participants accepted that they felt excited for downloading and using new mobile applications for foreign language learning. This item was the one with the lowest mean score. These results are aligned with the results of the first research question. Kafyulilo (2012) stated that in Tanzanian secondary school teachers and students had a positive attitude towards the use of mobile phones to enhance their learning. Students felt comfortable with mobile tools while learning new content. However, teachers did not feel comfortable with the mobile phone rather than computers. This difference may be the outcome of the generation difference. Young generations are digital natives. That may be a reason for feeling comfortable with technology or with mobile tools.

Analysis of the subscale 'voluntariness to use' showed that most of the high school students found using mobile devices while studying content enjoyable. This item had the highest mean score in the subscale. They preferred learning via mobile tools instead of through traditional methods. The students accepted that they were willing to use mobile devices during the class time. If a teacher integrated mobile devices into teaching and learning procedure, the students were willing to use mobile tools frequently. As the item with the lowest mean score, 'I easily learn how to use a new application of foreign language learning' was chosen. Ağca and Bağcı (2013) also found mobile tools as a motivation source for learners. Moreover; Almutairy, Davies and Dimitriadi (2015) concluded that in higher education students had positive perceptions toward mobile learning. Similar to the present study, the researchers found that students were willing and ready to use mobile phones for learning activities.

Mobile learning tools were accepted as the contributors of foreign language learning by high school EFL learners. The results showed that students they liked using mobile tools while learning a foreign language. They thought that using mobile tool made foreign language learning more productive and this was the item with the highest mean score.

According to the students, mobile tools could help to develop speaking skills and to increase success in foreign language learning. The lowest mean score was found for the effect of mobile tools on speaking activities. Similar results were found by many studies such as Chen and Huang, 2010; Chang, Chen, and Hsu, 2011; Sandberg, Maris, and Geus, 2011; Basoglu and Akdemir, 2010.

Regarding the highest and the lowest mean scores in the whole scale, the items with mean scores higher than 4.00 were from the subscales of perceived ease of use and voluntariness to use. The students were pretty sure that using mobile tools for educational purposes was easy and enjoyful. They preferred learning with mobile tools rather than with traditional methods and techniques. The items with mean scores lower than 3.00 were all in negative perception subscale. The results showed that the students' negative perception level of mobile learning tools was low. They generally perceived mobile tools positively.

Gender did not pose significant difference in acceptance of mobile learning tools according to the data analyzed in this study. Similarly, studying with pre-service teachers, Şad and Nalçacı (2015) found that gender did not have a significant effect on the participants ICT competence. On the other hand, Şener (2016) concluded that male high school students were more willing to use mobile tools for educational purposes than female participants. Yokuş (2016) found that gender significantly affects the attitude of university students towards m-learning in favor of male participants. Differences in the results may result from the context, focus and universe of studies. Further studies should be done about gender effect since the present study has the limitation that the number of male participants (n=103) is lower than female participants (n=249).

Grade level created a significant difference for the subscales of perceived ease of use and contribution to foreign language learning. On the contrary, for the subscales of negative perception and voluntariness to use, a significant difference was not found. Contribution to foreign language learning was found highest for 9th grade students. In terms of perceived ease of use prep class students had the highest acceptance level. The lowest level was found for 11^{th} graders. This situation may result from the fact that 11th grade students prepare for the national university entrance exam and they may find mobile tools disruptive and that may affect their perceived ease of use. On the contrary, Elçiçek (2015), Kurnaz (2010), Saraç (2014) and Gürkan (2017) studied m-learning

attitudes of students and found that grade level did not result in a significant difference. Positive attitudes in other studies and voluntariness to use in this study regardless of grade may be due to rapid social adaptation to technological development and devices.

5.1.4.The Role of TPACK on Mobile Learning Tools Acceptance

Examining data in two scales, namely TPACK scale and MLATS, it was found that the higher knowledge the students perceived, the more they accepted mobile learning tools in terms of perceived ease of use, contribution to foreign language learning and voluntariness to use subscales. In other words, the higher knowledge the students perceived, the lower they had negative perception regarding mobile learning tools. These results stressed the importance of the knowledge that teachers had and students' perceptions of teachers' knowledge.

