77. The Role of Technology Acceptance Model (TAM) in Developing Turkish Pre-Service EFL Teachers' Technology Adoption[1]

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Abstract

As 21st century has witnessed drastic changes in educational technology, the education of pre-service teachers has gained more significance. Educators are then sought to be digitally literate who are also accepting new technologies to utilize web tools competently. That said, this current quantitative driven-mix method research scrutinizes the role of the Technology Acceptance Model (TAM) in enhancing the pre-service English as a Foreign Language (EFL) teachers' technology adoption in this changing educational landscape. Accordingly, an online questionnaire together with structured interview are used to gather data from 94 pre-service EFL teachers at a public university in Türkiye due to the restrictions of the Covid-19 pandemic during 2020-21 academic year. Quantitative data are analyzed through SPSS 27.0 to detect construct-dependent and -independent frequency levels whereas qualitative data are analyzed in lieu of grounded theory by means of thematic analysis. As a result of the quantitative data analysis, it is revealed that the Turkish pre-service EFL teachers' levels of technology acceptance are moderately high, albeit there is no significant difference regarding age, gender, and personal computer ownership. On the other hand, qualitative data results provide a deeper insight into participants' perceptions on related concepts. The results are mainly noted as the growing need for modifications in teacher education programs in order to familiarize more with technology and web tools as well as to improve their future technology-integrated language teaching practices.

Keywords: Technology acceptance model, technology adoption, pre-service teachers, technology integrated learning, teacher education, TAM, EFL, ELT

İngilizce Öğretmeni Adaylarının Teknoloji Benimsemelerini Geliştirmede Teknoloji Kabul Modeli'nin (TKM) Rolü

Öz

21. yüzyılın eğitim teknolojisindeki köklü değişimlere tanık olmasıyla birlikte, öğretmen adaylarının eğitimi daha da önem kazanmıştır. Beraberinde, web araçlarını yetkin bir şekilde kullanmak için yeni teknolojileri kabul edebilen dijital okuryazar eğitimciler aranmaya başlamıştır. Bu noktada, kantitatif çıkışlı bu karma yöntem araştırması, zamanla değişen eğitim alanında, yabancı dil olarak İngilizce

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1254 / *RumeliDE* Journal of Language and Literature Studies 2023.33 (April)

The Role of Technology Acceptance Model (TAM) in Developing Turkish Pre-Service EFL Teachers' Technology Adoption / Ölmez, R. & Kavaklı Ulutaş, N.

öğretmeni adaylarının teknolojiyi kabul etmesinde Teknoloji Kabul Modelinin (TKM) rolünü incelemeyi amaçlamaktadır. Buna göre, 2020-21 akademik yılında Türkiye'deki bir devlet üniversitesindeki 94 İngilizce öğretmeni adayından, Covid-19 salgını kısıtlamaları nedeniyle çevrimiçi bir anket ve yapılandırılmış görüşme yoluyla veri toplanmıştır. Toplanan kantitatif veri, yapı-bağımlı ve -bağımsız frekans düzeylerinin saptanması için SPSS 27.0 yoluyla analiz edilirken, kalitatif veri ise temellendirilmiş kuram kapsamında tematik analiz yoluyla analiz edilmiştir. Kantitatif veri analizi sonucunda, İngilizce öğretmeni adaylarının teknoloji kabul düzeylerinin orta derecede yüksek olduğu fakat teknoloji kabul düzeylerinin yaş, cinsiyet ve kişisel bilgisayar sahipliği değişkenleri kapsamında anlamlı bir fark ortaya koymadığı saptanmıştır. Öte yandan, kalitatif veri analizi sonuçları, katılımcıların ilgili kavramlarına yönelik algılarına ilişkin daha derin bir ön izleme sağlamaktadır. Şöyle ki, İngilizce öğretmeni adayları, teknoloji entegre edilmiş gelecekteki dil öğretimi uygulamalarını geliştirmenin yanı sıra teknoloji ve web araçlarını daha iyi tanımak için öğretmen eğitimi programlarının yeniden düzenlenmesi için artan bir ihtiyaç hissetmektedir.

Anahtar kelimeler: Teknoloji kabul modeli, teknoloji benimseme, öğretmen adayları, eğitimde teknoloji entegrasyonu, öğretmen eğitimi, TKM, yabancı dil olarak İngilizce, İngiliz dili eğitimi

1. Introduction

The influx of technological innovations since the beginning of the 20th century reformed people's lives enormously in various ways. One of the most remarkable reformations brought by technological developments included educational technologies (EdTechs), which necessitated the evaluation of former teaching methods, tools, teachers' professional development and teacher education. Thus, the transmission of information through technology became one of the most significant tasks to be accomplished by teachers. The requirements for teachers' successful technology integration in their teaching broadened day by day as more recent technological developments emerged. Consequently, the question of "What makes a good teacher in the 20th century?" originated in the field of educational pedagogy.

Numerous frameworks, approaches, pedagogies, and theories were proposed to explain and build on the previous research and paradigms to seek the answers to this question. Even the ones emerged and utilized in other disciplines were revised and adapted into educational pedagogy because teachers were considered as a key for successful technology integration in teaching (Teo, 2011). Therefore, the research field on this subject matter diverged enormously. Some researchers focused on the qualifications and knowledge teachers ought to have for successful technology integration (Angeli & Valanides, 2008; Mishra & Koehler, 2006; Shulman, 1986), whereas some others sought for the answers of what led individuals to accept a specific technology (Davis, 1985; Davis et al., 1989; Davis, 1993; Venkatesh & Davis, 1996; Venkatesh & Davis, 2000; Venkatesh, 2000; Venkatesh et al., 2003, Venkatesh & Bala, 2008; Venkatesh et al., 2012).

