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FACTORS AFFECTING PERCEIVED TECHNOLOGY PROFICIENCY OF TURKISH TEACHERS OF ENGLISH IN THE LIGHT OF 21ST CENTURY LEARNING

M.A. THESIS

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Assoc. Prof. Dr. Levent UZUN

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BİLİMSEL ETİĞE UYGUNLUK

Bu çalışmadaki tüm bilgilerin akademik ve etik kurallara uygun bir şekilde elde edildiğini beyan ederim.

Yaşar ERDİN

01/03/2021

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Tez Başlığı / Konusu: 21. Yüzyıl Eğitimi Kapsamında Türk İngilizce Öğretmenlerinin Teknoloji Yeterlilik Algılarını Etkileyen Faktörler

Yukarıda başlığı gösterilen tez çalışmamın a) Kapak sayfası, b) Giriş, c) Ana bölümler ve d) Sonuç kısımlarından oluşan toplam 139 sayfalık kısmına ilişkin, 12/02/2021 tarihinde şahsım tarafından *Turnitin* adlı intihal tespit programından aşağıda belirtilen filtrelemeler uygulanarak alınmış olan özgünlük raporuna göre, tezimin benzerlik oranı %15'tir.

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YÖNERGEYE UYGUNLUK ONAYI

"Factors Affecting Perceived Technology Proficiency of Turkish Teachers of English in the Light of 21st Century Learning" adlı Yüksek Lisans tezi, Bursa Uludağ Üniversitesi Eğitim Bilimleri Enstitüsü tez yazım kurallarına uygun olarak hazırlanmıştır.

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Doç. Dr. Levent UZUN

ULUDAĞ ÜNİVERSİTESİ

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Özet

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Danışmanı : Doç. Dr. Levent UZUN

21. Yüzyıl Eğitimi Kapsamında Türk İngilizce Öğretmenlerinin Teknoloji Yeterlilik Algılarını Etkileyen Faktörler

21. yüzyıl hayatımıza birçok değişiklik ve yenilik getirdi. Akıllı telefonlar, 3 boyutlu baskı, artırılmış / sanal gerçeklik, çevrimiçi alışveriş, sosyal ağ siteleri, bulut bilişim, sosyal robotlar, drone teknolojisi, giyilebilir teknoloji, yapay zeka, büyük veri vb. buna sadece birkaç örnek. Bu yenilikler, farklı hızlarda hayatımızın bir parçası haline geliyorlar ve yerleşik alışkanlıklarımızı değiştiriyorlar. Bu değişiklikler, aynı zamanda öğretme ve öğrenme alışkanlıklarını da etkiliyor. Bu nedenle, bu ortamlardaki aktörler, yani öğrenciler, öğretmenler, idareciler, karar vericiler, ilgili kurumlar, teknolojik cihazları ve uygulamaları kullanmada beceri gerektiren bu değişiklikleri çalışmalarına entegre etmek için büyük bir çaba göstermek zorunda kalmışlardır. Bu çalışma, Türk İngilizce öğretmenlerinin bu süreçte ne durumda olduklarını ortaya koymayı ve onların teknoloji yeterlilikleriyle cinsiyetleri, yaşları, hangi düzeyde eğitim verdikleri, özel bir kurumda mı yoksa bir devlet kurumunda mı

eğitim verdikleri, kaç yıldır eğitim verdikleri ve elektronik ortamlarda ne kadar zaman geçirdikleri gibi değişkenler arasındaki ilişkiyi belirlemeyi amaçlamaktadır.

Çalışmada nicel araştırma yöntemlerinden anket araştırması yöntemi benimsenmiştir. Veriler, 5'li Likert ölçeğinde tasarlanan 21.Yüzyıl Öğrenmeleri için Teknoloji Yeterliği Öz-Değerlendirme Ölçeği (TPSA C-21) (Christensen ve Knezek, 2017) ile toplanmıştır. Anketi cevaplamadan önce 273 katılımcıya cinsiyetleri, yaşları, hangi düzeyde eğitim verdikleri, özel bir kurumda mı yoksa bir devlet kurumunda mı öğretmenlik yaptıkları, ne kadar süredir öğretmenlik yaptıkları ve elektronik ortamda ne kadar zaman geçirdikleri soruldu. Katılımcılara kolayda örneklem yöntemiyle ulaşılmış ve kartopu örnekleme yöntemine bir örnek oluşturacak şekilde katılımcılardan anketi meslektaşları ile paylaşmaları istenmiştir. Toplanan veriler, SPSS 22 programı üzerinde bağımsız örnekler t-testleri ve ANOVA testleri ile analiz edildi.

Bulgular, katılımcıların cinsiyetinin, yaşının, kaç yıldır öğretmenlik yaptıklarının ve hangi seviyede öğretmenlik yaptıklarının algılanan teknoloji yeterliliklerini etkilemediğini, fakat elektronik ortamlarda ne kadar zaman geçirdiklerinin ve bir devlet okulunda mı yoksa özel bir okulda mı ders verdiklerinin algılanan teknoloji yeterliliklerini etkilediğini ortaya koymaktadır.

Anahtar Sözcükler: Dijital yeterlilik, teknoloji entegrasyonu, teknoloji öz yeterliği, teknoloji yeterliliği, Türkçe İngilizce öğretmenleri

Abstract

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Supervisor : Assoc. Prof. Dr. Levent UZUN

Factors Affecting Perceived Technology Proficiency of Turkish Teachers of English in the Light of 21st Century Learning

The 21st century has brought many changes and innovations into our lives. Smartphones, 3D painting, augmented/virtual reality, online shopping, social networking sites, cloud computing, social robots, drone technology, wearable technology, artificial intelligence, big data, etc. are just to name a few. They are becoming parts of our lives at varying rates, and changing our settled habits. This change is also affecting teaching and learning practices. Therefore, the actors in these environments, namely learners, teachers, administrators, policymakers, related institutions, have had to work tremendously to integrate these changes into their practices, which requires competence in technological devices and applications. The present study aims to discover how Turkish teachers of English are doing in this process, and to find out if such variables as their sex, age, what level they teach, whether they teach at a private or state institution, how long they have been teaching, and the duration of time they spend in electronic environments affect their perceived technology proficiency.

Survey research method was adopted in this study. Data collection was performed through the Technology Proficiency Self-Assessment Questionnaire for 21st Century Learning (TPSA C-21) (Christensen & Knezek, 2017), which is designed in a 5-point Likert scale. Before answering the questionnaire, the 273 participants were asked their sex, age, what level they teach, whether they teach at a private or state institution, how long they have been teaching, and how much time they spend in electronic environments. The participants were reached through convenience sampling method, and they were asked to share the questionnaire with their colleagues, which is an example of snowball sampling method. Independent-samples t-tests and ANOVA tests were performed on SPSS 22 for the analysis of the collected data.

The findings reveal that the participants' gender, age, years of teaching experience and what level they teach do not affect their perceived technology proficiency while how much time they spend in electronic environments and whether they teach at a public or private school do.

Key Words: Digital competence, technology integration, technology proficiency, technology self-efficacy, Turkish teachers of English

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List of Abbreviations

COVID-19: Coronavirus disease 2019

EFL: English as Foreign Language

ELT: English Language Teaching

ICT: Information and Communications Technology

ISTE: International Society for Technology in Education

MoNE: Ministry of National Education

SAMR: Substitution Augmentation Modification Redefinition

SPSS: Statistical Package for Social Sciences

TAM: Technology Acceptance Model

TETCs: Teacher Educator Technology Competencies

TPACK: Technological Pedagogical Content Knowledge

TPIM: Techno-Pedagogical Integration Matrix

TPSA: Technology Proficiency Self-Assessment

TPSA C-21: Technology Proficiency Self-Assessment for 21st Century Learning

UTAUT: Unified Theory of Acceptance and Use of Technology

WSTP: Will, Skill, Tool, Pedagogy

Chapter I

Introduction

The introduction part is made up of five sections. The first one gives the background of the study. The next one explains the purpose of the study. The research questions are stated in the third, and the fourth section presents the significance of the study. Finally, the limitations are covered in the last chapter.

1.1. Background of the Study

Change is a fundamental part of life and humans have adapted themselves to it throughout the history to survive. Those who could not achieve to do so experienced difficulties, or even ceased to exist. History has witnessed many of such examples. To illustrate, one of the reasons why the Ottoman Empire dissolved was that they failed to adapt to the changes/innovations, and to keep up with the developed countries of the time such as Great Britain, France and Russia (Reynolds, 2011). Once holding over 40% of the global market share of mobile phones, Nokia collapsed because they insisted on using an outdated operating system called Symbian and fell behind the shift towards apps that Apple spearheaded (Doz, 2017). Failure to keep abreast of the developments of the era we live in also causes people to lose their jobs (Erdinç, 1999). To maintain existence or become successful in the era we live in, we must meet the basic requirements of that era. The world-famous toy producer LEGO is a good example. They constructed houses and manufactured furniture until the Great Depression, during which the company deteriorated and had fewer customers, then the owner acted innovatively and concentrated on small-scale items, so he started to manufacture tiny replicas of their products, thus LEGO, as we know it today, was born (Wiencek, 1987). Such examples can be multiplied and varied in different fields. In terms of teaching/learning environments, which this thesis study is concerned with, it can be argued that the foundations of classrooms are shaken and it is time to think and act

innovatively to turn the tide and to keep up with this age, just as LEGO did in the past. In the same vein, Nair (2011), a famous school architect, argues that classrooms have become obsolete and they fail to produce a competent workforce for the 21st century, and Benade (2017) states how effective classroom-based instruction is now is doubtful although it might have proved itself useful in the past. This situation also attracted the interest of the media. In its issue of December 2006, the world-famous magazine *Time* approached this issue stating in its cover "How To Build a Student For the 21st Century" (How To Build a Student For the 21st Century, 2006). In this issue, Wallis and Steptoe (2006) argue that although there had been many innovations and changes, classroom practices did not change much. Referring to this article, Lubelfeld and Polyak (2017) claim that the same still held true in 2017. By 2020, nothing much has changed. Wallis and Steptoe (2006) partly attribute this problem to that "... they (kids) can't think their way through abstract problems, work in teams, distinguish good information from bad or speak a language other than [their own]". The solution lies in developing 21st century skills in children. There is no agreement in the literature about what exactly these skills are. For instance, Wallis and Steptoe (2006) name these skills as "knowing more about the world", "thinking outside the box", "becoming smarter about new sources of information", "developing good people skills". World Economic Forum (2015), on the other hand, identifies 16 21st century skills under three separate headings as seen in Figure 1. Besides, albeit not limited to, Battelle for Kids (Partnership of 21st Century Learning, 2015; see Figure 2), National Research Council (Pellegrino & Hilton, 2013), and Jenkins, Clinton, Purushotma, Robison and Weigel (2006) proposed different frameworks. Despite this variety, these frameworks do not contradict, but offer opinions from different perspectives. Most of the studies agree that they are vital and they include the four Cs, namely critical thinking, communication, collaboration, and creativity, as put forward by the National Education Association (2012). Although there is a great deal of scholarship about how to make children

acquire new skills, not much has been achieved in accessing all children, so existing teaching models fail to make learners acquire the 21st century skills (Dede, Korte, Nelson, Valdez, & Ward, 2005). Policy-makers of education, researchers and teachers should find ways to overcome this issue and to make learners acquire these must-have skills.

Figure 1

21st Century Skills as identified by the World Economic Forum (2015, p.3)

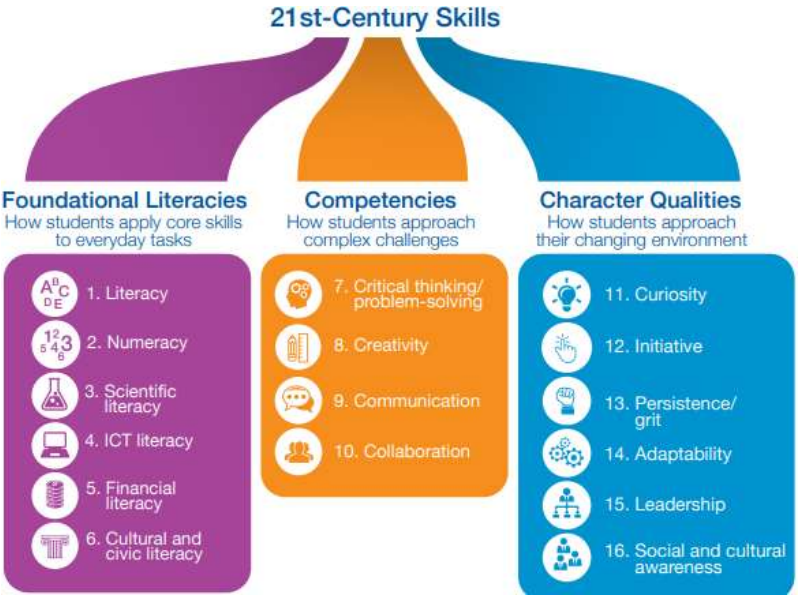


Figure 2

21st Century Skills as identified by Battelle for Kids (Partnership of 21st Century Learning, 2015, p.1)

As seen in these frameworks, technology competence, which refers to "the ability to create and use a particular field of technology effectively, which is gained through extensive

experimentation and learning in its research, development and employment in production" (Fai & von Tunzelmann, 2001, p.142), has a key role in the 21st century skills. It possesses the potential to facilitate how students learn content and acquire creativity and communication skills (Dousay & Weible, 2019). Therefore, we have to find ways to benefit from this tool as much as possible in teaching/learning environments and we have to keep up with and adapt ourselves to the innovations technology brings into our lives. Thanks to technology, classroom practices have undergone tremendous and rapid changes in the last few decades. Just as we were discussing the benefits of computers in the classroom context one or two decades ago, nowadays, we are debating about the advantages of cloud computing, augmented and virtual reality etc. (Erdin, 2020). As Seifert and Sutton (2009) put it, teaching is different from what it used to be in the past and schools, where teaching takes place, are not the same as they were. The 21st century has changed every aspect of conventional classrooms. Therefore, the actors in the educational spheres, namely learners, teachers, administrators, related institutions, should work tremendously to embrace and reflect these changes into teaching/learning environments. All efforts in doing so require competence in the use of technological devices and applications, which is a prerequisite of today's world.

1.2. Purpose of the Study

What has been discussed so far also applies to language teaching/learning environments, which form the focus of this thesis study and there is numerous research in which technology has been benefited successfully and positive outcomes have been obtained in and/or outside language classrooms (Altay & Altay, 2017; Kessler, 2018; Lee, 2019; Samur, 2019; Sirin et al., 2018; Van Praag & Sanchez, 2015). Although technology has been benefited to a great extent in class, it can be argued based on the number of studies in the recent literature related to language teaching that how good its practitioners, i.e. teachers, are at incorporating it into their classes (Almalki, 2020; Ardıç & Çiftçi, 2019; Ergen, 2019; Li,

2014; Liu & Kleinsasser, 2015; Teng, 2016) has been relatively neglected. Considering this shortcoming, this study is significant in that it addresses teachers' technology proficiency, lack of which causes failure in technology integration despite huge investments. At this juncture, it would be good to mention external and internal barriers, i.e. first-order and second-order barriers respectively, which were introduced by Ertmer (1999). The former corresponds to factors not related to educators, for instance lack of infrastructure and training. Institutions and schools are responsible for eliminating them. The latter, i.e. internal barriers, is related to teachers themselves, and to their opinions about teaching and technology. Eliminating one of these barriers is not enough for successful technology integration. Fatih Project in Turkey is a good example. Despite huge investments, it failed to produce desired outcomes (Bildircin, 2018; Cumhuriyet, 2018; Evrensel 2019). Investing large sums of money and eliminating first-order barriers do not lead to successful ICT integration into education and to the elimination of second-order barriers (Vanderlinde, Aesaert, & van Braak, 2014). This is partly because of the lack of teachers' Technological Pedagogical Content Knowledge (TPACK), which is necessary alongside self-efficacy, in the making effective use of technology in class (Jaipal & Figg, 2010; Kayaduman, Sarıkaya, & Seferoğlu, 2011). This proves that both barriers are intertwined and both should be eliminated for successful implementation of technology. Tsai and Chai (2012) even argue there are third-order barrier, which refers to "the lack of design thinking by teachers" (p.1), and all these three barriers should be eliminated for successful integration of technology in education.

Out of these barriers, the current study focuses on internal, i.e. second-order, barriers and aims to assess technology proficiency of Turkish teachers of English in terms of various variables, namely sex, age, what level they teach, whether they teach at a private or state institution, how long they have been teaching, and the time they spend on electronic environments.

1.3. Research Questions

In line with the purpose of the study, the following research questions were formulated:

1. Is there a meaningful relationship between the sex of Turkish teachers of English and their perceived technology proficiency?
2. Is there a meaningful relationship between the age of Turkish teachers of English and their perceived technology proficiency?
3. Is there a meaningful relationship between what level Turkish teachers of English teach and how proficient they perceive themselves in technology use?
4. Is there a meaningful relationship between whether Turkish teachers of English teach at a state or a private institution and their perceived technology proficiency?
5. Is there a meaningful relationship between years of teaching experience of Turkish teachers of English and their perceived technology proficiency?
6. Is there a meaningful relationship between how much time Turkish teachers of English spend in electronic environments and their perceived technology proficiency?

