An Investigation of Technological Pedagogical Content Knowledge (TPACK) of Pre-service English Teachers: A Case Study

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ABSTRACT

This research attempts to investigate the perceptions of pre-service EFL (English as a foreign language) teachers studying in the English Language department in the University of Duhok, regarding their Technological Pedagogical Content Knowledge (TPACK). It also aims to explore their perceptions about how well the program they attend to contributes to their TPACK, as well as the suggestions of the pre-service EFL teachers and the instructors of the department for further development of pre-service teachers' TPACK. The study has followed a mixed-methods approach utilizing both quantitative and qualitative data. For the quantitative data, Başer et al.'s (2016) TPACK-EFL survey has been used to gather data from 72 pre-service teachers (46 male and 26 female). To achieve the aims of the study and answer its questions, qualitative data were gathered through interviews conducted with ten pre-service teachers and five instructors. The results of the study have demonstrated the participating pre-service teachers' agreement on possessing quite a bit of all seven TPACK components. When each component of TPACK is considered, the most important components were found to be Content Knowledge (CK) and the least important one was Technological Pedagogical Content Knowledge (TPACK). When looked at from the 'gender' perspective, the study findings reveal that female participants claim the possession of Content Knowledge (CK), Technological Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK), and Technological Pedagogical Content Knowledge (TPACK) more than their male counterparts. Male participants, on the other hand, were found to have the Pedagogical Content Knowledge (PCK) more than female participants, based on their responses to the survey. The findings showed no significant differences between respondents according

to their age toward dealing with the TK, CK, PK, PCK, TCK, TPK, and TPACK. Regarding how well the program at the University of Duhok helped the pre-service teachers develop their TPACK, the results indicated that the contribution of the department is usually limited with some tools such as PowerPoint used in class presentations. The participants highlighted the need for more focused training not only for the pre-service teachers but also for the instructors in order to enhance the abilities, skills, and technology awareness of the pre-service teachers.

Keywords: Technological Pedagogical Content Knowledge (TPACK), English as a Foreign Language (EFL), Pre-service Teachers of English, University of Duhok

ÖZ

Bu araştırma, Duhok Üniversitesi İngilizce Bölümü'nde öğrenim gören öğretmen adaylarının Teknolojik Pedagojik Alan Bilgileri (TPAB) ile ilgili algılarını incelemeyi amaçlamaktadır. Çalışma buna ek olarak, katılımcıların Teknolojik Pedagojik Alan Bilgilerine eğitim gördükleri programın ne ölçüde katkı sağladığına ilişkin algılarını ve söz konusu Teknolojik Pedagojik Alan Bilgisinin daha da geliştirilmesi için hem kendilerinin hem de bölümde ders veren öğretim elemanlarının önerilerinin araştırılmasını da amaçlamaktadır. Çalışma, hem nicel hem de nitel verileri kullanan karma yöntem yaklaşımını izlemiştir. Nicel veri, 72 (46 erkek, 26 kadın) öğretmen adayından Başer ve ark.'nın (2016) TPACK-EFL anketi kullanılarak elde edilmiştir. Ayrıca on öğretmen adayı ve beş öğretim görevlisi ile mülakat yapılarak nitel veri de toplanmıştır. Çalışmanın sonuçları, katılımcı öğretmen adaylarının Teknolojik Pedagojik Alan Bilgisini oluşturan yedi bileşeninin bir çoğuna sahip oldukları konusunda hemfikir olduklarını göstermiştir. TPAB'ın her bir bileşeni dikkate alındığında, en önemli bileşenin Alan Bilgisi (AB) ve en az önemli olanın ise Teknolojik Pedagojik Alan Bilgisi (TPAB) olduğu görülmüştür. 'Cinsiyet' perspektifinden bakıldığında araştırma bulguları, kadın katılımcıların, erkek katılımcılara oranla Alan Bilgisi (AB), Teknolojik Alan Bilgisi (TAB), Teknolojik Pedagojik Bilgi (TPB) ve Teknolojik Pedagojik Alan Bilgisine (TPAB) sahip olduklarını daha fazla iddia ettiklerini ortaya koymaktadır. Erkek katılımcıların ise ankete verdikleri yanıtlara göre Pedagojik Alan Bilgisine (PAB) kadın katılımcılardan daha fazla sahip oldukları görülmüştür. Bulgular, katılımcıların yaş grupları ile Teknolojik Pedagojik Alan Bilgilerine ilişkin algıları arasında anlamlı bir ilişki göstermemiştir. Duhok Üniversitesi'ndeki programın öğretmen adaylarının Teknolojik

Pedagojik Alan Bilgilerini geliştirmelerine ne kadar yardımcı olduğuna ilişkin sonuçlar, bölümün katkısının genellikle sınıf sunumlarında kullanılan PowerPoint gibi bazı araçlarla sınırlı olduğunu göstermiştir. Katılımcılar, öğretmen adaylarının yeteneklerini, becerilerini ve teknoloji farkındalıklarını artırmak için sadece öğretmen adaylarına değil aynı zamanda öğretim elemanlarına da yoğun ve uygulamaya dönük eğitimlerin düzenlenmesine gereksinim olduğunu vurgulamışlardır.