The significant correlations were found between the subscales of MLTAS and the seven sub-domains of TPACK scale. Regarding perceived ease of use, contribution to foreign language learning and voluntariness to use; the highest positive correlations were found with technological knowledge, technological pedagogical knowledge and technological pedagogical content knowledge. As for the negative perception subscale, the highest negative correlations were also found with technological knowledge, technological pedagogical knowledge and technological pedagogical content knowledge. These results stressed the importance of technological knowledge and intersections of knowledge types with technology in order to accept mobile learning tools.

Based on the results of the study, TPACK of teachers and m-learning practices should be given importance. Teacher training programs should be integrated with technology and TPACK. This seems to affect teachers and also perceptions of learners regarding m-learning and m-learning tools. Similarly, Angeli and Valanides (2009) argued that if teachers learnt how to make good use of technology (information and communication technology), they were more likely to create better learning environments for students.

Similar results were gathered in the studies whose participants were teachers rather than students. For instance, Hsu (2016) examined the effect of EFL teachers' TPACK on the adoption of mobile-assisted language learning. To get results, 158 in-service Taiwanese English teachers were surveyed and the effect of TPACK on m-learning was examined. Therefore, the present study had basic similarity with Hsu (2016). The researcher found

that TPACK significantly affected the acceptance and adoption of technology in class. The researcher ended up with the idea that EFL teachers' TPACK affected their attitudes towards and adoption of MALL.

To continue with the studies with teacher participants, Archambault and Crippen (2009) found that teachers had confidence in pedagogical content knowledge, pedagogical knowledge and content knowledge, however; when technology came to the stage, they were found to have less confidence. Teachers were less confident in the domains that include technology namely technological knowledge (TK), technological content knowledge (TCK), technological pedagogical knowledge (TPK) and technological pedagogical content knowledge (TPACK). Similar results were also found in Chai Chin, Koh and Tan (2013). In that study, CK was rated highest and TPACK was rated lowest by the teachers regarding their own knowledge.

There have been studies (Boschman, McKenney and Voogt, 2015; Jen, Yeh, Hsu, Y. S, Wu and Chen, 2016) asserting the fact that teachers think their theoretical knowledge is enough but still they are unable to use technology effectively in the classes. According to Chuang, Weng and Huang (2015), having training on how to use technology in real classroom practices made TPACK of teachers better. The researchers stated that teachers were often forced to provide students with the opportunity to learn more, in less time. For this reason, new educational techniques and methods should be developed to ensure more productive learning process. It is compulsory for students and teachers to develop their own ability to search and find information that they need. In order to provide better and faster learning and teaching, new tools and methods must be constantly investigated and developed (Alkan, 1995). Similarly, Kukulska-Hulme (2009) stressed that students needed teacher guidance to utilize m-learning. It is therefore imperative for instructors to understand how to use mobile devices effectively in order to supplement their teaching, as well as student learning. Tai, Pan, and Lee (2015) argued the idea that prior to applying m-learning; teachers must possess appropriate technological and pedagogical knowledge.

In conclusion, in order to increase the acceptance level of mobile learning tools, seven domains of TPACK knowledge should be acquired. Especially technological, technological pedagogical and technological pedagogical content knowledge of teachers' had significant effects on the acceptance of mobile learning tools by the students.

5.2. Conclusion and Implications

The following sections present the summary and conclusion of the study and continue with the implications for educators. In the final section, the limitations of the study are explained and recommendations for further research are presented.

5.2.1. Summary and Conclusion of the Study

This is a quantitative study that aimed to investigate the role of TPACK of English teachers on the acceptance of mobile learning tools by high school EFL learners. The following research questions were posed regarding the aims of the study:

1. What are mobile tool use habits of high school students?
2. What are the high school students' perceptions regarding English teachers' TPACK?
3. What is high school students' acceptance of mobile learning tools?
4. What is the role of English language teachers' TPACK regarding high school students' acceptance of mobile learning tools?

