T.C.

ISTANBUL AYDIN UNIVERSITY

INSTITUTE OF GRADUATE STUDIES

PERCEIVED PROFICIENCY LEVELS OF ENGLISH LANGUAGE INSTRUCTORS IN USING TECHNOLOGY

MASTER'S THESIS

Yağmur TAŞ YARDIMCI

Department of Foreign Languages Education

English Language Education Program

JANUARY, 2024

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ONAY SAYFASI

DECLARATION

I hereby declare with respect that the study “Perceived Proficiency Levels of English Language Instructors in Using Technology”, which I submitted as a Master thesis, is written without any assistance in violation of scientific ethics and traditions in all the processes from the Project phase to the conclusion of the thesis and that the works I have benefited from those shown in the References. (03.01.2024)

Yağmur TAŞ YARDIMCI

FOREWORD

First, I would like to express profound gratitude to my thesis advisor, Assist. Prof. Dr. Hülya YUMRU, whose unwavering support and guidance were consistently evident throughout the formulation of the research topic and methodology for my thesis. I benefited significantly from her insights into the academic journey and the attributes that distinguish a committed researcher and educator. Also, I must express my sincere thanks to my thesis committee Prof. Dr. Türkay BULUT and Prof. Dr. Birsen TÜTÜNİŞ.

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PERCEIVED PROFICIENCY LEVELS OF ENGLISH LANGUAGE INSTRUCTORS IN USING TECHNOLOGY

ABSTRACT

In an era characterized by pervasive technological advancements, this study investigates the technological competence of English as a Foreign Language (EFL) instructors in Türkiye. As technology increasingly becomes integral to daily life worldwide, this research aims to assess how EFL instructors evolve in their technological proficiency. Factors influencing technological competence, including grade level taught, institutional affiliation (public or foundation universities), age, gender, teaching experience, and the duration dedicated to technological tools, are explored. Adopting a survey-based approach with a focus on quantitative research methods, the study involves tertiary-level instructors from various universities in Türkiye. Utilizing a combination of convenience and snowball sampling methods, data was gathered from 144 Turkish English teachers. The participants, comprising 84 females and 60 males, represent a diverse demographic, spanning age categories from 20 to 59 years. The primary tool for data collection is the Technology Proficiency Self-Assessment Questionnaire for 21st Century Learning (TPSA C-21), an instrument developed by Christensen and Knezek (2017). The researcher employed Statistical Package for the Social Sciences (SPSS) version 26.0 to conduct statistical analyses. Utilizing the independent-sample t-test and the ANOVA test, the researcher examined the gathered data to address the research questions. The findings of this study shed light on the current state of technological competence among EFL instructors, offering valuable insights into the dynamics of technology integration in language education. Understanding these factors is crucial for informing professional development initiatives and focusing on the use of technology in language instruction.

Keywords: Technology proficiency, digital competence, digital literacy, teacher self-efficacy.

İNGİLİZCE ÖĞRETMENLERİNİN TEKNOLOJİ KULLANIMI KONUSUNDA ALGILANAN YETERLİK DÜZEYLERİ

ÖZET

Teknolojinin etkisiyle dönüşen bir çağda, bu araştırma, İngilizceyi yabancı dil olarak öğreten öğretim görevlilerinin teknolojik yeterliliklerini incelemektedir. Teknolojinin dünya genelinde günlük yaşama bütünleşmeye başlamasıyla, bu araştırma öğretim görevlilerinin teknolojik yeterliliklerinde nasıl geliştiklerini değerlendirmeyi amaçlamaktadır. Sınıf düzeyi, kurumsal bağlantı (kamu veya özel üniversiteler), yaş, cinsiyet, öğretim deneyimi ve teknolojik araçlara ayrılan süre gibi teknolojik yeterliliği etkileyen faktörler incelenmektedir. Nicel araştırma yöntemlerine odaklanan ankete dayalı bir yaklaşımın benimsendiği çalışmaya, Türkiye'deki çeşitli üniversitelerden yükseköğretim düzeyindeki öğretim elemanları katılmaktadır. Kartopu ve uygun örnekleme yöntemleri kullanılarak veriler 144 öğretim görevlilerinden toplandı. 84 kadın ve 60 erkekten oluşan katılımcılar, 20'den 59'a kadar çeşitli yaş kategorilerini kapsayan farklı demografik özellikleri temsil etmektedir. Veriler, 21.Yüzyıl Öğrenmeleri için Teknoloji Yeterliği Özdeğerlendirme Ölçeği (TPSA C-21) (Christensen ve Knezek, 2017) ile toplandı. Elde edilen veriler, bağımsız örneklem t-testleri ve ANOVA testleri ile analiz edilmek üzere SPSS 26 programı kullanılarak incelendi. Bu çalışmanın bulguları, İngilizce dil eğitmenleri arasındaki teknolojik yeterliliğin mevcut durumuna ışık tutarak, dil eğitiminde teknoloji uyumu ve dinamikleri hakkında değerli bilgiler sunmaktadır. Bu etkenleri anlamak, mesleki gelişim girişimlerini bilgilendirmek ve dil öğretiminde teknolojinin kullanımına odaklanmak açısından çok önemlidir.

Anahtar Kelimeler: Teknoloji yeterliliği, dijital yeterlilik, dijital okuryazarlık, öğretmen öz yeterliliği.

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LIST OF ABBREVIATIONS

CALL : Computer Assisted Language Learning

CFA : Confirmatory Factor Analysis

CK : Content Knowledge

COVID-19 : Coronavirus disease 2019

DL : Digital Literacy

DSC : Digital Skills and Competencies

EFA : Factor Analysis

EFL : English as a Foreign Language

ICT : Information and Communication Technologies

ISTE : International Society for Technology in Education

KMO : Kaiser-Meyer-Olkin

MONE : The Ministry of National Education

OECD : The Organization for Economic Co-operation and Development

PCK : Pedagogical Content Knowledge

SPSS : Statistical Package for the Social Sciences

TK : Technological Knowledge

TPACK : Technological Pedagogical Content Knowledge

TPSA : Technology Proficiency Self-Assessment

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

WWW : World Wide Web

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I. INTRODUCTION

A. Background of the Study

Technology has significantly altered and improved our lives. All around the world, people have started utilizing technology in their daily lives. They have used technology in many aspects such as online shopping, social media and websites, e-learning, 3D printers, wearable technology, and artificial intelligence. Technology has made our lives easier since it saves time and effort. This has also affected the learning and teaching language process. Since the 2000s, the utilization of technology in higher education has increased dramatically. In the last two decades, the rise in popularity of laptops and computers marked the beginning of this development. This pattern persisted as cell phones proliferated, eventually giving way to tablets. The connectivity of learners, the output of research, and learning patterns have all been profoundly and significantly impacted by these developments in mobile technology. Additionally, they have had an equal impact on how classrooms run, faculty members' contributions to research, and educators' expectations.

To adapt to this process, teachers, students, and institutions have had to make efforts in terms of conducting technological development and application. The capacity to successfully incorporate Information and Communication Technologies (ICT) into teaching and learning activities is widely acknowledged as one essential skill for teachers in recent years. Learners' increasing engagement of a variety of ICT was extensively conducted in the research study done by Barry, Murphy, and Drew (2015). This recent interest for technology adoption has led to a substantial amount of scholarly research on issues like incorporation choices, implementation methods, effects on academic performance and learning outcomes, and student and teacher attitudes. Scholars like Baran (2014), as well as Moreira, Ferreira, Pereira Santos, and Duro (2014), have conducted thorough analyses of the corpus of literature that currently explores numerous ICT technologies within higher education.

The problem of digitization in education is not new; nonetheless, the introduction of Covid-19 has considerably increased its importance. Because of the availability of advanced technologies and the Internet, the abrupt lockdowns that resulted in school closures drove a rapid transition to online education via multiple platforms. This transition emphasized instructors' and learners' digital abilities and technological know-how, allowing them to effortlessly adapt old teaching approaches to this new online learning environment. Teachers have had to develop and discover new techniques in conflict situations.

In essence, the emergency created by the COVID-19 epidemic has highlighted the crucial need for digital skills for both instructors and pupils (Perifanou et al., 2021). Many school officials see the COVID-19 pandemic as a watershed moment that demonstrates how technology can be effectively integrated into education and training. As a result, the momentum of digital change in education has accelerated (Damşa et al., 2021).

Digital technologies are not only transforming business and society; they are also having a significant impact on education. When educators use digital technology effectively, equitably, and efficiently, it may have a major function in furthering the goal of delivering inclusive, good education and training to all students. As a result, digital competence has emerged as a primary focus and an essential component of education. (Li and Yu, 2022) Researchers have investigated the most effective methods to foster “digital competence in pre-service teacher training”. (Howard et al., 2021).

Digital education focuses a strong emphasis on improving both learners' and instructors' digital competences while emphasizing the pedagogical use of electronics. Digital competence is a big step within educational policies and frameworks as it grows in prominence within the sector. (Bourgeois et al., 2019).

On a global scale, in 2017 the International Society for Technology in Education released a guidance to create curricula and design classes that include technology. This guidance defines requirements for teacher digital competence and acts as a path for helping learners to benefit from technology. Aside from these worldwide standards, many countries have lately updated their activities and policies

to change their education systems, with a focus on defining standards for digital integration and improving teachers' digital competency.

With this goal in mind, the European Commission (2020) announced Digital Education Action Plan, running from 2020 to 2027.

This action plan's primary goal is to specify methods for increasing the standard of digital training and education, as well as to encourage Member States to develop crucial digital competences and skills. It incorporated feedback from a variety of stakeholders and provided guiding principles for adapting education and training to the technological transition.

According to European Commission (2020), digital literacy has been a key part for all citizens in an increasingly digital environment where people must manage massive volumes of information while combating deception. To promote safer and healthier Internet usage, educational institutions are tasked with educating students on how to critically evaluate material and identify disinformation.

The Organization for Economic Co-operation and Development (OECD) (2021) has released the report "21st Century Readers: Developing Literacy Skills in a Digital World." This research investigates how literacy has changed in the twenty-first century, emphasizing the ability to validate and generate information while discriminating between facts and views. Individuals as global citizens require these abilities since they routinely interact with digital technologies in all facets of their lives, including their employment.

According to the survey, pupils who learn digital literacy skills in school are better at distinguishing facts from opinions on online platforms. As a result, it emphasizes the significance of incorporating digital literacy into the learning and teaching procedure, with a primary dwell on improving educators' digital literacy (Minea-Pic, 2020).

Similarly, in 2017, the Office of Educational Technology in the USA released the National Education Technology Plan, which establishes a national plan and framework for all stakeholders. It suggests that both initial teacher education and ongoing professional development pathways use technology-enhanced learning activities to improve teachers' digital literacy. Furthermore, the plan recommends that

teacher education institutes ensure that all teachers-in-training acquire digital competency at the end of their programs, providing them with the awareness needed to effectively utilize digital tools for instructional objectives.

Furthermore, according to another assessment from the same organization, pre-service teachers' contact with educational technologies should be integrated into their method courses rather than presented as distinct, isolated courses (Stokes-Beverly and Simoy, 2016). This integrated approach intends to more effectively equip teachers to integrate digitals into their classes.

Eurydice report suggests that Türkiye is one of the few European nations lacking a teacher-specific digital competency framework and top-level regulation for initial teacher education (Bourgeois et al., 2019). The Ministry of National Education (MoNE) published the "General Competences for Teaching Profession" in 2017, which acts as a reference for establishing teacher skills as well as a guide for higher education institutions that train teachers in setting standards. While this research emphasizes pedagogical and subject knowledge as essential components of teacher preparation, it noticeably excludes technological and digital competence.

Similarly, the MoNE's 2018 "2023 Education Vision" does not directly target teachers' digital competences. However, one of its objectives is to improve instructors' digital skills. During the COVID-19 epidemic, the rapid move to distance education spurred MoNE to identify the need for digital technology resources for instructors. In response, the "Digital Literacy Teacher Handbook" was published in 2020. This handbook introduces teachers to the notion of digital literacy, describes its components, and explains its significance. It also provides practical advice and ideas for incorporating digital literacy into lesson content and boosting student digital literacy. The guidebook offers advice on how to use digital technology critically, efficiently, and ethically, as well as methods to promote digital literacy awareness among students and foster responsible digital citizenship (MoNE, 2020).