As the spectrum of the research field in technology acceptance and teacher knowledge diversified within multiple contexts and disciplines, more recent research topics appeared constantly. However, there was a common agreement on the significance of technology in teaching among authorities and other institutions, such as it was reported that technology ought to be an inseparable part of teaching and learning; thus, it must be enhanced in every step of teacher training globally (ISTE, 2000). That is why, at the end of the 20th century, the world witnessed so many technological innovations leading to the basic premise that a life without technology became almost impossible. It, then, transformed the way

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people could behave, think, and live, along with all scientific areas and educational technologies (Rahimi & Pourshahbaz, 2018).

One of the most substantial opportunities offered by these technologies was to be able to access digital information on the Internet with several web tools by means of a single click. It was reported that 55% used Wikipedia and 73% used social network sites to access information, above 25% downloaded podcasts, and 75% viewed videos on video-sharing sites. Consequently, the concept of "literacy" took on a new meaning in the 21st century, underlining the fact that being literate did not only correspond to read and write but also to be able to use new technologies (European Commission, 2007). As a result, the research field in education gravitated towards it thoroughly.

As the 21st century has become the era in which people cannot lead their lives without technology, areas of research have inclined towards the effective use of technologies in education in several disciplines. In 2008, the International Society for Technology in Education (ISTE, 2008) defined the standards for in- and pre-service teachers' computer competence for technology integration which involved the potent use of technologies in teaching, and the promotion of digital citizenship to develop students' creativeness and enhance recognition. Thus, the idea that teaching without technological resources is less effective (Ertmer & Ottenbreit-Leftwich, 2010) brought along the investigation of teachers' knowledge, technology acceptance, and digital literacies.

One of the disciplines focusing on the significance of technology integration and effective use of it both by teachers and learners is language education. The term Computer Assisted Language Learning (CALL), is defined as a language learning process in which learners use computers and improve their language proficiency, has emerged as a new research area (Beatty, 2004). The word computer in this definition does not only refer to electronic devices but also to all technology types that can be utilized in teaching and learning. Hence, the effective use of digital technologies in language education is acknowledged to have a facilitating impact on learners' language learning processes by enhancing their critical thinking and problem-solving skills (Blake, 2013; Kavaklı Ulutaş & Hancı-Azizoğlu, 2021).

Since the way of preparing teachers for teaching in the era of technology has its roots in teacher education institutions, which "serve as key change agents in transforming education and society" (UNESCO, 2005, p. 12), there is a need for the investigation of pre-service language teachers' technology acceptance, their knowledge levels for technology integration and their critical digital literacies so as to provide an insight for teacher educators and other authorities on the accomplishment of effective use and implementation of digital and web technologies in language education (Kavaklı Ulutaş, Abuşka, 2022; Kavaklı Ulutaş & Abuşka, 2023).

1.1. The Lay of the Land: The TAM Framework

The diversity of the educational technologies might provide numerous opportunities for teachers' professional development and support teaching and learning process, as it is pointed that learners are more motivated when the lessons are embellished with some technological tools (Granito & Chernobilsky, 2012), and sharing, collaboration, and expression are reinforced by web-based digital technologies such as blogs, YouTube, and other social media platforms, which is also noted by Kavaklı and Ölmez (2021) as:

> "The changes in our perspectives have also molded our expectations about learning. The role of inter-active media on learning is now clearer through the utilization of mobile, virtual, augmented, and

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1256 / *RumeliDE* Journal of Language and Literature Studies 2023.33 (April)

The Role of Technology Acceptance Model (TAM) in Developing Turkish Pre-Service EFL Teachers' Technology Adoption / Ölmez, R. & Kavaklı Ulutaş, N.

computed nature of multimodal learning environments. Besides, a myriad of Internet of Things (IoT) tools provides ubiquitous learning opportunities for learners of the twenty-first century." (p. 284)

Notwithstanding various favorable functions of educational technology and Internet, there are certain challenges they present which are noteworthy to discuss. First, the availability of technology does not guarantee effective use of it in teaching (Ertmer, 1999) together with the utilization of these technologies appropriately, and profitably hinges on some factors such as teachers' knowledge and expertise (Cowie & Jones, 2009). Moreover, the diversity of the online available resources requires teachers to obtain critical thinking skills regarding online and digital sources to be able to decide on their credibility with pedagogic objective, which is pointed as an issue teachers struggle with (Lightfoot, 2019). Several studies in literature acknowledged that teachers' use of technologies revolved around their previous practices such as drills (Garrett, 2009; Lei, 2009; Teo et al., 2008), or there was hardly any use of it due to certain reasons such as lack of familiarity with technology and fear of losing authority in class (Hixon & Buckenmeyer, 2009), anxiety (Ryan & Bagley, 2015) and fearfulness of not using it effectively (Ertmer & Ottenbreit- Leftwich, 2010).

The second challenge opposed by innovative educational technologies is that there is no assurance of successful technology integration in pre-service teachers' future teaching (Kavaklı Ulutaş, 2023). Even though today's teachers are regarded as "digital natives", they do not seem to discern the use of digital tools essentially (Heverly, 2007). In the same vein, it is also stated that there is a concern about effective integration of technologies in teaching although today's pre-service teachers are competent in communication and utilization of online interaction technologies (Lei, 2009; Ma et al., 2005). To confirm, pre-service teachers expressed that they did not feel ready for technology integration in their future teaching even after taking a methodology course (Tondeur et al., 2012), which highlighted the fact that effective use of digital and web tools in teaching context was not guaranteed by a stand-alone technology or methodology course in teacher education (Buss et al., 2015); henceforth, there has been a growing need for the investigation of what particularly promotes it.

Therefore, the background of this research comprises of the framework, namely, the Technology Acceptance Model (TAM) developed by Davis (1986). The framework was first proposed in different disciplines separately with an attempt to explore different topics, yet it was adapted to the educational settings within different contexts by previous researchers. Thus, the scope of the framework could be regarded as interdisciplinary in nature.