The research was conducted in the spring term of 2017-2018 Academic Year in a state high school in Muğla. Two scales were used with the aim of answering these questions. The first questions were answered with data collected via Mobile Tool Use parts of the scales. TPACK Scale developed by Tseng (2016) was used in order to answer the second research question. MLTAS was used to answer the third question. Multiple correlation analysis was performed to answer the last research question.

Conclusions drawn from the study are presented in the following statements;

The smart phone was the most used mobile tools for high school students. It was followed by tablet and laptop. It was concluded that teachers could benefit from the common use of smart phones and tablets through EBA, DynED or other mobile applications.

It was found that 89.5% of high school students spent more than 1 hour using mobile tools per day. 45.2% of them used mobile devices for 4-6 hours. It was concluded that high school students had time for m-learning.

The most common aim to use mobile tool was to use social media. 87.2% of the participants stated they used a mobile device to enter social sharing websites. Educational purposes (86.9%) had nearly the same incidence with social sharing websites (87.2%). It was concluded that teachers might integrate social sharing sites into classes to motivate the students.

Only half of the participants (52.9%) indicated that they downloaded and used mobile applications to facilitate English learning. Few of them (23%) stated that they used two or more applications. Most of the participants used mobile internet of a GSM operator. Duolingo was the most downloaded mobile application for English learning. It was followed by Google Translate. It was concluded that teachers should supply more guidance regarding mobile applications. The reason for low rates of MEB supported-application DynEd should also be taken into consideration.

High school students agreed on the content knowledge of their English teachers while they were unsure about other 6 domains of knowledge. Among 33 items in TPACK scale, there were 12 statements with mean scores higher than 4.00. It was concluded that the students were sure about teachers' knowledge of grammar, pronunciation, evaluation methods, teaching techniques, basic computer hardware, new technologies, teaching with computer, digitalized materials for reading, presentation strategies, using technology as a motivation tool, proper strategies to utilize technology in class.

Grade level affected students' perceptions in terms of technological knowledge, technological pedagogical knowledge, technological content knowledge and technological pedagogical content knowledge of teachers. Significant differences were observed in the factors that include technology, not in the others, namely PCK, CK and PK. It was concluded that grade level affected the way students perceived knowledge domains that includes technology.

High school EFL learners had moderately positive perceptions about mobile learning tools. Regarding the items with lowest mean scores in the subscales, it was concluded that English teachers should be knowledgeable about mobile applications that can be

used to foster foreign language learning. They should supply the students with adequate guidance.

Regarding the role of English teachers' TPACK on the acceptance of mobile learning tools of high school students, it was concluded that the higher knowledge they perceived, the more they accepted mobile learning tools. The highest correlations were found between acceptance of mobile tools and student-perceived technological knowledge, technological pedagogical knowledge and technological pedagogical content knowledge. It was concluded that technology was one of the most important elements and knowledge type for a teacher in order to increase the acceptance and use of mobile learning tools. Teacher training programs should be designed including technological integration.

5.2.2. Implications of the Study

Regarding mobile tool usage habits of the students, English teachers should not disregard technological developments. The fact that smart phones are one of the indispensable parts of people's lives should be taken into consideration. Teachers should seek the way of benefitting from smart phones instead of closing eyes to realities.

As m-learning is a relatively new field of study, more research should be done about m-learning, m-learning tools, m-learning tools acceptance.

Students' ideas regarding TPACK of teachers and m-learning practices should be given importance. There has been discrepancy in such studies. Therefore, more research should be conducted and student-perceived TPACK of teachers should be extensively examined.

There might be some additions to the curriculum regarding m-learning in order to increase the awareness of the students of this topic. English teachers should have knowledge of foreign language learning applications that can be downloaded and they should provide adequate guidance to the learners. Then they should provide the students with guidance form-learning, mobile applications and mobile tools that can be beneficial for EFL learning.

A teacher should remember that their knowledge affects the students' acceptance of mobile learning tools. That's why teachers should improve themselves and update their

knowledge. In order to increase m-learning practices, teachers should first have TPACK knowledge, especially the domains that include technology. This issue should be taken into consideration while designing teacher training programs.