1.4. Significance of the Study

There is limited research in the literature assessing perceived technology proficiency of Turkish teachers of English (Akturk & Ozturk, 2019; Ardıç & Çiftçi, 2019; Ergen, 2019; Köse, 2016; Özel & Arıkan, 2015). Besides, most of the literature focuses on assessing technology self-efficacy of pre-service teachers (Atar, Aydın, & Bağcı, 2019; Bağcı & Atar, 2019; Basal, 2015a; Başal & Kaynak, 2020; Hana, 2020; İşler & Yıldırım, 2018; Liza & Andriyati, 2020; Pace, Rodesiler, & Tripp, 2010; Raman, 2014; Sarıçoban, Tosuncuoğlu, & Kırmızı, 2019; Schieble, 2010; Solak & Çakır, 2014; Tachaiyaphum & Hoffman, 2018; Tseng, Cheng, & Yeh, 2019), most of whom are already *digital natives* and competent users of technology (Howlett & Waemusa, 2018; Lee & James, 2018). However, in-service

teachers, who are mostly *digital immigrants* (Howlett & Waemusa, 2018; Lee & James, 2018; Prensky, 2001) and may lack technology proficiency, are relatively ignored. Incidentally, these two terms were first used by Parlow (1996) in his *Declaration of Independence for Cyberspace*, and became popular thanks to Prensky (2001). The former corresponds to people who are born in the age of technology. The latter, on the other hand, corresponds to those who become familiar with the benefits of technology at later ages. These terms are used to refer to the differences between individuals born before and after 1980 in terms of their digital competence (Zaphiris & Ioannou, 2018). As digital natives are born into technology, they are all "native speakers of the digital language of computers, video games and the Internet" (Prensky, 2001, p. 1) while digital immigrants acquire this language later on. In-service teachers, who are digital immigrants to a great extent, have not received as much attention as their pre-service counterparts have. Taking this aspect into consideration, this study plans to assess whether or how the above-mentioned variables affect the perceived technology proficiency of in-service Turkish teachers of English. Besides, as Kahraman and Yılmaz (2018) state, it is of significance to investigate teachers' ICT (Information and communications technology) competence from time to time through a valid tool reflecting technological improvements because technology is a dynamic process and it keeps introducing innovations to our lives all the time.

In addition, the learning needs of the new generation have undergone changes. Paper-based sources do not appeal to students of today as much as they used to. They depend too much on technology and they can use computers, smartphones, tablets, etc. better than a pencil (Black, 2010). In a similar vein, a survey that Pearson, a well-known British education publishing and assessment company, conducted revealed that learners of today would like to use their mobile devices during lessons (Pearson Group, 2015). As Ertmer and Ottenbreit-Leftwich (2010) imply, benefits that technology provides are not manifest in educational

settings. Prensky (2005/2006), in a similar vein, argues that schools and teachers lag behind the times and students are ahead of them. He also argues that people of today are different from those in the past that education systems were prepared to teach (Prensky, 2001). Furthermore, due to Coronavirus disease 2019 (COVID-19), the concept of classrooms has been undergoing radical changes. Online education has become an indispensable part of our education life and the vitality of technology competence has increased to a large extent in this process. However, conducting a comprehensive systematic review of the related literature in Turkey, Atmacasoy and Aksu (2018) state that no matter whether they are digital natives or not, both pre- and in-service teachers are struggling in making use of technology in their classes. Therefore, individuals and bodies responsible for teaching have to improve themselves. To do so, we have to analyse the current situation first, and this thesis study aims to address this need and to find out how comfortable Turkish teachers of English are with technology.

1.5. Limitations

The biggest obstacle that the researcher faced was to reach Turkish teachers of English. Due to the COVID-19 pandemic, he was not able to collect data in person. Reaching the teachers in question and distributing the questionnaire through electronic means was the only possible option, which limited the number of participants to 273. Besides, those that do not have access to the internet and/or an electronic device were relatively left out of the scope of the study. To overcome this issue, the researcher reached such teachers that he works with by phone and delivered them the questionnaire through other means. He also asked his fellow teachers to distribute the questionnaire to such individuals. The participants were also asked to do the same. In addition, it was hoped that the participants were candid in their answers during the data collection process.

Chapter II

Review of Literature

The literature review of the field related to this study is covered in this chapter. As a result of the review, the following subtopics came to the forefront, and are included under the corresponding subheading: Digital Personality Spectrum*; Digital Competence in Teacher Education and of Pre-Service Teachers; Benefits of Technology Integration; Requirements for Successful Technology Integration; TPACK and Other Technology Integration Models; Technology Proficiency of Pre-Service Teachers; Technology Proficiency of In-Service Teachers; TPSA C-21.

2.1. Digital Personality Spectrum*

People who are born into and grow up in the age of ubiquitous technology are called Digital Natives (Prensky, 2001). They get familiar with technology at an early age and consider it as an integral part of their lives. In some sources, they are also named as "Net Generation" (Tapscott, 1998), "Millenials" (Howe & Strauss, 2000), "Google Generation" (Rowlands et al., 2008), homo zappiens (Veen & Vrakking, 2006). Digital Immigrants (Prensky, 2001), on the other hand, were born before technology became a dominant part of our lives and they (try to) get used to the innovations that technology brings. They also fail to embrace new technology quickly (Prensky, 2001). Palfrey and Gasser (2008) argue that digital immigrants are those who were born in and before 1980. Oblinger (2003) argue that they were born between 1982 and 1991. In addition to these two groups, there are digital settlers, located in the middle of the digital personality spectrum, between digital natives and digital immigrants (Moats, 2015). Coined by Palfrey and Gasser (2008), digital settlers refer to those who were born before technology began to play a huge part in our lives, just like

- Making a reference to the study of Palfrey and Gasser (2008), Moats (2015) used this term to refer to the terms Digital Native, Digital Immigrant and Digital Settler.

digital immigrants were, and who are able to make good use of technological devices, just like digital natives are, but interact with others depending too much on conventional methods.

As understood from these definitions, the digital literacy of digital natives is supposed to be much better than that of the others. However, since the terms digital native and digital immigrant were coined, the people belonging to the other two groups, i.e. digital immigrants and digital settlers, have been increasingly exposed to technological devices, and their digital literacy inevitably increased, so the divide between these groups is not as distinguishable as it used to be (Howlett & Waemusa, 2018). In the same vein, Jones, Ramanau, Cross and Healing (2010) argue that the main divide between digital natives and digital immigrants is not about age anymore, it is about experience.

These labels are criticized for discriminating and stereotyping people (Stoergers, 2009). According to Stoergers (2009), individuals lacking technological competence are deprecated, and this is perilous; the dichotomy between digital natives and digital immigrants leads to an unbalanced structure of power between related parties; and it can be understood from these terms that digital immigrants cannot become digital natives, and the former might use it as an excuse to justify their incompetence. On the other hand, Bayne and Ross (2011) criticize these terms for making students considered subjects of marketing campaigns. Besides, Helsper and Eynon (2010) argue that segregating people into groups of digital natives and digital immigrants based on their age would result in an irreversible digital divide. They claim that such variables as technology ownership, range of practices in which technology is benefited, former experiences, self-efficacy, and training ought to be considered rather than age while defining digital natives and digital immigrants (Helsper & Eynon, 2010). Teo, Kabakçı Yurdakul and Ursavaş (2016) summarize the qualities of digital natives as follows: they have access to various technologies, they are good at multitasking, they are able to use technological devices easily, they go online first when they would like to find out

new information or learn something, they are able to obtain new information instantaneously through multiple sources. However, there are also studies indicating that not everyone being included in the scope of digital nativity possesses these skills. Thompson (2013), for instance, found that university students, who are supposed to be digital natives, benefit from the limited number of technologies and they do not make frequent use of new technologies. Margaryan, Littlejohn and Vojt (2011), in a similar vein, revealed that university students are not competent enough in using technology.

Investigating how Turkish digital natives are doing, Atal and Usluel-Koçak (2011) found that elementary school students, albeit not often, use blogs and wikis, but they do not use podcasts. Somyürek and Coşkun (2013) state that young Turkish people benefit from technology only to communicate and use collaborative networks. Aiming to find out what makes someone a digital native, Akçayır, Dündar and Akçayır (2016) conducted a study on some students studying at Turkish and Kyrgyz universities, they found how developed someone's country affects his/her digital nativity and this might change even between different regions of the same country. They also revealed that students at later grades can make better use of technology (Akçayır et al., 2016). A study conducted with teenagers from 25 European countries revealed that Turkish teenagers are among the ones with the fewest digital skills (Livingstone, Haddon, Enke, & Ólafsson, 2011). In the same vein, Somyürek and Coşkun (2013) state that the digital competence of Turkish students is low, and that the school curricula should be designed in a way to have them develop ICT skills.

It is a rough estimation that the earliest so-called digital natives were born during when home computers became widely accessible and the world wide web was introduced, that is to say, towards the end of 1980s and in the beginning of the 1990s (Black, 2010). This suggests that digital natives started to appear in classrooms as teachers only within the last decade and a considerable number of teachers today are digital immigrants who may lack

technology proficiency, which is a quality that everyone needs to possess to catch up with the 21st century.

2.2. Digital Competence in Teacher Education and of Pre-Service Teachers

Acknowledging how significant it is to make use of technology for educational purposes, the European Union announced *digital competence* among the eight competences for lifelong learning (European Union, 2006), which are, namely and respectively, "communication in the mother tongue, communication in foreign languages, mathematical competence and basic competences in science and technology, digital competence, learning to learn, social and civic competences, sense of initiative and entrepreneurship, and cultural awareness and expression" (p. 13). Various definitions have been put forward regarding digital competence, but the most comprehensive one is probably as follows:

> Digital Competence is the set of knowledge, skills, attitudes, abilities, strategies and awareness that are required when using ICT (Information and communications technology) and digital media to perform tasks; solve problems; communicate; manage information; collaborate; create and share content; and build knowledge effectively, efficiently, appropriately, critically, creatively, autonomously, flexibly, ethically, reflectively for work, leisure, participation, learning and socialising (Ferrari, 2012, p. 30).

The definition suggests that digital competence is not just about how well someone uses a technological device. It is much more complicated. The digital competence of teachers is even more complicated compared to other professions because they, in addition, need to concentrate upon how to convey their knowledge to their students (Krumsvik, 2008). As specified in ISTE (International Society for Technology in Education) Standards, teachers also have to "facilitate and inspire student learning and creativity", "design and develop digital age learning experiences and assessments", "model digital age work and learning",

"promote and model digital citizenship and responsibility", and "engage in professional growth and leadership" (ISTE, n.d.). But, are teacher-training institutions able to produce such teachers? There are studies indicating that they fail to do so. In such studies, pre-service and beginning teachers are found to fail in integrating technology into their teaching successfully (Batane & Ngwako, 2017; Tondeur, van Braak, Sang, Voogt, Fisser, & Ottenbreit-Leftwich, 2012; Tondeur, van Braak, Siddiq, & Scherer, 2016). Nevertheless, the education they receive at their faculties determines pre-service teachers' future classroom practices, and influences their self-efficacy and beliefs about technology integration (Chen, 2010). At this point, questions are raised about how well teacher-training institutions are doing in technology integration and how good their curricula are. However, without leaving any room for question marks, the ability to make use of ICT should be regarded as a key component of teacher education (Drummond & Sweeney, 2017; Krumsvik, 2014). Unfortunately, it does not seem so because ICT integration into education does not have a significant place in the curricula of teacher-training institutions (Instefjord & Munthe, 2016). Similarly, in-service teachers' classroom practices are not in accord with what they have been taught, i.e. how they implement technology in their classes does not represent the education they receive (Cuhadar, 2018; Ottenbreit-Leftwich, Glazewski, Newby, & Ertmer, 2010). In a similar vein, new teachers state that they do not think they are competent enough to make use of technology in their classes (Demir, Özmantar, Bingölbali & Bozkurt, 2011; Tondeur, Pareja Roblin, van Braak, Voogt, & Prestridge, 2017). These are signs of problems existing in teacher education because, despite being the most digital native generation of all time, pre-service and starting teachers of today lack necessary skills and scholarship (Mouza, Karchmer-Klein, Nandakumar, Yilmaz Ozden, & Hu, 2014). As mentioned before, pedagogical and content knowledge is necessary in addition to technological competence to disclose the entire potential of ICT integration into education (Koehler & Mishra, 2009), and being an expert

user of technology, just as digital natives are, does not necessarily result in efficient technology integration (Polly, Mims, Shepherd, & Inan, 2010). Teachers' beliefs also play a role and these beliefs shape the way teachers teach, and they are even more effective than the knowledge teachers possess (Pajares, 1992). Therefore, teacher education should be able to perceive these beliefs facilitating technology integration in various ways, which would enhance the quality of teacher education and help second-order barriers be eliminated (Kim, Kim, Lee, Spector, & DeMeester, 2013). Brenner and Brill (2016) analysed practices in teacher education which hinder ICT incorporation and found that attitudes of cooperating teachers, failure to establish cooperation among pre-service teachers and with their faculty during their field experience, shortage of time and resources, unsatisfactory guidance by their faculty, insufficient number of technology-based courses, and shortage of opportunities to have pre-service teachers gain experience in technology-integrated classes are barriers to the successful integration of educational technologies. Teacher-training institutions have to eliminate these shortcomings and provide adequate technology skills and instructional theory for their students preparing for their service (Brenner & Brill, 2016). They should also raise pre-service teachers' awareness to make them keep up with technological developments of the era they live in (Brenner & Brill, 2016). Since, as the proverb goes, as the twig is bent, so is the tree inclined, which means early influences have lasting effects, so if prospective teachers are convinced in the effectiveness of ICT integration during their training, they will benefit from technology in their teaching. Justifying this statement, Mei, Brown and Teo (2018) found a meaningful relationship between pre-service teachers' beliefs regarding the use of technology and their motives about technology integration. Their findings also indicate that their motives are closely related to their self-efficacy in technology integration (Mei et al., 2018). Along the same lines, "personal experiences, vicarious experiences, and social-cultural influences" (Ertmer, 2005, p.32) are of great importance to create a niche in pre-service

teachers' minds about technology. Ertmer (2005) argues that gaining personal experiences in technology use, seeing cooperating teachers make use of technology (i.e. vicarious experiences) and teachers' environments (i.e. social-cultural influences) are effective in shaping pre-service teachers' beliefs. Teacher-training institutions adopt some strategies such as providing courses on technology and on developing materials, and creating counselling programs and online guidance systems, which paves the path for technology-integrated classrooms of the future (Ottenbreit-Leftwich et al., 2010). Such strategies adopted in teacher education were analysed by Tondeur et al. (2012), who created a comprehensive synthesis of qualitative evidence model. Providing a guide for teacher trainers to reconsider their teaching, they identified "12 key themes for content and delivery methods that prepare pre-service teachers to integrate technology into their future classrooms" (Tondeur et al., 2012, p.138). The first seven of them are about preparing pre-service teachers for their future and the other five are about what is required for successful technology integration at institutional level. These 12 themes are as follows respectively:

> aligning theory and practice, using teacher educators as role models, reflecting on attitudes about the role of technology in education, learning technology by design, collaborating with peers, scaffolding authentic technology experiences, moving from traditional assessment to continuous feedback; technology planning and leadership, co-operation within and between institutions, staff development, access to resources, and systematic and systemic change efforts (Tondeur et al., 2012, pp.138-140).

When these themes appear in the curricula of teacher-training institutions, pre-service teachers are reported to take a favourable stance towards incorporating ICT and to be sure of their skills while benefiting from educational technologies (Tondeur, Scherer, Siddiq, & Baran, 2017). The validity of the synthesis of qualitative evidence model that Tondeur et al.

(2012) developed was also established in the teacher-training context in Turkey by Baran, Canbazoglu Bilici, Albayrak Sari and Tondeur (2019). Reviewing the literature on technology integration in teacher-training, Nelson, Voithofer and Cheng (2019) state that pre-service teachers ought to be educated in a way to realize the advantages of technology use in their future classes, and to develop self-confidence in their abilities to make use of technology; their educators should assume a positive attitude towards technology and serve examples about how to use it. Investigating the effectiveness of educational and technological courses appearing in the curricula of English language teaching departments in the Turkish universities, Uzun (2016) found that such courses do not contribute to students' digital competence and they fall short of fulfilling the educational requirements of the 21st century, which hinders technology-integration in education. In another study on teacher education, Goktas, Yildirim and Yildirim (2009) investigated what hinders ICT adoption in teacher-training institutions in Turkey and they found that instructors do not receive sufficient training and they are short of materials and hardware, which prevents technology from being integrated on a large scale. As a result, teacher educators fail to satisfy expectations and they are not able to improve themselves. How competent they are in technology use was also overlooked until recently. The introduction of Teacher Educator Technology Competencies (TETCs) by Foulger, Graziano, Schmidt-Crawford and Slykhuis (2017) brought the technology proficiency of teacher trainers into the forefront. These 12 competencies, i.e. TETCs, are related to knowledge, skills, and attitudes every teacher trainer should possess so that their students will become technology-proficient teachers in the future (Foulger et al., 2017). They are listed as follows:

1. Teacher educators will design instruction that utilizes content-specific technologies to enhance teaching and learning.

2. Teacher educators will incorporate pedagogical approaches that prepare teacher candidates to effectively use technology.
3. Teacher educators will support the development of the knowledge, skills, and attitudes of teacher candidates as related to teaching with technology in their content area.
4. Teacher educators will use online tools to enhance teaching and learning.
5. Teacher educators will use technology to differentiate instruction to meet diverse learning needs.
6. Teacher educators will use appropriate technology tools for assessment.
7. Teacher educators will use effective strategies for teaching online and/or blended/hybrid learning environments.
8. Teacher educators will use technology to connect globally with a variety of regions and cultures.
9. Teacher educators will address the legal, ethical, and socially-responsible use of technology in education.
10. Teacher educators will engage in ongoing professional development and networking activities to improve the integration of technology in teaching.
11. Teacher educators will engage in leadership and advocacy for using technology.
12. Teacher educators will apply basic troubleshooting skills to resolve technology issues (Foulger et al., 2017, pp.432-433).