Firstly, TAM was introduced by Davis in 1986 to reveal the major stimulating factors of acceptance of a technology by its users in information systems. Since 1970s, technology acceptance has been a research area drawing the attention of scholars in the business and information systems disciplines (Teo, 2014). Davis (1986) proposed that there were three main contributing factors of a technology acceptance, which were 'perceived usefulness', 'perceived ease of use', and 'attitudes towards use'. These three factors were hypothesized to have a direct impact on the actual system usage. It was also highlighted in the model that the 'attitudes towards use' construct was affected by the other constructs, and 'perceived ease of use' had a direct influence on 'perceived usefulness'. The first introduction of the TAM was followed by the development of several other TAM frameworks (Davis, 1993; Davis et al., 1989; Venkatesh, 2000; Venkatesh & Bala, 2008; Venkatesh & Davis, 1996; Venkatesh & Davis, 2000 Venkatesh et al., 2003, Venkatesh et al., 2012), adapted, developed, and revised with add-on constructs and their interrelationships over time. The name given to the model was revised and changed according to the inclusion and exclusion of certain constructs, too. For instance, it was named as TAM2 (Venkatesh &

Davis, 2000), the model of Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003), TAM3 (Venkatesh & Bala, 2008), and the model of UTAUT2 (Venkatesh et al., 2012).

2. Literature Review

The studies conducted on TAM in relation to teacher education including pre- and in- service teachers have been diverse in terms of the contexts and the participant groups involved. Most of the research on this subject matter were conducted in Asia where the "Technology Acceptance Measure for Pre-service Teachers Scale" was introduced by Teo in 2010. There were also several other studies conducted in the Western context with pre-service teachers. In both cases, it is worth noting that studies performed worldwide included pre-service teachers studying at different departments, yet, to the researcher's knowledge, this study is one of those preliminary ones in literature providing an insight into the technology acceptance and integration of pre-service EFL teachers in the Turkish context.

To elaborate previous studies on TAM, those performed with pre-service teachers had been the focal point of teacher education studies in Asia. The scholars had long debated the impact of TAM constructs on the behavioral intention (BI) and technology acceptance of pre-service teachers. Specifically, Timothy Teo could be regarded as the pioneer of these studies in the Asian context on the grounds that he conducted various studies with pre service teachers within different TAM frameworks investigating the interrelations of the framework' components (e.g., Bell et al., 2013; Funkhouser & Mouza, 2013; Lei, 2009; Sadaf et al., 2012; Sang et al., 2010; Teo, 2011; Teo et al., 2008; Teo & Van Schalk, 2009) whose results were consistent with the study of Davis et al. (1989) pointing the robust influence of the subjective norm (SN) on pre-service teachers' computer attitudes (CA).

A large and growing body of literature in the Asian context have investigated the interrelations between the TAM constructs with pre-service teachers. A more recent research on this subject matter, performed with 302 pre-service teachers in Malaysia, were contradictory with the findings of Teo et al. (2008), Teo (2011), and Lei (2009) with the claim that perceived usefulness (PU) and attitudes towards use (ATU) had a direct impact on pre-service teachers' technology integration in their teaching, the latter showing less variance, whereas perceived ease of use (PEU) was not significant determinant of BI and ATU, yet it was detected to be a predictor of PU (Wong, 2013).

Following this, recently, the attention has focused on the gender differences in technology acceptance in pre-service teachers. Teo et al. (2015) studied the gender difference in technology acceptance with 339 pre-service teachers enrolled at a teacher training institute in a South-East Asian university and discovered that there was no statistically significant gender difference on the PU, ATU and BI constructs suggesting that pre-service teachers from both gender groups had equal perceptions about the usefulness of technology, attitudes towards technology use and intentions to use it in their teaching.

While numerous studies attempted to explain the technology acceptance of pre-service teachers, the measurement tools for those investigations had been limited to those developed for individuals in different business sectors, in-service teachers etc., and not developed specifically for pre-service teachers. However, it was not until the development of a scale for pre-service teachers that the studies on this subject matter diversified worldwide.

Teo (2011) developed the five-factor scale, which are perceived usefulness (PU), perceived ease of use (PEU), subjective norm (SN), facilitating conditions (FC), and attitudes towards use (ATU), "Technology

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1258 / *RumeliDE* Journal of Language and Literature Studies 2023.33 (April)

The Role of Technology Acceptance Model (TAM) in Developing Turkish Pre-Service EFL Teachers' Technology Adoption / Ölmez, R. & Kavaklı Ulutaş, N.

Acceptance Measure of Pre-service Teachers" (TAMPST) drawing from various theoretical frameworks introduced in information systems and technology acceptance by using three studies with 759 pre-service teachers. Subsequently, Teo (2015) performed another analysis on the technology acceptance with 387 pre- and 430 in-service teachers and proposed a new 7-point scale with seven variables which are PU, PEU, ATU, SN, FC, Computer Self- Efficacy (CSE), and Technological Complexity (TC). The results of the analysis revealed that all these seven variables were valid in explaining technology acceptance among both teacher groups, yet FC and TC were detected to be more significant in predicting technology acceptance.

Although the investigation of technology acceptance or technology integration had been a prominent research area in the Turkish context, far too little had been paid to the investigation of this subject matter with pre-service teachers under the TAM frameworks. In terms of educational technology acceptance and integration, there were few studies conducted with in-service teachers (Adıgüzel et al., 2011; Akar, 2019; Göktaş et al., 2008), and the participant groups of the studies with pre-service teachers were distributed among numerous departments (i.e., science, technical science, classroom teaching, Turkish, social studies, mathematics, pre-school, psychological guidance, English language teaching etc.) in Türkiye.