Anahtar Kelimeler: Teknolojik Pedagojik Alan Bilgisi (TPAB), Yabancı Dil Olarak İngilizce (EFL), İngilizce Öğretmen Adayları, Duhok Üniversitesi

DEDICATIONS

To my beloved family

ACKNOWLEDGEMENTS

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LIST OF ABBREVIATIONS

AJET	Advanced Joint English Teaching
BA	Bachelor of Arts
CALL	Computer-assisted Language Learning
CD	Compact Disk
CK	Content Knowledge
CU	Continuous Usage
EFL	English as a Foreign Language
ELD	English Language Department
ELT	English Language Teaching
FL	Foreign Language
FLL	Foreign Language Learning
I	Instructors
ICDL	International Computer Driving License
ICT	Information and Communication Technologies
KRI	Kurdistan Region of Iraq
L1	First Language
L2	Second Language
LMS	Learning Management System
MALL	Mobile-assisted Language Learning
MoHE	Ministry of Higher Education
PBL	Project Based Learning
PC	Personal Computer
PCK	Pedagogical Content Knowledge

PDA	Personal Digital Assistant
PEU	Perceived Ease of Use
PS	Pre-service Teachers
PU	Perceived Usefulness
SLTE	Second Language Teacher Education
SMS	Short Message Service
SPSS	Statistical Package for the Social Sciences
TCK	Technological Content Knowledge
TELL	Technology Enhanced Language Learning
TESOL	Teaching English to Speakers of Other Languages
TK	Technological Knowledge
TPACK	Technological Pedagogical Content Knowledge
TPACK-EFL	Technological Pedagogical Content Knowledge - English as a Foreign Language
TPK	Technological Pedagogical Knowledge
TRA	Theory of Reasoned Action
UK	United Kingdom
UoD	University of Duhok
VLE	Virtual Learning Environment

Chapter 1

INTRODUCTION

In this chapter first the background of the study is given. Then, the problem statement, the aim of the study and research questions are presented. The chapter ends with the significance of the study.

1.1 Background of the Study

Teachers have always been in search of ways to facilitate their learners' learning, and for this purpose they have utilized the available educational tools that they are provided with, such as the blackboard, and overhead projectors, and in the last decades, information and communication technology (ICT) such as computers, tablets, smart phones, and virtual learning environments (VLE). Nowadays, teachers are trying to investigate the most ideal route for their students to become engaged with the process of learning by planning a wide range of online materials to be utilized for students inside and outside the classroom, while they are at home, on the train, at work-place and even while they are having a cup of tea. Computer-Assistant Language Learning (CALL) and Mobile- Assistant Language Learning (MALL) innovations have made substantial changes in the teaching field. The attitude of instructors and students towards the utilization of innovation is uprising. Learners are motivated to use technology as it makes them independent and autonomous learners.

The rapidly developing field of education technology has shown the need for teachers to be qualified to use such rapidly growing instruments in their classrooms. Some

teachers may feel disadvantaged as they can consider themselves 'digital immigrants', i.e. born before the spread of the digital technology (Prensky, 2001), who have digital natives to teach, who are all native speakers of computer, video and Internet digital language (Prensky 2001). Unless they change themselves and start learning how to catch up with the speed of technology around them, these teachers may become redundant no matter how well equipped they are with other aspects of teacher knowledge. The Knowledge of Technical Pedagogical Content (TPACK) is the new form of knowledge that all teachers need to teach digital natives.

Mishra and Koehler created TPACK in 2006 to clarify the nature of knowledge required by teachers to effectively teach through technology. The theory is based on Shulman's definition (1986) of "Content Knowledge" (CK) and "Pedagogical Knowledge" (PK) of teachers (i.e., basic knowledge of the topic they teach) as well as (knowledge concerning how to teach, including basic methods of teaching). Also established in 1986 was the Pedagogical Content Knowledge (PCK), a combination of CK and PK, which teachers require in order teaching their subject matter effectively? The PCK did not provide technical expertise, Mishra and Koehler (2006) realized. Therefore, technology was added for PCK, so that a TPACK framework was developed that emphasized the links, interactions and constraints within the three fields of knowledge that teachers work.

Having technology as an independent knowledge set presents challenges, but teachers may incorporate technology in their classrooms' content and pedagogy when understanding the TPACK system. The incorporation would make it easier for students to learn, as the topic to be learned is more accessible. Mishra and Koehler (2006) propose that TPACK direct curriculum creation and teaching and change the way

teachers organize their daily teaching so that overlapping knowledges are generated and built to give their students the best learning environment.

In order to assess teachers' TPACK, most commonly surveys are used. Several survey studies were established for TPACK to be accurate and reliable (e.g. Archambault & Barnett, 2010; Chai, Koh, & Tsai, 2010; Koh, Chai & Tsai, 2010; Sahin, 2011; Schmidt et al., 2009; Yurdakul et al., 2012). Nonetheless, the surveys cover more general or multiple areas of content rather than particular fields like teaching English as a Foreign Language (EFL). Baser, Kopcha, and Ozden (2016) have established one of the most popular EFL specific TPACK surveys, which will be explained in detail in Chapter 2.

Before proceeding to the statement of the problem, it seems necessary to introduce the education system in the Kurdistan Region of Iraq (KRI). Since the end of the Gulf War in 1991, the education system in Kurdistan region of Iraq (KRI) has undergone several changes, when the Kurdish government decided to implement a number of reforms for the development of education. Therefore, many universities, institutions, and schools were opened. In 1991 there were 1320 schools in KRI area but now the number of schools in KRI exceeds 3500 schools (Sofi-Karim, 2015).