5.2.3. Limitations of the Study and Recommendations for Further Research

There has not been any classroom observation on the real practices of English teachers who are evaluated by students. Therefore, the only source is students' responses in the scales. The results are limited to survey data. Social Sciences High School is a boarding school. That's why the students who did not go to their hometown in the second term could not get the permission paper from their parents, which reduces the number of participants.

Some suggestions for further research are stated as follows;

This is a quantitative study based on two scales. It is suggested that further research should be designed as a mixed study with subsequent interviews with voluntary students. Furthermore; classroom observations to see real practices can be done in further studies.

This study was conducted in a state high school with 352 participants. In order to generalize the results, the number of participants should be increased. Different types of schools can be included in potential studies.

The study focuses on high school EFL learners and their perceptions. English teachers can also be included in order to see the differences between the perceptions of teachers and students.

There are not many instruments to collect data about students' perceptions of TPACK. Researchers can conduct studies to develop such scales in Turkish context. There is also need for more studies on mobile learning tools acceptance of students.

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APPENDICES

Appendix 1. Etik Kurul Kararı

MUĞLA SITKI KOÇMAN ÜNİVERSİTESİ
İNSAN ARAŞTIRMALARI ETİK KURUL KARARI

Protokol No : 180090 **Karar No : 80**

Araştırma Yürütücüsü	İngilizce Öğretmeni DERYA BOSTAN
Kurumu / Birimi	MUĞLA SITKI KOÇMAN ÜNİVERSİTESİ / İNGİLİZ DİLİ EĞİTİMİ
Araştırmanın Başlığı	The Role Of Tpack Of English Teachers On High School Learners' Acceptance Of Mobile Learning Tools: A Case Study. (İngilizce Öğretmenlerinin Teknolojik-Pedagojik-Alan Bilgisinin (Tpab), Lise Öğrencilerinin Mobil Öğrenme Araçları Kabul Düzeyi Üzerindeki Etkisi: Bir Durum Çalışması))
Başvuru Formunun Etik Kurula Geldiği Tarih	27.04.2018
Başvuru Formunun Etik Kurulda İncelendiği Tarih	10.05.2018
Karar Tarihi	**16.05.2018**

KARAR : **UYGUNDUR**
AÇIKLAMA :Araştırmanın uygulanabilirliği konusunda bilimsel araştırmalar etiği açısından bir sakınca yoktur.

Prof. Dr. Banu BAYAR
Başkan

Prof. Dr. Ali AKAR
Üye

Prof. Dr. Özcan SAYGIN
Üye

Prof. Dr. Ulrul AVCI
Üye

Prof. Dr. Hanlo UÇUNCU
Üye

Prof. Dr. Novido DELLAL
Üye

Prof. Dr. Nejcan CENGİZ
Üye

Appendix 2. Aydınlatılmış Onam Formu (Anket Araştırmaları İçin)

"İngilizce Öğretmenlerinin TPAB'nin Lise Öğrencilerinin Mobil Öğrenme Araçları Kabul Düzeyi Üzerindeki Rolü" adlı çalışma Derya BOSTAN tarafından gerçekleştirilecektir. Araştırma, Menteşe Sosyal Bilimler Lisesi'ndeki İngilizce Yabancı dil hazırlık programına dahil olmuş öğrencilerin gözünden İngilizce öğretmenlerinin TPAB'ni ve yine aynı öğrencilerin mobil öğrenme araçlarını kabul düzeyini ortaya koyacak olan iki ölçeğe dayalı veri toplamak amacıyla planlanmıştır. Bu araştırmaya katılmak gönüllülük esasına dayanmaktadır. Çalışmaya katılmamayı tercih edebilir veya ölçeği doldururken sonlandırabilirsiniz. Ölçek formunun üzerine adınızı ve soyadınızı yazmayınız. Bu ölçek ile toplanan bilgiler sadece bilimsel amaçlar için kullanılacaktır. Bu nedenle soruların tümüne doğru ve eksiksiz yanıt vermeniz büyük önem taşımaktadır.