Despite these efforts to improve teachers' digital competences and exploit the potential of digital technologies in Türkiye, there is still a noteworthy lack of a comprehensive digital competence framework adapted to teachers' demands. This gap

makes assessing teachers' digital competences, skills, and knowledge and comprehending the current situation difficult. (TEDMEM, 2020)

B. Statement of the Problem and Purpose of the Study

The goal of this study is to find out how EFL instructors—those who teach English as a foreign language—progress during the process and evaluate the technological competence of English teachers in Türkiye concerning several factors, including what grade level they teach, if they work in public or private institutions, age, gender, their duration of teaching background, and the length of time they commit to technological tools.

C. Research Questions

1. Does the attainment of a master's degree by educators have a substantial association with their perceived technology proficiency?
2. Is there a significant correlation between the type of institution where educators are employed (private or state) and their perceived technology proficiency?
3. Does the amount of time that educators allocate to electronic environments correlate significantly with their perceived technology proficiency?
4. Is there a noteworthy link between the number of years educators have spent in the profession and their perceived technology proficiency?
5. Does the age of educators significantly relate to their perceived technology proficiency?
6. Is there a substantial association between the gender of educators and their perceived technology proficiency?

D. Significance of the Study

Teachers around the world are dealing with an unprecedented transformation brought on by a variety of causes, such as different student populations and the need to keep up with rapidly evolving technologies.

Teachers need training in technologically advanced teaching to acquire the essential skills and capabilities to address and deal with these challenges. Students'

educational requirements have changed. Students today are less interested in paper-based sources than they once were. They depend upon technology, and as a result, they can use gadgets like computers, smartphones, and tablets more successfully than paper-based sources. Furthermore, the idea of classrooms has undergone significant alterations because of the 2019 coronavirus disease (COVID-19). (J. Olivier et al.) Online learning has integrated itself seamlessly into our educational lives, greatly enhancing the importance of technological proficiency. Therefore, teachers should improve themselves to meet these needs. This study aims to concentrate on this and determine how comfortable Turkish English teachers are utilizing technology.

The literature emphasizes the need of digital competence and Technological Pedagogical Content Knowledge (TPACK) levels for educators in the light of their needs in the twenty-first century. Nevertheless, there has been limited research on the characteristics of pre-service EFL teachers in Türkiye, with only a few studies conducted in this context (Akayoğlu et al., 2020; Turgut, 2017). Their goal is to mention this gap by investigating the connection between digital literacy and TPACK levels among Turkish EFL pre-service teachers. The results of this research could prove valuable for teacher educators as they provide insights into the extent to which EFL teacher training programs in Türkiye equip their students with the necessary digital competence. Furthermore, the study may offer essential insights into the digital literacy and TPACK competency of Turkish EFL pre-service teachers. These research findings could make a significant contribution by guiding policy development and the establishment of standards within all teacher education programs, ensuring that technology becomes an integral component of the curriculum.

II. LITERATURE REVIEW

This chapter contains a review of the literature in the field relevant to this inquiry. Following subtopics are brought to light by the review and are covered under these subheadings: Digital Literacy Among Teachers, Digital Competence in Teacher Education, Information and Communications in Education.

A. Digital Literacy Among Teachers

In today's technology-driven society, instructors must be proficient in digital literacy. English language teachers must possess digital literacy abilities to incorporate technology into their teaching methods. Digital literacy has become a critical competency for educators in the 21st century's digital age. They must own digital literacy abilities to integrate technology into their teaching methods as English language teachers. The ability to explore and interact in digital settings requires not merely digital capabilities but also social and cognitive abilities. We will examine the results of numerous research on digital literacy among English teachers in this chapter.

Paul Gilster coined the term digital literacy, and he characterized it as “the ability to understand and use information in multiple formats from a wide variety of sources when information is provided by computers, notably the Internet” (Gilster, p. 6, 1997). He underlines the distinctions between traditional print media and digital information media. It includes “adapting our skills to an evocative new medium, our experience of the Internet will be determined by how we master its core competences” (Gilster, p. 6, 1997). The emergence of the information society compels us to consider how the next generation of educators will be trained for employment in the official and informal education sectors. In the modern period, "digital literacy" has been connected to young people's success as students, active citizens, and future workers. “Defining what is meant by digital literacy however has proven complicated, as the spaces, texts, and tools which contextualize such practices are continually changing.” (Pangrazio, p. 163, 2016)

Digital literacy has a wide range of definitions, each expressing a unique viewpoint. Digital literacy was described by Bawden (2008) as being able to search, assess, produce, and present information via digital technology. It entails abilities like information seeking, information evaluation, and efficient communication with the aid of electronic devices. Digital literacy, according to other scholars, is how to use digital assets for learning, problem-solving, and connection with others. (Gilster, 1997; Jenkins et al., 2006).

The Internet has strengthened and occasionally made more visible existing social (and educational) phenomena rather than introducing new ones. The epidemic of COVID-19 did not result in a desire for teachers to have wholly new digital competences. Widely accepted models and lists of competences created before COVID-19 have often been affirmed, and in some cases are updated. As Bozkurt identified in the article remote education is like an emergency during the pandemic however both teachers and learners were not ready for this emergency. (Bozkurt and Sharma, 2020; Murphy, 2021; Pyzalski, 2020). Furthermore, he stated, “While we rush to implement emergency remote teaching, are we focusing enough on learners and learning?” (Bozkurt and Sharma, 2020; Murphy, 2021; Pyzalski, 2020). This emphasizes the distinctive qualities and challenges that academic institutions and professionals face. The transition from traditional to online education has not been adequately prepared for by educational systems around the world.

In today's culture, digital literacy is becoming more and more crucial, and instructors are expected to have the abilities and expertise required to successfully integrate technology into their lessons. Digital literacy is characterized by the capacity to critically analyze and deal with problems, employing various digital tools and resources for communication, collaboration, and creativity.

Many studies have examined teachers' levels of digital literacy and described some of the difficulties they encounter while implementing technology in the classroom. Demel (2017), for instance, discovered that instructors in a US metropolitan school district reported feeling overloaded by the amount of technology accessible and unsure of how to use it successfully. Similar findings were revealed by Lockett (2018), who found that teachers' digital literacy was an essential element of

their ability to incorporate technology into lessons and that more support was needed to help instructors advance their skills.

Despite these difficulties, there are numerous instances of educators who have effectively incorporated technology into their classes and displayed high levels of digital literacy. For instance, Brown (2017) discovered that highly digitally literate teachers were more likely to incorporate technology into their lessons and were better able to engage students with digital tools and resources. Similar findings were made by Maphalla (2021), who discovered that teachers who went through digital literacy training were able to enhance their practices and raise the motivation and involvement of their pupils.

Now more than ever, the digitalization of education is a top goal in many nations. Effective digitization necessitates not only an understanding of how ICT, could be used in education, as well as technical obstacles. In the process of effectively implementing ICT, teachers have emerged as the keystone. (Tomczyk and Fedeli, 2021) It is insufficient to simply equip schools without improving teacher quality. As a result, it is essential to assess what has been accomplished so far in the domain of education digitization from a worldwide viewpoint. Moreover, educational policies ought to be regulated, and teacher trainers ought to periodically observe teachers. For instance, a teacher who graduated 20 years ago should be given the chance to advance through competent instructors. Otherwise, the divide between students and teachers could lead to pandemonium since some teachers may be struggling with new technological advances or teaching techniques.

Teachers must adapt as the generations do to effectively fulfill the requirements of their students. Before getting to the primary subject—teacher digital competences necessary for high-quality education—we first look at the existing spectrum of digital competences. In the framework of student digital capabilities, it is understood to be the goal that teachers want to achieve. To put it another way, educators seek to assist students in acquiring a bunch of digital skills essential for success in social, professional, and academic spheres in the digital age.

Digital literacy abilities are essential in the twenty-first century, it has been highlighted. Digital literacy is a three-dimensional notion, according to Wan Ng

(2012): 1) The 'technical' dimension, which refers to technical skills; 2) The 'cognitive' dimension, referring to the ability for critical thought; and 3) The focus on using ICT for education and socialization. Information like security and privacy are included in the "socio-emotional" dimension. Additionally, digital literacy has been recognized in national and international legislation as one of the most crucial skills to possess in the twenty-first century.

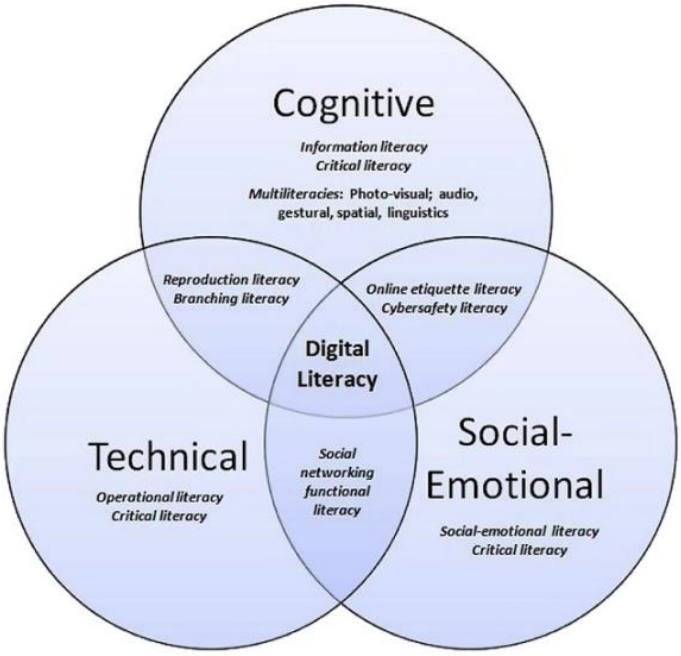

Fig. 1. Digital literacy model (Ng, 2012).

Figure 1: Digital literacy Model

As depicted in Figure 1, the technical facet of digital literacy has a broad understanding of possessing the knowledge and operational skills necessary to utilize ICT for learning and daily activities. It involves using and implementing input and daily electronic gadgets such as smartboards, external speakers, and earphones or a headset. The cognitive component of being digitally literate is connected to the ability for critical thought within the process of looking for evaluating and generating digital knowledge. It also encourages to find and use the finest technology to assist with or accomplish assignments. The social-emotional aspect of digital literacy and the intersections between the social-emotional and cognitive aspects is the ability to use the digitals responsibly for engaging in communication, social interaction, and learning by understanding similar regulations to communicating in person, such as

appreciation and using proper words and phrases to avoid misinterpretation and miscommunication. Gavin Dudeney, Nicky Hockly, and Mark Pegrum created a framework specifically for language teachers in 2013. This framework, which was modified in 2022, focuses on four core categories of digital literacies, each of which includes a variety of sub-literacies. The "communicating" domain includes printed literacy, online literacy, literacy in multiple media, immersive literacy, spatial literacy, smartphone literacy, and coding literacy. "Informing": The second focus is on informing, which includes sub-literacies like tagging, searching, filtering, and information literacy. "Collaborating": Attentional, critical, and remix literacy are all part of the framework's "(Re)designing" section. It's worth noting that Dudeney, Hockly, and Pegrum (2022) emphasize that these components aren't completely distinct with clear-cut limits. The purpose of creating this figure is to serve as a resource for language teachers and students. The authors feel that digital literacy abilities can assist language learners in communicating on a global scale (Pegrum, 2019).

Guikema and Menke conducted a study in 2014 to investigate pre-service foreign language teachers' opinions of digital literacy in their current and future instructional practices. Teacher candidates enrolled in a method course took part in a teleconference where specialists presented various digital tools and discussed their successful integration into language teaching as part of this research. This program ended with an open discussion in which participants were able to put forward further questions. At the end of the conference, the participants' reflections were collected. The study's outcomes suggested as potential teachers were eager to learn and use digital tools, they were concerned about their technological proficiency. Surprisingly, in their responses, participants primarily focused on the communication and cultural aspects of digital literacy, indicating a lack of awareness of other dimensions of digital literacy or a lack of understanding about how to implement these dimensions into their teaching practices. Participants also underlined the significance of watching real-life examples from other practitioners to complete theory and practice. According to the study, teaching digital literacy and technology integration separately does not adequately enhance awareness or build a thorough grasp of instructional techniques. As a result, teacher education programs should incorporate digital literacy into pedagogy-focused

courses. They should also underline the importance of digital literacy and offer ways to tackle it in educational settings.