To illustrate, Özdamlı et al. (2009) investigated the attitudes of pre-service teachers from several departments such as Computer Education and Instructional Technology (CEIT), Teaching in Sport and Physical Education (TSPE), Turkish Language and Teaching (TLT) together with English Language Teaching (ELT), towards educational technologies and reported that participants from all branches had an agreement on the positive effect of educational technologies with no statistically significant gender difference. Similarly, Efe (2011) examined science pre-service teachers' beliefs and intentions of educational technology use in instruction and revealed a high correlation between educational technology experience and intention to use it in future classrooms. Furthermore, Koc (2013) inspected on the technology conceptions of 237 technical pre-service teachers in Türkiye through a metaphor analysis and highlighted that they had restricted conceptions, mostly centered on technical dimensions, albeit with no significant gender difference on educational technologies.

There had been few empirical investigations on the relationship between the technological/ computer competencies and the attitudes towards technology use among pre-service in the Turkish context. For example, Çetin et al. (2012) conducted research with 642 pre-service teachers from several departments in Türkiye. The researcher reported the technology competency level of pre-service teachers was at an average level and they had positive attitudes towards educational technology use in instruction. A more recent study inspected on the relationship between computer competence, attitudes towards computer-assisted education (CAE) and technology acceptance intention of 476 pre-service teachers from various departments within three dimensions of TAM (PU, PEU and perceived enjoyment), and found a statistically significant relationship among these three subjects. It was also reported in the study that three dimensions of the TAM had a significant relation with attitude towards CAE, PEU not being a determinant of attitudes towards CAE, and females were detected to have a higher levels of technology competence (Baturay et al., 2017). Lastly, Baydas and Goktas (2017) proposed a model for the analysis of pre-service teachers' information and communication technology (ICT) usage intentions in future lessons under the UTAUT framework. Their study acknowledged that PU, PEU and efficacy were intermediate factors in determining ICT usage intentions whereas they were all affected negatively by computer anxiety, which in turn, indirectly impacted BI.

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So far, technology acceptance, attitudes towards technology integration, and the technology competence of pre-service teachers in the Turkish context have been investigated as previously noted; however, they did not deal specifically with pre-service EFL teachers. Therefore, the number of studies on the technology acceptance of pre-service EFL teachers in Türkiye is scarce.

To elaborate, İlter (2015) analyzed the perceptions of pre-service EFL teachers and young learners on technology use qualitatively and reported that participants agreed on the positive effect of technology in language learning process. On the other hand, there were two other studies performed with 241 pre-service EFL teachers in Türkiye within the TAM framework. The first one (Bozdoğan & Özen, 2014) examined the level and competence of ICT usage and the factors having an impact on the ICT self-efficacy levels of pre-service EFL teachers in Türkiye. The study acknowledged that the ICT self-efficacy levels of most of the participants were high, and supportive and dynamic nature of ICTs were positively impactful on their ICT integration (Bozdoğan & Özen, 2014). The study also underlined that the knowledge and skills were the main determinants of ICT integration of pre-service teachers in their future teaching.

The second study (Kırmızı, 2014) investigated the technology acceptance of 213 pre- service EFL teachers in Türkiye within the TAM framework and revealed that pre- service EFL teachers had positive awareness of PEU, FC, attitudes toward computer use (ATCU) technological complexity, computer self-efficacy, and BI. It was also reported in the study that there were statistically significant differences between first and fourth grade students regarding PEU, FC, ATCU and computer self-efficacy. Lastly, PEU was detected not to be a determinant of BI, which is in line with the findings of Wong (2013), and PU to have a positive effect on ATU.

3. Methodology

This non-experimental study has a mix-method research design which includes the employment of qualitative and quantitative data analyses as a stand-alone survey provides limited data in refinement (Clough, & Nutbrown, 2012). More specifically, the research has a quantitatively driven design in which there are quantitative data at its core complemented with them to postulate on the findings in depth, and from a wider perspective (Johnson, 2001). Herein, quantitative data are utilized to reveal the Turkish pre-service EFL teachers' technology acceptance levels while qualitative data obtained from the open-ended questions given at the end of the survey to get their reflections and in tow employed to gain an insight regarding the perceptions of the Turkish pre-service EFL teachers' technology acceptance levels and the interplay among the constructs listed.

In the light of these, current research, addresses the following research questions:

1. What are the Turkish pre-service EFL teachers' levels of technology acceptance?

2. Is there a statistically significant difference of technology acceptance levels of Turkish pre-service EFL teachers in terms of age, gender and owning a personal computer?

3. How can you improve your Technology Acceptance and integration as a pre- service EFL teacher? As for your further suggestions, what are the ways to promote it?

3.1. Setting and participants

The research was conducted at the department of English Language Teaching at a state university in Türkiye during 2020-2021 academic year. All the students (assumed as pre-service teachers) in the

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The Role of Technology Acceptance Model (TAM) in Developing Turkish Pre-Service EFL Teachers' Technology Adoption / Ölmez, R. & Kavaklı Ulutaş, N.

department were invited to participate in the study; however, participation in the research was based on the principle of voluntariness.

Beyond question, whether the research method was employed qualitatively or quantitatively, sampling methods were demanded for maximizing efficiency and validity of the research. Thus, for sampling, convenience sampling method was utilized which was a quite common sampling method in second language studies (Mackey & Gass, 2005) as it provided researcher with a sampling group who were easy to access and met the criterion for the sample as a type of purposeful sampling designs (Johnson & Christensen, 2019).

Demographic information obtained from the participants regarding their age, gender, level of education, family income level, personal computer ownership, and frequency of web tools usage (i.e., always, sometimes, rarely, very rarely, never). The sample size of the study consisted of 94 participants in total studying at the department of English Language Teaching at a state university in Türkiye. Demographic information of the participants is listed as; of 94 participants in total 56 were female (59.6%), 26 were male (38.3%), and 2 were reported as non-defined (2.1%). The age distribution of the participants was ranged as 17-21 (n= 77), 22-26 (n= 12), and 27 and above (n= 5). The participants of the research consisted of 44 freshmen (46.8%), 26 sophomores (27.6%), 20 juniors (21.3%), and 4 seniors (4.3%).