The Kurdish language belongs to the Indo-European language family. Not necessarily for that reason alone, but in general Kurdish people have a rather positive attitude towards learning English (Sofi-Karim, 2015). The Iraqi northern Kurdish regions have been able to achieve wide-spread autonomy in the no-fly zone enforced by the U.S. and coalition forces during this time since the beginning of 1991. Kurdish people have tried different ways to learn English to communicate with foreigners, to let their voice heard, although Arabic is also taught in schools, many people want to learn English

instead of Arabic (Harb, 2008). Some people do not even have any desire to learn Arabic because of political reasons, but still for religious reasons Kurdish people are learning Arabic because 94% of Kurdish population is Muslim (Sofi-Karim, 2015). English language learning starts in the kindergarten while teaching Arabic starts at the beginning of grade four (Sofi-Karim, 2015).

In the KRI area learning Kurdish and English language is more than that of Arabic from grade 1 primary school to grade 9 secondary school lower level. However, from grades 10 to 12 secondary school higher level, the same teaching hours are assigned to both Kurdish and Arabic with greater hours to English. In KRI, the educational system uses the classification K-12, and the grades in basic education are 1-9. Basic schools are generally divided into two groups: primary school grades 1-6, and lower secondary school grades 7-9, and grades 10-12 secondary school higher level. In some schools in KRI girls and boys are educated together and in some locations schools are segregated; it all depends on the availability of schools and numbers of students in those areas (Khoshnaw, 2014).

Many people in KRI want to learn English for many different reasons such as study, economy, music, educational purpose, travel, films and communicational technology with the outsiders; therefore, the attitude of the Kurdish people towards learning the English language has been significantly positive since all the above mentioned reasons motivate the nation to learn the English language (Ali, 2012). As a reaction to this positive attitude, many schools have been opened in KRI with all the instructions in English. Examples of such schools are British International Kurdistan Schools (Nursery Age 3-5, Basic Grades 1-9), American International School in Kurdistan, Classical Medes School (Kindergarten through Grade 12) and Choueifat International

School (KG1-12). Also, it is important to mention that the education in KRI is free from the kindergarten to the university. Even if some students live in rural areas and want to study at university, the university provides them with free accommodation and some other expenses as well. However, at the moment there are some policy changes at all universities in KRI. Students with low achievement or those who want to study at evening classes, or those who desire to study in a better department, they have to pay tuition fees, and otherwise, education is free (Sofi-Karim, 2015).

The government of Kurdistan Region of Iraq (KRI) has tried a new way to elevate the English language to another level after the invasion of Iraq in 2003. For this purpose, the government established a new English curriculum from grade one to grade twelve for all schools in 2007. This new curriculum, called Sunrise, is based on the communicative language teaching approach where the materials of the program included a course book, work book, CDs and teacher book. They were written and published in the UK by Macmillan Publication. The course book has many activities connected to listening, speaking, reading, writing and lots of stories and grammatical structures. The Sunrise course would give students the opportunity to become autonomous, but many teachers claimed that the program is not up to their standards because it does not provide students with fluent and correct English language skills, and students typically receive low marks in examinations (Vernez et al., 2014). Therefore, teachers believed the program has some weaknesses and the government should make some changes to the curriculum. Only a handful of public high school graduates can communicate in English intelligently (Sofi-Karim, 2015). The performance of the students on national English tests is below expectations. For example, the results of the national tests of 2008 grade 9 suggest that about one-third of students have not passed English, receiving grades of less than 50 percent, which is

the passing grade. More than 5 per cent of the students scored in English above 85 per cent (Vernez et al., 2014).

In higher education at universities in KRI, like in the previous stages, three languages namely Kurdish, English, and Arabic are taught but the English language is rather more important subject for the university students in all departments across the region.

1.2 Statement of the Problem

The use of technology especially in foreign language classrooms has many benefits. As emphasized in the related research, technology motivates and engages the students (Kurt et al., 2014; Kwangsawad, 2016; Oz, 2015), which appears to be the major reason for using it. It has also been recorded that students take greater responsibility for their own learning using technology and thus becoming more autonomous learners (Clifford, 2006; Qinhai, 2005). Regardless of these advantages of technology-integrated education, all English language teachers are required to be trained with sufficient knowledge of how to use technology in their classrooms. Although individual teachers may take the initiative to become more competent in using technology for pedagogical purposes, this is mostly the responsibility of teacher education programs where pre-service teachers are educated. There are a variety of studies in the related literature that detail how teacher education systems accommodate TPACK in their curricula and how pre-service teachers perceive it (Bostancıoğlu & Handley, 2018; Mahdum, 2015; Turgut, 2017; Wulandari, 2019). However, to the researcher's best knowledge there are no studies carried out in Iraq's Kurdistan region to investigate the perceptions of their TPACK's pre-service Foreign Language (FL) teachers.

1.3 Aim of the Study

Based on the above-mentioned issue, this study aims to investigate the perceptions of EFL (English as a Foreign Language) pre-service teachers studying in the Department of English Language at Duhok University regarding their TPACK. It also aims to explore their perceptions about how well the ELT teacher education program contributes to their TPACK, and their suggestions for improvement, as well as the suggestions of the instructors in the department.