These competencies aim to encourage teacher trainers to prepare courses incorporating digital tools specific to their fields, make pre-service teachers benefit from technology efficiently, help them discover how students benefit from technology, bring new aspects to the way they teach, participate in occupational development events, establish contact with their national

and international counterparts, and promote technology use (Foulger et al., 2017). Technology is considered a useful tool to implement constructivism into education. A constructivist educator ought to be able to establish a lively, engaging, instructive and interactive learning setting. Teachers had better internalize how to do so during their pre-service. To this end, digital environments, where students are able to produce their works, solve problems etc., offer great affordances to teacher educators. For instance, disclosing the potential of Facebook in teacher education, Saini and Abraham (2019) covered the same content in a traditional class and in a Facebook group with pre-service teachers, and performed such tasks as online discussions, watching videos, polls, online exams etc. in the latter. Thanks to the intervention, they established a student-oriented setting that is based upon social constructivism, and students' engagement and achievement improved. On the other hand, learning needs of the new generation have undergone radical changes in the 21st century, and to fulfil these needs and to create a constructivist learning setting, teachers and teacher educators must think outside of the box and resort to different instructional methods. Making use of videos and/or audio files in class is not a way to achieve this anymore. Virtual reality constitutes a relatively new approach for technology integration in teacher education. In their systematic literature review on virtual reality in teacher education, Billingsley, Smith, Smith and Meritt (2019) found that it improves both teacher educators' and their students' performance, offers affordances in teaching students with learning or physical disabilities, raises emotional awareness, and make learning permanent. It would be nice to benefit from all these affordances in assessment, too, but concepts such as stealth assessment, intelligent tutoring system, game-based assessment (Koomen & Zoanetti, 2016) etc. are far from becoming mainstream practices, but such technology-based assessment methods can provide great advantages. More research should be conducted to disclose the potential of technology in assessment. Besides, because of lack of necessary infrastructure at schools and lack of

necessary electronic devices, online education or blended learning opportunities are limited. Furthermore, in order to provide troubleshooting in case of a technological problem, teacher educators should be able to be aware of how learning and teaching take place in mind. The review study by Zengin and Aksu (2017) indicated that more research is required on technology integration in foreign language teacher education in Turkey, such studies are mostly carried out with fewer participants compared to their counterparts around the world, teacher educators possess both negative and mostly positive views regarding incorporating ICT in teacher education, and technology can offer great advantages for both teacher educators and pre-service teachers. Aşık et al. (2019) investigated technology integration in English language teacher education in Turkey, Portugal and Poland, and found that in Turkey, the integration did not take place as much as expected; pre-service teachers need feedback regarding their teaching with technology, more experience in designing lessons and more real-life experience; Turkish pre-service teachers have difficulty in finding a role model who can inspire them to incorporate ICT; there is lack of collaboration between teacher educators; and curricula should be designed in a way to incorporate ICT throughout the program.

On the other hand, considering students' perspective, Baran et al. (2019) report that since prospective teachers do not have scholarship and experience in planning technology-integrated lessons, the process of designing and preparing for such lessons is difficult and time-consuming for them. They also state that group-work and cooperation among pre-service teachers contribute to better learning outcomes in terms of incorporating technology into education (Baran et al., 2019). Reporting a discrepancy between how often technology is used in schools and how much it is highlighted in teacher education, Martinovic and Zhang (2012) state that technology is benefited in real life much more than it is in teacher training. This should be balanced though because pre-service teachers believe that putting what they have learnt about ICT into practice in real life is of significance (Baran et al., 2019). Receiving

feedback is also found to improve pre-service teachers' digital competence (Baran et al., 2019), so an educational setting where they receive feedback from their instructors and give feedback to each other should be established. On a side note, teacher-training institutions try to have pre-service teachers gain technology-integration skills through stand-alone semester-long courses, which contradicts the concept of integration itself (Foulger et al., 2017). In this regard, the teacher-training institutions should assume such a stance: "If the use of technology to enrich learning is ever to become effective, we must stop regarding it as a separate entity and see it as part of everyday instruction" (Johnson, 2013, p. 84). All these suggest that urgent steps should be taken in teacher education. Because teacher-training programs fall short of equipping pre-service teachers with enough experience in technology use (Instefjord & Munthe, 2016; Uzun, 2016). Thus, when they begin to teach, they consider themselves impromptu in making use of technology (Sang, Valcke, van Braak, & Tondeur, 2010). Therefore, technology should be integrated throughout the whole training process of teachers in order to have them experience it for educational purposes. Evaluating the situation in Turkey, Solak and Çakır (2014) believe technological innovations should be reflected in teacher education and pre-service teachers need more technology-related training than they are currently having. Stating that teachers ought to be aware of the learning needs of digital natives, Merç (2015) found that pre-service teachers would like to benefit from technology, but most schools in Turkey lack necessary equipment; in addition to pre-service teachers, their cooperating teachers working at where they do their internship do not make regular use of technology; and the curricula at teacher-training institutions should be revised. To this end, Merç (2015) suggested that teacher training institutions should keep up and equipped with the latest technological innovations, create online teaching opportunities, provide training to make pre-service teachers able to create online activities, expose them to technology as much as possible, schools and teacher training institutions ought to collaborate to provide authentic

experiences to pre-service teachers. Providing a detailed insight into blended learning activities in teacher education in Turkey, Atmacasoy and Aksu (2018) found that such activities are superior to online and traditional activities, and they increase the motivation pre-service teachers possess and have them take a positive stance towards incorporating technology. On the other hand, their study revealed that related institutions suffer from a lack of technological infrastructure and pre-service teachers' self-efficacy is low (Atmacasoy & Aksu, 2018). Highlighting that blended learning benefits from the useful features of face-to-face and online education, Atmacasoy and Aksu (2018) argue ICT should be incorporated into the curricula of faculties of education. Keser, Karaoğlan Yılmaz and Yılmaz (2015) state that technology-integrated applied courses should be offered at universities so that pre-service teachers can display their skills, and faculty members ought to teach how to incorporate technology into lessons apart from technology knowledge. Ergen (2019) argues that the curricula of English language teaching departments ought to be revised and updated so that prospective teachers' self-efficacy improves and they can embrace technology integration. This could be achieved if English teachers developed a mind-set on ICT integration, paid more attention to pre-service teachers' mind-set, and curricula were designed based on these suggestions. Moreover, Ursavaş, Yalçın and Bakır (2019) suggest that pre-service teachers should be forced to conduct technology-integrated lessons during their internship. In the same vein, Uzun (2016) suggests that curricula of teacher-training programs should be kept up-to-date by incorporating innovations that contemporary technology brings and by taking the needs of contemporary learners into consideration. Highlighting the key role of technology skills in the 21st-century skills, Valtonen et al. (2017) state that these skills must also be taught in teacher training programs.

The foundations of successful technology-integrated practices are laid in the faculties where pre-service teachers receive their education. Only if these foundations remain firm, will they lead to contemporary classrooms and fulfil the requirements of the 21st century.

2.3. Benefits of Technology Integration

Despite the above-mentioned problems regarding integrating ICT into teacher education, the benefits technology provides within educational settings are undeniable. Marshall and Cox (2008) state that the effect of technology use on education began to be assessed as early as the 1970s and it has been in the limelight since then. Placing emphasis on the role of technology in education and acknowledging that teachers are the practitioners of technology in class, Kim et al. (2013) reported that supporting teachers to integrate technology into educational settings efficiently is a significant step to take in order to get the most out of previous and ongoing investments in education technologies. This approach enabled technology to be benefited in education on a large scale, especially after the introduction of personal computers. As a result, it has been studied in educational spheres on a vast scale and when the literature on educational technology is reviewed, various terms appear, including but not limited to:

> ...e-learning, instructional technology, information and communication technology (ICT) in education, EdTech, learning technology, multimedia learning, technology-enhanced learning (TEL), computer-based instruction (CBI), computer-managed instruction, computer-based training (CBT), computer-assisted instruction or computer-aided instruction (CAI), internet-based training (IBT), flexible learning, web-based training (WBT), online education, digital educational collaboration, distributed learning, computer-mediated communication, cyber-learning, and multi-modal instruction, virtual education, personal learning environments, networked learning, virtual learning

> environments (VLE) (which are also called learning platforms), m-learning, ubiquitous learning and digital education (Vrije Universiteit Amsterdam, n.d.).

With the outbreak of COVID-19, technology began to attain an even bigger and indispensable place in education, and above-mentioned terms have begun to be discussed more often. A new term regarding technology-integration has also been added to them, which is emergency remote teaching (Hodges, Moore, Lockee, Trust, & Bond, 2020). It is defined as:

> ... a temporary shift of instructional delivery to an alternate delivery mode due to crisis circumstances. It involves the use of fully remote teaching solutions for instruction or education that would otherwise be delivered face-to-face or as blended or hybrid courses and that will return to that format once the crisis or emergency has abated (Hodges et al., 2020).

Due to its temporary nature, it is different from online learning. In another study conducted in the times of COVID-19, Peterson, Scharber, Thuesen and Baskin (2020) analysed the planning and implementation process of the quick transition to distance learning in a school in Minnesota, the USA. They found that before starting to teach content online, if you spend a week "assessing student and community internet access, (re)building staff and student/family relationships, reviewing past learning and completing make-up work" (p.464), you achieve better engagement and attendance (Peterson et al., 2020). Establishing a space for non-instructional purposes for students would also increase their engagement, diminish their anxiety about the future, keep them socialized and create a relaxed environment (Peterson et al., 2020), all of which is of significance because distance learning may cause a feeling of isolation and disconnection in both learners and teachers (Kennedy & Ferdig, 2018). During this process, the effects of the digital divide, which implies the difference between people with access to up-to-date technology and those without (Compaine, 2001), become evident.

Governments, non-governmental organizations, policy-makers, etc. should work hard to help the underprivileged, make up the digital divide and provide necessary equipment to those without one.

The related literature also suggests that educational technology facilitates and/or enhances learning through making use of various technological innovations and yields positive results (Adam & Tatnall, 2017; Alhalabi, 2016; Hudson et al., 2019; Nwosu, Monnery, Reid, & Chapman, 2017; Parong & Mayer, 2018; Passig, Tzuriel, & Eshel-Kedmi, 2016; Urrutia, Loyola, & Marín, 2019; Zhuang & Xiao, 2018). Moreover, language classrooms, which form the focus of the present thesis study, are no exception and technology has also been benefited and yielded positive results in various settings such as in-class contexts (Byrd & Lansing, 2016; Ebrahimzadeh & Alavi, 2017; Eppard, Nasser, & Reddy, 2016; Reynolds & Kao, 2019; Samur, 2019; Uzun, 2017; Yang, Quadir, & Chen, 2016), outside-class contexts (Ibrahim, 2019; Lai, 2015; Lai, Yeung, & Hu, 2016; Scholz, 2017), both in- and outside-class context (Basal, 2015b; Evseeva & Solozhenko, 2015; Girmen & Kaya, 2019; Hung, 2018; Kurt, 2017; Lee, 2019; Tan, 2018), education of the underprivileged (Dey & Bandyopadhyay, 2019; Sirin, Plass, Homer, Vatanartiran, & Tsai, 2018; Westin, Männikkö Barbutiu, Perera, & Anuradha, 2016), education of the disabled (Abdallah & Fayyoumi, 2016; Ok & Rao, 2017; Saad, Dandashi, Aljaam, & Saleh, 2015; Singh & Kaur, 2016;), teacher education (Benitt, Schmidt, & Legutke, 2018; Howard & Scott, 2017; Kessler & Hubbard, 2017).

Focusing on the Turkish context, Cengiz (2015) conducted a technology intervention on pre-service teachers of physical education to see whether this affects their TPACK, self-efficacy in ICT and what they expect from use of ICT for educational purposes. The participants were supposed to set up a web-page of their own and to upload course-related materials. The study found the prospective teachers' technology knowledge improved and the

intervention resulted in better learning outcomes (Cengiz, 2015). Another study conducted at a university in Turkey by Yürük (2019) assessed the effectiveness of gamification in a foreign language class. To that end, she used Kahoot, which is an online game-based platform used for educational purposes and which can be used for such purposes as icebreaking, warming students up, flipped learning and making revisions. She found that such tools can provide student engagement, increase student motivation, provide immediate feedback, reduce tension and anxiety in class, make withdrawn students participate, and create a cooperative and collaborative setting for learning (Yürük, 2019). In addition to these, Aktekin, Çelebi and Aktekin (2018) found that Kahoot can also provide positive learning settings and enhanced learning, and be used as a closure activity. Çakıroğlu, Başıbüyük, Güler, Atabay and Yılmaz Memiş (2017) designed a gamified intervention for undergraduate students through Microsoft Excel, Wix, Microsoft Publisher and Microsoft Movie Maker, and their findings showed that the students' engagement, motivation and academic success increased. Stating that policy-makers in educational spheres fail to keep up with technological innovations and putting a postmodern approach into practice, Uzun (2017) benefited from Second Life, an online 3D virtual world, with purpose of fostering acquisition of language. In his study conducted on secondary school students, the findings revealed that learners tend to use their L2 more in virtual environments than in their classrooms and this provides a relatively authentic setting for them to practice their L2; meeting new people on such platforms creates an authentic space to exchange information willingly because when students practice speaking with their classmates, they, more or less, know the answer they will receive; the pre-service teachers conducting the intervention stated that if they are provided necessary means, they can perform online classes and obtain good results thanks to such platforms. Punar and Uzun (2019) aimed to see whether conducting a speaking lesson on Skype reduces learners' anxiety during speaking activities in English lessons and they found that learners' anxiety decreases, their

motivation increases and they feel more relaxed compared to face-to-face lessons in such settings. Investigating university instructors' opinions on the effects of a Web 2.0 tool called Penzu, an online diary and personal journal, on improving writing skills of university students, Yüce (2020) reported that instructors of foreign languages are enthusiastic about making use of this tool and they believe such tools could improve students' skills, but digital immigrants may be hesitant about their implementation and advantages. Shedding light on how technology is benefited in English language classrooms by teachers in Turkey, Çelik and Aytın (2014) found that they believe technology integration provides great benefits and has become a necessity; technology use can increase student motivation; learner differences and various learning styles could be addressed; language learning process continues in extramural settings through digital educational materials and authentic communication with other language learners and/or native speakers thanks to technology; and teachers believe in their abilities to integrate technology into their classes. On the other hand, English teachers have difficulty in classroom management while electronic devices are present in class, suffer from lack of training, and have problems in troubleshooting (Çelik & Aytın, 2014). Avcı, Kula and Haşlaman (2019) conducted a large-scale study on teachers' beliefs regarding technology use in Turkey and they highlighted that some participants are not knowledgeable in the pedagogical aspect of technology integration, and consider technology integration as knowing the names of digital tools that they would like to use, making presentation on PowerPoint and watching videos. This limited and outdated use of technology could be attributed to the development level of the country according to Şad and Arıbaş (2010), who state that developed countries such as the USA, England and France began to take concrete steps to revise their education systems in a way to incorporate technology into education in the beginning of the 1990s, but the same process began in Turkey in the 2000s. Therefore, it

could be argued that Turkey is 10 years behind the developed countries in technology integration into education.

2.4. Requirements for Successful Technology Integration

To obtain satisfactory learning outcomes through technology integration, as in the studies mentioned previously, teachers are supposed to have self-efficacy (Bandura, 1993) and TPACK (Koehler & Mishra, 2009). Regarding the former, Bandura (1993) argues that when teachers feel themselves competent in their abilities, they are able to create better educational settings, which would increase students' academic success and provide better learning. Therefore, for successful technology incorporation into their clasrooms and to address their digital native students' needs, teachers have to be competent users of technology first. However, gaining technology knowledge is not enough itself. Teachers should also be competent in pedagogical and content knowledge of their own fields (Koehler & Mishra, 2009). In addition, Christensen and Knezek (2018) recognize that apart from self-efficacy and TPACK, teachers must also possess "positive attitudes and long-standing positive dispositions" (p.358). Similarly, Zhao, Pugh, Sheldon and Byers (2002) argue that educators' social awareness is necessary for successful technology integration in addition to their technology competence and pedagogical compatibility. On the other hand, Kabakci Yurdakul et al. (2012) state that teachers should also be competent in how to design and conduct their classes, be aware ethically, innovative, problem-solver and expert in their fields in addition to their TPACK. In a similar vein, Yeşilyurt, Ulaş and Akan (2016) aimed to evaluate the relations among different types of self-efficacy, namely teacher, academic and computer, and teachers' stance about technology-integrated classrooms. The findings indicate that academic and computer self-efficacies, and attitudes towards using technology for educational purposes are affected by self-efficacy of teachers to a great extent; self-efficacy of teachers, self-efficacy in making use of computers and self-efficacy of academic performance have serious

effects on technology integration habits. Guzman and Nussbaum (2009) pointed out that teachers should also be able to plan and employ appropriate assessments, create a proper setting where ICT can easily be integrated and have learners form positive opinions about technology use. Besides, Voogt, Fisser, Pareja Roblin, Tondeur and van Braak (2013) argue teachers should be familiar with various pedagogical approaches so that they can make good use of technology and have their learners develop the 21st-century skills. Davis (1985) introduced the Technology Acceptance Model (TAM) to outline what affects people's use of technology. When people are convinced that the technology they make use of increases their performance, i.e. perceived usefulness, and that they can use that technology with ease, i.e. perceived ease-of-use, they would like to benefit from it willingly (Davis, 1985). In the face of criticism against TAM, Venkatesh and Davis (2000) proposed TAM 2. The new model "incorporates additional theoretical constructs spanning social influence processes (subjective norm, voluntariness, and image) and cognitive instrumental processes (job relevance, output quality, result demonstrability, and perceived ease of use)" (Venkatesh & Davis, 2000, p.187), all of which make technology accepted by its practitioners. Venkatesh, Morris, Davis and Davis (2003) melted 8 outstanding TAMs of the time, which are "the theory of reasoned action, the technology acceptance model, the motivational model, the theory of planned behavior, a model combining the technology acceptance model and the theory of planned behavior, the model of PC utilization, the innovation diffusion theory, and the social cognitive theory" (p.425), in the same pot, and introduced Unified Theory of Acceptance and Use of Technology (UTAUT). UTAUT aims to find out how likely technology-integration turns out to be successful, and what makes users embrace technology so that policy-makers could organize activities accordingly. According to UTAUT, expectancy of performance and effort, and social influence define attitudes towards technology use; attitudes and facilitating conditions define usage behaviour; and experience, willingness, sex and age are also effective

variables in assessing UTAUT (Venkatesh et al., 2003). Assessing university teachers' attitudes towards learning management systems through TAM, Fathema, Shannon and Ross (2015) proposed some revisions for the model and stated that perceived self-efficacy, systems quality and facilitating conditions are also very effective on university teachers' use of technology. Arguing that TAM is not able to properly assess technology acceptance in online games, social networks, virtual environments etc., or in general in hedonic-motivation systems, Lowry, Gaskin, Twyman, Hammer and Roberts (2013) proposed the Hedonic-Motivation System Adoption Model, which is specific to such settings and helps us comprehend and take advantage of them better, and according to this model, cognitive absorption plays a key role in technology acceptance.