Botturi undertook a case study in 2019 to investigate digital literacy in the area of teacher training preparation. Pre-service primary and pre-primary schoolteachers in Switzerland were included in the study, with many of them either finishing their teaching practicum or working as part-time teachers at that time of the search. These participants took a two-credit course in digital and media technology. The study collected quantitative pre- and post-survey data, as well as qualitative interviews, to determine whether the course influenced students' attitudes toward digital and media literacy. The findings suggested that the brief course had an impact on the participants. They reported a strong willing to incorporate digital and media literacy into their classroom instruction. Furthermore, after finishing the course, students tended to explore solutions for integrating digital literacy rather than focusing on external impediments such as a lack of resources. This shows that the course influenced a shift in their perceptions and pushed them to take a proactive approach to incorporating digital and media literacy into their future teaching initiatives.

List did a qualitative research study in 2019 to investigate pre-service teachers' perceptions of digital literacy, considering opinions on digital natives, skill-based learning, and sociocultural effects. The study included 188 people from the United States who answered survey questions. According to the research findings, many participants believe that digital literacy is a talent that can be learned, regardless of whether one is a digital native or becomes a member of a digital community. Furthermore, the study found that digital literacy can be acquired through a variety of methods, such as self-directed learning, exposure to technical tools, or content production for specific goals. One interesting conclusion was that pre-service teachers reported learning digital literacy abilities largely in educational environments such as schools rather than through their daily life experiences. This implies that formal schooling had a major impact on digital literacy competences.

In 2019 research done by Ata and Yıldırım, researchers gathered qualitative and quantitative data from 295 pre-service teachers registered in several departments at a public university. The study's goal was to get insight into these pre-service teachers' thoughts, attitudes about digital literacy. The quantitative data demonstrated

that pre-service teachers had favorable feeling toward digital literacy. The qualitative part of the study, on the other hand, revealed further insights. It revealed that the participants lacked the cognitive skills needed to effectively search for, appraise, produce, and communicate knowledge in the digital domain. Furthermore, the survey discovered a gender gap in digital literacy ability. Male participants displayed greater digital literacy ability than their female counterparts. Another major conclusion of this study was related to the internet usage patterns of the participants. Participants who spent more time online had higher digital literacy scores than those who spent less time online. This implies a possible link between internet usage and digital literacy ability. In summary, while pre-service teachers had good impressions of digital literacy, there was a need to improve their cognitive skills in multiple digital literacy dimensions, according to the research. Furthermore, gender and internet usage habits were found to influence participants' digital literacy ability.

Akayoğlu et al. did a study in 2020 to understand the digital literacy perceptions of 113 pre-service English teachers who were senior students enrolled in foreign language departments at three universities in Türkiye. According to the study's findings, there was no agreement among participants on the notion of digital literacy. Some participants believed that digital literacy was largely about technical knowledge, whilst others realized that it spanned a variety of other dimensions beyond technical elements. Participants indicated experience with a variety of digital tools in semi-structured interviews and voiced their confidence that these tools could be effectively implemented into the teaching process of the productive and receptive skills: writing, speaking, listening, and reading. Furthermore, pre-service teachers supported the utilization of digital technologies for testing, providing feedback, increasing student engagement, and inspiring learners. The study also highlighted the relevance of teachers as role models for demonstrating how to use electronics effectively in a classroom atmosphere. Furthermore, the study emphasized the importance of teacher education institutes integrating digital literacy courses with pedagogy to train future educators for the successful utilization of digital knowledge in their classes.

A training curriculum was built to encompass many areas of digital competence in research undertaken by Reisoğlu and Çebi 2020, using the DigComp framework. They did this training to aid 24 pre-service teachers with skills in communication and

cooperation, knowledge and data literacy, digital knowledge, safety, and knowing how to solve problems. (Reisoğlu and Çebi, 2020) The study took a qualitative approach, and data were gathered through diaries kept by participants during and after training. Focus group interviews were also done to gain participants' perspectives on the subject. The findings suggested that participants improved themselves in the areas covered by the program. They specifically improved their abilities to search for and locate information, evaluate information for dependability, and store information in a digital setting. Furthermore, this study found that participants acknowledged the value of active practice over passive learning. They saw their trainers as role models who provided useful examples of how to use technology in education. There was also a recognized need for the integration of pedagogical information into the training program, which would allow trainees to observe effective and practical examples of technology utilization in an educational atmosphere. In conclusion, this research emphasized the effectiveness of a training program in improving the participants' digital competence, also the importance of active learning and the integration of pedagogical knowledge in technology training to provide them with valuable practical examples and role models.

In research conducted by Peled in 2021, the focus was on evaluating pre-service teachers' perspectives of digital literacy in Israel. The survey data was gathered from a large group of 1265 students participating in teacher education programs. According to the research findings, the students had a high perceived grade of digital literacy. The investigation did, however, identify certain areas of concern. Pre-service teachers had difficulties when it came to analyzing and critically evaluating knowledge, which is an essential component of 21st-century abilities. The study also discovered that these students lacked ethical awareness in the context of digital literacy. Surprisingly, the researcher did not find out an important link between gender and prospective teachers' perceived digital literacy, implying that gender did not have a vital function in deciding their digital literacy perceptions.

As a conclusion, while pre-service teachers in Israel demonstrated a high perceived digital literacy, the study highlighted the importance of addressing critical analysis, ethical awareness, and other aspects of digital literacy to ensure a comprehensive and well-rounded digital literacy curriculum.

It is crucial for students' academic and personal growth to teach these abilities in context and to allow them to practice them in ways that highlight their importance in decisions and in applying them correctly. The utilization of the three elements of the digital literacy guidance, which are perspectives on how to achieve digital literacy, used as the theoretical foundation for the study. This correlated the students' ‘digital nativeness’ with their perceived levels of digital literacy and sought to determine whether these levels could be raised by educational technologies during instruction and through an examination of how readily the students welcomed different ones for acquiring knowledge.

B. Digital Competence in Teacher Education

The term "digital competence" has recently gained currency in policy documents and is frequently used to refer to the skills and knowledge required for success in the knowledge-driven era. This comprises ideas for teaching English as a Foreign Language (EFL). When referring to technological abilities, the term "digital" has replaced phrases such as "information and communication technology" (ICT) or "information technology." While it was first mentioned in policy documents and was not directly addressed in recent publications such as “The OECD's Definition and Selection of Competences (OECD 2005)”, it has been linked to digital literacy in works such as “Ala-Mutka et al. (2008) and Punie (2007)”. (Ilomäki, 2014) According to an OECD analysis from 2010, the identification and promotion of 21st-century development of 21st-century skills and competences. (Ilomäki, 2014)

Strategy planners, administrators, and managers work together to address the development of digital competencies among teachers and students, as well as the integration of ICT into the larger educational area. This entails significant investments in strengthening information technology infrastructure, providing continual professional development for teachers, and encouraging teacher training efforts that are aligned with the expanding landscape of digital skills. It is also crucial to build a broad network of smart pedagogy that includes networking, collaboration, and partnerships among all stakeholders. Researchers can assess the current state of digital proficiency in Türkiye's educational sector by looking at the scenario both before and after the lockdown.

While many teachers lacked adequate technical skills prior to the initial lockdown in 2020, the ongoing global epidemic has compelled many in-service teachers to adapt to shifting conditions. They have immersed themselves in the digital realm while simultaneously improving their ICT skills and refining their teaching approaches. To fulfill the expectations of elementary and secondary pupils, the epidemic has demanded novel teaching practices as well as changes to the curriculum and evaluation criteria. A teacher's influence on a student's performance in learning digital competence is notable (Jasute and Dagiene, 2012). Teachers in the twenty-first century are expected to be high performers who exhibit the behavior they want their

students to emulate. According to Jasute and Dagiene (2012), instructors should keep their skills up to date and participate in collaborative professional development opportunities with peers through team projects to share best practices.

Researchers give many definitions and categories of digital skills and competencies (DSC). Three major DSC categories for citizens are identified under the newly developed Europen Union classification: (1) Digital competences: Also known as digital literacy, this term refers to a collection of fundamental digital abilities, like "information and data literacy", problem-solving, online interaction and teamwork, and "the ability to create digital material". (N. Walter and J. Pyzalski, 2022) The capacity to use these digital skills (content and attitudes) in a critical, and responsible way within a given content (such as schooling) is referred to as digital competence. Since 2006, the Europen Union has identified eight core competences for sustainable learning, and digital competence is among them. (2) Job-related technology: a collection of digital abilities for individuals doing activities, such as using and maintaining digital technologies. (3) Digital abilities for ICT staff members are a collection of sophisticated and expertise talents for persons working in the ICT industry, such as programmers. (N. Walter and J. Pyzalski, 2022) Skills are the ability required to apply information and use knowledge to complete tasks and solve problems. Competence, on the other hand, is the "ability to apply knowledge, skills, and personal, social, and/or methodological abilities in a variety of work and study, as well as in professional and personal development". (N. Walter and J. Pyzalski, 2022)

In 2010, the European Union formulated a comprehensive framework outlining critical competences essential for lifelong learning in a knowledge-based society, and digital competence is one of them. The framework highlights the importance of updated classroom technology in instilling essential ICT skills. The authors claim that there has been insufficient emphasis on other areas, "such as critical thinking in the use of developing technologies and media, safe and responsible use, risk awareness, and ethical and legal considerations", beyond fundamental ICT skills. (Ilomäki, 2014, p. 657) 22 competences are listed in the framework, which is divided into 6 categories: Professional involvement, which includes educators' professional competencies, is an essential component. Furthermore, educators' pedagogic competencies include the successful use of digital tools for teaching and learning, as well as sophisticated

evaluation procedures and the capacity to encourage learners. There is also an important issue associated to enabling learners' digital competency, which is part of the learners' competencies. This phenomenon has prompted the creation of several frameworks around the world, most notably in Latin America and the European region of interest, which includes the northern half of Africa and Eastern Europe. In accordance with this, Pozos Pérez and Tejada Fernández (2018) have outlined six digital competencies that educators should cultivate to align with contemporary educational standards. These include (a) the ability to strategize and design instruction for virtual settings; (b) the creation and execution of cooperative learning ventures; (c) participation in research, innovation, and pedagogical advancement involving information and communication technology (ICT); (d) providing guidance, direction, and assessment; (e) supervising personal advancement and professional growth with the help of ICT; and (f) championing diversity, ethical conduct, and responsibility. Each of these domains' proficiency levels might vary, as can their complexity and relationship to temporal stages (integration phases: accessibility, adoption, adaptation, appropriation, and invention). This progression encompasses basic, middle, and advanced grades, ranging from rudimentary skills to expertise. (Marín, V. I., and Castañeda, L.) Introducing digital literacy to kids is an important step toward training them to be responsible digital citizens who can use technology effectively and appropriately not only in formal schooling but also in their personal lives. Teachers play an important role in demonstrating how to become skilled in digital literacy. The DigCompEdu project of the European Commission is a significant endeavor aiming at incorporating digital literacy into national curricula. According to Redecker (2017), to successfully include digital literacy in their lesson plans, teachers must have digital abilities that go beyond simply operational knowledge. Some researchers are undertaken to examine pre-service teachers' digital literacy levels to ensure that future teachers are appropriately trained in this respect. These studies seek to establish if higher education institutions are equipped and ready to give future educators essential support in this vital area of education.

“Digital Competence is the set of knowledge, skills, attitudes, abilities, strategies, and awareness that are required when using ICT 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 socializing, consuming and empowerment" (Ferrari, 2012, p.30)

Upon the explanation, digital competence is required for the application of based on technology skills, knowledge, and mindsets, whereas digital competence is closely associated with the capacity to use knowledge in the implementation of technological devices based on principles of education, as well as a grasp of the implications of teaching methods.

Competence-based methods, such as project-oriented, arts-based, inquiry-based, practical, or work-based education, increase learning outcomes and student involvement. At the same time, they provide chances for innovation, collaboration, and cross-discipline learning; they center learners and encourage active engagement. Digital tools, such as those used in project-based learning, increase the learning process and aid in the growth of digital competences. Competence-oriented techniques, when paired with emotional and social education and health-promoting physical activities, boost total learner motivation, performance, and active involvement. Digital competence is emphasized by the fact that millennials use ICT for personal aims, and it is also acknowledged as one of the basic competences that need to be systematically developed in an official learning environment. A digitally competent individual is someone having essential knowledge, abilities, and attitudes about both theoretical and practical aspects of basic applications. This involves the ability to look for, gather, organize, store, and analyze information. (Am, St. A., Nappu, S., and Qalbi, N.)