1.4 Research Questions

The purpose of this research is to answer the following questions of the study:

1. What are the pre-service EFL teachers' perceptions as regards their current technological pedagogical content knowledge (TPACK)?

2. What are the pre-service EFL teachers' and instructors' perceptions as regards the effect of the teacher education program on pre-service teachers' TPACK development?

3. What are the pre-service EFL teachers' and instructors' suggestions for further development of pre-service teachers' TPACK?

1.5 Significance of the Study

This study is significant in many ways. First of all, As far as the researcher knows, this is the first study to examine the TPACK of EFL pre-service teachers in Kurdistan region of Iraq. In that sense, it will be a guide study for future research studies on similar topics.

Secondly, by means of the survey and the interviews to be administered, the participants are expected to become more familiar with their need of technology inside

and outside the class and to know how TPACK will offer benefits to them as prospective teachers of English.

Third, the results of this study that provide valuable feedback for the English Language department's instructors and administrators to become more acquainted with their students' TPACK needs (i.e., pre-service EFL teachers), as well as the program's strengths and limitations in terms of its contribution to the TPACK students. Based on this input, the department may take some decisions to improve not only the infrastructure of the department but also the pedagogical practice of the instructors to contribute more to the pre-service teachers' TPACK. Furthermore, the findings of this research may help to improve students' learning and teachers' teaching for all of the departments in the University of Duhok in general.

In fact, the timing of this study matches with an initiation of the Ministry of Higher Education (MoHE) in Kurdistan Region of Iraq (KRI). Emphasizing that technology is very important in the twenty-first century as many things are becoming digitalized, the KRI finds it necessary to implement a program called International Computer Driving License (ICDL) to enhance teachers' technological skills in their teaching career in 2010. Therefore, all teachers are expected to take part in this program to gain inside the classroom knowledge about using computer. In that sense, it is also possible to share the findings of the present study with the course planners.

1.6 Summary

The chapter presented background information on the value of knowledge of technical pedagogic content (TPACK) for English language teachers. It also outlined the problem statement, study objective, research questions and study significance.

Chapter 2

REVIEW OF LITERATURE

This chapter provides an overview about the use of technology in learning and teaching a foreign language, specifically the English language, focusing on Computer-assisted Language Learning (CALL) and Mobile-assisted Language Learning (MALL). Then, it introduces the teacher knowledge and the knowledge base of teaching, which includes Technological Pedagogical and Content Knowledge (TPACK). Lastly, the previous studies related to TPACK are presented at the end of the chapter.

2.1 The Use of Technology in Language Learning and Teaching

Technology in every era, past and present, has always permeated into all aspects of our lives, including instructive settings. Over the last 15 years of technology, smartphones, computers, and the internet have been utilized in all parts of lives, including shopping, media, communication tools, and education. Currently, information technologies are all the more amazing assets to educate, motivate, and make the subjects more fascinating in the present schools. Use technologies such as blogs and wikis, audio and video resources in language classrooms has created enormous communicative opportunities for learners to use the language meaningfully, as well as collaboratively develop skills with other learners.

The integration of technology into language classrooms was first heard in mid-1980 with the term CALL (computer-assisted language learning) (Chapelle, 2001), and it has been around since then. According to Warschauer and Healeym (1998), CALL is

divided into three different compounds according to language learning approaches: i) behavioristic CALL, which is based on behaviorism, ii) communicative CALL, which is based on cognitivist and communicative language learning, and finally, iii) integrative CALL, which is based on social cultural theory of learning. Another view about the main focus of CALL is that it is connected with task design, software, and learners (Chapelle & Jamison, 1986). Both learners and teachers benefit from CALL and its components in learning and teaching pronunciation, lexical items, grammatical structures, reading comprehension, listening, culture, and communication skills (Rahimi & Yadollahi, 2010).

Computer-based materials are online collections of many resources made for language learning process, which are accessible by the learners to progress themselves for further education whenever they want and wherever they are, and many scholars believe that the costs of those materials are cheaper and beneficial (Chia, 2007; Lai & Gu,2011). Also, many software programs are available online. Learners, through e-learning system, can download programs and install them to their computers and study on the material if they are connected to the Internet. Therefore students do not have to work in a laboratory or classroom. Students can learn through the e-learning system because they receive feedback from their teachers through computers and interact with their friends, and can enjoy learning a target language in their convenient time and place in a free virtual environment. Many teachers are trying to develop this method for their students to use a computer for a target language learning in a friendly environment and try to support them to became independent learners and solve their own problems. Furthermore, teachers provide online help to students whenever/wherever they need (Lee, 2012). Yet, it should be remembered that this approach may have some negative points as well because to work through computer

technology to learn a language may not work for all ages; many learners may feel lonely and isolated, so they may want to be in the classroom to see other students and teachers face to face (Grob & Wolff, 2001; Lai, Shum & Tian, 2016; Lee, Yeung & Tiffany, 2016; Lee, Cheung, Wong, & Lee, 2013; Lu, 2010; Van Waes, Van Weijen & Leijten, 2014).

MALL, which stands for Mobile-assisted Language Learning, is another well-known and often used term. MALL is the use of mobile phones and other portable devices for the study of languages. The ubiquity of the mobile phone is a key fascination of mobile-learning. In other words, due to its size, the mobile technology can be carried everywhere in people's pockets. There is no requirement for the learners to sit in a classroom or in front of the computer for this portable device to have access to the learning materials or activities. It offers unparalleled opportunities to the learners in listening, reading, writing and speaking in the target language, either as self-study or with others (Kukulska-Hulme & Shield, 2008), removing time and position limits on learning (Miangah & Nezarat, 2012).