Birinci ölçek 35, ikinci ölçek 19 sorudan oluşmaktadır. Ölçeği tamamlamak yaklaşık 25 dk zamanınızı alacaktır.

Çalışma ile ilgili her hangi bir sorunuz olduğunda aşağıdaki isimle iletişim kurabilirsiniz.

Sorumlu Araştırmacının

Unvanı, Adı Soyadı: Öğretmen – Derya BOSTAN

Telefon Numarası: 0 530 087 38 64

Ölçeği doldurduğunuz için teşekkür ederim.

Appendix 3. Yabancı Dil Olarak İngilizce Öğrenen Öğrencilerin Algısıyla İngilizce Öğretmenlerinin Teknolojik Pedagojik Alan Bilgisi Ölçeği

Sevgili Öğrenciler,

Aşağıda size yöneltilen sorular Yabancı dil olarak İngilizce öğrenen öğrencilerin algısıyla İngilizce öğretmenlerinin Teknolojik Pedagojik Alan Bilgisini belirlemeyi amaçlamaktadır. Demografik bilgilerle ilgili 5 madde, İngilizce öğretmeninizin Teknolojik Pedagojik Alan Bilgisi ile ilgili 35 madde bulunmaktadır. Sizden beklenen, her bir ifadeyi dikkatlice okuduktan sonra, ifadede dile getirilen düşünceye katılma derecenizi, belirtilen katılma derecelerine göre ilgili seçeneğe ait kutucuğu **(X)** ile işaretlemenizdir. Her ifadeyi okuduktan sonra aklınıza gelen ilk seçeneği işaretleyiniz. İşaretsiz ifade bırakmayınız. Vereceğiniz cevaplar yalnızca bilimsel amaçlarla kullanılacağından **adınızı, soyadınızı yazmayınız.**

DEMOGRAFİK BİLGİLER

Sınıf:

Yaş:

Cinsiyet:

Lise Türü:

Akıllı telefonunuz var mı?

Tablet Bilgisayarınız var mı?

Herhangi bir Operatörün **Mobil İnternet Paketine** sahip misiniz?

		Kesinlikle Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle Katılıyorum
1	Öğretmenim temel bilgisayar donanımını bilir. (RAM, ağ kablosu, projektör gibi)					
2	Öğretmenim temel bilgisayar yazılımını bilir. (ortam yürütücüsü/medya player, web tarayıcısı, kelime işlem programları gibi)					
3	Öğretmenim donanım parçaları ile ilgili problemleri nasıl çözeceğini bilir. (yazıcıyı kurma, web cam kullanımı, hard disk değiştirme gibi)					
4	Öğretmenim yazılım ile ilgili problemleri ile nasıl başa çıkabileceğini bilir. (sürücüleri yükleme, internete bağlanma, bulutta dosya paylaşımı gibi)					
5	Öğretmenim yeni teknolojilere ayak uydurur. (e-kitap, Facebook, akıllı tahta gibi)					
6	Öğretmenim derste çeşitli öğretme stratejileri kullanır (açıklama, soru sorma, grup çalışması gibi)					
7	Öğretmenim farklı ölçe metot ve tekniklerini kullanır (quiz, sunma/raporlama, canlandırma gibi)					
8	Öğretmenim öğrencilerin öğrenme zorluklarını anlar.					
9	Öğretmenim öğrencilerin performans ve geri dönütlerine göre öğretme şeklini günceller					
10	Öğretmenim sınıfı nasıl yöneteceğini bilir (açık sınıf kurallarını belirleme, sınıfta arkadaşça bir ortam oluşturma, öğrenci-öğretmen arasında iyi bir ilişki geliştirme gibi)					
11	Öğretmenim yeterli İngilizce dilbilgisine sahiptir.					
12	Öğretmenimin iyi bir telaffuzu vardır					
13	Öğretmenim İngilizceyi doğal bir şekilde öğretir					
14	Öğretmenim, öğrenmeyi geliştiren materyaller üretir					
15	Öğretmenim, öğrencilerin İngilizce ile ilgili sorularını cevaplar.					
16	Öğretmenim, beni motive etmek için teknolojiyi kullanır					
17	Öğretmenim, daha iyi açıklama yapmak için teknolojiyi kullanır					
18	Öğretmenim, bizimle daha fazla iletişim kurmak için teknolojiyi kullanır					