A literature analysis and empirical investigation undertaken by Littlejohn and other researchers (2012) provide a classification of three unique models for providing professional services to students. These strategies include modular resources designed to provide customizable and standalone learning opportunities, outreach campaigns including digitally savvy individuals who serve as ambassadors, and an integrated approach that combines digital and learning skills into a comprehensive curriculum. The same group of academics emphasizes critical variables that must be considered while developing ways to foster digital literacy (DL) in universities. For example,

giving students control and authority over technology increases their self-assurance in actively participating in the educational process. However, it is critical to recognize the diverse range of technical abilities and behaviors demonstrated by students. (Littlejohn 2012)

Furthermore, Littlejohn and colleagues' (2012) work highlights the importance of an educational process that includes genuine tasks that are harmoniously intertwined with digital technologies, adequate time allocated for the exploration of academic and professional in the digital realm, mindful thought of how academic discourse is constructed through various media and knowing of past student learning approaches as valuable reservoirs of knowledge. Higher education institutions may investigate lowering the time required for information retrieval to empower students to take control of their quest for information within their academic realm. This could be accomplished through methods such as journals and educational resources that are freely accessible, reinforced by the supply of information literacy strategies. (Gibson and Smith, 2018).

In their study, Gibson, and Smith (2018) found that children develop a form of digital literacy associated with the use of technological devices, such as smartphones and tablets, as they grow and evolve. From a young age, their guardians and other family members develop their competency through both indirect and explicit guidance. These writers also emphasize the importance of establishing critical digital literacy, which provides individuals with the ability to find digital content and make inferences, especially given the prevalence of disinformation and the large volume of online information. Educators can help young learners understand what they need to learn and where to find information by devoting time to dialogues about texts and the intentions of their creators, and scrutinizing practices to uncover associations and personal online interactions (Gibson and Smith, 2018). Children are enabled through engagement with their peers when these strategies are used. Kirchoff (2017), on the other hand, proposes using digital comics to introduce students to the world of (critical) digital literacy abilities. This is accomplished via engaging with producing digital texts and generating three varieties of comics utilizing various online settings, all by Selber's (2004) structure of a framework, which includes the cultivation of practical, analytical, and persuasive literacy.

C. Information and Communications in Education

The incorporation of Information and Communication Technologies (ICTs) in teaching and learning is thought to enhance the quality of education, especially in the realm of English language instruction. Our world is controlled by ICTs, so to use them effectively, we need to be digitally literate. Considering global environment, teachers need to consider incorporating ICT technology when teaching and studying academic subjects especially in English language education. Teachers have historically felt confident and powerful when imparting knowledge that they are the most knowledgeable about and that they are aware students lack. They feel strong, in charge, and in control as a result. They are exposed to the students' authorities through digital instruction, where the students are now in charge. Teachers today are facilitators rather than knowledge sources in the digital age. Students can participate actively in the learning and add to the formation of new knowledge thanks to this. This is one of the factors, though, that discourages teachers from embracing technology-enhanced learning in the classroom. Torsani (2016) claims that "language education cannot afford to neglect this potential" since "technology has become a part of - and has revolutionized - our everyday life."(p. 16) It is obvious that teachers are essential to the “teaching-learning process”. In a setting where languages are taught and studied, “English language teachers are the main sources of language learning materials for their students.” (Mihireteab Abraham, p. 2, 2022)

The improvement of ICT has changed the web into an interactive and collaborative universal space where users play dual roles as content constructors and content creators, as noted by Faizi, Afia, and Chihep in 2014. The concept of Web 2.0, which underpins this transformation, was introduced by Tim O'Reilly in 2005 following a brainstorming session at a conference held by MediaLive International in 2004. In that same year, the first Web 2.0 conference took place. In broad terms, Web 2.0 are online tools that empower learners to generate content and customize it according to their preferences, as explained by Kolbitsch and Maurer in 2006. While Web 1.0 primarily delivers content to users, Web 2.0 extends the experience by offering users the ability to both share and create content. In contrast to Web 1.0's one-sided communication characterized by narration and monologue, Web 2.0 provides advantages for two-way dialogue, classroom discussions, and interactive

communication, as outlined by McLeod and Vasinda in 2008. According to Franklin and van Harmelen in 2007, the change for users from Web 1.0 to Web 2.0 might be compared to an ecological transition. In the former, there were a few content creators and many readers, whereas in the later, people actively contribute, change, and consume content jointly. Web 2.0 tools take prominence among the array of technologies that have effortlessly blended into our daily lives due to their user-friendly capability for content creation. Web 2.0 tools, according to Butler's definition in 2012, are often inexpensive, simple to learn, and require few curriculum revisions when introduced in educational settings. Kolbitsch and Maurer's 2006 investigation provides a broader view of Web 2.0, including features like blog posts, wikis, and photography, among others. Web 2.0 has evolved into a highly popular social environment fulfilling personal, social, professional, and organizational demands due to its communication characteristics that allow sharing and interaction in online social networks. These tools have the potential to foster an advantageous learning atmosphere by promoting creativity, collaboration, and communication, and by integrating instructional approaches that emphasize the usage of these. Through these tools, users can easily share visual and audio content, engage in online interactions, exchange various types of materials, curate personal content portfolios, collaborate for shared objectives, and connect through virtual environments, as noted by Solomon and Schrum in 2007.

The new generation of online programs, categorized as Web 2.0 tools, offers students enhanced opportunities to engage with the language they aim to learn and engaged in the learning process. They excel in interactivity compared to Web 1.0 tools, as observed by Lee in 2009. Web 2.0 tools empower students to take an initiative role in structuring and sharing knowledge. Moreover, they create conducive conditions for students to embrace fresh concepts and reassess their existing knowledge, as highlighted by Williams and Jacobs in 2004.

Given the pervasive presence of Web 2.0 technologies in the daily lives of young individuals and educators, excluding them from this phenomenon is considered impractical, as researchers Campion, Nalda, and Rivilla noted in 2012. It has been substantiated that integrating Web 2.0 tools in educational settings improves skills like

teamwork, higher-order thinking, multi-tasking, and the initiation of self-directed learning.

The incorporation of Web 2.0 technology in education is critical in the twenty-first century, since it can improve both the learning and teaching processes, ultimately contributing to individuals' success in our contemporary information-driven society. This significance of Web 2.0 in the area become increasingly apparent, especially as students strive to enhance their skill sets, as emphasized by “the Partnership for 21st Century Skills” by Shihab in 2008. (Shihab, 2008, p.20) Hence, it is immensely beneficial for future teachers to gain the expertise in integrating Web 2.0 tools into the classrooms, and effectively utilize these tools in the instructional strategies they design for their classes.

According to Chapelle in 2009, the appropriate use of Web 2.0 tools in English instruction can be quite beneficial. This instruction primarily revolves around four fundamental skills: listening, speaking, reading, and writing. While acquiring these skills, students often grapple with feelings of anxiety, which can be attributed to their limited language proficiency and insufficient opportunities for oral expression, as noted by Ho in 2003, Pong in 2010, and Sun in 2009.

While some pedagogical methods and techniques integrate the teaching of these English skills simultaneously, it's important to recognize that each skill can also be addressed individually. Web 2.0 tools helped to improve learners’ fluency in listening, reading, speaking, pronunciation, and vocabulary. This means that these language skills can be learned separately or collectively, offering a holistic approach to English language education.

According to Chang et al. (2012), Web 2.0 provides foreign language students with the capacity to organize their knowledge and cultivate profound grammar and cultural connections with target language. Numerous studies conducting the effectiveness of Web 2.0 technologies on foreign language learning consistently indicate that these tools positively impact students' attitudes and motivation in the pursuit of mastering the target language. Furthermore, they serve as facilitators, speeding up foreign language acquisition. As highlighted by Hilton (2006), technology plays a crucial role in enhancing the English language learning environment by

offering diverse language learning opportunities and fostering a sense of continuous learning. The field of language teaching stands out as particularly reliant on scientific innovations and technological advancements, more so than many other areas within the social sciences. In this context, teachers can create and enhance authentic language learning settings by integrating technology into their classrooms.

Nevertheless, teachers often face a gap in their technology-related knowledge, skills, and competences when compared to students who are natives in the digital realm, as noted by Belland in 2009. In addition to this knowledge deficit, some educators lack the practical experience in leveraging technology to enhance their teaching, and their efforts to incorporate technology may be limited, as discussed by Koehler, Mishra, et al. in 2013.

Albion (2008) highlighted the importance of educators tapping into the capabilities of Web 2.0 tools, emphasizing the necessity for educators to acquaint themselves with these tools as part of their training. This preparation is crucial for enhancing language learning and ensuring that graduates can effectively apply Web 2.0 in their careers. In the 21st century, teachers must possess a blend of digital technology skills and pedagogical knowledge to adeptly implement Web 2.0 into their teaching strategies. By leveraging these tools, they can facilitate interactive and collaborative learning, fostering a socially active learning environment, as suggested by Nelson, Christoper, and Mims in 2009.

An educator should possess a thorough understanding of the subject matter they are teaching, pedagogical competence aligned with the characteristics of their target audience, and proficient skills in utilizing technology effectively. Computer or technology-assisted classes, as highlighted by Liu, Moore, Graham, and Lee in 2002, add to the professional improvement of teachers through the diverse use of technology, while also benefitting students in their language acquisition inside technology-enhanced environments.

Casillas Martin et al. (2019) undertook a study to investigate digital knowledge, usage, and attitudes about Information and Communication Technology (ICT) among Spanish pre-service early childhood education teachers. This research employed a quantitative descriptive approach, and data was collected using a questionnaire with

88 items and a Likert-type scale from 0 to 10. According to the findings, the participants had a favorable mindset toward ICT. They did not only notice the importance and necessity of ICT for their future professions, but they also recognized it. Notably, the mean scores for ICT use were greater than the mean scores for ICT knowledge. Furthermore, the study found a link between individuals who scored higher on ICT usage and those who were more confident in their ICT knowledge. In terms of gender, women scored higher in terms of their attitude toward ICT, although men reported a more positive impression of their understanding and use of ICT.

Finally, the researchers proposed that ICT knowledge and digital competence are required for successful technology integration in education. As a result, they proposed that teacher education programs be developed to handle these issues appropriately, highlighting the necessity of digital literacy in teacher preparation.

Since the year 2000, we've seen rapid technological advances that have begun to touch the field of education. This influence is becoming more visible in the skill set expected of educators. "International Society for Technology in Education" (ISTE, 2000) played a vital role by proposing new technological standards for instructors, emphasizing the utilization of technology into both learning and academic subjects. Shulman (1986), on the other hand, overlooked the significance of technological knowledge and its relationship to other knowledge domains such as content and pedagogy. This absence was owing to the widespread notion that classroom tools used from the 1980s through the 2000s, such as overhead projectors, charts, and tables, were considered typical or usual. Essentially, the technology used in classrooms before the 2000s was frequently labeled as "transparent" or "commonplace" (Mishra and Koehler, 2006).

Given the rise of new technologies that are transforming classroom dynamics, researchers have set out to provide a conceptual framework for educational technology. Technology is now recognized as an essential skill for teachers to have to function effectively in these changing educational settings. Furthermore, educational technology research has come under fire for allegedly lacking sound theoretical foundations (Mishra and Koehler, 2006). In 2006, They introduced the TPACK framework, clarifying this application process. Their work emphasized the significance of combining educational knowledge, pedagogy, topic expertise, and

technological competency, emphasizing the relevance of this synthesis for effective teaching and learning.

Pierson established the foundation for this conceptual paradigm in a 2001 study. Along with Pedagogical Content Knowledge (PCK), this study introduced the idea of technology knowledge. This included not just technological competences, but also a grasp of certain technologies with special characteristics essential to the teaching and learning processes. According to Pierson (2001), effective technology integration necessitates teachers combining technology competence with comprehensive topic and pedagogical understanding.

Mei, Brown, and Teo (2018) highlighted that employing technology for educational purposes is closely linked to a favorable attitude toward technology and the proficiency to seamlessly incorporate it into the instruction of subjects, such as English. In their study involving prospective English teachers, they found that TPACK directly influences the intention to utilize technology in education. Therefore, it is suggested that English language teacher candidates should gain practical experience in integrating various "Web 2.0 tools into their language teaching, particularly in the context of Computer Assisted Language Learning (CALL) 2.0" (Mei, Brown, Teo 2018).