It is important to state that learning a language cannot be compressed in the closed walls since the world continues to change. Internet and MALL technology changed the way of learning. Learning cannot be old fashioned and restricted to one way in the classroom. If we want to have autonomous learners, mobile devices can do that. Students are reported to become more willing to find the way to become independent learners through the mobile technology (Bachore, 2015).

Huang et al. (2012) also point out the advantages of mobile technology pointing to its versatility, small size, low cost, and user friendliness. By having mobile phones

learners are exposed to learning a language every day even when they are using it for games, social networks, and or just doing homework. Learners are not in the classroom but still they are learning. In some countries around the world, time for the classes is limited. Grönlund's (2012) study was conducted on the students' attitude toward using the mobile phone for the activities that they could not finish inside the class. The study has revealed that the students used their mobile phones to complete the activity that they were unable to finish in the class. Thus, learners are exposed to using mobile phones for educational purposes. Learners had a positive attitude towards using their devices. Also, students asked for more to get informed about their classes and had more class material for their mobile devices. MALL's versatility led to learners becoming empowered and independent in their learning process. MALL's versatility led to learners becoming empowered and independent in their learning process. Hulme and Traxler (2010) state that learning is becoming more personal while at the same time becoming more connected to the world and providing more potential for interactive and collaborative practices.

It is obvious that technology use in language learning has a highly motivating role. Great deals of research have shown that students continue to have a positive approach to the use of technology in their learning. To illustrate this, Öz, Demirezen and Pourfeiz (2015) explored the connection between computer literacy, attitudes of learners towards foreign language learning and computer-assisted language learning (CALL) among the 123 university students who are majoring as a foreign language in English. The findings showed the positive attitude of the students towards learning the foreign language by using CALL.

In another study, Rahimi and Yadollahi (2010) performed a study on 130 female Iranians whose age ranged from 12 to 39 years old. The study aimed at examining their attitudes toward Foreign Language Learning (FLL) as a predictor of attitudes toward computer technology; the analysis also found that the influence of each individual learner's attitude toward technology was directly and indirectly related to their attitude behavior relationship. In addition, a survey called Theory of Reasoned Action (TRA) has shown that learners' attitudes, as well as their influenced behaviors, have been positive about successfully using computer and communication technology. In contrast, due to lack of information or inexperienced learners, there were some negative assumptions regarding the use of technology (Rahimi & Yadollahi, 2010).

In general, it can be said that for more than 40 years, the use of computer technology has increased in the field of language teaching and learning. Language learners who have a positive attitude towards technology have been using the digital device technology to enhance their potential of learning a language in a positive way. In other words, the studies mentioned above showed that if the learners had a negative attitude toward using technology, their process of learning were impeded. On the other hand, those who had a positive attitude toward the use of technology achieved better results. Also, the studies have shown that the learners' attitude toward foreign language learning and using computer-assisted language learning had a great impact on their progression. There were some learners who were not happy about using technology because of the lack of information and some had a negative assumption about the notion of learning. However, in general, in the above-mentioned studies many learners were contented with the use of technology inside and outside the classroom because it provided them with ways to achieve and fulfill their goals and most of the learners had great enthusiasm and held positive attitude toward the FLL and CALL.

Among the studies which show how technology motivates students to learn a second language, we can refer to Yang and Chen's (2007) study conducted in Taiwan with 44 male students in grades 10 to examine the use of technology by teachers. Six Internet-based teaching activities were planned for students to participate as a portion of a technology enhanced language learning (TELL) project in Taiwan. A web-based course, group e-mailing, English homepage design, video conferencing, an e-mail writing program, and chat room discussion were included. Study learners were periodically interviewed for their progress during the research. Teachers have met on a regular basis to review more materials and develop a better student-level curriculum. Students learned easily how to create a personal website in a number of styles within a limited period of time. Later on, the study illustrated that how technology helped them improve in learning a foreign language about their success satisfaction. The study indicated that learners were more motivated by chatting with video conferencing, but less motivated by discussion and composition with films. The study revealed that participants were satisfied with having web-sites, video chatting, improving personal computer skills and being able to find ready material online, which all contributed to the improvement of their English. Some participants were not satisfied with some activities because some tasks did not work on all computers and required excessive time and energy.

Another study which shows the impact of technology in language learning process is carried out by Sun et al. (2008). They listed in their report an online game named VocabTrainerA1 with four different learning rates. In each stage students practiced different English skills. In the first three stages a range of offline games offered individual learning opportunities. At level 4, students were expected to engage in real-life communication on a topic with their peers. Also, they were given feedback about

their answers. Tasks were designed in such a way that students were both engaged and challenged. When they scored 90%, they could move to the next level. The research findings showed that the learners enjoyed this new form of learning activities and developed a positive attitude towards learning a new language through technology.

In the same vein, Berns (2016) conducted a study similar to Yang and Chen's (2007) study. In this study students were provided with a number of Internet-based teaching activities such as video-conferencing, web-based course, English homepage design, group e-mailing, an e-mail writing program, and chat room discussion. The findings of the study showed that learners found these learning activities very engaging and motivating in learning English.