It is also worth noting that all senior students in the department have taken the courses of BIL101 Information Technologies, EBB605 Instructional Technologies, and IDE201 Approaches to English Language Learning and Teaching, all of which are likely to have an indirect impact on the participants' responses to the questionnaires. To note more, junior students have taken BIL101 Information Technologies and EBB605 Instructional Technologies courses, and the sophomores have only taken BIL101 Information Technologies course.

As noted by other demographic variables in this study, in terms of family income level, participants were grouped as 1500-2500 (n= 15), 15 2600-3600 (n= 21), and 3600 and above (n= 53). Herein, 5.3% of the participants did not define their family income levels, though (n= 5). It was also noted that 85 of them (P= 90.4%) owned a personal computer whereas 9 of them (P= 9.6%) did not. Lastly, of 94 participants, the frequency of web tools usage was reported as always (n= 73, P= 77.7%); sometimes (n= 20, P= 20.3%), and very rarely (n= 1, P= 1.1%).

3.2. Procedures for data collection

Due to the restrictions of the worldwide pandemic situation, the quantitative data were not collected face-to-face at one sitting yet collected through an online survey created on Google through Google Forms. The online survey was shared with the participants through the agency of their instructors on Microsoft Teams, which was employed as a learning management system during the pandemic at the university.

The researchers attended the first 15 minutes of each online course for each level and were briefly explained the research topic. The data collection tools within the survey were introduced to the participants and responded to any possible questions of the participants regarding them. The consents of the participants were obtained before filling. After the introduction part, the participants were given probable time to fill in them under the provision of their course instructor(s) on voluntary basis. The

online survey was shared in the course groups on Microsoft Teams for absent students and they filled it after the course when they were available, as well.

Besides, students were invited to respond open-ended questions listed at the end of the survey regarding their personal opinions and beliefs, which constituted the reflective (qualitative) part of the study. The consents of the voluntary participants were obtained before filling. The data collection as an overall process was completed in two weeks in sum.

3.3. Instruments

For data collection, an online survey, which was consisted of five sections, was employed in the form of Google Forms. The instruments were explained in detail in the following sections; however, it was noteworthy to briefly mention them before mingling with the details of each.

The first section required demographic information of the participants, which were age, gender, level of education, family income level, personal computer ownership, and frequency of web tools usage. The second section was composed by the 5-point Likert type items, ranked from Strongly Disagree (1) to Strongly Agree (5), named as 'Technology Acceptance Measure for Pre-service Teachers' developed by Teo (2011) with 5 constructs and 16 items in sum. The items and constructs were adapted from distinctive theoretical frameworks used in information systems usage behavior, which were the Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), Theory of Planned Behavior (TPB), and Unified Theory of Acceptance and Use of Technologies (UTAUT) (Teo, 2011).

Reliability analysis was employed with an attempt to measure internal consistency of the instrument, from which the Cronbach Alpha coefficient was stipulated to be above .70 to be deemed as internally consistent in the field of Social Sciences (Mujis, 2004). The Cronbach Alpha coefficient of the instrument was calculated as .918 as illustrated in the table below. Additionally, split-half reliability analysis was also conducted to reaffirm the internal consistency through the results created from the two subsets of items by halves (n1= 8; n2= 8) and reported as .893 (r1) and .815 (r2).

The scale consisted of five factors: (1) perceived usefulness (PU), (2) perceived ease of use (PEU), (3) subjective norm (SN), (4) facilitating conditions (FC), and (5) attitudes toward computer use (ATCU). The final section of the survey utilized for data collection included a written open- ended question to be answered by the participants on voluntary basis. The main objective of collecting qualitative data in this research was to reflect on the perspectives of the participants on the subject matter in depth as the surveys alone were limited in providing broader perspectives and opinions of the participants (Clough & Nutbrown, 2012).

The questions were formed with an attempt to provide an insight on the perceptions of the participants in a more detailed and broader aspect. The open-ended questions also contributed to the researcher in terms of suggesting implications from an objective perspective. Thus, volunteer participants were asked to give short answers to the following question of "How can you improve your Technology Acceptance and integration as a pre-service EFL teacher? As for your further suggestions, what are the ways to promote it?"

The participants choosing to respond to these questions were informed that they were required to complete all if they chose to do so. Thus, there were no participant in the study who answered only one or two of the questions above. The qualitative data were also collected through an online platform

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through Google Forms as a supplementary part to the other instruments located at the end. Surely, the consent of the participants was attained before they gave answers to the questions, and they were informed about the anonymity and confidentiality of their answers. The answers were analyzed via thematic coding and the results were presented thereof.

3.4. Procedures for data analysis

The quantitative data were analyzed by the Statistical Package for Social Sciences (SPSS, Version 27.0). Detecting items throughout data entry, frequency analysis yielded no abnormality. There were neither reverse coded nor controlling items in the instruments. The emergent data showed that neither of the items did have a big impact on the reliability statistics; and thus, none of them was omitted.