In technology-supported research conducted by Grant in 2016, he explored the effect of technology on language education. His study involved two groups of students. Group 1 engaged in peer evaluation exclusively with technological assistance, without any online support. The second group, Group 2, conducted their peer evaluation activities with the added support of class activities. The findings presented that only the students who joined in technology-supported peer assessment managed to complete the tasks. Furthermore, these students, in addition to benefiting from technology, also displayed positive attitudes and increased motivation toward the activity, which was further supported by in-class activities (Grant, 2016). However, the research suggests that teachers mostly do not utilize technology for instructional purposes, or if they do, their use is limited. Instead, teachers tend to employ technology primarily for tasks such as research, lesson planning, and question preparation.

In their 2016 article titled "Blended Learning Approach in Developing Teachers' Technological Pedagogical Content Knowledge," Qasem and Viswanathappa conducted research on high school teachers in Yemen. The study focused on these teachers' utilization of ICT in an e-course designed with a blended learning approach and aimed at assessing their skills. The findings of their research highlighted the potential benefits of future studies examining online collaboration activities. Such research could enhance awareness of the factors associated with online group activity and help identify the teacher training requirements for teachers in the utilization of ICT. This would enable the provision of necessary assist and guarantee the effective integration of new technologies in educational settings (Qasem and Viswanathappa, 2016).

In one of the articles published in 2016, Beschorner and Kruse conducted research centered on the usage of the technology integration plan cycle by prospective teachers. The concept of the technology integration plan cycle was originally introduced by Hutchison and Woodward in 2014, and it draws its foundation from Mishra and Koehler's TPACK guidance established in 2006. The study involved student teachers who employed the Technology Integration Plan Cycle for their lesson planning, which encompassed the following key phases: (1) conscious planning, (2) defining instructional objectives, and the critical decisions regarding (3) choosing a teaching approach and (4) determining the usage of digital technology (Beschorner and Kruse, 2016).

In 2018, Bostancıoğlu and Hannley developed a survey aimed at measuring teachers' TPACK. The improvement and validation process of this survey involved several key steps. They initially created a pool of survey items depended on a comprehensive review of the literature on PCK and the utilization of technology in EFL instruction. To ensure content validity, they sought input and opinions from 36 international professionals in the field of computer-assisted language learning. The survey was distributed to 542 English teachers, and its foundational factor arrangement underwent examination and validation through both “Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA)”. (Bostancıoğlu and Hannley, p. 572, 2018). The outcomes of the analysis unveiled “a six-factor solution, comprising Pedagogical Content Knowledge (PCK), Technological Knowledge (TK), Content

Knowledge (CK), Technological Pedagogical Knowledge (TPK), Technological Content Knowledge (TTK), and Technological Pedagogical Content Knowledge (TPCK).” (Bostancıoğlu and Hannley, p. 572, 2018).

Debbagh and Jones, in 2018, also did a study concerning the use of TPACK in teaching communication skills. Their findings indicated that teachers exhibited low levels of technology knowledge (TK) but demonstrated a high degree of TPACK knowledge.

Oktalia and Drajati (2018) did a study aimed at investigating EFL teachers' perspectives regarding the use of the Text to Speech program in the creation of listening materials, utilizing the TPACK model. The study recognized that transcripts could serve as a solution to address the lack of listening materials. For their research, a qualitative approach was applied, and participants interviews were conducted as the data collection technique. The study sample consisted of eight EFL teachers. Several steps were taken to gain insight into these teachers' perspectives of using text-to-speech in crafting listening materials. Initially, computer training was provided to ensure that EFL teachers became acquainted with the Text to Speech program. Subsequently, listening materials created by the instructors were uploaded to a Google site for distribution to students. The teachers then tested the prepared listening materials and the features of the Google site. Following these activities, interviews were conducted to capture the EFL teachers' viewpoints on the Text to Speech program and the Google site. The findings showed that English teachers responded positively to the incorporation of the Text to Speech program within the framework of the TPACK model. The EFL teachers found this digital approach to be valuable and beneficial in the language learning process (Oktalia and Drajati, 2018).

In a study conducted by Tseng et al. (2019), the aim was to determine the nature of TPACK and understand how it shapes in terms of web conferencing teaching, particularly among pre-service English teachers. This research involved an examination of design conversations among six teachers. These discussions focused on developing strategies for designing online teaching materials and activities for remote learning, while also tackling contextual challenges that arose during the teaching process. The study utilized “both quantitative content analysis of the coded post-instructional discussions and qualitative analysis of interviews”. (Tseng et al.

p.171, 2019) According to the results, the discussions primarily emphasized Pedagogical Content Knowledge (PCK) rather than focusing on technology-based knowledge (TK). Furthermore, it became clear that the discussions did not significantly address the technological aspect of TPACK. The research also identified two environmental factors that influenced web conferencing teaching. The first factor was technological concerns with sound quality, which represented a micro-level contextual challenge. The second factor involved teachers' expressing worries about their students' past knowledge and attention spans, indicating a student-centered as an environmental factor. The findings shed light on how design thinking affects learners TPACK subdomains, allowing teachers to navigate and adapt to contextual problems that arise during the teaching process.

In their 2020 study, Lie et al. searched the online engagement of language teachers in Indonesia during the Covid-19. The research was framed around four key questions:

“1) To what extent did teachers engage in online learning during the Covid-19 outbreak? 2)What challenges did teachers encounter while participating in online learning during the Covid-19 crisis? 3) How did the suspension of face-to-face class meetings impact teachers' teaching practices? 4) What were the teachers' aspirations for the future of education in their region?” (Lie et al. p. 806, 2020).

The “case study” encompassed “18 teachers from four distinct regions in Indonesia.” (Lie et al. p. 804, 2020). Data collection involved “an online survey, weekly feedback, and interviews with the teachers”. (Lie et al. p. 804, 2020). To enhance the validity of the findings, a triangulation method was employed, which included a group interview comprising five students for each of the 18 teachers. Furthermore, the researchers performed a comprehensive analysis of the experiences of four teachers, offering in-depth insight of different qualifications. The findings indicated that teachers' online learning engagement was influenced by the interaction of five key factors across five levels of participation. These factors included students, teachers' prior experience with online learning, technological and pedagogical expertise, and support systems. In conclusion, according to the researchers, the participants in this investigation were still grappling with enhancing the standard of their online teaching practices. However, demonstrated an increased awareness of the

constraints associated with online learning and conveyed a renewed dedication to enhancing their professional competence. They held high hopes that they could enhance their skills and enhance their professional practice in the future.

III. METHODOLOGY

This chapter comprises six sections and provides an in-depth explanation of the methodology employed in this study. The initial part addresses the research design. The second one outlines the research queries. The third section presents the research context and provides information about the instructors participating in the study. Subsequently, the fifth section elucidates the instrument employed for data collection by the researcher. Ultimately, the sixth section delves into the procedures used for data analysis.

A. Participants

This study adopts a survey-based approach utilizing quantitative research methods. The participants in the study are English language instructors at the tertiary level from various universities. They are chosen through the convenience sampling method. After the initial contact through the convenience sampling method, participants were then asked to further distribute the survey to individuals within their network who are relevant to the study. This practice exemplifies the snowball sampling method, which operates on the principle that individuals who participate in a questionnaire or survey are likely to share it with their acquaintances who fall within the defined scope of the study.

Consequently, the researcher successfully gathered data from a total of 144 English instructors, comprising 84 females and 60 males. Among the total participants, 18 were within the age range of 20-25 years, 59 fell into the 25-29 age group, 37 belonged to the 30-35 age category, 13 were in the 40-49 age group, and 3 were in the 50-59 age group.

Table 1: Demographic Information about the Participants

Data shows the participant's age and gender.

		F	%
Age	20-25	18	12,5
	25-29	59	41,0
	30-35	37	25,7
	35-39	14	9,7
	40-49	13	9,0
	50-59	3	2,1
Gender	Female	84	58,3
	Male	60	41,7

Table 2: The Participants' Institution They Work in

Data shows the participants' institution they work in.

	F	%
State	98	68,1
Foundation	46	39,1

Out of the 144 participants, 98 are employed in state universities, while the remaining 46 are affiliated with foundation universities.

Participants were also asked about the duration of their English teaching experience. The data revealed that 10 of them had taught for less than a year, 22 for a span of 1-3 years, 65 for a period of 4-6 years, 13 for 7-9 years, 18 for 10-14 years, and 16 for 15 years or more. The corresponding data can be found in Table 3.

Table 3: The Participants' Years of Teaching Experience

Data shows the duration of the participants' teaching experience.

Years of teaching experience	F	%
Less than one year	10	6,9
1-3 years	22	15,3
4-6 years	65	45,1
7-9 years	13	9,0
10-14 years	18	12,5
15+ years	16	11,1

Lastly, the participants were asked about their daily time allocation to electronic environments, including activities such as computer usage, smartphone use, social media engagement, web browsing, texting, and gaming. Among the 144 participants, 32 reported spending 0-3 hours, 68 dedicated 3-6 hours, 32 invested 6-9 hours, and 12 allocated more than 9 hours per day to electronic environments. The corresponding data can be found in Table 4.

Table 4: The amount of Time that the Participants Allocate to Electronic Environments Daily

Duration of hours	F	%
0-3 hours	32	22,2
3-6 hours	68	47,2
6-9 hours	32	22,2
+9 hours	12	8,3

The participants were asked about their major fields of study. Table 5 shows the distribution of 144 participants across various major fields of study. The most common major is "English Language and Teaching," with 90 participants. "English Language and Literature" follows with 25 participants, while "Translation and Interpreting" is represented by 12 participants. In the field of "American Language and

Literature," there are 10 participants, and "Linguistics" has 7 participants. This data provides a clear breakdown of the number of participants in each major, illustrating the presence of "English Language and Teaching" majors in the study's sample.

Table 5: The participants' Major Fields of Study

Major	F	%
English Language Teaching	90	62,5
English Language and Literature	25	17,4
Translation and Interpreting	12	8,3
American Language and Literature	10	6,9
Linguistics	7	4,9

Lastly, the participants were asked whether they had a master's degree or not. Table 5 reveals the educational qualifications of the 144 participants in the study, specifically in relation to the completion of a master's degree. A total of 49 participants, representing 34% of the sample, have successfully obtained a master's degree, while the majority, accounting for 66% of the total (95 participants), have not pursued or completed a master's degree. This data paints a picture of the educational diversity within the participant group, illustrating the presence of both master's degree holders and those without such qualifications.

Table 6: The participants' Master's Degrees

Data related to the participants' master's degrees.

Master's Degree	F	%
Yes	49	34
No	95	66

B. Data Collection Instrument

The data collection instrument given to the participants comprised three sections (see QR code page 39). The initial section included the researcher's name and email address, an expression of gratitude for their survey participation, and an explanation of the study's purpose.

The second section consisted of 8 items containing multiple-choice personal inquiries. The participants were tasked with providing information about their age, gender, primary teaching level, employment status (state or private institution), years of teaching experience, and the amount of time they spent daily in electronic environments.

In the third section of the survey, quantitative data were collected using the Technology Proficiency Self-Assessment Questionnaire for 21st Century Learning (TPSA C-21), a questionnaire developed by Christensen and Knezek (2017). This questionnaire is an enhanced version of the TPSA introduced by Ropp (1999), designed to assess teachers' self-efficacy in using technology in education. It has been effectively employed in the USA and other countries since its introduction (Christensen and Knezek, 2017). The TPSA measures four specific types of technology proficiencies: using electronic mail, utilizing the World Wide Web (WWW), employing technology applications, and teaching with technology (Christensen and Knezek, 2017, p.20). Each of these sub-dimensions was originally based on the standards established by the International Society for Technology in Education (ISTE) at that time.

Due to the evolving nature of technology used in the classroom, some modifications to the TPSA were necessary. Consequently, Christensen and Knezek (2017) made certain updates. “In addition, 14 items related to new information technologies, such as Web 2.0 tools, mobile learning, social media, and accessing a cloud-based environment, were added to create the TPSA for 21st Century Learning (TPSA C-21) “(Christensen and Knezek, p. 20 2017). Consequently, the questionnaire now encompasses six sub-dimensions, reflecting six distinct sections of technology proficiencies.