All these reveal the multifaceted nature of the technology integration process and suggest that successful technology integration depends on teachers and they are expected to benefit from current technological tools in class because making use of technology results in better learning outcomes, absorption, increase in motivation, providing authenticity and development of critical thinking skills (Sheehan & Nillas, 2010). Therefore, a 21st-century teacher should be able to conduct technology-integrated classes, address the needs of digital natives, and be familiar with how they can use technology.

2.5. TPACK and Other Technology Integration Models

While discussing the digital competence of teachers, particular emphasis should be placed on TPACK. Koehler and Mishra (2005) first introduced it with the acronym TPCK, which stands for Technological Pedagogical Content Knowledge. Then, it was changed to TPACK making a reference to "Total Package", which implies that technology, pedagogy and content should be approached as a whole (Thompson & Mishra, 2007). Until its emergence in the literature, the field of educational technology had been suffering from a shortage of a unifying conceptual framework (Archambault & Barnett, 2010). Therefore, when TPACK

first appeared, it attracted considerable attention from researchers (Cox & Graham, 2009). The foundations of TPACK were actually laid by Shulman (1986) in his study in which he introduced three content knowledge varieties, which are namely subject matter, pedagogical and curricular knowledge. Koehler and Mishra (2005) attached the technology aspect to his pedagogical content knowledge, and thus created the TPACK framework. This framework has been benefited to a great extent while teacher training curricula are designed, and it is a significant indicator of how competent teachers are in technology integration (Baran et al., 2019). It posits that in order to incorporate technology in educational settings, being a good user of technology does not suffice; the relations between technology, pedagogy and content should also be acknowledged (Koehler & Mishra, 2005). To that end, teachers must possess every possible combination of the following knowledge varieties: technological, pedagogical and content (Koehler & Mishra, 2005). TPACK is also believed to be useful for decision-makers in the field of education in that it helps them design better teacher-training opportunities (Harris, Mishra, & Koehler, 2009).

As in most cases creating repercussions, TPACK is not without its critics. One of the earliest critics, Archambault and Crippen (2009) argue that TPACK further complicates Shulman's (1986) concept of pedagogical content knowledge, which is already complicated itself, and they could not validate the framework in their comprehensive study on online teachers. Acknowledging the potential benefits of TPACK on the one hand, Archambault and Barnett (2010) state that TPACK has some deficiencies on the other and it should be further studied. They also found that it is challenging to distinguish the types of knowledge from each other, and the only distinguishable domain is technology; and that TPACK also fails to help researchers find out novel information and estimate results (Archambault & Barnett, 2010). Despite centring upon the domains of technology, pedagogy and content, TPACK is criticized for not clearly revealing how and why these domains are related (Archambault & Barnett,

2010). Criticizing TPACK for not having a sound theoretical background and for its integrative nature, Graham (2011) states that the model does not have consistent construct validity and it is not very useful in ensuring technology-integration in education.

Along the same lines, Puentedura (2006) introduced the SAMR (Substitution Augmentation Modification Redefinition), which is the acronym of Substitution, Augmentation, Modification, and Redefinition. It is a technology-integration model, albeit not as popular as TPACK in the literature, analysing K-12 teachers' related skills and it has been benefited by instructors and policy-makers to outline their technology-integration process (Hamilton, Rosenberg, & Akcaoglu, 2016). Among other similar models that take place in the literature, in addition to TPACK and SAMR, are the Apple Classrooms of Tomorrow (ACOT) Model (Dwyer, Ringstaff, Haymore Sandholtz and Apple Computer Inc., 1994), Pierson's Technology Integration Model (Pierson, 2001), Technology Integration Planning Model for Teachers (Roblyer, 2006), Social Model (Wang, 2008), Systematic ICT Integration Model (Wang and Woo, 2007), Technology Integration Matrix (Florida Center for Instructional Technology, 2005), Model of the Technology Integration Process (Edyburn, 1998), the Will, Skill, Tool, Pedagogy (WSTP) Model of Technology Integration (Knezek & Christensen, 2016). In addition to these models, a study conducted in Turkey proposed a two-stage model called Techno-Pedagogical Integration Matrix (TPIM) (Şahin & Akkoç, 2020). Şahin and Akkoç (2020) sought to investigate prospective mathematics teachers' TPACK by combining two models, namely the Instructional Quality model and SAMR. The former, which was introduced by Klieme, Pauli and Reusser (2009), was used to assess the pedagogical aspect, and the latter to assess the technological aspect. Thanks to TPIM, they melted the pedagogy and content aspects of TPACK and the technology-integration aspect of SAMR in the same pot, and attached a novel group called ignorance, which refers to zero technology use, to SAMR.

2.6. Technology Proficiency of Pre-Service Teachers

Thanks to such efforts, it has long been established that technology contributes to successful learning outcomes, but this does not necessarily suggest that teachers can integrate technology in their classes successfully (Farjon, Smits, & Voogt, 2019). At this point, how competent teachers are in using technology, i.e. their technological self-efficacy, comes into question and it has not been paid attention as much as the effect of technology on education. Nevertheless, it should be so because teachers are crucial actors of technology-integrated classes (Baturay, Gökçearslan, & Ke, 2017; Christensen & Knezek, 2018). Suggesting that educators should be able to benefit from digital tools and to teach learners how to use technology effectively, ISTE publishes standards that constitute a framework for innovation in education and these standards help educators prepare learners for the future and according to these standards, educators should be able to incorporate technology into their classrooms when it can provide better learning outcomes, and they should create a learning environment in which learners develop technological skills (ISTE, n.d). These suggest that both in- and pre-service teachers of today should be competent in technology use in their own fields, and to check whether they are or not, studies have been conducted, albeit mostly on the latter group. In one of such studies, Çoklar (2008) assessed pre-service teachers' self-efficacy regarding educational technologies and found that they perceive themselves to be more proficient at the basic level of technology skills, but less at higher-level technology skills. The findings also reveal that the participants have significantly lower levels of self-efficacy in social, ethical, legal and humanitarian sub-dimensions (Çoklar, 2008). This suggests an inverse relationship between technology use and these sub-dimensions, which refer to the legal responsibilities and human rights that are brought together with technology use. Teachers are supposed to provide education that raises such an awareness in students. They are also expected to offer equal opportunities to their students while benefiting from

technology, teach them how to stay safe while using technology, and have them appreciate individual differences (Çoklar, 2008). Çoklar and Odabaşı (2009) aim to determine pre-service teachers' assessment and evaluation self-efficacies regarding standards of educational technology and reveal that pre-service teachers think that they are good enough in technology use in assessment and evaluation applications. Şirin and Duman (2013) also investigated self-efficacy perceptions of pre-service physical education teachers regarding technology use and the results indicate that the participants are highly efficient at educational technology and they can benefit from technology appropriately. Investigating TPACK level of pre-service teachers and their self-efficacy, Keser et al. (2015) revealed that these are prone to change based on what they study at university and what year they are in, and their self-efficacy and TPACK are highly correlated. Similarly, Yerdelen-Damar, Boz, & Aydın-Günbatar (2017) explored whether and how pre-service science teachers' self-efficacy views on TPACK are related to their approach to technology integration, their possession of technological devices, digital skills, and their experiences. The researchers found that how pre-service science teachers assess themselves regarding TPACK is directly proportionate to how competent they are in using technology and to their experiences; a positive attitude towards technology leads to better self-efficacy beliefs regarding TPACK; being competent and experienced in technology help pre-service science teachers develop positive attitudes about technology integration. Kavanoz, Yüksel and Özcan (2015) assessed English teacher candidates' self-efficacy beliefs about web pedagogical content knowledge, their results indicated that their self-efficacy in Web Pedagogical Content Knowledge (W-PCK) is satisfactory; their self-efficacy, technology habits, and stance towards web-based instruction are closely related; year level and gender are not significant factors of self-efficacy; the more frequently they use the web, the more self-efficacy they have. Çubukçu and Çeliker (2016) investigated whether prospective English teachers' attitudes and perceived self-efficacy towards technology integration into education

are related. Their results show their attitude and perceived self-efficacy are positively correlated; they are confident in their skills to incorporate technology in their classrooms successfully and that technology is a necessary and useful part of today's classrooms; gender and class level are not significant factors affecting attitudes and technology self-efficacy. İşler and Yıldırım (2018) investigated Turkish preservice EFL teachers' level of TPACK, what affects how they perceive TPACK, and their ideas about technology incorporation into EFL classes. Their findings indicate that technology integration into English language teaching is important especially during listening activities and while presenting visual and authentic materials; when technology is integrated into instruction, it provides individualization of learning, and an engaging, interactive and interesting educational settings; on the other hand, the study reveals that technology incorporation could be time-consuming if it is not managed well. In another study on pre-service teachers, Baturay et al. (2017) found that sex, owning a computer and internet access are not effective in their digital competence, but how long they use a computer in a day is. They also report a positive relationship between their digital competence, their attitudes about the use of computers in education and technology acceptance. García-Martín and García-Sánchez (2017) conducted a descriptive study to discover how knowledgeable pre-service teachers are atto Web 2.0 tools, how often they these tools, and whether their gender and/or educational background affect their use of these tools. They found prospective teachers make extensive of Web 2.0 tools, but they use social media sites much more. According to their findings, females use Moodle, Twitter, Google Docs, Skype and Facebook more frequently than males, but males are more knowledgeable in Web 2.0 tools in general (García-Martín & García-Sánchez, 2017). Compared to pre-service teachers of geography, history, biology, geology, economics and physical education, those of language and literature seem to be most desirous of learning theories publishing and reading academic publications; they also reveal a larger capacity for reflection (García-Martín &

García-Sánchez, 2017). Assessing the TPACK proficiency of Turkish pre-service teachers of English, Solak and Çakır (2014) found that their digital literacy is high; they can integrate ICT into their classes though not at the desired level, so they need more training; when they encounter a technological problem, they fail to come up with a solution; and they are not good at keeping up with latest developments in technology. Gathering data from prospective teachers of science in Turkey, Üstündağ, Güneş and Bahçivan (2017) state that the level of their digital competence seems to be high. Similarly, Çelik and Karamustafaoğlu (2016) stated the technology efficacy of prospective science teachers is high, but when they encounter a problem during the implementation process, they tend to give up quickly and use non-digital activities, so teacher-training programs should also focus on developing pre-service teachers' digital skills. Developing a questionnaire to assess pre-service teachers' digital competence, Çebi and Reisoğlu (2020) obtained contradicting results. Their study indicated that pre-service teachers' digital competence is moderate and it largely depends on sex, department and perceived digital competence (Çebi & Reisoğlu, 2020).

2.7. Technology Proficiency of In-Service Teachers

Most studies in the literature evaluate technology competence and/or self-efficacy of only prospective teachers who are already digital natives, were born into technology, and are mostly considered digitally literate. These studies and most of the literature relatively fail to assess the technological self-efficacy of those who have been teaching for some time and are digital immigrants. Nevertheless, pre-service teachers' TPACK skills are different from their in-service counterparts (Yeh, Hsu, Wu, Hwang, & Lin, 2014), so the latter should be investigated separately. Acknowledging this difference, this research is significant in that it aims to assess what affects the technology competence of in-service teachers, who are mostly digital immigrants, not of pre-service teachers.

Assessing the digital competence of secondary and high school teachers, Keskin and Yazar (2015) found their digital competence sufficient, and it depends on gender, their academic degree, their experience, and their age. In her thesis study, Ergen (2019) aimed to find out whether middle school English teachers' digital self-efficacy and attitudes are related. She found that they are closely related and the latter are effective on the former, and that English teachers believe making use of technology in class is necessary despite limitations (Ergen, 2019). She also suggests that authorities should explore in-service teachers' attitudes towards technology, which would enable them to map out a route to better classrooms (Ergen, 2019). Similarly, Ozel (2019) explored beginning kindergarten teachers' self-efficacy and their technology use, and she found that whether they incorporate technology into their teaching depends on their confidence in their technological skills; when they are enthusiastic about technological developments, they can design technology-integrated classes. Ardıç and Çiftçi (2019) assessed the digital competence of Turkish teachers of English, and their findings revealed that these teachers believe their ICT skills are underdeveloped in some areas; their sex and previous experience can predict their ICT skills; and they need and are willing to receive training on how to make use of technology. Beşoluk, Kurbanoğlu and Önder (2010) stated experienced teachers think their technology knowledge is not sufficient, but they are aware of the significance of technology in education and would like to improve themselves to keep up with the era. They also state that how developed a country is affects its citizens' technology competence, and it might be the reason behind technology adoption in Turkey since it is a developing country (Beşoluk et al., 2010). Assessing TPACK levels of in-service teachers and some factors affecting their TPACK, Bas and Senturk (2018) stated in-service teachers' TPACK level was found to be unsatisfactory, and their ICT competence is affected by their sex, professional experience, level of education, the level they teach and related training they have received. Contrarily, Kahraman and Yılmaz (2018) found in-service

teachers' internet self-efficacy to be considerably high, and it does not vary according to teachers' gender. Ursavaş et al. (2019) aimed to explore how effective subjective norms are on both pre- and in-service teachers' attitudes towards technology use. Their findings indicated that both groups of teachers' attitudes towards ICT determine their in-class practices; the effect of subjective norms is higher in pre-service teachers than it is in their in-service counterparts; in-service teachers can benefit from technology if they are convinced of its usefulness; in-service teachers' practices regarding technology-integration are mostly predicted by their previous experience and engagement with technology (Ursavaş et al., 2019). Implying that their digital competence is not at the desired level, Ursavaş et al. (2019) argue that in-service teachers should be provided with training programs to experience the affordances that technology may offer, then it should be mandatory for them to make use of simple technologies in class. However, and unfortunately, in-service teacher education in Turkey was found to be unsatisfactory (Uztosun, 2018). On the other hand, course designers and software developers should prepare easy-to-comprehend guides and manuals for teachers to show them how to conduct effective technology-integrated courses (Ursavaş et al., 2019).

Pre-service and beginning teachers are much more likely to be digital natives and competent users of technology compared to their in-service counterparts. Therefore, in-service teachers, most of whom are digital immigrants, are more likely to fail in integrating ICT into their classes. Along these lines, Liu, Tsai and Huang (2015) report that in spite of their experience and technological skills, in-service teachers might still fail in benefiting from ICT efficiently in their classes and they mostly use computers for tasks not related to teaching such as giving marks, taking registers etc. Besides, experienced in-service teachers have the tendency to implement settled teaching styles (Liu et al., 2015). A study conducted in Turkey yielded similar results. Beşoluk et al. (2010) found that in-service teachers, especially experienced teachers, fail to implement technology in their classes, and some are even afraid

of and reluctant about learning how to do so. However, teachers must be open to changes and keep up with innovations. Considering these facts, this study aims to elaborate the 21st-century technological competence of in-service teachers. Besides, there is an abundance of data regarding pre-service teachers, but there is not as much data available on their in-service counterparts. Thus, this study also seeks to make contributions to the available data on in-service teachers, more specifically on in-service Turkish teachers of English, by examining factors affecting their technology self-efficacy.

2.8. Self-Assessment Scales and TPSA C-21

Christensen & Knezek (2018) state that a widespread and successful self-assessment that is accompanied by careful monitoring of the same setting might be an untaxing method to gain insight about technology integration in teaching/learning settings. Based on this mindset, Carpenter et al. (2020) created a self-assessment tool that is grounded on TETCs in order to assess teacher trainers' ICT competency. Similarly, Kartal, Kartal and Uluay (2016) prepared a survey which is based on TPACK and called TPACK Self-Assessment Scale (TPACK-SAS) so that they could investigate self-perceptions and self-assessments of pre-service teachers. On a similar note, Yanış and Yürük (2020) introduced Educational Robotics TPACK self-efficacy scale which is also based on TPACK. As Buabeng-Andoh (2012) reports, attitudes of teachers are a significant determinant of efficient implementation of technology in classrooms, so exploring teachers' self-assessment beliefs would provide useful data. Setting off with these ideas in mind, the researcher aimed to assess what affects technology proficiency of Turkish teachers of English. To this end, the researcher benefited from a reliable and valid instrument called TPSA C-21 (Christensen & Knezek, 2017), which is the revised version of TPSA (Technology Proficiency Self-Assessment) which Ropp (1999) introduced and aimed to assess teachers' self-efficacy while they were making use of technology. Prepared in line with the ISTE standards, TPSA has four sub-scales, which are e-

mail, WWW, integrated applications and teaching with technology. Besides, Gençtürk, Gökçek and Güneş (2010) translated the scale into Turkish and found it to be a valid and reliable instrument to assess teachers' technology self-efficacy. In 2017, Christensen and Knezek (2017) published TPSA C-21, the revised version of TPSA. In addition to the four sub-scales of TPSA, TPSA C-21 has two new sub-scales, which are emerging technologies and teaching with emerging technologies (Christensen & Knezek, 2017). TPSA C-21 was also adapted into the Turkish context by Fidan, Debbağ and Çukurbaşı (2020) and the validity and reliability were achieved.