The assumption of normality for the sample scale (n= 94) was analyzed via examination of the items within the scope of TAM as this study aimed to analyze participants' technology acceptance in pre-service EFL teachers' WPACK and CDL development. The test of normality was conducted to check if data were normally distributed or not. According to the results gained by the Kolmogorov- Smirnov test of normality, the factor list was spotted to be insignificant for each of the variables (i.e., gender, age, owning a personal computer) respectively with the p level above .05; thus, appropriate to run parametric tests. As the Kolmogorov-Smirnov test of normality confirmed normality, no other test (i.e., Test of Homogeneity) was conducted. To stipulate normal univariate distribution, the values for skewness should be between -2 and +2 whereas the values for kurtosis should be between -7 and +7 (Bryne, 2010). Correlatively, the values for skewness (= -1.368) and kurtosis (= 3.452) were considered acceptable, which also proved normality as an assumption. However, it was to be noted that there were some outliers revealed by the histogram chart with a slightly leptokurtic distribution in which the tails were little bit fatter since kurtosis was greater than +3. Yet, normality was enabled albeit for some outliers as the Q-Q Plots and histogram chart together with the appropriate sample size (N= 94) indicated so. Additionally, the range (= 63.00) was divided by six to see the expected standard deviation (= 10.50). The calculated standard deviation of the test was accepted as proportionate (SD= 10.31). The scores of mean (= 61.00), mode (= 62.00) and median (= 62.00) were either so close or equal to one another confirming the normality of the distribution as another assumption. In the light of these, it was stipulated that the total scores of TAM were normally distributed which favored the use of parametric tests in order to see the group differences.

To note, the results of the reliability tests in relation to the utilized instrument confirmed that the instruments were highly reliable (r above .80). Besides, descriptive statistics were used to mark demographic information of the participants (given under the heading of participants and setting). Independent samples t-tests and ANOVA were performed to analyze if specific differences blossomed across the participants in lieu of independent variables. To add with, correlations (both bivariate and partial) were used to explore the relationships among three frameworks mentioned so far.

Lastly, qualitative data were analyzed through thematic coding according to the grounded theory known as an inductive approach in qualitative analysis in which the data analysis results were inductive to a theory (Glaser & Straus, 1967). The themes emerging from the data were categorized according to occurancy frequency in the responses, and induced to a phenomenon, and the results were presented in detail.

4. Results

To reveal the technology acceptance level of the participants, frequency analysis was conducted, and means and standard deviations were presented. The results suggested that technology acceptance levels of the Turkish pre-service EFL teachers were moderately high (M = 3.81, SD = .64). Additionally, the descriptive component analysis of TAMPST was operated and mean scores for each construct were presented.

Accordingly, the results indicated that the construct with the highest mean score was PU (M = 4.10, SD = .79) and the lowest was FC (M = 3.36, SD = .74). According to this result, it could be stipulated that technology acceptance levels of the Turkish pre-service EFL teachers was mostly affected by perceived usefulness, foregrounding the fact that when pre-service EFL teachers found a technology useful, they were more likely to accept and use it. Herewith, the factor having a slightly lower impact on the participants' technology acceptance was facilitating conditions, implying that the participants were likely to accept and use a technology even when the facilitating conditions were not fully met, yet the usefulness of the technology was perceived by the users.

Lastly, the component based descriptive statistics analysis of TAMPST was conducted to uncover the three highest and lowest mean scores of each component. The component based descriptive statistics of TAMPST reported the highest mean score as the first statement "Using computers will improve my work." (M = 4.34, SD= .88) and the lowest as the eighth statement "When I need help to use computer, a specific person is available to provide assistance." (M = 3.05, SD= 1.15), pointing that the Turkish pre-service EFL teachers believed that the use of computers would contribute to their work whereas they were slightly prone to suppose that they might not be able to get help with computer usage from a specific person whenever they needed. This result was in line with the previous mean score analysis of survey's construct(s) highlighting the constructs with the highest and the lowest mean scores as PU and FC.

With an attempt to uncover whether there was a statistically significant difference in technology acceptance levels of the Turkish pre-service EFL teachers in terms of age, a one-way analysis of variance (ANOVA) test was performed. The ANOVA test results demonstrated that there was no statistically significant difference at the p<.05 level in technology acceptance [F (2, 91) = .120, p = .887] levels of the Turkish pre-service EFL teachers in terms of age. This result could be attributed to the distribution of sample group's age as 81.9% percent was between 17-21 years old and only 5.3% was 27 years above. Thus, the age variable did not have a significant effect on the results of this research.

Besides, to reveal whether there was a statistically significant difference in technology acceptance levels of the Turkish pre-service EFL teachers in terms of gender, an independent-samples T-test was conducted to compare the gender groups. The results of the independent-samples T-test noted that no significant differences at the p<.05 level were found in technology acceptance of females (M = 3.79, SD= .65) and males (M= 3.80, SD= .64); t(90) = -.050, p= .960.

One more to note, to reveal whether there was a statistically significant difference in technology acceptance levels of the Turkish pre-service EFL teachers in terms of personal computer ownership, an independent-samples T-test was employed. According to the independent-samples T-test results above, no significant differences at the p<.05 level were found in technology acceptance level of owning a personal computer (M= 3.80, SD= .65) and not owning (M= 3.88, SD= .57); t(92) =.342, p= .733. This could be resulting from the fact that 90.4% of the participants stated that they owned a personal

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1264 / *RumeliDE* Journal of Language and Literature Studies 2023.33 (April)

The Role of Technology Acceptance Model (TAM) in Developing Turkish Pre-Service EFL Teachers' Technology Adoption / Ölmez, R. & Kavaklı Ulutaş, N.

computer. Besides, the magnitude of the differences in the means was not calculated with eta squared (η2) since the results were insignificant.

Lastly, as for the analysis of the Turkish pre-service EFL teachers' beliefs on the development of their technology acceptance, the participants were asked an open-ended question to report their perceived understandings. The responses given the addressed open-ended questions at the end of the questionnaires were transferred to Excel from Google Forms and was analyzed through thematic analysis. However, the number of responses given to the open-ended questions were detected as four answers for the first and the second questions, and three answers for the third question. The participation in the qualitative data collection was based on voluntariness of the participants, and as the data were collected through online forms due to the restrictions resulted by the Covid- 19 pandemic, the number of responses given to the open-ended questions could not be regarded to reach at a satisfactory level, albeit noted. Each of the responses was noted as given by the participants without any correction regarding grammar, word choice, coherence, or typo, and the participants' names were kept anonymous for the sake of individual's confidentiality; and thus, labelled as P1, P2, P3, and the like ('P' as the abbreviated form of 'participant').