The questionnaire initially included 34 items. However, the 7th item, which involved searching for and finding the Smithsonian Institution website, was removed. This decision was made because the participants may not be familiar with (or expected to be familiar with) this. Furthermore, there is no comparable institution in Türkiye that could serve as a substitute. Consequently, the final version of the questionnaire utilized in the study contains 33 items, distributed across six sub-dimensions. Each of the 33 items in the questionnaire was structured on a 5-point Likert scale. The participants selected the response that most accurately represented their viewpoint. Fidan (2020) have adapted TPSA C-21 for use in Türkiye. The content validity scores were determined after the translation into Turkish and were discovered to range from "0.75 to 1.00 for the subscales and 0.88 for the overall scale" (Fidan et al, p. 480,2020).

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Figure 2: “Six scales with sample items for the new TPSA C-21.” (Christensen and Knezek, p.21, 2017)

According to Cortina (1993), Cronbach's alpha values within the range of 0.70 to 0.80 are considered acceptable, those between 0.80 and 0.90 are regarded as good, and values at or above 0.90 indicate supreme reliability. (Cortina, 1993). With this criterion, TPSA questionnaire can be deemed an exceptional reliable self-assessment scale. Ropp (1999) evaluated the reliability of the TPSA scales on two occasions, finding a coefficient of 0.95, indicating excellent reliability. Furthermore, Christensen and Knezek (2001) established the reliability of the sub-scales to range from 0.73 to 0.87, indicating acceptable and good levels of reliability. The evolving landscape of technology and the shifting requirements in teaching and learning prompted the need for an update to TPSA.

“The reliability scores for the original TPSA sub-scales were as follows:

Email: $\alpha = 0.76$ (Items 1–5)

World Wide Web (WWW): $\alpha = 0.75$ (Items 6–10)

Integrated Applications: $\alpha = 0.84$ (Items 11–15)

Teaching with Technology: α = 0.89 (Items 16–20)" (Christensen andKnezek, p.23, 2017)

These values indicate the reliability of each sub-scale. Additionally, the newly added sub-scales in TPSA C-21, "namely Teaching with Emerging Technologies (Items 21-28) and Emerging Technology Skills (Items 29-34)", demonstrated "reliabilities of 0.93 and 0.84", respectively (Christensen and Knezek, p.23, 2017). These reliability scores are indicative of the consistency and trustworthiness of the questionnaire's measurement. Moreover, the overall reliability value for all items of TPSA C-21 was determined to be $\alpha = 0.96$. These findings confirm that all the items in the questionnaire meet the reliability criteria established by Cortina (1993) to varying degrees. The reliability values reported by Christensen and Knezek (2017) and those identified by the researcher are both documented in Table 7. This table likely provides a comparison of the reliability values found in the original study by Christensen and Knezek and the values obtained in the current research.

Table 7: The Cronbach's Alpha Values

The Cronbach's alpha values for reliability were calculated for each of the six sub-scales as well as for the entire questionnaire. These values offer insights into the internal consistency and reliability of the measures employed in the study.

TPSA C-21 (Christensen and Knezek, 2017)	α	Items
Email scale	.76	5
WWW scale	.75	5
Integrated Applications scale	.84	5
Teaching with Technology scale	.89	5
Teaching with Emerging Technologies scale	.93	8
Emerging Technologies Skills scale	.84	6
Entire survey (Total Item scale)	.96	34

TPSA C-21 (for this study)	α	Items
Email scale	.89	5
WWW scale	.77	4
Integrated Applications scale	.82	5
Teaching with Technology scale	.88	5
Teaching with Emerging Technologies scale	.95	8
Emerging Technologies Skills scale	.93	6
Entire survey (Total Item scale)	.97	33

In the present study, to evaluate the structural validity of the scale, a principal component analysis, a method of factor analysis, was utilized. After the factor analysis, the Kaiser-Meyer-Olkin (KMO) coefficient was computed, yielding a value of .942,

and Bartlett's test was conducted, resulting in a significant outcome with a value of .000.

In factor analysis, it is crucial for the KMO value to be at least .60, and for Bartlett's test to yield a significant result (i.e., less than .05) to ensure the appropriateness of factor analysis (Pallant, 2001; Büyüköztürk, 2011). The obtained KMO and Bartlett's values align with these criteria, indicating the suitability of the data for factor analysis. The total item correlation values for each item within TPSA C-21 ranged from .545 (Item 7) to .805 (Item 23). These values suggest that the items employed in the research exhibit strong differentiation, either excellent or good, and there is no requirement to alter or exclude any of the items. The factor analysis results are outlined in Table 8. Collectively, these findings strongly suggest that TPSA C-21 is a reliable and valid assessment scale for the research.

Table 8: Total item correlation and item loading values of TPSA C-21 items

Items	Total item correlation	Item loading
1- E-mail scale	,620	,675
2- Email scale	,692	,619
3- Email scale	,709	,609
4- Email scale	,735	,851
5- Email scale	,678	,658
6- WWW scale	,661	,811
7- WWW scale	,545	,598
8- WWW scale	,668	,685
9- WWW scale	,791	,735
10- WWW scale	,641	,715
11-Integrated Application	,662	,743
12- Integrated Application	,587	,733
13- Integrated Application	,649	,716
14- Integrated Application	,411	,592
15- Integrated Application	,766	,794
16- Teaching with Technology	,615	,665
17- Teaching with Technology	,752	,814
18- Teaching with Technology	,682	,738
19- Teaching with Technology	,586	,633
20- Teaching with Technology	,778	,837
21- Teaching with Emerging Technologies	,622	,689
22- Teaching with Emerging Technologies	,692	,760
23-Teaching with Emerging Technologies	,805	,842
24- Teaching with Emerging Technologies	,782	,802
25- Teaching with Emerging Technologies	,803	,812
26- Teaching with Emerging Technologies	,765	,803
27- Teaching with Emerging Technologies	,762	,777
28- Teaching with Emerging Technologies	,764	,790
29- Emerging Technologies Skills	,743	,806
30- Emerging Technologies Skills	,779	,856
31- Emerging Technologies Skills	,696	,716
32- Emerging Technologies Skills	,701	,711
33- Emerging Technologies Skills	,780	,797

C. Data Collection Procedures

The researcher started the data collection process immediately upon obtaining the requisite permissions from the Research and Publication Ethics Committee for Social Sciences and Humanities of İstanbul Aydın University, as documented in Appendix C.

The questionnaire was sent to the participants via Google Forms. The participation in the study was entirely on voluntary basis. The participants were informed about the objectives of the study and assured that the confidentiality of their responses and any personal information would be maintained. The QR code related to the google form link is as revealed below:

D. Data Analysis

After gathering the data, the researcher analyzed the data statistically on Statistical Package for the Social Sciences (SPSS) version 26.0. The independent-sample t-test and the ANOVA test were required to be conducted by the researcher to analyze the data collected and to find answers to the research questions. Creswell (2007) delineates a five-step process for collecting quantitative data. This process encompasses not only the actual gathering of data but also a series of interrelated steps. These steps include selecting the study's participants, obtaining the necessary permissions from various individuals and organizations, determining the type of information to collect from various online sources for the quantitative research, identifying and selecting appropriate instruments for data gathering that will yield valuable insights for the study, and ultimately conducting the data gathering process to obtain the required data.

The data analysis in the study followed a sequence of steps as outlined below:

The researcher compiled a codebook and input the data into SPSS. To address an open-ended question regarding the number of educational technology training sessions attended, the responses were categorized into three groups for subsequent inferential statistical analysis, and this categorization was assigned codes.

Descriptive statistics and frequencies were computed and examined. This included the calculation of means and standard deviations, along with the determination of minimum and maximum values for the scales and sub-scales. Additionally, the participants' scores were reported in accordance with the original methodology introduced by Christensen and Knezek (2017).

Reliability was assessed by evaluating Cronbach's alpha values for both scales and sub-scales. This was done to ensure the consistency and trustworthiness of the measurements. Data analysis involved the use of ANOVA tests and independent t-tests. The specific test employed for each research question is shown in Table 9.

Table 9: Research Questions and Test Type

Research questions	Test

1- Does the attainment of a master's degree by educators have a substantial association with their perceived technology proficiency? (Analyzed using ANOVA)
2- Is there a significant correlation between the type of institution where educators are employed (private or state) and their perceived technology proficiency? (Analyzed using an independent t-test)
3- Does the amount of time that educators allocate to electronic environments correlate significantly with their perceived technology proficiency? (Analyzed using ANOVA)
4- Is there a noteworthy link between the number of years educators have spent in the profession and their perceived technology proficiency? (Analyzed using an independent t-test)
5- Does the age of educators significantly relate to their perceived technology proficiency? (Analyzed using ANOVA)
6- Is there a substantial association between the gender of teachers and their perceived technology proficiency? (Analyzed using ANOVA)

IV. FINDINGS

A. Introduction

This chapter focuses on the findings gathered from the statistical analyses done in this study. The main goal of this study is to assess the perceived technology proficiency of Turkish English teachers and explore the potential influence of different factors, such as gender, age, institutional affiliation, teaching years, and time spent in electronics, on their perceived technology proficiency. The study employed the self-assessment tool TPSA C-21 to fulfill this goal, and the resulting data were analyzed in correlation with the personal details supplied by the individuals involved in the study.

Normality assessments were conducted to determine whether the subsequent analyses to be carried out using the SPSS software would be parametric or non-parametric in nature. Both Skewness and Kurtosis tests were employed to find the distribution. Byrne (2010) proposes that data can be considered normally distributed when the skewness score falls within the range of +2 to -2, and the kurtosis score is within the range of +7 to -7. To assess the normality of the data, both were computed for every subscale and overall scale.

Table 10 containing information about the normality distributions is provided below in the context of the relevant analyses.

Table 10: Normality Distributions of the Data

Questions	Skewness	Kurtosis
S1	-3,707	16,901
S2	-1,119	0,659
S3	-1,43	1,546
S4	-2,712	9,438
S5	-1,936	3,83
S6	-2,6	8,162
S7	-0,152	-1,032
S8	-1,691	2,54
S9	-1,825	4,395
S10	-0,28	-1,009
S11	-0,244	-0,879
S12	-1,168	0,553
S13	-2,063	5,728
S14	-0,852	-0,056
S15	-1,437	1,865
S16	-0,723	-0,101
S17	-1,468	1,582
S18	-0,967	0,023
S19	-0,349	-0,819
S20	-1,097	0,87
S21	-1,049	0,606
S22	-0,792	-0,413
S23	-1,369	1,575
S24	-1,323	1,524
S25	-1,655	2,693
S26	-1,374	2,132
S27	-1,385	1,428
S28	-1,904	3,246
S29	-1,825	3,133
S30	-1,754	2,859
S31	-2,931	11,563
S32	-2,262	6,655
S33	-1,499	1,518

Table 10 presents the skewness and kurtosis values for a set of questions labeled S1 to S33. Skewness measures the symmetry or lack thereof in the distribution of data. Positive one presenting the data is skewed to the right, as negative one suggests a leftward skew on the left. Kurtosis, on the other hand, assesses the degree of

peakiness or thickness in the data distribution. Higher ones show a more peaked distribution, whereas lower ones show a flatter distribution.

Upon reviewing the data in the table, it's apparent that several questions exhibit varying levels of skewness and kurtosis. For example, questions S1, S4, S6, and S31 have notably negative skewness values, indicating a leftward skew in their response distributions. This suggests that the data for these questions may be concentrated toward lower values. Furthermore, questions like S7, S14, and S18 display negative skewness but have kurtosis values near zero, which could imply relatively normal distributions. In analyzing the entire table, it's evident that the skewness values range from approximately -3.707 to -0.152, indicating varying degrees of leftward skewness in the data distributions. The most negatively skewed questions have their data concentrated towards the lower end, while those with less negative skewness exhibit a more balanced spread of responses.

In terms of kurtosis, the values span from 0.023 to 16.901. This wide range of kurtosis values reflects a diverse set of data distribution shapes. Questions with higher positive kurtosis values are characterized by more peaked distributions, whereas those with lower kurtosis values are relatively flatter.

After Kurtosis and Skewness test, homogeneity of variance was conducted through Levene Test.

Table 11: The Homogeneity Scores

Questions	Levene's Test Scores
Gender	0,00*
Age	0,00*
Major	0,685
Master's degree	0,019
Institution	0,332
Teaching experience	0,93
Allocated time with technology	0,072

Prior to initiating data analysis corresponding to study, the mean scores for each response were calculated. The table provides a snapshot of participants' ratings for various technology proficiency subscales. Across the subscales, the ratings generally hover above 4, indicating a predominantly positive assessment of technology proficiency. The lowest mean score is observed in the "WWW scale" (items 6 to 10), where scores range from 3.44 to 4.63, suggesting slightly lower proficiency in this aspect. On the other hand, the highest score is evident in the "E-mail scale," with scores ranging from 4.32 to 4.79, reflecting a comparatively higher proficiency level. This data highlights a balanced perception of technology proficiency, with the "E-mail scale" standing out as an area where participants express greater confidence.