The above studies have proven that learners were satisfied with the use of technology in their life and they were really motivated to do tasks online because they found it more convenient to learn a language. Furthermore, the games made for teaching English encouraged learners to work on four skills, namely speaking, listening, writing and reading.

Some researchers who have conducted studies on the use of mobile devices and their impact on language learning adapted mini-learnings and quizzes, and provided students with text messages relevant to vocabulary test practice (Levy & Kennedy, 2005; Norbrook & Scott, 2003). One of the surveys showed that the Japanese prefer using mobile devices for exchanging emails over the desktop PC. A mobile device was used to learn idioms by watching web-based videos and learners were encouraged to learn vocabulary by mobile-based emails (Thornton & Houser, 2005).

Bezircilioglu's (2016) study which investigated the participants' learning process through MALL technology showed a similar finding. The study involved 60 students whose English language proficiency was at A2 level in İzmir Institute of Technology School of Foreign Languages Summer School. The results showed 98.3% of learners used their mobile device for language learning, and most learners used their mobile device in the search for new words. In the study, using a dictionary application was found to be the most popular usage of technology among the students.

Similarly, Taiwanese learners enjoyed using mobile devices to learn a language with that small screen as they call it 'bite-size-chunks' (Chen, Hsieh & Kinshuk, 2008). The study showed that the attitudes of the students in a range of language areas, such as mobile pronunciation, writing and grammar, have been positive. In general, mobile technology applications in language acquisition suggest better language skills and often create positive mobile technology attitudes (Hsu, 2012; Rosell-Aguilar, 2007).

The above studies and others have demonstrated that learners hold a positive attitude and motivation toward using mobile technology because of its portability and connectivity, as well as flexibility inside/outside the classroom and surpassing the old fashion classroom demonstrations. All the studies show that a variety of materials and alternatives are beneficial for students to acquire a second language at their convenient time and place. The CALL technology shows that no matter where we are, or how busy our lives can be, we always have a possibility to enhance the knowledge and learn an L2. CALL technology has changed the classical way of teaching to a whole new level of teaching for learners to achieve their goals independently and finally they become autonomous learners.

One important question might be raised here. Are teachers aware of the importance of technology in the acquisition of foreign languages, and can they use it effectively? The section below centers on this issue.

2.2 Teacher Knowledge and Knowledgebase of Teachers

A crucial problem in teacher education is recognizing the skills that a teacher needs to learn to teach. Over many decades the quality of the subject matter was considered to be what the instructor needed to know to teach. Yet, in reality what characterizes a good teacher is not just content such as Biology, Chemistry, English, and Geography. If it were so, all the university teachers, researchers and experts would be excellent teachers, which is not always the case.

A series of models reflecting teacher knowledge have been developed in an effort to define and delineate what a body of teaching knowledge base is (Freire, 1985; Gauthier, 1998; Shulman, 1986; Tardif, 2002; Wilson et al., 1987). Specific terms, indicating each one element of the knowledge (Henze et al., 2007), were used in teacher knowledge literature, and these terms give a description of how the expertise of teachers in recent decades was examined (Verloop et al., 2001). Personal Knowledge (Connelly & Clandinin, 1985), Situated Knowledge (Brown et al., 1989), Professional Knowledge, Crafts Knowledge (Shimahara, 1998), Actions Oriented Knowledge (Carter, 1990), Tacit Knowledge (Eraut, 1994), among other things, are the most frequently used terms.

Freeman and Johnson (1998) made a valuable contribution to the field of Second Language Teacher Education (SLTE) from a socio-cultural point of view by introducing a re-conceptualized SLTE knowledge base that focuses on the teaching

process itself who does it, where it is done, and how it is done. Such knowledge base, according to the scholars, will cover three interrelated fields of teaching activity: the teacher, the social background, and the pedagogical method. This idea has stimulated a wide range of intellectual discussion (Freeman & Johnson, 2005; Tarone & Allwright, 2005; Yates & Muchisky, 2003) that has helped push the field forward. The re-conceptualized base structure of knowledge is seen as a broader conceptual framework defining SLTE research and informing changes and upgrades to the SLTE system (Freeman & Johnson, 1998).

A variety of researchers have attempted to identify the content of SLTE systems. Table 2.1 summarizes various interpretations of SLTE's knowledge base.

Table 2.1: Views of the Knowledge Base of SLTE

Day (1993)	Lafayette (1993)	Richards (1998)	Roberts (1998)
Content Knowledge (CK)	Language Proficiency	Theory of Teaching	Content Knowledge (CK)
Pedagogical Knowledge (PK)	Civilization and Culture	Teaching Skills	Pedagogical Content Knowledge (PCK)
Pedagogical Content Knowledge (PCK)	Language Analysis	Communication Skills	General Pedagogic Knowledge
Support Knowledge		Subject Matter Knowledge	Curricular Knowledge
		Pedagogical Reasoning and Decision Making	Contextual Knowledge
		Contextual Knowledge	Process Knowledge

Lafayette (1993) suggested that an SLTE curriculum must include three key areas of expertise, namely language proficiency, civilization and culture, and language analysis, i.e. language understanding. While Lafayette (1993) recognized the crucial position of language literacy and the target language civilization and culture, he did not appear to recognize the significance of pedagogical awareness and knowledge of pedagogical content.