The responses given to the open-ended questions were analyzed based on the grounded theory (Glaser & Strauss, 1967) where the most occurring themes were categorized an induced to phenomenon. Besides, as the responses of the participants were not totally different in terms of meaningful connections on the subject matter, they highlighted different points. That was to say, there was not a common frequent occurring theme that could be categorized as a "theme", yet the responses could be induced to a common subject.

As for the question of "How can you improve your technology acceptance and integration as a pre-service EFL teacher? What are the ways to promote it?", there were four responses given by the participants:

> P1: *"Familiarizing yourself with the usage of computers and web should be enough because accessing information has never been easier."*
>
> P2: *"I think we can improve our web pedagogical content knowledge by watching videos and joining online communities."*
>
> P3: *"Certainly, this information should be given to students comprehensively under a lesson."*
>
> P4: *"People are inspirations. This, I would observe and learn from other teachers and try to find different ways to implement a specific content."*

The participants' responses presented above indicated that the opinions and beliefs of the pre- service EFL teachers varied on the basis that each of them had a different approach and perspective on the subject matter. While some participants believed that their technology acceptance and integration could be promoted through self-effort such as providing self-familiarization with computers or being active in online communities, some others agreed that it could be taught under a curriculum as a part of their pre- service teacher training.

5. Discussion

Regarding the sub scales of TAMPST, the average scores of sub-levels of PU and FC are calculated as 4.10 and 3.36 respectively. PU sub-levels have the highest average score and FC sub-level have the lowest average score. Finally, the highest and lowest scores are found as 'Using computers will improve my work' (M= 4.34) and 'When I need help to use computers, specialized instruction is available to help me'

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respectively (M= 3.57). These levels have expected pre-service teachers as more technology-oriented by belonging to Z generation who are born into a digital world. Also, these results have supported previous research findings regarding teachers' having higher levels of technology acceptance (Akarsu & Güven, 2014; Hu et al., 2003; Teo & Ursavas, 2012).

In the next step, data related to technology acceptance levels of the Turkish pre- service EFL teachers in terms of their ages are analyzed. The findings of ANOVA test have indicated that there exist no significant differences in terms of age groups regarding technology acceptance. These results can barely justify that age intervals are not high enough and the number of the participants in each age group are different which may not get results with significance. Such a result is surprising considering previous research findings (Kavanoz et al., 2015; Yesiltas, 2016) as they have asserted that age is a critical independent variable that affects web pedagogical content knowledge of the teachers.

Besides, Venkatesh et al. (2003) have found out indirectly that age is one of the demographics that promotes using behavior via behavioral intention, facilitating conditions, social influence, effort expectancy and performance expectancy. Age, in addition to experience, is considered as a very important factor and demographic feature that positively affects the levels of technology acceptance (Wang & Chen 2009) since young generations easily manage to create a higher understanding and acceptance of digital tools and technologies compared to the older counterparts.

The research question is also related to gender to check whether the Turkish pre- service EFL teachers are differing with their levels of technology acceptance. The findings of the data analysis showed that there were no statistically significant differences in terms of gender within the scope of technology acceptance levels of the Turkish pre-service EFL teachers. This result can be resulted by the fact there were more female teachers than male teachers. In the same vein, the result is not supported with some previous studies as they (Morris & Venkatesh, 2000; Nazzal et al., 2021; Trocchia & Janda, 2000) have found that gender does not play a role in any way to improve digital literacy. On the other hand, compared to other previous research findings (Li, 2010; Venkatesh et al., 2003), such a result is surprising as they (Venkatesh et al., 2003) have also found out that gender is indirectly accepted as one of the demographics that promote using behavior via behavioral intention, social influence, effort expectancy, and performance expectancy. To better understand how gender affects decision-making and buying behavior, several research on the acceptability of new IT systems have been conducted. These studies have found that different gender types evaluate different IT characteristics and uses (Kavanoz et al., 2015; Morris & Venkatesh, 2000).

In the next part, the Turkish pre-service EFL teachers' personal computer ownerships are evaluated whether is statistically significant in lieu of their technology acceptance levels. The findings have showed that no significant differences exist between having a personal computer and their technology acceptance levels. However, it should be noted that the percentage of participants with personal computer (P= 95%) was much more than those with no personal computer. Since compared to some of the findings in the previous studies (Varma, 2010), it is found that experiencing and using personal computers affects technology acceptance intentions in two different ways, levels or areas including mediated and/or direct effects. Specifically, being proficient in a technology is expected by the gathered benefits of the acceptance of a computer and/or other technologies; henceforth, there is a direct correlation between owning technology and technology acceptance. This topic should be investigated in more detailed way to identify the relationships between owning, using, and being proficient on technology together with the levels of technology acceptance.

1266 / *RumeliDE* Journal of Language and Literature Studies 2023.33 (April)

The Role of Technology Acceptance Model (TAM) in Developing Turkish Pre-Service EFL Teachers' Technology Adoption / Ölmez, R. & Kavaklı Ulutaş, N.

Overall, our findings supported previous research findings to some extent. Although some of our expectations were not satisfied, they could be justified by somehow limited sample of the study. For example, although age and gender were two important and effective demographic features for technology acceptance (Baturay, 2017), our findings did not support it which was in line with some other studies (Koç, 2011; Özdamlı et al., 2009; Sang et al., 2010; Teo et al., 2015), though. In addition, owning a personal computer was not found as effective as expected because almost all the participants had personal computers and there weren't any participants who could be compared with them, which contradicts the study result of Arabacıoğlu and Dursun (2015) and Ata and Yıldırım (2019). On the other hand, most of the findings were aligned with the previous studies. Teachers' levels of technology acceptance were found high (Baturay et al., 2017; Bozdoğan & Özen, 2014; Wong, 2013) as they were considered as the members of Z generation, and they were born into the digital world (Kavaklı Ulutaş & Ölmez, 2021; Ölmez & Kavaklı Ulutaş, 2023).