Table 12: Mean Scores of Each Question

Questions	Mean Score
1- E-mail scale	4,79
2- E-mail scale	4,32
3-E-mail scale	4,41
4-E-mail scale	4,69
5-E-mail scale	4,55
6-WWW scale	4,63
7-WWW scale	3,44
8-WWW scale	4,42
9-WWW scale	4,54
10-WWW scale	3,65
11- Integrated Application	3,68
12-Integrated Application	4,26
13-Integrated Application	4,59
14-Integrated Application	3,88
15-Integrated Application	4,33
16-Teaching with Technology	4,02
17-Teaching with Technology	4,33
18-Teaching with Technology	4,15
19-Teaching with Technology	3,70
20-Teaching with Technology	4,24
21-Teaching with Emerging Technologies	4,19
22-Teaching with Emerging Technologies	4,03
23-Teaching with Emerging Technologies	4,34
24-Teaching with Emerging Technologies	4,28
25-Teaching with Emerging Technologies	4,38
26-Teaching with Emerging Technologies	4,28
27-Teaching with Emerging Technologies	4,38
28-Teaching with Emerging Technologies	4,54
29-Emerging Technologies Skills	4,51
30-Emerging Technologies Skills	4,48
31-Emerging Technologies Skills	4,72
32-Emerging Technologies Skills	4,76
33-Emerging Technologies Skills	4,48
Whole scale	**4,09**

B. Findings

The objective of this study was to find out perceived technological proficiency of English as a Foreign Language (EFL) instructors. The assessment considered several influencing factors, such as gender, age, the educational level they have, their institutional affiliation (state or foundation), their teaching years, and the extent of time they engage with electronics. Taking into this account, the answers to the following six research questions were analyzed.

1. Does the attainment of a master's degree by educators have a substantial association with their perceived technology proficiency?
2. Is there a significant correlation between the type of institution where educators are employed (foundation or state) and their perceived technology proficiency?
3. Does the amount of time that educators allocate to electronic environments correlate significantly with their perceived technology proficiency?
4. Is there a noteworthy link between the number of years educators have spent in the profession and their perceived technology proficiency?
5. Does the age of educators significantly relate to their perceived technology proficiency?
6. Is there a substantial association between the gender of educators and their perceived technology proficiency?
7. In this section, a comprehensive account of the gathered data and the statistical analysis is provided, serving to substantiate the conclusions drawn in alignment with the previously stated research questions.

C. Findings of the Research Question One

The first question was "Does the attainment of a master's degree by educators have a substantial association with their perceived technology proficiency?" To find an answer to this question, an independent-sample t-test was used.

Table 13: Relationship between Perceived Technology Proficiency of EFL Teachers and a Master's Degree

		N	Mean	Std. Deviation	df	t	p
Technology Proficiency	MA (Yes)	49	4,4400	,47	142	1,92	,057
	MA (No	95	4,2200	,71			

The provided SPSS table examines the relationship between perceived technology proficiency among EFL teachers and their possession of a master's degree (MA). The data reveals that the group of EFL teachers holding a master's degree exhibits a slightly higher mean technology proficiency score (4.44) compared to those without a master's degree (4.22). Notably, the standard deviation in the "MA (Yes)" group is lower at 0.47, indicating less variability in scores within this group. Conversely, the "MA (No)" group displays a higher standard deviation of 0.71, signifying greater variability. With a p-value of 0.057, the statistical analysis suggests that the difference in perceived technology proficiency between these two groups may not be statistically important at the commonly used significance level of 0.05.

D. Findings of the Research Question Two

The second research question was "Is there a significant correlation between the type of institution where educators are employed (private or state) and their perceived technology proficiency?"

Table 14: Relation between the Type of Institution and Their Perceived Technology Proficiency

		N	Mean	Std. Deviation	df	t	p
Technology Proficiency	State	98	4,24	,68	142	-1,504	,135
	Private	46	4,42	,53			

Table 14 table reveals the relationship between the type of institution where EFL teachers work (either state or private) and their perceived technology proficiency. The data is presented in terms of means and standard deviations. Notably, the "State"

group, consisting of 98 teachers, exhibits a mean technology proficiency score of 4.24, with a standard deviation of 0.68. On the other hand, the "Private" group, composed of 46 teachers, shows a slightly higher mean technology proficiency score of 4.42 and a lower standard deviation of 0.53. The t-test is employed to determine whether there is a significant difference between these two groups. With a p-value of 0.135, which exceeds the conventional significance level of 0.05, the results suggest that the observed difference in perceived technology proficiency between state and private institutions may not be statistically significant.

E. Findings of the Research Question Three

The third question was “Does the amount of time that educators allocate to electronic environments correlate significantly with their perceived technology proficiency?”.

Table 15: Relation between Teachers’ Allocated time and Their Perceived Technology Proficiency

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7,928	3	2,643	7,116	,000
Within Groups	51,991	140	,371		
Total	59,919	143			

Table 16: Mean Scores of Each Time Range

Range of time	Mean score	N
0-3 hours	3,98	32
3-6 hours	4,25	68
6-9 hours	4,57	32
9+ hours	4,71	12

Table 16 presents mean technology proficiency scores corresponding to various time ranges that English teachers spend in electronic environments. Among the 32 teachers who dedicate 0-3 hours to electronic environments, the average technology proficiency score is 3.98. For the 68 teachers investing 3-6 hours in electronics, the mean technology proficiency score is 4.25. In the case of 32 teachers spending 6-9 hours in electronic environments, their mean technology proficiency score is 4.57. Lastly, for the 12 teachers who allocate 9 or more hours to electronic environments, their mean technology proficiency score is 4.71.

The data indicates a pattern where, on average, educators who devote more time to electronics tend to exhibit higher levels of perceived technology proficiency. This observation suggests a positive association between the duration of teachers' engagement with electronics and their technology proficiency. As they spent more time in electronics, the mean technology proficiency scores also rise. This insight holds significance in comprehending the impact of electronic environment usage on teachers' perceived technology proficiency, potentially influencing teacher training and support strategies for effective technology integration in their teaching practices.

Table 17: Multiple Comparisons

Multiple Comparisons						
Dependent Variable: Total_Tech						
Bonferroni						
(I) Time_spenton_electronics	(J) Time_spenton_electronics	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
0-3 Hours	3-6 Hours	-,27022	,13064	,243	-,6198	,0794
	6-9 Hours	-,59470*	,15235	,001	-1,0024	-,1870
	+9 hours	-,73516*	,20628	,003	-1,2872	-,1831
3-6 Hours	0-3 Hours	,27022	,13064	,243	-,0794	,6198
	6-9 Hours	-,32448	,13064	,085	-,6741	,0251
	+9 hours	-,46494	,19081	,096	-,9756	,0457
6-9 Hours	0-3 Hours	,59470*	,15235	,001	,1870	1,0024
	3-6 Hours	,32448	,13064	,085	-,0251	,6741
	+9 hours	-,14047	,20628	1,000	-,6925	,4116
+9 hours	0-3 Hours	,73516*	,20628	,003	,1831	1,2872
	3-6 Hours	,46494	,19081	,096	-,0457	,9756
	6-9 Hours	,14047	,20628	1,000	-,4116	,6925
*. The mean difference is significant at the 0.05 level.						

Table 17 presents the outcomes of multiple comparisons utilizing the Bonferroni method to investigate the mean disparities in technology proficiency scores concerning the time spent in electronic environments. Several time range comparisons are outlined, along with their corresponding mean differences, standard errors, significance levels, and confidence intervals.

When comparing teachers who spend 0-3 hours and those who spend 3-6 hours in electronic environments, the mean difference is -0.27022, though it is not statistically significant ($p = 0.243$).

A significant mean difference emerges when evaluating teachers allocating 0-3 hours and 6-9 hours, with a mean difference of 0.59470 ($p = 0.001$). The confidence interval reveals that the actual mean difference ranges from -1.0024 to -0.1870.

Similarly, a statistically significant mean difference is observed between teachers in the 0-3 hours group and those dedicating 9 or more hours to electronic environments, with a mean difference of -0.73516 ($p = 0.003$). The confidence interval spans from -1.2872 to -0.1831. Conversely, no statistically significant differences are found when comparing teachers spending 3-6 hours with those spending 6-9 hours or 9 or more hours in electronic environments. In summary, the findings suggest that the mean discrepancy in technology proficiency is significant when contrasting teachers who spend 0-3 hours with those who spend 6-9 hours or more in electronic environments. This outcome implies a potential connection between increased time spent in electronics and heightened technology proficiency.

F. Findings of the Research Question Four

The fourth question was "Is there a noteworthy link between the number of years educators have spent in the profession and their perceived technology proficiency?"

Table 18: Mean Scores of Each Range of Teaching Years

Range of teaching years	Mean score	N
Less than 1 year	4,60	10
1-3 years	4,43	22
4-6 years	4,31	65
7-9 years	4,24	13
10-14 years	4,34	18
15+ years	3,89	16

For teachers with less than 1 year of teaching experience (N=10), their mean technology proficiency score is relatively high at 4.60. Teachers with 1-3 years of experience (N=22) also demonstrate a strong mean technology proficiency score of 4.43. Meanwhile, for those with 4-6 years of experience (N=65), their mean score stands at 4.31. Teachers with 7-9 years of experience (N=13) exhibit a mean technology proficiency score of 4.24. Teachers who have been teaching for 10-14 years (N=18) maintain a mean score of 4.34. However, those with 15 or more years of

teaching experience (N=16) show a slightly lower mean technology proficiency score of 3.89. These results present that there might be a correlation between the number of years spent in the teaching profession and perceived technology proficiency among English teachers. Teachers with a range of 1-6 years of experience tend to exhibit higher technology proficiency, while those with over 15 years of experience have a somewhat lower mean proficiency score.

Table 19: Link between Different Teaching Experience and How EFL Teachers Perceive Their Technology Proficiency

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4,072	5	,814	2,013	,081
Within Groups	55,847	138	,405		
Total	59,919	143			

Table 19 presents the findings of an analysis of variance (ANOVA) aimed at examining the link between different levels of teaching experience and how teachers of English perceive their technology proficiency.

The results reveal that the variability observed between groups, which represent different teaching experience levels, is 4.072. The analysis involved 5 degrees of freedom (df) and produced a mean square value of 0.814. The F-statistic, used to assess group differences, is calculated to be 2.013. However, the associated p-value, which is a measure of statistical significance, is 0.081. This p-value exceeds the common significance threshold of 0.05.

In simpler terms, the results imply that there is no statistically significant distinction in perceived technology proficiency among teachers with various levels of teaching experience. This means that, in this sample, the amount of teaching experience does not appear to significantly influence how teachers perceive their technology proficiency.

The table displays the results of a multiple comparisons analysis, specifically using the Bonferroni correction, to examine the differences in perceived technology proficiency based on different ranges of teaching experience. The analysis compares the mean differences between these groups and provides confidence intervals.

The results show that for all pairwise comparisons between the different teaching experience groups (e.g., less than one year, 1-3 years, 4-6 years, 7-9 years, 10-14 years, and +15 years), there are no statistically significant differences in perceived technology proficiency. This is evident as all p-values are greater than 0.05.

In other words, this analysis suggests that teaching years teachers have in the profession does not have a significant impact on their perceived technology proficiency. Regardless of their teaching experience, their average technology proficiency scores do not significantly differ from each other.

G. Findings of the Research Question 5

The fifth question was “Does the age of educators significantly relate to their perceived technology proficiency?” Table 20 presents mean scores of each age range.

Table 20: Mean Scores of Each Age Range

Age range	*Mean score*	*N*
20 -25	4,31	18
25-29	4,44	59
30 - 35	4,24	37
35-39	4,23	14
40-49	4,02	13
50-59	3,57	3

The data indicates that the perceived technology proficiency tends to be higher among younger teachers, especially those between the ages of 25 and 29, while older teachers, particularly those aged 50-59, have lower perceived technology proficiency.