Chapter III

Methodology

Chapter III consists of six sections and elaborates the methodology of this study. The research design is covered in detail in the first part. Research questions are given in the second one. The third section introduces the research setting and the participants. Next, the data collection instruments that the researcher used are explained in the fifth section. Finally, the data analysis procedures are covered in the sixth section.

3.1. Research Design

The present thesis study aims to analyse the technology competence of Turkish in-service teachers of English and to explore the factors affecting their perceived technology proficiency in the light of 21st-century learning. To this end, survey research method, a quantitative research method, was adopted. Fraenkel and Wallen (2006) defined survey as "a collection of information from a sample by asking questions in order to describe some aspects of the population of which the sample is a part" (p.423). According to Creswell (2014), "a survey design provides a quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population. From sample results, the researcher generalizes or draws inferences to the population" (p.155). The researcher preferred survey design because it provides data quickly, and it enables the identification of characteristics of a larger population by the help of a small group of individuals (Fowler & Cosenza, 2009). In survey research designs, questionnaires are the most common method to collect data, and they are defined as a range of questions, i.e. items, that pursue an established pattern to collect data from people regarding at least one particular subject (Lavrakas, 2008). The researcher benefited from a questionnaire that was designed in a 5-point Likert scale. The Likert scale is probably the most used way of attitude measurement in survey research, and it includes several items which are summed to lead to a more dependable evaluation (Lavrakas, 2008).

3.2. Research Questions

This study aimed to find answers to the research questions below:

1. Is there a meaningful relationship between the sex of Turkish teachers of English and their perceived technology proficiency?
2. Is there a meaningful relationship between the age of Turkish teachers of English and their perceived technology proficiency?
3. Is there a meaningful relationship between what level Turkish teachers of English teach and how proficient they perceive themselves in technology use?
4. Is there a meaningful relationship between whether Turkish teachers of English teach at a state or a private institution and their perceived technology proficiency?
5. Is there a meaningful relationship between years of teaching experience of Turkish teachers of English and their perceived technology proficiency?
6. Is there a meaningful relationship between how much time Turkish teachers of English spend in electronic environments and their perceived technology proficiency?

3.3. Research Setting and Participants

This study was carried out within the ELT contexts ranging from primary schools to higher education institutions in Turkey. Having been last revised in 2012 and been in effect since then, the Turkish national education system requires the citizens to receive a 12-year period of obligatory education, and this period is divided into three stages, namely primary school, secondary school and high school, each of which takes four years to complete. As of the 2nd grade until they graduate from high school, the students are obliged to take English lessons, in other words, they receive compulsory English language education for nearly 10 years. In the 2nd, 3rd and 4th grades, the number of weekly English lessons is 2; in the 5th and 6th grades, it is 3; in the 7th and 8th grades, it is 4. There are various types of high schools in Turkey, which are Anatolian High School, Social Sciences High School, Science High

School, Fine Arts High School, Sports High School, Anatolian Religious High School, and Vocational and Technical Anatolian High School. The number of English lessons offered weekly at these high schools varies between 5 and 2. In addition, students are offered elective courses of English from the 2nd grade to the 12th grade; and they take 20 hours of English in the preparatory year which some high schools offer. Despite being exposed to English for more than a decade and at least nearly 1300 hours, Turkish people are not able to speak English well. As the 2020 English Proficiency Index of Education First, which is published annually, reveals, Turkey is among the countries with low proficiency, ranked 69th out of 100 countries – it was 79th the year before (Education First, 2020).

Following the 12-year compulsory education, students who would like to receive tertiary education take the university entrance exam. Undergraduate education lasts four years except for departments of faculties of medicine, which last six years. They may also study at two-year associate degree programs. Students of English-medium departments and those of English-and-Turkish-medium departments have to complete a pre-sessional year during which they study English. Those who can provide a valid language score or who can get a passing grade in placement tests are exempt from this pre-sessional course.

As mentioned before, the data show English language education in Turkey is not satisfactory, which drives people to look for alternative ways. This paved the way for the plethora of language courses in Turkey, especially in big cities. No study was found in the literature revealing their numbers, but when “dil kursu (meaning “language course”)” or “dil okulu (meaning “language school”)” is typed on Google, tens of millions of results show up. However, the quality of education they provide is questionable. Investigating the employment of non-Turkish and non-native teachers of English in Turkey in her thesis study, Origo (2016) found that 4 out of every 5 language courses hire non-Turkish and non-native English teachers, and introduce them to their students as native speakers; and that most language

course providers possess little knowledge about such concepts as English as an International Language, English as a lingua franca and World Englishes, and about related practices. Analysing some online groups of teachers and blogs, she also highlights that some courses employ inexperienced Turks and teachers from countries such as Ukraine and Syria and pay very little money to them (Origo, 2016).

In the past three paragraphs, the settings where the participants of the present study are employed and Turkish students are generally taught English are explained. As for their educational backgrounds, most of them graduated from a four-year English Language Teaching department falling under the faculties of education. During their education, these participants took stand-alone technology courses under various names such as instructional technology, educational technology etc. and these are only one-semester-long courses, which means they have not been exposed to technology at a desired level during their teacher education and they have had to improve themselves in technology integration. Furthermore, after receiving a pedagogical formation training, which the faculties of education provided, the graduates of the following departments could also become English teachers in Turkey: Translation and Interpreting, English Language and Literature, American Culture and Literature, and English Linguistics, which fall under the faculties of letters in most Turkish universities. However, as of 2020, pedagogical formation training will no longer be provided (Ülkar, 2020). On the other hand, some participants of the study work as an instructor at a university in Turkey. To become an instructor, someone has to complete their master's degree (Resmi Gazete, 2018). In addition to their undergraduate degree, some participants are pursuing their postgraduate education. Besides, within the scope of FATİH Project, state-school teachers regularly receive in-service technology trainings (Fatih Projesi, n.d.), and most private schools offer such trainings themselves (Metin, 2018).

The researcher reached the participants through the convenience sampling method, in which "members of the target population are selected for the purpose of the study if they meet certain practical criteria, such as geographical proximity, availability at a certain time, easy accessibility, or the willingness to volunteer" (Dörnyei, 2007, p.98-99). After they were contacted through the convenience sampling method, they were asked to share the survey with other related people they know, which is an example of the snowball sampling method, which posits that those who participate in a questionnaire, survey etc. share it with their acquaintances who fall under the scope of the study in question, thus a larger sample group is achieved. (Biernacki & Waldorf, 1981). As a result, the researcher was able to collect data from 273 (214 females, 59 males) Turkish teachers of English. The gap between female and male teachers could be explained by the data that the Ministry of National Education (MoNE) published in 2015-2016, according to which, the number of male teachers is 447.958 and the number of their female counterparts is 545.836, and the number of female pre-service teachers is twice as much as that of male pre-service teachers (Ülkar, 2016). Seventy-seven participants were between 20-29 years old; 154 between 30-39; 34 between 40-49; and 8 between 50-59. The age composition of the participants is very similar to that of the teachers employed by MoNE. 22.95% of them are 30 and below, 38.86% are between 31 and 40, 26.29% are between 41 and 50, 10.41% are between 51 and 60, and 1.48% are 61 and above (Uçar, 2020). Table 1 elaborates the participants' gender and age.

Table 1

Demographic data of the participants

Variables		F	%
Age			
	20-29	77	28.21%
	30-39	154	56.41%
	40-49	34	12.45%
	50-59	8	2.93%
Gender			
	Female	214	78.39%
	Male	59	21.61%

As per what level the participants mainly teach, the obtained data indicated that 32 of them teach at primary school level, 93 at secondary school, 47 at high school, 101 at university. Among the 273 participants, 114 work at a private institution, and 159 work at a state institution. Besides, among those working at a private institution, 13 teach at primary school, 13 at secondary school, 11 at high school, 77 at university. Among the participants who work at a state institution, 19 teach at primary school, 80 at secondary school, 36 at high school, 24 at university. Table 2 shows the related data.

Table 2

Data related to what level the participants teach and whether they teach at a private or state institution

Variables			F	%
Level				
	Primary school		32	11.72%
	Secondary school		93	34.07%
	High school		47	17.22%
	University		101	37.0%
Private or State?				
	Private institution		114	41.76%
		Primary school	13	4.76%
		Secondary school	13	4.76%
		High school	11	4.03%
		University	77	28.21%
	State institution		159	58.24%
		Primary school	19	6.96%
		Secondary school	80	29.30%
		High school	36	13.19%
		University	24	8.79%

The participants were also asked about how long they had been teaching English. The data showed that 8 of them had been teaching for less than a year, 34 for 1-3 years, 57 for 4-6 years, 61 for 7-9 years, 59 for 10-14 years, and 54 for 15 or more years. The related data are provided in Table 3.

Table 3

Data showing how long the participants have been teaching English

Variables		F	%
Range of years			
	Less than 1 year	8	2.93%
	1 – 3 years	34	12.45%
	4 – 6 years	57	20.88%
	7 – 9 years	61	22.34%
	10 – 14 years	59	21.61%
	15+ years	54	19.78%

Finally, the participants were asked how much time they spend in electronic environments (computers, smartphones, social media, www, texting, gaming etc.) in a day. Out of 273 participants, 63 spend 0-3 hours, 126 spend 3-6 hours, 59 spend 6-9 hours, and 25 spend more than 9 hours in electronic environments. The related data are given in Table 4.

Table 4

Data showing how much time the participants spend in electronic environments in a day

Variables		F	%
Range of hours			
	0 – 3 hours	63	23.08%
	3 – 6 hours	126	46.15%
	6 – 9 hours	59	21.61%
	+9 hours	25	9.16%

3.4. Data Collection Instruments

The data collection tool distributed to the participants consisted of three sections (see Appendix A). The first section states the name and the e-mail address of the researcher, his appreciation for taking their time to take the survey, and the aim of the study.

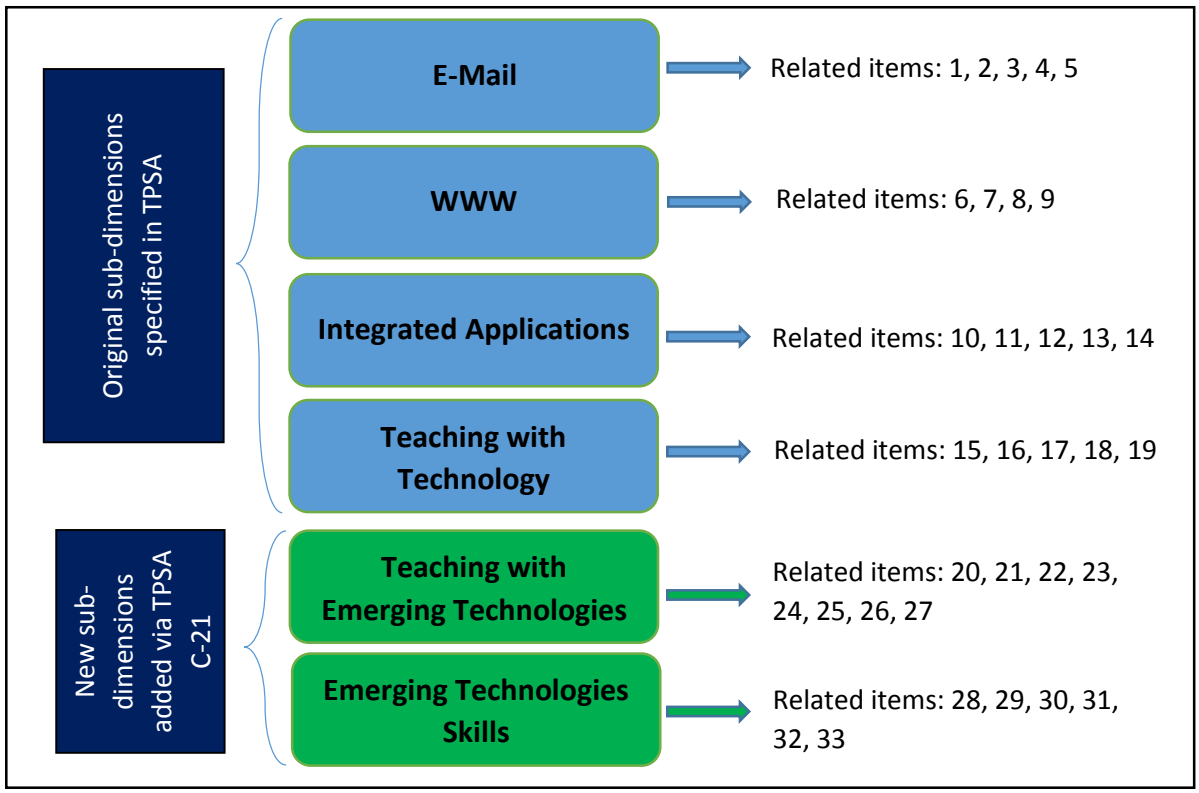
In the second section, there was an information form consisting of multiple-choice personal questions. The participants were asked how old they are, what their sex is, what level they are mainly teaching at, whether they work for a state or private institution, how long they have been teaching, and how much they spend in electronic environments in a day respectively.

In the third section, quantitative data were collected through TPSA C-21, which Christensen and Knezek (2017) introduced. This questionnaire is the upgraded version of TPSA, which Ropp (1999) introduced to assess teachers' self-efficacy while benefiting from technology in education and has been implemented in the USA and other countries successfully since then (Christensen & Knezek, 2017). TPSA measures "four types of technology proficiencies: using electronic mail, using the World Wide Web (WWW), using technology applications, and teaching with technology" (Christensen & Knezek, 2017, p.20). Each of these sub-dimensions was determined based on ISTE standards of the time. The changes in technology to be benefited in the classroom necessitated some alterations on TPSA. Therefore, Christensen and Knezek (2017) updated some wordings (e.g. Alta Vista was replaced with Google) and added 14 new items regarding such new ICT tools as mobile learning, Web 2.0, social networking sites, and a cloud technology (Christensen & Knezek, 2017). These 14 new items are classified under 2 sub-dimensions, namely emerging tools and teaching with emerging technologies. As a result, the questionnaire has 6 sub-dimensions, i.e. 6 types of technology proficiencies. The questionnaire consists of 34 items, but, upon the approval received from the advisor of the present thesis study, the 7th item which states ". . .

search for and find the Smithsonian Institution Web site" was discarded because it does not have any indicative feature as Turkish teachers of English, whom the questionnaire was going to be administered, do not know (or are not supposed to know) what Smithsonian Institution is. Besides, there is no similar institution in Turkey that can be mentioned instead. Therefore, the final version of the questionnaire to be used consists of 33 items under 6 sub-dimensions (see Figure 3). Each of the 33 items was designed based on a 5-point Likert scale (1-Strongly disagree, 2-Disagree, 3-Undecided, 4-Agree, 5-Strongly Agree), and the participants were asked to choose whichever applied to them most.

Figure 3

Sub-dimensions of TPSA C-21 and items corresponding to them



Cortina (1993) states that Cronbach's alpha values between .70 and .80 provide acceptable, between .80 and .90 good, and .90 and higher excellent reliability. In light of this information, TPSA is an extremely reliable self-assessment questionnaire because Ropp (1999) tested the reliability of the TPSA scales twice and she found it 0.95, which refers to

excellent reliability. Christensen and Knezek (2001) found the reliability of the sub-scales ranging from 0.73 to 0.87, which corresponds to acceptable and good reliability. TPSA was also applied to teachers living in Mexico City, Mexico and Texas, the USA (Morales, Knezek, & Christensen, 2008). When TPSA was applied to teachers in Texas, the sub-scale reliability was found to vary between 0.73 and 0.88 (Morales et al., 2008), which is nearly the same as the findings of Christensen and Knezek (2001). It was later translated into Spanish and applied to those in Mexico City, and the reliability of the sub-scales was found to range from 0.91 to 0.93, which refers to excellent reliability (Morales et al., 2008). The reliability of the whole tool was found 0.93 in Texas, and 0.97 in Mexico City, both of which correspond to excellent reliability (Morales et al., 2008). TPSA was also translated and adapted into Turkish by Gençtürk et al. (2010). They indicated that TPSA is a valid and very reliable (α=0.94) self-assessment tool that could be applied in Turkey (Gençtürk et al., 2010).

The innovations taking place in technology and the changing teaching/learning needs created a need to update TPSA, so Christensen and Knezek (2017) introduced TPSA C-21. The reliability scores of the original TPSA sub-scales were found as follows: "Email α = .76 (Items 1–5); WWW α = .75 (Items 6– 10); Integrated Applications α = .84 (Items 11–15); and Teaching with Technology α = .89 (Items 16–20)" (Christensen & Knezek, 2017, p.23), and the reliabilities of the newly-added sub-scales, namely Teaching with Emerging Technologies (Items 21-28) and Emerging Technology Skills (Items 29-34), were found to be 0.93 and 0.84 respectively (Christensen & Knezek, 2017). (The item numbers specified in the brackets refer to the original questionnaire, not to the one in which an item was discarded for this study). Besides, the reliability value for all items of TPSA C-21 was found α = .96. These values suggest that all the items comply with the reliability criteria specified by Cortina (1993) in various degrees. In addition, Knezek and Christensen (2016) state that TPSA C-21 is

successful in assessing technology integration skills of users within the WSTP Model of Technology Integration.