In the final part, the Turkish pre-service EFL teachers' reflections within the scope of technology acceptance are qualitatively investigated from the structured interviews conducted with them by means of an open-ended question listed at the end of the Google Forms. Specifically, they are asked to provide their perspectives about how to improve technology acceptance and integration as being future EFL teachers (Hancı-Azizoğlu & Kavaklı Ulutaş, 2021a; Hancı-Azizoğlu & Kavaklı Ulutaş, 2021b). According to the previous findings, instructors have had positive opinions on the value, practicality, context, and usage of digital technology in EFL courses.

The findings of the qualitative part have showed that the Turkish pre-service EFL teachers have indicated four typical responses to suggest how the levels of technology acceptance and integration can be accomplished as a future teacher. Firstly, it is noted by the Turkish pre-service EFL teachers that they should familiarize themselves with computer usage and web tools, and thus, they can access data and retrieve information in a much easier way. Secondarily, they purport that they should join online communities and watch videos to improve their web pedagogical content knowledge. Another suggestion is about giving related information which should be instructed to the learners in language classes. And finally, they suggest that learning from their colleagues and utilizing similar and useful approaches and techniques from them is of vital importance.

Beyond question, teachers' self-efforts play an important role in terms of enhancing teachers' technology acceptance and integration levels and skills. Considering previous studies and their findings, these suggestions are aligned with the previous research (Mouza et al., 2014) since joining social technology related communities and taking opportunities to learn technological advances as well as understanding technology can boost their technology awareness and technology acceptance together with their integration efforts. Additionally, they suggest integrating into groups and related professional development courses which can help teachers and teacher candidates increase their technology acceptance. For instance, such courses can include a semester-long content related to the current technologies utilized in language classrooms such as web 2.0, internet sources, concept mapping software, and interactive manipulatives. Thereof, especially, learning practices of technology tools enhance teachers' understanding of technology and increase their levels of technology acceptance efforts.

6. Conclusion

In today's world and education systems, the understanding of technology and technology literacy are necessary as the important skills for learners. Teachers as being at the central position in the field of education for the goodness of next generations, it is essential to possess higher understanding of related skills, knowledge, and perspectives.

Accordingly, the findings of the current research revealed that pre-service EFL teachers' technology acceptance levels could be improved by providing them more technology and web-oriented classes under the supervision of their technologically competent professors and educators, implementing technology and digitally oriented courses into the teacher education curricula, and guiding and mentoring them with professors being technologically competent with a high level of digital literacy. To be able to raise awareness of the pre-service EFL teachers in terms of technology acceptance, they could have given more opportunities during their pre-service education where they can practice their digital skills with the help of web tools. They could also be involved in different educational programs or courses focusing on their educational development in addition to their curricular educational practices, as future Z-generation teachers.

However, it should also be noted that the current study was limited to the following conditions in data collection and data analysis processes. Firstly, the participants of the study were limited to pre-service EFL teachers (as to the researcher's convenience), which might hinder the comparison of pre- and in-service EFL teachers. The findings of the study were limited to the responses and comments from the participants. As majority of participants (P= 95%) did have a personal computer (meaning almost all the participants had personal computers), owning a personal computer was not employed as an independent variable to be statistically tested; albeit estimated as not statistically significant. The findings of the study were limited to the results of descriptive and inferential statistics according to the responses gathered from the participants. Moreover, the COVID-19 pandemic period restricted the qualitative data collection process as face-to-face interaction was somehow limited and the researcher herself did not find appropriate time blocks for seeing the participants at hand. In response to that, the participants might not be so eager to participate in the qualitative part (which was composed of open-ended questions; and thus, time consuming) where the COVID-19 pandemic period restricted the availability of participants even for convenience sampling although the number of participants was reported to be 94.

Based on the results addressed, the following recommendations are acknowledged to improve the quality of future studies. The number of participants should be more than the current study to compare groups and participants with proper statistical tools and estimations. The sample groups could be selected from both pre-service and in-service teachers within the perspective of a comparative analysis in between. Owning a personal computer should be investigated in more detailed way to identify the relationships between owning, using, and being proficient on technology together with the levels of technology acceptance as the literature reported so, which might affect the results in a different way. The participants could be face-to- face interviewed to have a better understanding of their perspectives toward technology and its usage in the language classrooms. To eliminate social desirability as an effect to hinder the reliability and validity of the results, a more robust way of understanding if pre-service EFL teachers' own belongings (knowledge and skills) could be employed, or they might report themselves with the highly desired values that an EFL teacher should have in the future to be having web pedagogical content knowledge embellished with technological and critical literacy. Herein, in-class

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1268 / *RumeliDE* Journal of Language and Literature Studies 2023.33 (April)

The Role of Technology Acceptance Model (TAM) in Developing Turkish Pre-Service EFL Teachers' Technology Adoption / Ölmez, R. & Kavaklı Ulutaş, N.

observations might be executed to identify whether they could implement them in real classroom environment.

Acknowledgment

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1270 / *RumeliDE* Journal of Language and Literature Studies 2023.33 (April)

The Role of Technology Acceptance Model (TAM) in Developing Turkish Pre-Service EFL Teachers' Technology Adoption / Ölmez, R. & Kavaklı Ulutaş, N.

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İngilizce Öğretmeni Adaylarının Teknoloji Benimsemelerini Geliştirmede Teknoloji Kabul Modeli'nin (TKM) Rolü / Ölmez, R. & Kavaklı Ulutaş, N.

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1272 / *RumeliDE* Journal of Language and Literature Studies 2023.33 (April)

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