Day (1993) tackled this deficiency by proposing that four knowledge groups, such as Content Knowledge (CK), Pedagogical Knowledge (PK), Pedagogical Content Knowledge (PCK), and support knowledge, should form part of the knowledge base of SLTE program. Day's (1993) framework appears to be more systematic than Lafayette's (1993) framework and adds supporting information to the framework to emphasize the role of knowledge of the various disciplines that guide our approach to English teaching and learning; e.g., psycholinguistics, linguistics, L2 acquisition, sociolinguistics, and research methods (Day, 1993).

However, there is also a lack of care in considering the teacher as a learner, and how to teach. This vulnerability is later discussed by Roberts (1998) and Richards (1998) in two perspectives of the SLTE base of expertise. Roberts (1998) suggested six forms of teacher awareness, including CK, PCK, General Pedagogic Knowledge, Curricular Knowledge, Contextual Knowledge, and Process Knowledge. Similarly, Richards (1998) suggested six key areas of knowledge: Theories of Teaching, Teaching Skills, Communication Skills, Subject Matter Knowledge, Pedagogical Reasoning and Decision Making, and Contextual Knowledge. Commenting on the comprehensiveness of Roberts' (1998) and Richards' (1998) models, Graves (2009) pointed out that both knowledge bases go well beyond subject skills -experience,

language skills and basic pedagogical awareness. This involves pedagogical content, contextual awareness of students, the school and the society, and how the environment influences the teaching and shapes this.

2.2.1 Technological Pedagogical and Content Knowledge (TPCK/TPACK)

The term TPCK, otherwise called TPACK, was first presented by Koehler and Mishra in 2005. It represents the educators' knowledge base with respect to technology and how to utilize it successfully in the classroom. In fact, TPACK is the all-inclusive and extended form of Shulman's (1986) concept of Pedagogical Content Knowledge (PCK), as referred to in Koehler and Mishra (2005), which asserted that the Content Knowledge (CK) on the educators and their pedagogical level ought to be dealt with similarly selective and they should be prepared in regards to this issue. Briefly, TPACK is a concept used slowly to explain what instructors need to learn in order to integrate technology effectively through their realistic teaching (Schmidt et al., 2009). This study explores how TPACK training helps pre-service teachers make progress in the process of teaching English language.

2.3 The Framework of the TPACK

Throughout the years the technological innovation take-over in the educational segment has prompted such a large number of explorations and improvements for students benefit to learn a language in a better way. Technology can be consolidated to make learners' learning productive and powerful by educators, stakeholders in education, and strategy makers. This change has taken place so that technology is currently seen as an instructive tool, not as content (Koehler & Mishra, 2005; Mishra & Koehler, 2006; Niess, 2005, 2006). This means that innovation was not to be constrained in use by just utilizing it to build up students' mechanical capacities

particularly computer aptitudes, rather to build up the students' capacity to get a handle on ideas by using technology.

Koehler and Mishra (2005) and Niess (2005) discussed the need for educators to build a knowledge structure that takes into account the consolidation of topic information, pedagogical knowledge, and technological planning in education and schools; the need for teachers to build up knowledge of pedagogical content to convey their subject matter. As to this point the following questions might come to the researcher's mind: Would technology become a learning instrument or an integral component? Were learners learning various technologies alongside technology while learning similar subjects? Will the learners be effectively engaged with a particular topic using technology as performance, communication, analysis, problem solving and decision-making? (Niess, 2006). These inquiries and more brought the comprehension of the need of technology pedagogical content knowledge (TPCK), i.e. PCK that has technology. This indicates that technology should not be regarded as separate and autonomous from PCK, but as essential as other components of TPACK within the educational setting (Koehler & Mishra, 2005; Mishra & Koehler, 2006).

The vast majority of the ongoing exploration on TPACK began with the point of giving productive and compelling approaches to preservice educators to incorporate technology because of the widespread disorder technology combination has encountered throughout the years. Claiming the lack of a proper framework of technology knowledge for in-service teachers as well would not be wrong at all. In other words, TPACK is necessary not only for preservice teachers but for in-service teachers and instructors, too.

The TPACK has demonstrated to be a framework for educators since the innovation of technology has created a portrayal for new ideas and affectability to the dynamic, value-based connection between each of the three parts recommended by the TPCK framework. Koehler and Mishra (2005) portrayed the connection between content, pedagogy and technology (PCK) (Shulman, 1986) and went further to lead a top to bottom analysis of the perplexing collaboration of these parts. The expansion of technology right now ascends to four additional components, namely technological knowledge (TK), technological pedagogical knowledge (TPK), technological content knowledge (TCK), and TPACK (technological pedagogical and content knowledge). This framework structure strongly argues that a convincing blend of technology into guidance can be achieved by integrating knowledge of content, pedagogy, and technology as one feature or frame rather than isolated elements.