TPSA C-21 was also adapted in the Turkish context by Fidan et al. (2020). After it was translated into Turkish, content validity values were calculated and found to range from 0.75 to 1.00 for the sub-scales, and it was found 0.88 for the entire scale (Fidan et al., 2020). These scores correspond to an acceptable level according to Davis (1992). Explanatory and confirmatory factor analyses were run to assess the construct validity, and following the former, the 6 sub-scales of the original version were put together under 4, namely E-mail, WWW, Integrated Applications and Teaching with Technology (Teaching with Emerging Technologies and Emerging Technologies Skills were incorporated into Teaching with Technology); 10 items were removed because of low factor loads and overlapping values (Fidan et al., 2020). The reliability scores for the newly-determined sub-scales were 0.85, 0.82, 0.81 and 0.89 respectively, and 0.89 for the entire scale; following the re-test, these scores were found 0.85, 0.81, 0.83 and 0.89 respectively, and 0.81 for the entire scale, which makes Turkish TPSA C-21 a reliable self-assessment instrument (Fidan et al., 2020).

The researcher began to work on the present thesis study before the publication of the study mentioned in the previous paragraph. Therefore, as the questionnaire was administered in a different setting to different people from the original respondents of TPSA C-21, a pilot study was conducted on 88 participants in 2019 to test reliability and validity. The Cronbach's alpha value of the whole scale was found to be $\alpha = .945$, which suggests excellent reliability according to Cortina (1993). Then, the reliability of each sub-dimension was assessed. The results showed that the Cronbach's alpha value for E-mail (Items 1-5) is $\alpha = .826$; WWW (Items 6-9) $\alpha = .536$; Technology Applications (Items 10-14) $\alpha = .793$; Teaching with Technology (Items 15-19) $\alpha = .864$; Teaching with Emerging Technologies (Items 20-27) $\alpha = .908$; Emerging Technology Skills $\alpha = .837$. All the subscales were found to provide

reliability in various degrees, but the sub-scale WWW has relatively lower reliability compared to the others, but it can still be considered to have moderate reliability as Hinton, McMurray and Brownlow (2014, p. 364) state that "0.50 to 0.70 shows moderate reliability". The reliability values that Christensen and Knezek (2017) found and those that the researcher found are presented in Table 5.

Table 5

Reliability (Cronbach's alpha) values of the six sub-scales and of the entire questionnaire

TPSA C-21 (Christensen & Knezek, 2017)	α	Items	TPSA C-21 used for the present study	α	Items
E-mail scale	.76	1, 2, 3, 4, 5	E-mail scale	.83	1, 2, 3, 4, 5
WWW scale	.75	6, 7, 8, 9, 10	WWW scale	.54	6, 7, 8, 9
Integrated Applications scale	.84	11, 12, 13, 14, 15	Integrated Applications scale	.79	10, 11, 12, 13, 14
Teaching with Technology scale	.89	16, 17, 18, 19, 20	Teaching with Technology scale	.86	15, 16, 17, 18, 19
Teaching with Emerging Technologies scale	.93	21, 22, 23, 24, 25, 26, 27, 28	Teaching with Emerging Technologies scale	.91	20, 21, 22, 23, 24, 25, 26, 27
Emerging Technologies Skills scale	.84	29, 30, 31, 32, 33, 34	Emerging Technologies Skills scale	.84	28, 29, 30, 31, 32, 33
Entire scale (N=34)	.96		Entire scale (N=33)	.95	

To evaluate structural validity of the scale, principle component analysis, which is a factor analysis method, was used. Following the factor analysis, the Kaiser–Meyer–Olkin (KMO) coefficient was figured out to be .824 and Bartlett's value was calculated at a significant level, i.e. .000. KMO value must be at least .60 and Bartlett's test score must be significant, i.e. lower than .05, in order for the factor analysis to be conducted (Pallant, 2001; Büyüköztürk, 2011) and the obtained values comply with this statement. Then, the item loading values of each item, which were obtained through factor analysis (principal components, varimax rotation), were checked. The lowest item loading value is .530 (Item 9) and the highest one is .849 (Item 10). Pallant (2001) posits that item loading values higher than .4 refer to strong loading and such items should not be deleted from the scale. All the items in the scale conform with this statement and no items were excluded from the study. Afterwards, the total item correlation values of each item were analysed. A value which is equal to .4 or higher means excellent item distinctiveness; a value between .3 and .4 means good item distinctiveness; a value between .2 and .3 means the item should be revised; and a value equal to .2 or less should be excluded from the study (Büyüköztürk, 2011). The total item correlation value of each item under TPSA C-21 was found to range between .301 (Item 5) and .792 (Item 24), which means the items used in the study have excellent or good item distinctiveness and there is no need to revise or exclude any items. The item loadings obtained through the factor analysis (principal components, varimax rotation) and the total item correlation values can be observed in Table 6. All these above-mentioned data suggest that TPSA C-21, which was employed in the present study, is a reliable and valid tool.

Table 6

Total item correlation and item loading values of TPSA C-21 items

Items	Total item correlation	Item loading
1- ...send e-mail to a friend.	,366	,769

2- ...subscribe to a discussion list.	,591	,776
3- ...create a distribution list to send e-mail to several people at once.	,505	,694
4- ...send a document as an attachment to an e-mail message.	,405	,782
5- ...keep copies of outgoing messages that I send to others.	,301	,742
6- ...use an Internet search engine (e.g., Google) to find Web pages related to my subject matter interests.	,445	,820
7- ... create my own web page.	,505	,592
8- ...keep track of Web sites I have visited so that I can return to them later. (An example is using bookmarks.)	,554	,710
9- ...find primary sources of information on the Internet that I can use in my teaching.	,513	,530
10- ...use a spreadsheet to create a bar graph of the proportions of the different colors of M&Ms in a bag.	,519	,849
11- ...create a newsletter with graphics.	,567	,822
12- ...save documents in formats so that others can read them if they have different word processing programs (e.g., saving Word, pdf, RTF, or text).	,574	,601
13- ...use the computer to create a slideshow presentation.	,644	,765
14- ...create a database of information about important authors in a subject-matter field.	,609	,678
15- ...write an essay describing how I would use technology in my classroom.	,745	,763
16- ...create a lesson or unit that incorporates subject matter software as an integral part.	,655	,699

17- ...use technology to collaborate with teachers or students, who are distant from my classroom.	,663	,650
18- ...describe 5 software programs or apps that I would use in my teaching.	,659	,728
19- ...write a plan with a budget to buy technology for my classroom.	,556	,719
20- ...integrate mobile technologies into my curriculum.	,752	,750
21- ...use social media tools for instruction in the classroom. (e.g., Facebook, Twitter, etc.)	,618	,681
22- ...create a wiki or blog to have my students collaborate.	,631	,712
23- ...use online tools to teach my students from a distance.	,718	,702
24- ...teach in a one-to-one environment in which the students have their own device.	,792	,737
25- ...find a way to use a smartphone in my classroom for student responses.	,650	,747
26- ...use mobile devices to connect to others for my professional development.	,606	,691
27- ...use mobile devices to have my students access learning activities.	,629	,798
28- ...download and listen to podcasts/audio books.	,514	,784
29- ...download and read e-books.	,512	,817
30- ...download and view streaming movies/video clips.	,527	,787
31- ...send and receive text messages.	,444	,740
32- ...transfer photos or other data via a smartphone.	,425	,823
33- ...save and retrieve files in a cloud-based environment.	,674	,557

3.5. Data Collection Procedures

The researcher started collecting data as soon as necessary permissions were received from the Research and Publication Ethics Committee for Social Sciences and Humanities (see Appendix B).

The questionnaire was recreated on Google Forms, and a shortened URL (bit.do/tech-proficiency) and a QR code (see Figure 4) were created so that it could be delivered to the participants easily. The participation was on a voluntary basis. They were informed about the target of the study and told that their personal data and responses would be kept confidential. They were also told that if they had been interested in the results of the study, they could contact the researcher.

Figure 4

QR code linked to the questionnaire

3.6. Data Analysis Procedures

Following the data collection process, they were processed through Statistical Package for Social Sciences (SPSS) 22. For the analysis of the obtained data and to answer the research questions, the researcher had to run an independent-samples t-test and ANOVA test. According to Gravetter, Wallnau, Forzano and Witnauer (2011), three assumptions, namely independence of observations, normality and homogeneity of variance, have to be satisfied in t-tests and ANOVA tests. To this end, the normality and homogeneity of the collected quantitative data were analysed first. The researcher discovered the data were distributed normally and were homogeneous. Next, independent-samples t-tests and ANOVA tests were performed. The former involve investigating if the difference between two unrelated sample

groups is meaningful (Seçer, 2015). Akbulut (2011) states that ANOVA analysis is performed to examine effects of a non-dependent variable with a minimum of three or more levels on one dependent variable. Which test was run for each research question can be seen in Table 7.

Table 7

Research questions and corresponding tests

Research question	Test
1. Is there a meaningful relationship between the sex of Turkish teachers of English and their perceived technology proficiency?	Independent-samples t-test
2. Is there a meaningful relationship between the age of Turkish teachers of English and their perceived technology proficiency?	ANOVA
3. Is there a meaningful relationship between what level Turkish teachers of English teach how proficient they perceive themselves in technology use?	ANOVA
4. Is there a meaningful relationship between whether Turkish teachers of English teach at a state or a private institution and their perceived technology proficiency?	Independent-samples t-test
5. Is there a meaningful relationship between years of teaching experience of Turkish teachers of English and their perceived technology proficiency?	ANOVA
6. Is there a meaningful relationship between how much time Turkish teachers of English spend in electronic environments and their perceived technology proficiency?	ANOVA

Chapter IV

Results

The results that were obtained as a result of the statistical analyses are covered in this chapter. This study seeks to assess the perceived technology proficiency of Turkish teachers of English and find out whether their gender, their age, what level they teach, they work for a state or private institution, their teaching experience and how much time they spend in electronic environments affect their perceived technology proficiency. To this end, the self-assessment tool called TPSA C-21 was employed. Then, the obtained data were analysed in relation to the personal data the participants provided.

4.1. Preliminary Analyses

Before conducting statistical tests, one should discover whether to use parametric or non-parametric tests. For this purpose, the normality and homogeneity of the data should be tested first. In line with this statement, the normality of the data was evaluated. Byrne (2010) and Hair, Black, Babin and Anderson (2010) state that a skewness score ranging between +2 and -2, and a kurtosis score ranging between +7 and -7 indicate that the data are normally distributed. The skewness and kurtosis scores were calculated for each subscale and for the entire scale. The skewness scores were found to range between -0.752 (Teaching with technology) and -1.923 (Email), and the kurtosis scores between 0.159 (Teaching with Technology) and 4.638 (Email). The results suggest that the data obtained for the present study is normally distributed and can be seen in Table 8. Then, the test of homogeneity of variance (Levene's test) was run and all the values were found significant, ranging from 0.54 (Is the institution you work for a state or private school/university) to 0.809 (How old are you), which suggests that the data are homogeneously distributed. The homogeneity scores are provided in Table 9. After the normality and homogeneity of the data were ensured, independent-samples t-test and ANOVA tests were applied for the corresponding research

question. In what follows, each research question is tested and the related results are presented under a different sub-heading.

Table 8

Skewness and kurtosis values

Sub-scales	Skewness	Kurtosis
E-mail scale	-1,923	4,638
WWW scale	-,910	,635
Integrated Applications scale	-,848	,497
Teaching with Technology scale	-,752	,159
Teaching with Emerging Technologies scale	-,860	,500
Emerging Technology Skills scale	-1,761	3,505
Entire questionnaire (N=33)	-1,139	1,746

Table 9

Homogeneity values

Personal Information Questions	Levene's test score
How old are you?	.809
Sex?	.187
What level are you mainly teaching at?	.579
Is the institution you work for a state or private school/university?	.054
How long have you been teaching?	.734
How much time do you spend in electronic environments in a day?	.344

Prior to analysing the data according to the research questions, the mean scores of each answer given to the TPSA C-21 items were calculated. The item with the lowest mean score (3.15) was Item 7 (I feel confident that I could create my own web page), and the ones with the highest mean score (4.71) were Item 4 (I feel confident that I could send a document as an attachment to an e-mail message) and 6 (I feel confident that I could use an Internet search engine (e.g., Google) to find Web pages related to my subject matter interests). The mean score for the whole scale was 4.19. The mean scores in question are given in Table 10.

Table 10

Mean scores of each TPSA C-21 item

Items	Mean score
1- ...send e-mail to a friend.	4,68
2- ...subscribe to a discussion list.	4,38
3- ...create a distribution list to send e-mail to several people at once.	4,45
4- ...send a document as an attachment to an e-mail message.	4,71
5- ...keep copies of outgoing messages that I send to others.	4,55
6- ...use an Internet search engine (e.g., Google) to find Web pages related to my subject matter interests.	4,71
7- ... create my own web page.	3,15
8- ...keep track of Web sites I have visited so that I can return to them later. (An example is using bookmarks.)	4,26
9- ...find primary sources of information on the Internet that I can use in my teaching.	4,56
10- ...use a spreadsheet to create a bar graph of the proportions of the different colors of M&Ms in a bag.	3,56
11- ...create a newsletter with graphics.	3,41

12- ...save documents in formats so that others can read them if they have different word processing programs (e.g., saving Word, pdf, RTF, or text).	4,22
13- ...use the computer to create a slideshow presentation.	4,47
14- ...create a database of information about important authors in a subject-matter field.	3,85
15- ...write an essay describing how I would use technology in my classroom.	4,20
16- ...create a lesson or unit that incorporates subject matter software as an integral part.	3,88
17- ...use technology to collaborate with teachers or students, who are distant from my classroom.	4,42
18- ...describe 5 software programs or apps that I would use in my teaching.	4
19- ...write a plan with a budget to buy technology for my classroom.	3,35
20- ...integrate mobile technologies into my curriculum.	4,15
21- ...use social media tools for instruction in the classroom. (e.g., Facebook, Twitter, etc.)	3,89
22- ...create a wiki or blog to have my students collaborate.	3,63
23- ...use online tools to teach my students from a distance.	4,35
24- ...teach in a one-to-one environment in which the students have their own device.	4,09
25- ...find a way to use a smartphone in my classroom for student responses.	4,12
26- ...use mobile devices to connect to others for my professional development.	4,29
27- ...use mobile devices to have my students access learning activities.	4,29
28- ...download and listen to podcasts/audio books.	4,44
29- ...download and read e-books.	4,44
30- ...download and view streaming movies/video clips.	4,43

31- ...send and receive text messages.		4,64
32- ...transfer photos or other data via a smartphone.		4,60
33- ...save and retrieve files in a cloud-based environment.		4,20
	Whole scale	4,19

4.2. Relationship between sex and perceived technology proficiency of Turkish teachers of English

The first research question is "Is there a meaningful relationship between sex of Turkish teachers of English and their perceived technology proficiency". An independent-samples t-test was conducted in order to answer this research question. The significance value was found to be .286, which is higher than .05 and suggests no significant difference between females' and males' perceived technology proficiency. In other words, sex is not a factor affecting the technology proficiency of Turkish teachers of English. Table 11 presents the results.

Table 11

Relationship between sex and technology proficiency of Turkish teachers of English

		n	Mean	Std. deviation	df	t	p
Perceived technology proficiency	Female	214	4,17	,62	271	-1,070	,286
	Male	59	4,27	,73			

4.3. Relationship between age and perceived technology proficiency of Turkish teachers of English

The next, i.e. second, research question is "Is there a meaningful relationship between age of Turkish teachers of English and their perceived technology proficiency". To assess the participants' age, some age ranges were identified, namely 20-29, 30-39, 40-49, 50-59 and

60+, and placed on the survey. None of the participants were 60 or above. ANOVA test was run to assess how their age and perceived technology proficiency are related. There was found to be a non-significant difference, 0.054 (p>.5), which suggests that age is not a factor affecting the technology proficiency of Turkish teachers of English. The results are shown in Table 12. Since the significance value was higher than .05, a post-hoc test was not conducted.

Table 12

Relationship between age and technology proficiency of Turkish teachers of English

	Sum of squares	df	Mean square	F	p
Between groups	3,141	3	1,047	2,576	,054
Within groups	109,334	269	,406		
Total	112,475	272			

Albeit not significantly, the participants falling under a higher age range have relatively lower mean scores. The mean score of the group of 50-59 was found 3.72 while that of 20-29 was 4.31. The mean scores for each age range are provided below in Table 13.

Table 13

Mean scores of each age range

Age range	Mean score	N
20 - 29	4.32	77
30 - 39	4.17	154
40 - 49	4.13	34
50 - 59	3.72	8

4.4. Relationship between what level Turkish teachers of English teach and how proficient they perceive themselves in technology use

The third research question is "Is there a meaningful relationship between what level Turkish teachers of English mainly teach and how proficient they perceive themselves in technology use". ANOVA test was conducted to assess the relationship in question. These levels were stated in the survey as primary school, secondary school, high school, university. No significant difference was found, .371 (p>.05), between what level Turkish teachers of English mainly teach and how proficient they perceive themselves in technology use. In other words, what level they teach at does not affect their technology proficiency. The results are presented in Table 14. Since the significance value is higher than .05, a post-hoc test was not conducted.

Table 14

Relationship between what level Turkish teachers of English teach and how proficient they perceive themselves in technology use

	Sum of Squares	df	Mean Square	F	p
Between Groups	1,300	3	,433	1,049	,371
Within Groups	111,175	269	,413		
Total	112,475	272			

The mean scores for each teaching level are also provided in Table 15.