Table 21: The Relationship between Different Age Groups and Their Perceived Technology Proficiency among Teachers

ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4,023	5	,805	1,986	,0084
Within Groups	55,896	138	,405		
Total	59,919	143			

Table 21 presents the results of an analysis of variance (ANOVA) conducted to examine the relationship between different age groups and their perceived technology proficiency among teachers. The variance between the age groups accounts for a total of 4.023 units, with 5 degrees of freedom (df). This variance leads to a mean square value of 0.805. The F-statistic, which assesses the difference between the groups, has a value of 1.986. Importantly, the associated p-value is 0.0084, which is less than the commonly accepted level of 0.05.

The significant p-value (0.0084) indicates that there is a statistically meaningful difference in perceived technology proficiency among the various age groups of the participants. In other words, the age of teachers appears to have a notable impact on their perceived technology proficiency in this sample.

H. Findings of the Research Question 6

The sixth question was “Is there a substantial association between the gender of educators and their perceived technology proficiency?”

Table 22: Exploring the Relationship between Educators' Gender and Their Perceived Technology Proficiency

		N	Mean	Std. Deviation	df	t	p
Technology Proficiency	Female	84	4,30	,62	142	,095	,925
	Male	60	4,29	,67			

Table 22 provides an overview of the analysis aimed at exploring the relationship between teachers' gender and their perceived technology proficiency. Among the female teachers (N=84), the mean technology proficiency score is 4.30,

with a standard deviation of 0.62. For male teachers (N=60), the mean technology proficiency score is 4.29, with a standard deviation of 0.67.

The statistical analysis, which includes a t-test, reveals that there is no significant difference in perceived technology proficiency between male and female teachers.

With a t-value of 0.095 and the associated p-value of 0.925, significantly exceeding the widely accepted significance level of 0.05, the results suggest a lack of statistical significance.

V. DISCUSSION AND CONCLUSIONS

A. Introduction

The objective of this research was to examine the development of EFL (English as a Foreign Language) instructors in Türkiye and assess their technological proficiency. Various factors, such as the grade level they teach, the type of institution (public or private), age, gender, teaching experience, and the duration dedicated to using electronics, were considered in the evaluation. The participants were 144 Turkish English instructors at the tertiary level from various universities. This research employed a survey-based approach, utilizing quantitative research techniques.

B. Conclusions

The first research question was related to the participants' relationship between their technology proficiency and possession of a master's degree. According to findings, holding a master's degree exhibits a slightly higher mean technology proficiency score (4.44) compared to those without a master's degree (4.22). The findings reveal that there is no statistically significant difference in technological competency between EFL teachers with and without a master's degree (p-value = 0.057). This implies that the observed variation in mean scores could be due to chance rather than a genuine difference. One reason for this could be because the sample size was insufficient to detect a significant effect. The group lacking a master's degree also had greater variability in technology proficiency scores, making it more difficult to detect a consistent pattern. The p-value is close to 0.05, indicating that a higher sample size or a stricter significance criterion could influence the outcome.

The second research question examined the relationship between the type of institution where EFL teachers work (either state or private) and their perceived technology proficiency. The finding (p-value = 0.135) implies that the difference in technological proficiency between EFL teachers in public and private institutions may

be statistically insignificant. This could be because the sample sizes in both groups were small (98 and 46 teachers, respectively), limiting the test's potential to identify significant differences. The relatively high standard deviations in both groups could contribute to increased variability, making identifying a clear pattern more difficult. The observed differences may be due to chance because the p-value is more than the conventional significance level of 0.05. When interpreting these findings, and a larger sample size or investigation of additional factors could provide a more comprehensive understanding of the relationship between institutional type and technology proficiency among EFL teachers.

The third research question examined the link between the participants technology proficiency and time spent in electronic environments. The findings revealed that average technology proficiency scores for English teachers based on the time they spend in electronic environments. For teachers spending 0-3 hours, the average score is 3.98; for 3-6 hours, it's 4.25; for 6-9 hours, it's 4.57; and for 9 or more hours, it's 4.71. The data suggests a trend: educators who spend more time in electronic environments tend to have higher level of technology proficiency scores. This indicates a positive link between the time teachers engage with electronic tools and their perceived technology skills. As the time in electronics increases, so do the proficiency scores. This finding is important for understanding how teachers' electronic engagement relates to their technology proficiency, potentially influencing training, and support techniques to use technology effectively into their classes.

The fourth research question was related to the potential relationship between the number of years educators have spent in the profession and their perceived technology proficiency. The findings showed that mean scores for different experience ranges show that teachers with less than one year and 1-3 years have relatively high competency scores, while those with 4-6 years and 7-9 years have a little decrease. Teachers with 10-14 years of experience have an even mean score, but those with 15 or more years of experience have a somewhat lower score. ANOVA showed that there is no statistically significant difference in perceived technology competency across these experience groups, with a p-value of 0.081 exceeding the commonly used threshold of 0.05. This finding is supported by multiple comparisons analysis with the Bonferroni correction, which shows no significant differences between teaching

experience groups. As a result, despite differences in mean scores, the data show that, in this group, years of teaching experience do not affect how English teachers evaluate their technological competency. While these findings provide insights for this unique sample, caution is advised when generalizing to more people, and individual experiences may differ.

The fifth research question investigated the relationship between educators' age and their perceived technology proficiency. The mean scores for different age groups indicate a trend in which younger educators, particularly those aged 20-29, report better-perceived technology proficiency, while older educators, particularly those aged 50-59, report lower proficiency scores. ANOVA confirmed that these differences are statistically significant. This significant p-value suggests a statistically significant difference in perceived technological proficiency among participants of various ages. In short, educators' age appears to significantly impact how they assess their technological proficiency in this group. When compared to their older colleagues, younger educators report better levels of technology proficiency. This study has implications for understanding the relationship between age and technological competency among educators, as well as for targeted training or support initiatives to improve technology abilities, particularly among older educators.

The sixth research question was related to the relationship between educators' gender and their perceived technology proficiency. The t-value and p-value from the analysis explain why there is no significant difference in technological proficiency between male and female teachers, as seen in Table 22. The t-value is low (0.095), but the p-value (0.925) is significantly greater than the conventional level of significance (0.05). This high p-value indicates that there is insufficient evidence to claim a genuine difference in technology competency between male and female teachers. To put it differently, the evidence implies that any obvious difference could be attributable to random chance rather than a meaningful differential. As a result, we cannot state with certainty that gender has a substantial impact on technology competence ratings among this set of educators. The lack of a substantial difference in perceived technological skill between male and female teachers could be attributed to several variables. Both genders in the study probably had possible that both genders in the study had equivalent access to technological training and professional growth, resulting in

similar levels of competency. The changing educational landscape, which emphasizes technological integration, may help to close previous gender gap in proficiency. Individual differences within each gender group, as well as shifting societal standards, could all play an impact. Furthermore, the organizational culture and policies of educational institutions may promote equitable chances for technological training, hence reducing gender gaps. The small impact size or self-selection bias of technology-interested teachers could also contribute to the observed similarity in perceived proficiency. The diminishing gender gap is predictable, considering that the Internet and technology are today an essential aspect of everyone's daily lives.

In conclusion, this research is significant in the realm of English as a Foreign Language (EFL) instruction because it provides unique insights that can inform and transform numerous elements of language education. The study fills a significant gap in understanding the dynamics of technology integration within the educational context by studying the technical skill and development of EFL instructors in Türkiye. The findings serve as a guide for developing focused professional development efforts that provide educators with the support and tools, they need to navigate the changing terrain of language education. Moreover, the study's focus on the tertiary level is notable, as it has a direct impact on higher education procedures. The findings of this study not only help instructors improve their teaching methods, but they also enable institutions to modify their strategies to meet the technological needs of both educators and students. Policymakers can use these insights to create informed policies, properly allocate resources, and establish an atmosphere receptive to technology innovation in language teaching. Overall, this study contributes to a larger global conversation about the junction of technology and language training, providing practical implications that resound not only inside the Turkish educational setting but also across the international landscape.

C. Suggestions for Further Studies

The current study has several recommendations for future research endeavors. Building upon the current research, future studies could focus on the strategies used by English as a Foreign Language (EFL) instructors in Türkiye for integrating technology into their teaching practices. A comparative analysis across different

educational levels, such as primary, secondary, and tertiary, could be included for insights into variations in technological proficiency and factors influencing it.

Initially, the methods used in this study relied solely on quantitative approaches, which were deemed adequate for achieving the stated aims. In future research, qualitative methods, particularly interviews, would be more effective. This change would help us better understand the reasons that contribute to instructors' reluctance to successfully integrate technology in the classroom. Also, the number of the participants is not high, larger groups can be added to further studies.

Longitudinal studies that track the evolution of technological proficiency over time, as well as cross-cultural comparisons with teachers from other countries, might help us understand this phenomenon better.

Evaluating the impact of EFL teachers' technological proficiency on student learning results, as well as studying emerging technologies in language instruction, are critical issues for future research. Furthermore, gender-based studies and comparisons of teachers in public and private institutions could reveal detailed patterns and differences, leading to the establishment of effective professional development programs and educational policies in Türkiye.

The developments in internet and computer technologies should be closely monitored, and intentional efforts should be taken to ensure their integration. To accomplish this, information technology technicians and specialists should be hired to provide support to teachers, relieving them of the pressure of dealing with issues that may occur in classrooms on their own.

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DISSERTATIONS

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APPENDICES

Appendix A: Technology Proficiency Self-Assessment for 21st Century Learning (TPSA C21)

Appendix B: Permission received from the scale's (TPSA C-21) owner

Appendix C: Ethics Committee Approval

Appendix A Technology Proficiency Self-Assessment for 21st Century Learning (TPSA C21)

I feel confident that I could...	**SD D U A SA**
1. ...send e-mail to a friend.	1 2 3 4 5
2....subscribe to a discussion list.	1 2 3 4 5
3. ...create a distribution list" to send e-mail to several people at once.	1 2 3 4 5
4....send a document as an attachment to an e-mail message.	1 2 3 4 5
5....keep copies of outgoing messages that I send to others.	1 2 3 4 5
6. ...use an Internet search engine (e.g., Google) to find Web pages related to my subject matter interests.	1 2 3 4 5
7. ...search for and find the Smithsonian Institution Web site.	1 2 3 4 5
8. ...create my own web page.	1 2 3 4 5
9. ...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
10. ...find primary sources of information on the Internet that I can use in my teaching.	1 2 3 4 5
11. ...use a spreadsheet to create a bar graph of the proportions of the different colors of M&Ms in a bag.	1 2 3 4 5
12. ...create a newsletter with graphics.	1 2 3 4 5
13. ...save documents in formats so that others can read them if they have different word processing programs (eg., saving Word, pdf, RTF, or text).	1 2 3 4 5
14. …use the computer to create a slideshow presentation.	1 2 3 4 5
15. ...create a database of information about important authors in a subject matter field.	1 2 3 4 5
16. …write an essay describing how I would use technology in my classroom.	1 2 3 4 5
17. ...create a lesson or unit that incorporates subject matter software as an integral part.	1 2 3 4 5
18. ...use technology to collaborate with teachers or students, who are distant from my classroom.	1 2 3 4 5
19. … describe 5 software programs or apps that I would use in my teaching.	1 2 3 4 5
20. ...write a plan with a budget to buy technology for my classroom.	1 2 3 4 5
21. …integrate mobile technologies into my curriculum.	1 2 3 4 5
22. …use social media tools for instruction in the classroom. (ex. Facebook, Twitter, etc.)	1 2 3 4 5
23. …create a wiki or blog to have my students collaborate.	1 2 3 4 5
24. …use online tools to teach my students from a distance.	1 2 3 4 5
25. …teach in a one-to-one environment in which the students have their own device.	1 2 3 4 5
26. …find a way to use a smartphone in my classroom for	1 2 3 4 5

student responses.

27. … use mobile devices to connect to others for my professional development.	1 2 3 4 5
28. … use mobile devices to have my students access learning activities.	1 2 3 4 5
29. … download and listen to podcasts/audio books.	1 2 3 4 5
30. … download and read e-books.	1 2 3 4 5
31. … download and view streaming movies/video clips.	1 2 3 4 5
32. … send and receive text messages.	1 2 3 4 5
33. … transfer photos or other data via a smartphone.	1 2 3 4 5
34. … save and retrieve files in a cloud-based environment.	1 2 3 4 5

Appendix B Permission received from the scale's (TPSA C-21) owner

Appendix C Ethics Committee Approval

Evrak Tarih ve Sayısı: 05.05.2023-85123

T.C.
İSTANBUL AYDIN ÜNİVERSİTESİ REKTÖRLÜĞÜ
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