		Kesinlikle Katılmıyorum	**Katılmıyorum**	**Kararsızım**	**Katılıyorum**	**Kesinlkle Katılıyorum**
19	Öğretmenim, öğrenme aktivitelerini desteklemek için teknolojiyi kullanır					
20	Öğretmenim, kendi öğretimine uygun olan teknolojileri kullanır.					
21	Öğretmenim, kelimeleri daha iyi öğrenebildiğim dijital öğretim materyallerini kullanır					
22	Öğretmenim, dilbilgisini daha iyi öğrenebildiğim dijital öğretim materyallerini kullanır.					
23	Öğretmenim, İngilizce okuma becerimi geliştiren dijital öğretim materyallerini kullanır.					
24	Öğretmenim, İngilizce konuşma becerimi geliştiren dijital öğretim materyallerini kullanır.					
25	Öğretmenim, hedef kültürü (İngiliz-Amerikan kültürü) daha iyi anlayabildiğim dijital öğretim materyallerini kullanır.					
26	Öğretmenim, İngilizceyi daha iyi anlayabileceğim şekilde ders işler					
27	Öğretmenim, İngilizceyi daha fazla pratik edebildiğim mini sınavlar (quiz) yapar					
28	Öğretmenim, İngilizceyi daha fazla pratik edebildiğim oyunlar oynatır					
29	Öğretmenim, İngilizceyi daha fazla kullanabildiğim grup aktiviteleri yapar					
30	Öğretmenim, İngilizceyi daha fazla kullanabildiğim tartışma aktiviteleri yürütür					
31	Öğretmenim ders içeriğini uygun stratejiler ile,çeşitli teknolojiler aracılığıyla sunar					
32	Öğretmenim uygun stratejilerle, çeşitli teknolojiler aracılığıyla bizlere İngilizceyi pratik etme şansı sunar					
33	Öğretmenim uygun stratejilerle, çeşitli teknolojiler aracılığıyla bizlere İngilizceyi kullanma şansı sağlar					
34	Öğretmenimin bilgisayar ile bizlere İngilizceyi öğretme şekli merak uyandırıcıdır.					
35	Öğretmenimin bilgisayar ile bizlere İngilizceyi öğretme şekli, İngilizce öğrenimime yardımcı olur					

Appendix 4. Mobil Öğrenme Araçlarını Kabul Ölçeği

Aşağıda size yöneltilen sorular sizlerin mobil öğrenme araçlarını ne derece kabul ettiğinizi belirlemeyi amaçlamaktadır. Mobil cihaz kullanım bilgilerinizle ilgili soruları cevapladıktan sonra 19 maddelik ölçeği cevaplamanız gerekmektedir. Sizden beklenen her bir ifadeyi dikkatlice okuduktan sonra ifadede dile getirilen düşünceye katılma derecenizi, belirtilen katılma derecelerine göre ilgili seçeneğe ait kutucuğu (X) ile işaretlemenizdir. Her ifadeyi okuduktan sonra aklınıza gelen ilk seçeneği işaretleyiniz. İşaretsiz ifade bırakmayınız. Vereceğiniz cevaplar yalnızca bilimsel amaçlarla kullanılacağından adınızı, soyadınızı yazmayınız.