Table 15

Mean scores of each teaching level

Teaching level	Mean score	N
Primary School	4,24	32
Secondary School	4,12	93
High School	4,13	47
University	4,27	101

4.5. Relationship between whether Turkish teachers of English teach at a state or a private institution and their technology proficiency

The fourth research question is "Is there a meaningful relationship between whether Turkish teachers of English teach at a state or a private institution and their perceived technology proficiency". An independent-samples t-test was conducted to find an answer to this research question. The researcher found a significant difference (p=.001; p<.05), which suggests that whether Turkish teachers of English teach at a state or a private institution affect their perceived technology proficiency. The mean score of those working at private institutions (4.34) was found to be higher than the other (4.09). Table 16 shows the results. Later, the effective size was calculated to find out how effective the variable is on their perceived technology proficiency through the "eta squared" test, which is calculated as follows: $t^2 / [t^2 + (n1 + n2 - 2)]$. Since SPSS does not run this test, it was done by the researcher manually. The result was 0.04, which corresponds to a value between small effect and medium effect according to Pallant (2001, p.181), who states "0.01=small effect, 0.06=moderate effect and 0.14= large effect".

Table 16

Relationship between whether Turkish teachers of English teach at a state or a private institution and their technology proficiency

		n	Mean	Std. deviation	df	t	p
Perceived technology proficiency	Private	114	4,34	,59	271	3,311	,001
	State	159	4,09	,66			

4.6. Relationship between years of teaching experience of Turkish teachers of English and their perceived technology proficiency

The fifth research question is "Is there a meaningful relationship between years of teaching experience of Turkish teachers of English and their perceived technology proficiency". The relationship in question was assessed through ANOVA. Year ranges assigned in the survey are: less than 1 year, 1-3 years, 4-6 years, 7-9 years, 10-14 years and 15+ years. A non-significant difference was found as a result ($p=.636$; $p>.05$), which suggests that years of teaching experience of Turkish teachers of English do not affect their perceived technology proficiency. The results are provided in Table 17. Since the significance value was higher than .05, a post-hoc test was not conducted. Albeit not significantly, the mean scores of the participants with 10-14 years and 15+ years of teaching experience are lower than the others (4.14 and 4.08 respectively). The mean scores of each group are provided in Table 18.

Table 17

Relationship between years of teaching experience of Turkish teachers of English and their technology proficiency

	Sum of Squares	df	Mean Square	F	p
Between Groups	1,422	5	,284	,684	,636
Within Groups	111,053	267	,416		
Total	112,475	272			

4.7. Relationship between how much time Turkish teachers of English spend in electronic environments and their perceived technology proficiency

The sixth, i.e. the last, research question is "Is there a meaningful relationship between how much time Turkish teachers of English spend in electronic environments and their perceived technology proficiency". The time ranges were stated on the survey as follows: 0-3

hours, 3-6 hours, 6-9 hours and 9+ hours. ANOVA test was run to check whether the relationship in question exists. A significant difference was found (p=.000; p<.05), which suggests that how much time Turkish teachers of English spend in electronic environments affects their perceived technology proficiency. The related results are provided in Table 19.

Table 18

Mean scores of each range of teaching years

Range of teaching years	Mean score	N
Less than 1 year	4,28	8
1-3 years	4,22	34
4-6 years	4,25	57
7-9 years	4,26	61
10-14 years	4,14	59
15+ years	4,08	54

Table 19

Relationship between how much time Turkish teachers of English spend in electronic environments and their perceived technology proficiency

	Sum of Squares	df	Mean Square	F	p
Between Groups	7,221	3	2,407	6,151	,000
Within Groups	105,254	269	,391		
Total	112,475	272			

The mean scores of each time range are also given in Table 20. Since the obtained data are meaningful and homogenous, a post-test called Bonferroni was run to see the relations between the time ranges. Apart from the relationship between 0-3 hours and 3-6 hours, and that between 6-9 hours and 9+ hours, all the relationships were significant. The results are provided in Table 21.

Table 20

Mean scores of each time range

Range of time spent in electronic environments	Mean score	N
0-3 hours	4,04	63
3-6 hours	4,11	126
6-9 hours	4,39	59
9+ hours	4,52	25

Table 21

Bonferroni (Post-hoc) test results indicating the relations between the time ranges

		Mean Difference			95% Confidence Interval	
					Lower	Upper
(I) Time	(J) Time	(I-J)	Std. Error	Sig.	Bound	Bound
0-3 hours	3-6 hours	-,06710	,09652	1,000	-,3236	,1894
	6-9 hours	-,34298*	,11333	,016	-,6442	-,0418
	9+ hours	-,48108*	,14786	,008	-,8741	-,0881
3-6 hours	0-3 hours	,06710	,09652	1,000	-,1894	,3236
	6-9 hours	-,27588*	,09868	,033	-,5382	-,0136
	9+ hours	-,41398*	,13695	,016	-,7780	-,0500
6-9 hours	0-3 hours	,34298*	,11333	,016	,0418	,6442
	3-6 hours	,27588*	,09868	,033	,0136	,5382
	9+ hours	-,13810	,14928	1,000	-,5349	,2587
9+ hours	0-3 hours	,48108*	,14786	,008	,0881	,8741
	3-6 hours	,41398*	,13695	,016	,0500	,7780
	6-9 hours	,13810	,14928	1,000	-,2587	,5349

*. The mean difference is significant at the 0.05 level.

Chapter V

Discussion and Conclusion

In this chapter, the obtained findings are covered. After the results are presented, implications from prominent studies are provided. The chapter also presents some suggestions that might be useful in prospective studies.

5.1. Discussion of the Results

Technology proficiency of each participant, i.e. in-service Turkish teachers of English, were assessed through TPSA C-21, which was developed in a 5-point Likert scale by Christensen and Knezek (2017). The answers of 273 individuals who took part in the study were analysed, and the mean scores of their answers were calculated. The findings reveal that Turkish teachers of English consider themselves competent in pursuing email correspondence and sending attachments, keeping copies of their outgoing messages, searching for information online, finding useful resources for their teaching, sending and receiving text messages, and transferring data on electronic devices. Their mean scores for the related items are higher than 4.50. On the other hand, they do not do very well in creating a website, creating a newsletter with graphics, and writing a plan with a budget to buy technology for their classroom, all of which require more complex skills. The mean scores of the related items are lower than 3.50 on a 5-point Likert scale. The results are in accordance with the findings of Gökçek, Güneş and Gençtürk (2013), who examined in-service primary school teachers' technology self-efficacy via TPSA. Similarly, they found that primary school teachers are competent in email correspondence, sending and receiving online data, and using search engines; but they have difficulty in creating a webpage, creating a database, and obtaining information on a software related to their subject matter (Gökçek et al., 2013). In this study, the mean score all participants obtained in TPSA C-21 was 4.19, which implies that in-service Turkish teachers of English can make good use of technology. In the study

Gökçek et al. (2013) conducted, the mean score was found 3.41, which means primary school teachers' technology self-efficacy is at a medium level. Assessing the ICT competence of English language lecturers working at Turkish universities, Ardıç and Çiftçi (2019) discovered that their perceived technology proficiency is low. Similarly, Erdamar, Demirkan, Saraçoğlu and Alpan (2017) examined high school teachers' internet self-efficacy, they revealed that they can use the internet sufficiently. In the same vein, Bas and Senturk (2018) revealed a medium level of TPACK perceptions among in-service elementary and high school teachers. Yielding contradicting results, Pan and Franklin (2011) investigated in-service K-12 teachers' technology proficiency in using Web 2.0 tools, and self-efficacy level was low. On the contrary, Turel (2014) found that secondary and high school teachers believe they have good computer skills. Likewise, examining TPACK self-efficacies of primary school teachers, Kazu and Erten (2014) found that the participants scored high in each sub-dimension of TPACK, in other words, they consider themselves competent in TPACK. Yielding similar results, Çetin and Güngör (2014) found out that elementary school teachers' computer self-efficacy is high. Besides, Şimşek and Yazar (2017) and Çakır and Oktay (2013) stated primary and secondary school teachers' ICT self-efficacy is high. Kahraman and Yılmaz (2018) also assessed the internet self-efficacy that working teachers possess, discovered that they can use the internet well. Investigating pre- and in-service English teachers working at private universities, Akcaoğlu (2008) found that they are proficient in using computers. Durak (2019) also discovered high TPACK levels among in-service teachers. For technology-integrated classrooms, which are essential components of 21st-century learning, technology-competent teachers are required, and self-efficacy is a significant predictor of technology-integration skills (Knezek & Christensen, 2016). Taking the present study and the studies assessing in-service teachers' technology proficiency into consideration, it could be inferred that in-service teachers are competent users of technology, which suggests that second-order

barriers (Ertmer, 1999) to technology integration are largely eliminated. Nevertheless, technology is not still fully integrated into today's classrooms. Therefore, it can be concluded that eliminating first-order (Ertmer, 1999) and third-order (Tsai & Chai, 2012) barriers should be aimed at by policymakers, researchers, teachers and other related parties.

The first research question aims to discover whether significant relationship exists between sex and perceived technology proficiency of Turkish teachers of English. The findings suggest that the relationship is not meaningful. Male and female teachers have a similar level of competence in technology use. This finding is in accord with the findings of some studies. In one of them, Özer (2018) found that although males possess more positive conceptions of computers than females, there is not any meaningful difference between genders while benefiting from ICT in language education. Onivehu, Ohawuiro and Oyeniran (2017) aimed to assess what teachers in special needs schools in Nigeria think about using assistive technology and also found that gender does not predict technology competence of teachers. In another similar study, Arslan (2015) examined the TPACK competencies of Turkish physical education teachers and found no significant difference between genders. Analysing whether gender affects in-service teachers' internet self-efficacy, Kahraman and Yılmaz (2018) also discovered that male and female teachers can use the internet at a similar level. Similarly, Gökçek et al. (2013) discovered technology self-efficacy beliefs do not vary based on teachers' gender. Moreover, Akturk and Ozturk (2019) found out that gender and perceived TPACK levels of teachers are not related. However, the findings of this study also contradict some other studies. For instance, the study by Kaarakainen, Kivinen and Vainio (2018) assessed the ICT skills of students and teachers, and found that both male students and teachers outperformed their female counterparts. Another study by Teo, Fan and Du (2015) aimed to examine potential gender differences in teachers' perceived technology acceptance level, and discovered that females exhibit a lower level of computer proficiency than males.

Similarly, Bas and Senturk (2018) stated that male in-service teachers possess better TPACK knowledge compared to female in-service teachers. Şimşek and Yazar (2017) also discovered that male teachers' self-efficacy beliefs regarding technology use in education are better than female teachers'. Investigating the digital competence of Turkish teachers of English teaching at the university level, Ardıç and Çiftçi (2019) found that male teachers consider themselves more competent than female teachers in technology use. On the other hand, Anderson and Maninger (2007), Basargekar and Singhavi (2017), Buabeng-Andoh (2019) and Çakır and Oktay (2013) revealed an exact opposite situation in which females outperform males in technology use. In a similar vein, Kazu and Erten (2014) revealed that female in-service teachers possess a higher level of TPACK self-efficacy in the dimensions of pedagogical and technological pedagogical knowledge; no significant difference between genders was found in the other dimensions. In light of these three contradicting groups of findings, the present study is accordant with the first one, stating that the technology proficiency of Turkish teachers of English does not differ depending on their gender. In the light of technological improvements and increasing access to electronic devices in recent years, the disappearance of difference between males and females is not surprising because the internet, Google, smartphones, computers etc. have become indispensable parts of every individual's life irrespective of their gender, especially in the time of Coronavirus outbreak, when people depend on electronic devices to run their errands.

The second research question indicated no meaningful relationship between age and perceived technology proficiency of English teachers in Turkey. Similarly, Martin, Reeves, Smith and Walker (2016) state that computer proficiency is similar across different age groups of teachers. Along the same lines, Luik, Taimalu and Suviste (2018) discovered an inverse relationship between age and teachers' technology proficiency. Investigating behavioural intentions of university instructors in using learning management systems,

Cigdem and Topcu (2015) also found that their self-efficacy in such applications does not vary based on their age. However, there are also studies indicating that young teachers are more competent in using ICT. For instance, Basargekar and Singhavi (2017) aimed to assess the effect of non-manipulative and manipulative factors on their perceived ICT proficiency, and they discovered that younger teachers have more confidence in benefiting from ICT. Scherer, Siddiq and Teo (2015) also revealed that age is an important factor affecting ICT proficiency and older teachers are more hesitant and less proficient in technology use. In a similar vein, Kazu and Erten (2014) indicated that technology self-efficacy decreases in older teachers, but they can compensate for this shortcoming with the experience and competence that come with their age. Albeit not significantly, the findings also hold that the participants with higher age ranges have relatively lower technology self-efficacy scores. Since the literature mostly focuses on pre-service teachers, who are most likely to be digital natives, in-service teachers' technology proficiency is tended to be neglected. However, their technology self-efficacy should also be addressed more in the literature and needs improvement because most of them are naturally older, likely to be digital immigrants and likely to struggle in incorporating technology into their lessons. To this end, more in-service training should be organized to improve in-service teachers' technology skills.

The third research question attempts to assess whether what level Turkish teachers of English teach pushes them to be proficient in technology. The present study discovered that the technology proficiency of teachers does not change depending on their students' level. This research question is significant in that there are very few studies on this aspect of technology use in the literature. In one of such studies, in parallel to the obtained findings, Hsu and Kuan (2013) indicated that school type and school size do not affect elementary and junior high school teachers significantly in Taiwan; but the latter outperform the former in word processing and making use of the internet for class preparation; and the former

outperform the latter in establishing communication via the internet and ICT. Similarly, Şimşek and Yazar (2017) discovered that no significant difference exists among the digital competences of elementary, middle and high school teachers. Investigating the technology use of elementary and middle school teachers, Çakır and Oktay (2013) also found no significant difference between their technology proficiency. On the other hand, aiming to assess what affects technology self-efficacy of primary and secondary school teachers working in Texas, the USA, and Mexico City, Mexico, Morales et al. (2008) also revealed that the latter group in both cities consider themselves significantly more proficient compared to the former group. Similarly, Balta and Duran (2015) investigated learners' and educators' attitudes towards smartboards at primary and high schools, and primary school students were found to possess better attitudes compared to high school students, which suggests that as students grow older, their attitudes towards technology in class turn out to be negative. This finding is parallel to the findings obtained from teachers, in other words, teachers seem to enjoy technology more in classes with younger students (Balta & Duran, 2015). Along the same lines, Kay (2006) reviewed the studies on integrating ICT into pre-service teacher education, he found that attitudes towards technology integration change based on their grade level, and that most of the studies did not even consider this aspect. Based on these findings, despite contradicting those of this study, it could be argued pre- and in-service teacher training programs ought to be designed paying attention to what level teachers (are going to) teach because their audience's, i.e. their students', attitudes towards technology use change based on what grade they study. Or, technology could be incorporated into such courses as teaching foreign language to young learners, teaching of language skills, and material design. Therefore, pre-service teachers would be able to produce activities based on various proficiency levels through technology.

The fourth research question aims to find out whether there is a meaningful relationship between whether Turkish teachers of English teach at a state or a private institution and their perceived technology proficiency. The findings revealed that teachers working at a private institution were found to be better at using technology compared to their counterparts at state institutions. In the literature, there is very little research considering this aspect of technology use. Basargekar and Singhavi (2017) stated educators working for a private institution have relatively higher ICT proficiency than the ones working for a state institution. In the same vein, in order to investigate ICT integration in K-12 schools in Turkey, Aydin, Gürol and Vanderlinde (2015) chose 4 state schools and 1 private school through purposive sampling method and analysed the opinions of 102 teachers working in these schools. They found that the private school outperformed the state schools in ICT use (Aydin et al., 2015). The reason behind this difference might be that private institutions have better technology equipment, so teachers have better opportunities to improve themselves (İlgar, 2014). According to the data MoNE announced in 2020, there are 54.715 state schools, 13.870 private schools and 4 open education schools in Turkey, and most of the private schools are located in big cities, especially in Istanbul, where there are 3.444 state and 3.481 private schools (MoNE, 2020), which reveals that the number of private schools outnumbers that of state schools in Istanbul. This finding of the present study is of significance in that it reflects the inequality of opportunities between private and state schools in Turkey. One of the reasons behind this gap could be that parents pay money to private schools, so they expect better service in return. In order to meet this demand, private schools might invest in technology much more, thus they might have better software and hardware. However, there are millions of students studying and millions of teachers teaching at state schools under unequal circumstances. Therefore, major responsibilities fall upon the shoulders of policymakers, relevant institutions and organizations, and the government to bridge this gap.

The fifth research question seeks to find out whether how long Turkish teachers of English have been teaching and their perceived technology proficiency. The findings suggest that there is not a significant relationship, which means teaching experience is not a factor affecting technology proficiency. In the same vein, Yang and Huang (2008) also found that how long teachers teach and their attitudes towards technology use are not significantly related. This finding contradicts most of the literature. To illustrate, Uerz, Volman and Kral (2018) posit that teachers having taught for 15+ years have less technology competence than their younger counterparts, so the rate they integrate it into their classes is low. Similarly, Christensen and Knezek (2016) found an inverse relationship between mobile learning competence and years of teaching, in other words, younger teachers can handle mobile learning technologies in their classes better. Besides, Şimşek and Yazar (2017) indicated that teachers with 1-5 years of teaching experience are more technology proficient compared to their counterparts with 11-15 and 16-20 years of teaching experience. Along the same lines, Bas and Senturk (2018) and Akturk and Ozturk (2019) found a significant difference between TPACK scores in favour of less experienced in-service teachers. The contradictory finding of the present study could be justified in that experienced teachers' technology self-efficacy beliefs are improving thanks to technology training programs (Yang & Huang, 2008), and that their exposure to electronic devices is increasing inevitably. However, as most of the literature holds, experienced teachers tend to be less technology proficient, so more in-service technology training programs that are designed based on their needs should be provided.

The sixth, i.e. the last, research question aims to find out whether or not there is a meaningful relationship between how much time Turkish teachers of English spend in electronic environments and their perceived technology proficiency. The results indicate a positive relationship, which means Turkish teachers of English spending more time on electronic devices have better technology self-efficacy beliefs. As Bandura (1993) states,

experience plays a key role in improving self-efficacy. Therefore, it is not surprising that teachers who spend more time in electronic environments possess higher levels of technology self-efficacy because, during their time on digital devices, they also gain experience about how to make better use of them. In the same vein, Kahraman and Yılmaz (2018) found that experience in internet use is an important indicator of internet self-efficacy. Turel (2014) also discovered that how often teachers use electronic devices and their technology self-efficacy are positively related. Similarly, Durak and Sarıtepeci (2017) found that technology use has a positive impact on classroom management in teachers spending more time online compared to their colleagues. Despite being conducted on pre-service English teachers, the study by Bozdoğan and Özen (2014) yielded similar results, which indicate that experience in computer use leads to better use of technology. There is not much research contradicting this finding in the literature. In one of such studies, So, Choi, Lim and Xiong (2012), also conducted on pre-service teachers, found that using computers for personal purposes does not predict computer use. In the same vein, So and Kim (2009) stated that using computers for pedagogical and personal purposes are two different phenomena, which suggests that although teachers can make good use of computers for personal purposes, this may not manifest itself in their classroom practices related to technology. However, in the present study, which assumes that the participants who spend a lot of time in electronic environments spend much of it for personal purposes, this does not seem to be the case because those spending a lot of time in electronic environments are also competent in integrating technology into their teaching. Therefore, due to the positive relationship between time spent in electronic environments and perceived technology proficiency, digital immigrants and/or those who spend less time in digital environments should be exposed to electronic devices more in order to improve their technology proficiency, which would lead to technology-integrated classrooms of the 21st century.

5.2. Implications for Future Research

Four-walled classrooms where conventional teaching methods are implemented are rapidly becoming things of the past. Therefore, in order to keep up with the era we live in, technology-integrated curricula must be designed. This requires digital competence, which is a common concern of researchers, policymakers and practitioners (Søby, 2016). Teachers must acquire this skill during their teacher education, but teacher educators' role is neglected in the literature (Nelson et al., 2019). Therefore, how competent they are in technology use should also be investigated in future studies.

As Ardıç and Çiftçi (2019) argue, in-service teachers must receive training to acquire technology skills. In future studies, interventions should be designed to have them acquire digital competence, which is a prerequisite for 21st-century teaching/learning. In-service teachers with good ICT skills should also take initiative to help their colleagues during the process (Ardıç & Çiftçi, 2019). While designing pre- and in-service teacher training programs on technology integration, pedagogy must also be taken into account. To establish this relationship between technology and pedagogy, Okojie, Olinzock and Okojie-Boulder (2006) suggested the following to be considered:

- Identifying learning objectives in a technology-based instruction requires teachers to select and/or adapt instructional technology to match the objectives based on the students' needs.
- Presenting instruction using technology as part of the instructional process requires teachers to choose the methods that are relevant to the objectives, the technology selected, learning styles, modes and pace of learning.
- Evaluating technology-based instruction requires teachers to select appropriate evaluation techniques that are relevant to the objectives, methods of instruction, and to technologies that have been used.

- Designing follow-up activities using technology requires teachers to select appropriate follow-up materials that are relevant to the objectives of the instruction and technologies that are accessible to the students as well as easy to use.
- Developing course enrichment materials using technology requires teachers to provide opportunity for students to explore issues related to the course materials and to provide them with the opportunity to select and analyze course enrichment materials using technology in ways that broaden their problem-solving skills.
- Locating sources for additional instructional materials using technology requires teachers to use the internet and multimedia networks to develop additional learning materials and expand instructional resources aimed at broadening the knowledge and the skill gained.
- Designing a dynamic classroom using technology requires teachers to provide a learning environment that is colorful, engaging, exciting, interactive and energetic as a way of encouraging students to venture into the world of technology and to discover knowledge for themselves. (p.70)

In their extensive literature review on digital competence in educational contexts, Pettersson (2018) reveals that digitally competent teachers are a must to integrate technology into teaching and learning practices, and to fulfil the educational needs of the 21st century. These teachers are attempted to be trained through stand-alone courses during their pre-service education, which contradicts the idea of integration. Therefore, future studies should focus on designing teacher education curricula in a way to integrate technology throughout the whole teacher education process.

The scope of the present study could be extended by assessing technology proficiency of teachers of other foreign languages such as French, German etc.

Knezek and Christensen (2015) introduced the WSTP model of technology integration, which is the extended version of the Will, Skill, Tool (WST) model of technology integration (Knezek, Christensen, Hancock, & Shoho, 2000). The constructs of the WSTP model refer to "positive teacher attitudes toward technology (Will), proficiency with technology (Skill), access to the needed tools and infrastructure (Tool), and teaching practices that are conducive to promoting technology infused teaching and learning (Pedagogy)" (Christensen & Knezek, 2017, p.27). In future studies, TPSA C-21 can be benefited to assess to what extent technology is integrated in the WSTP model (Christensen & Knezek, 2017).

5.3. Conclusion

Investigating the factors affecting the perceived technology proficiency of Turkish teachers of English in the light of 21st-century learning, the present study yielded some useful data. The participants' perceived level of technology use was found to be high, but technology is not integrated into today's classroom as much as it is desired. Therefore, it can be argued that factors other than teachers' technology self-efficacy should be analysed because in-service teachers were found to be competent technology users regardless of their demographic background. The results also suggest in-service Turkish teachers of English are ready to integrate technology into their teaching, but due to lack of necessary infrastructure and motivation, they sometimes fail to do so. If these shortcoming are eliminated, they will do a good job.

Being a digital native is not enough itself to perform technology-integrated classes. In addition to their high digital skills, digital native teachers should also be knowledgeable in teaching techniques, students' psychology, learning theories etc. They should be able to lecture and develop materials considering all of these. Therefore, teacher training curricula

must be revised in a way to make it possible and incorporate such courses as technology-enhanced vocabulary/grammar teaching, pragmatics, storytelling etc.

The unfortunate discrimination between women and men in social and professional life has been rapidly disappearing, which also manifests itself in the use of technology. Most of the earlier studies held that males outperform females in technology proficiency, but recent research indicates just the opposite. So does the present study. In addition, technology has become ingrained in every part of our lives, so it is nearly impossible to survive in the 21st century, especially during COVID-19 pandemic, without technology proficiency. Therefore, it is not surprising to have revealed no difference between women and men in technological competence.

Benefiting from technology is becoming an indispensable part of our lives, and digital immigrants have to keep up with this process. This study indicates that they are successful in doing so. However, they still struggle with how to integrate technology into their teaching. To overcome this issue, they should be provided with in-service training programs. Both pre- and in-service teacher training programs ought to be designed paying attention to students' levels.

As the present study and some other studies indicate, teachers working for a private institution have higher technology proficiency compared to those working for a public institution, which could be attributed to the inequality of opportunities between private and public schools. This affects millions of students and teachers, so this gap must be bridged as soon as possible.

The 21st century has changed people's habits and the way they teach and learn. It has also introduced lots of innovations and changes to teaching/learning settings through technology, and people should find ways to incorporate technology into their social and professional lives. Aiming to map out the current situation in English classrooms, the present study has revealed how well Turkish teachers of English are doing during this process. The

researcher believes that the present study delivers some beneficial data, and by making use of these data, future researchers can contribute to the elimination of the problems identified in this study, and lay the foundations of technology-integrated classrooms, which are essential for 21st-century learning.

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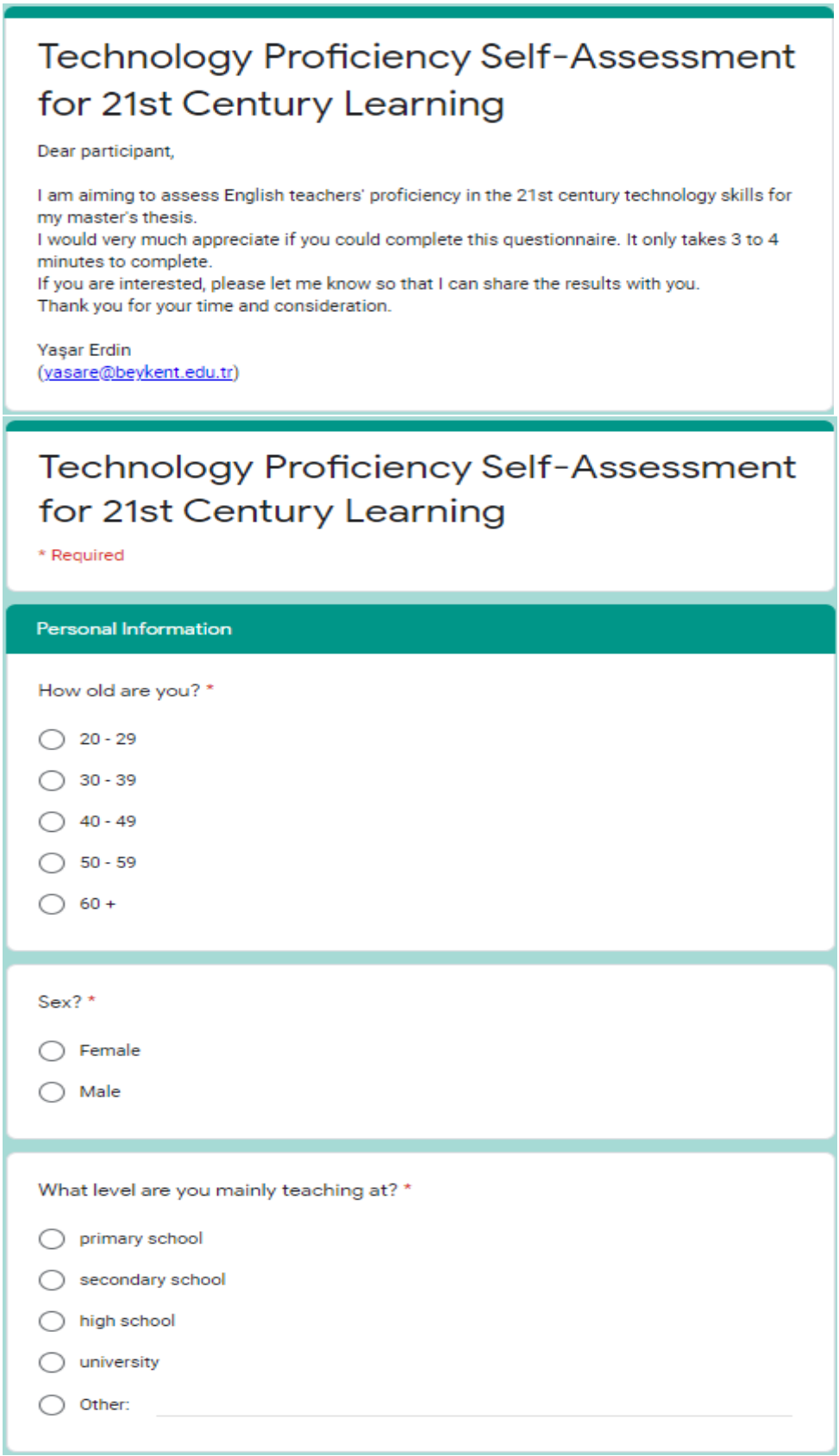
Appendices

APPENDIX A: Questionnaire used to collect data



Technology Proficiency Self-Assessment for 21st Century Learning

Dear participant,

I am aiming to assess English teachers' proficiency in the 21st century technology skills for my master's thesis.
I would very much appreciate if you could complete this questionnaire. It only takes 3 to 4 minutes to complete.
If you are interested, please let me know so that I can share the results with you.
Thank you for your time and consideration.

Yaşar Erdin
(yasare@beykent.edu.tr)

Technology Proficiency Self-Assessment for 21st Century Learning

* Required

Personal Information

How old are you? *

- ◯ 20 - 29
- ◯ 30 - 39
- ◯ 40 - 49
- ◯ 50 - 59
- ◯ 60 +

Sex? *

- ◯ Female
- ◯ Male

What level are you mainly teaching at? *

- ◯ primary school
- ◯ secondary school
- ◯ high school
- ◯ university
- ◯ Other: _____

Is the institution you work for... *

- ◯ a state school / university?
- ◯ a private school / university?

How long have you been teaching? *

- ◯ Less than 1 year
- ◯ 1 - 3 years
- ◯ 4 - 6 years
- ◯ 7 - 9 years
- ◯ 10 - 14 years
- ◯ 15 + years

How much time do you spend in electronic environments (computers, smartphones, social media, www, texting, gaming etc.) in a day? *

- ◯ 0-3 hours
- ◯ 3-6 hours
- ◯ 6-9 hours
- ◯ +9 hours

Technology Proficiency Self-Assessment for 21st Century Learning

* Required

Technology Proficiency Self-Assessment for 21st Century Learning

For the following statements, please choose the option that best applies to you. The numbers correspond to:

1- Strongly disagree
2- Disagree
3- Neither agree nor disagree
4- Agree
5- Strongly agree.

1- I feel confident that I could send e-mail to a friend. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

2- I feel confident that I could subscribe to a discussion list. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

3- I feel confident that I could create a distribution list to send e-mail to several people at once. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

4- I feel confident that I could send a document as an attachment to an e-mail message. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

5- I feel confident that I could keep copies of outgoing messages that I send to others. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

6- I feel confident that I could use an Internet search engine (e.g. Google) to find web pages related to my subject matter interests. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

7- I feel confident that I could create my own web page. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

8- I feel confident that I could keep track of web sites I have visited so that I can return to them later. (An example is using bookmarks.) *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

9- I feel confident that I could find primary sources of information on the Internet that I can use in my teaching. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

10- I feel confident that I could use a spreadsheet (e.g. Word Excel) to create a bar graph of the proportions of the different colors of M&Ms in a bag. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

11- I feel confident that I could create a newsletter with graphics. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

12- I feel confident that I could save documents in formats so that others can read them if they have different word processing programs (e.g., saving Word, PDF, RTF, or text). *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

13- I feel confident that I could use the computer to create a slideshow presentation. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

14- I feel confident that I could create a database of information about important authors in a subject-matter field. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

15- I feel confident that I could write an essay describing how I would use technology in my classroom. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

16- I feel confident that I could create a lesson or unit that incorporates subject matter software as an integral part. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

17- I feel confident that I could use technology to collaborate with teachers or students, who are distant from my classroom. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

18- I feel confident that I could describe 5 software programs or apps that I would use in my teaching. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

19- I feel confident that I could write a plan with a budget to buy technology for my classroom. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

20- I feel confident that I could integrate mobile technologies into my curriculum. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

21- I feel confident that I could use social media tools for instruction in the classroom. (e.g. Facebook, Twitter, etc.) *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

22- I feel confident that I could create a wiki or blog to have my students collaborate. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

23- I feel confident that I could use online tools to teach my students from a distance. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

24- I feel confident that I could teach in a one-to-one environment* in which the students have their own device (In one-to-one environments, each learner has access to a digital device). *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

25- I feel confident that I could find a way to use a smartphone in my classroom for student responses. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

26- I feel confident that I could use mobile devices to connect to others for my professional development. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

27- I feel confident that I could use mobile devices to have my students access learning activities. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

28- I feel confident that I could download and listen to podcasts/audio books. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

29- I feel confident that I could download and read e-books. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

30- I feel confident that I could download and view streaming movies/video clips. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

31- I feel confident that I could send and receive text messages. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

32- I feel confident that I could transfer photos or other data via a smartphone. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

33- I feel confident that I could save and retrieve files in a cloud-based environment. *

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Curriculum Vitae

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Place of Birth: Samsun / Turkey

EDUCATIONAL BACKGROUND

- Master's Degree — Uludağ University
  2018 - … — English Language Teaching
- Bachelor — Dokuz Eylül University
  2007 – 2012 — Translation and Interpreting
- High School — Samsun Milli Piyango Anatolian High School
  2002 – 2007 — Foreign Languages

WORK EXPERIENCES

- **Lecturer** (03.10.2016 - …)

Beykent University

- **English Teacher** (21.11.2015 – 28.02.2016)

Municipality of Avcılar - Language Course

- **Lecturer** (15.09.2015 – 09.09.2016)

İstanbul Gelişim University

CERTIFICATES

- **Teach English Now! Foundational Principles (2016)**

Arizona State University on Coursera

- **Pedagogical Formation Certificate (2017)**

Amasya University / Faculty of Education

- **The 1st International Foreign Languages Symposium: Globalization of English Language (2017)**

İstanbul Gelişim University

- **Oxford Teachers' Academy Course – Teaching English to Adults (2019)**

Beykent University & Oxford University

- **"The Importance of the 21st Century Skills in Higher Education Institutions with English as the Language of Instruction" Symposium (2019)**

Beykent University

- **Creativity in the Classroom (2020)**

Bell Cambridge

PUBLICATIONS

- **Exploring Preparatory School University Students' Demotivational Factors of Learning English and Their Analysis in Terms of Various Variables**

Erdin, Y., & Akar, Ç. S. (2021). Exploring Preparatory School University Students' Demotivational Factors of Learning English and Their Analysis in Terms of Various Variables. *Journal of Foreign Language Education and Technology, 6*(1), 42–63. Retrieved from http://jflet.com/jflet/index.php/jflet/article/view/218

- **Translanguaging: Insights into its Theoretical Underpinnings and Classroom Implications**

Erdin, Y., & Salı, P. (2020). Translanguaging: Insights into its Theoretical Underpinnings and Classroom Implications. *Journal of Language Research, 4*(1), 1-11. Retrieved from https://dergipark.org.tr/en/pub/jlr/issue/54148/707898

- **New Digital Technology in Education: Conceptualizing Professional Learning for Educators (Book Review)**

Erdin, Y. (2020). [Review of the book *New Digital Technology in Education: Conceptualizing Professional Learning for Educators*, W. Ng]. *Journal of Foreign Language Education and Technology*, *5*(1), 186-194. Retrieved from http://jflet.com/jflet/index.php/jflet/article/view/202