Mobil Cihaz Kullanım Bilgileri

Mobil Cihaz Kullanım Bilgileri	
Kullandığınız mobil cihazlar (Birden fazla işaretleyebilirsiniz)	☐Akıllı Cep Telefonu ☐Cep Telefonu ☐Dizüstü Bilgisayar ☐MP3 Çalar ☐PDA (Kişisel Dijital Asistan) ☐Tablet ☐Diğer (Lütfen Belirtiniz) …….. ☐ Kullanmıyorum
Günlük mobil cihaz kullanma süreniz (Telefon konuşmaları dışında)	☐ 1 saatten az ☐ 1 saat ☐ 2 saat ☐ 3 saat ☐ 4 saat ☐5 saat ☐ 6 saat ☐7 saat ☐8 saat ☐ 9 saat ☐ 10 saat ☐Diğer .....
Mobil cihazları ne amaçla/amaçlarla kullanıyorsunuz?	☐ Araştırma yapmak ☐ Eğitim amaçlı kullanmak ☐ Fotoğraf çekmek ☐ Fotoğraf paylaşmak ☐ İnterneti kullanmak ☐Oyun oynamak ☐ Sohbet etmek ☐ Sosyal PaylaĞım Sitelerine Girmek ☐ Diğer (Lütfen Belirtiniz) .....
Eğitim amaçlı hangi etkinlikler için mobil cihaz kullanırsınız?	☐Araştırma yapmak ☐Eğitsel oyun oynamak ☐E-kitap okumak ☐Ev ödevini yapmak ☐Sözlük kullanmak ☐Test çözmek ☐Video izlemek ☐Diğer (Lütfen Belirtiniz) .....
Mobil aracınıza İngilizce öğrenimini desteklemek için indirdiğiniz ve kullandığınız bir uygulama var mı? Varsa ismi nedir?	.....

Mobil Öğrenme Araçlarını Kabul Ölçeği

1: Bana Hiç Uymuyor

2: Bana Çok Az Uyuyor

3: Bana Orta Derecede Uyuyor

4: Bana Uyuyor

5: Bana Tamamen Uyuyor

		1	**2**	**3**	**4**	**5**
1	Mobil araç kullanmak öğrenmemi geliştirir.					
2	Mobil aracı öğrenme amacıma uygun olarak kullanmak benim için kolaydır.					
3	Yabancı dil öğrenimine ilişkin yeni bir mobil araç uygulaması duyduğumda indirip kullanmayı heyecanla beklerim.					
4	Mobil aracın bir dersin içeriğini çalışmayı kolaylaştırdığını düşünüyorum.					
5	Mobil araçla çalışmak eğlencelidir.					
6	Dil öğrenirken sözcük öğreniminde mobil araç yoluyla öğrenmeyi geleneksel yöntemle öğrenmeye çoğu zaman tercih ederim.					
7	Öğretmenimin kullanımını serbest bırakması halinde, mobil aracımı derste kullanmayı isterim					
8	Mobil aracımı ders içi ve dışında etkili kullanmama karşın sınavlarda olması gereken başarıyı yakalayamıyorum.					
9	Yabancı dil öğrenimi ile ilgili yeni bir uygulama indirdiğim zaman nasıl kullanılacağını kolayca öğrenirim.					
10	Dersin işlenişini mobil araçlara da uygun olacak şekilde tasarlayan öğretmenlerimin dersinde, sıklıkla mobil aracımı kullanırım.					
11	Mobil aracımı yabancı dil öğrenme sürecimde kullanmak beni akademik anlamda daha başarılı bir öğrenci yapmaktadır.					
12	Mobil araç derse dikkatimi vermemi güçleştirmektedir.					
13	Dili öğrenirken mobil araç kullandığım durumları sabırsızlıkla beklerim.					
14	Mobil aracın not alma becerilerimde olumlu bir etkisi olmaktadır.					
15	Mobil aracım sözel iletişim becerilerimi geliştirmeme yardım etmektedir.					
16	Mobil araç kullanmak benim derslerdeki etkililiğimde önemli bir değişikliğe yol açmamaktadır.					
17	Arkadaşlarım beni mobil araç kullanmaya yöneltmemektedir.					
18	Mobil araç kullanmak benim için zordur.					
19	Mobil araç kullanımı benim yabancı dilde ürünler ortaya koymamda üretkenliğimi arttırır.					

Katılımınız için teşekkürler

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Work Experience

Employment	Institution	Year
English Teacher	Ministry of Education	2014 - still on

Publications

Şener, S., & Bostan, D. (2017). Using posters in EFL classroom: An elementary school case. International Online Journal of Education and Teaching (IOJET), 4(4),552-560. http://iojet.org/index.php/IOJET/article/view/242/190