In Figure 2.1 the TPACK structure framework can be seen as a Venn diagram with three circles. Each of these circles represents a particular type of teacher knowledge areas (Graham, 2011) which are interconnected together: Content, Pedagogy, and Technology. As indicated by Schmidt et al. (2009), the intersection of these components lies at the unconstrained comprehension of showing the topic with fitting pedagogy techniques and innovational technologies. The interconnection between these three parts achieves the arrangement of extra new domains of knowledge; TCK, TPK including Shulman's Pedagogical Content knowledge (PCK) to make a total of the three domains of the area. The interconnection of the three significant components and the recently framed knowledge spaces shapes the last knowledge domain of TPACK.
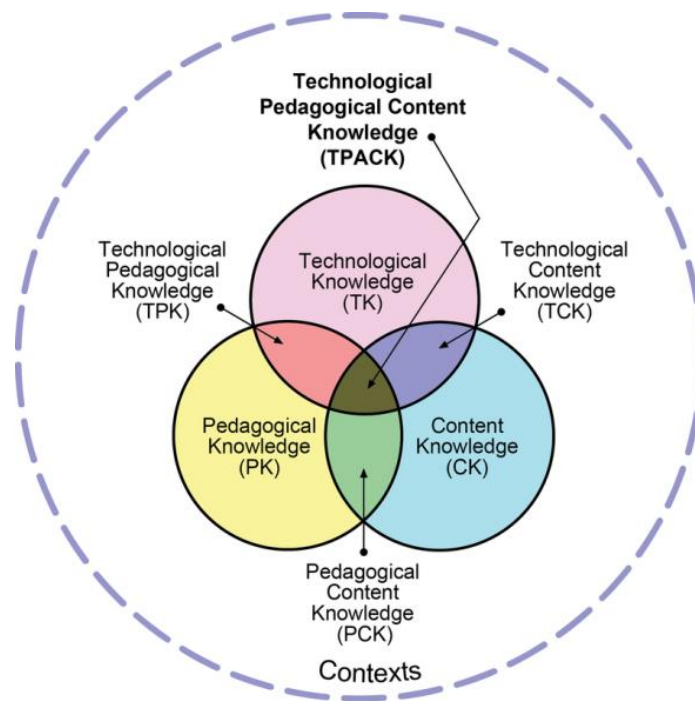
Figure 2.1: Framework of the TPACK and its Components (Graphic Taken from https:// tpack.org)

2.3.1 The Components of the TPACK

The TPACK system contains seven sections (Koehler & Mishra, 2005). **CK** (Content Knowledge) is also called subject aptitude (Shulman, 1994). It is the knowledge about a specific topic (Koh et al., 2013) that will be learned or instructed (Koehler & Mishra, 2005, 2009; Mishra & Koehler, 2006, 2008; Schmidt et al., 2009). It is the knowledge about a subject that is exercised, learned, or educated over some undefined time frame. For example, the knowledge relates to the particular subject such as general linguistics, Biology, Chemistry, English, Geography, etc. (Kind, 2009). This is the knowledge about a specific topic which a teacher has.

PK (Pedagogical Knowledge) is the top to bottom knowledge on educating techniques, practices strategies and procedures. It refers to the procedures and strategies for educating, which incorporates knowledge on managing the classroom, exercise plan

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improvement, assessments and students' learning (Schmidt et al., 2009). It is the knowledge on the best way to move or impart the CK. Depending upon the pedagogical reason for the instructor, various strategies are grasped so as to draw out the ideal learners' behavior and to help learners' learning (Koehler & Mishra, 2005, 2009; Mishra & Koehler, 2006, 2008; Koh et al., 2013).

TK (Technological Knowledge) is the knowledge on technology apparatuses (Koh et al., 2013), including digital video, the web, computers, and progressively ordinary advances including overhead projectors, programming programs, interactive whiteboards, etc. (Koehler & Mishra, 2005, 2009; Mishra & Koehler, 2006, 2008; Schmidt et al., 2009).

TCK (Technological Content Knowledge) is the knowledge on the most proficient method to utilize technology to demonstrate a subject. This is the comprehension of technology sway on demonstrating a content which gives the adaptability of technology use for instructive purposes so as to impact the manner in which learners practice and comprehend the idea of a specific topic (Schmidt et al., 2009).

TPK (Technological Pedagogical Knowledge) is the knowledge on the best way to utilize technology to actualize or embrace various strategies (Koehler & Mishra, 2009; Koh et al., 2013; Schmidt et al., 2009).

PCK (Pedagogical Content Knowledge) is the knowledge on how a topic is to be instructed. This incorporates techniques and procedures to convey a particular content. As indicated by Shulman (1986), this knowledge supports the learning of all subjects as it gives methods for organizing, demonstrating and adjusting diverse interest and

expertise of students (Koehler & Mishra, 2006, 2008; Koh et al., 2013; Mishra & Koehler, 2005, 2009; Schmidt et al., 2009).

TPACK (Technological Pedagogical Content Knowledge) is the knowledge which emerges from the mixing of technology, pedagogy and content. It is the knowledge required by educators to utilize technology to actualize teaching techniques or procedures in any topic (Koh et al., 2013; Mishra & Koehler, 2009; Schmidt et al., 2009). It goes beyond techno-anti-extremism since it helps instructors in powerful and inventive reasoning.

2.3.2 The Shift from TPCK to TPACK

After some time since the TPACK has been shaped – from 2005 to 2007, it was shortened to TPCK, where Technology, Pedagogy, Content, and Knowledge. In 2007, Mishra and Thompson (2007) thought it was necessary to make this change for the following reasons. First of all, the TPCK pronunciation puts off general learners and pre-service teachers. Second, to ensure proper articulation there must be a vowel to improve pronunciation; the abbreviation is overflowing with consonants. At the ninth Annual National Technology Leadership Summit in 2007-2008, TPCK was renamed to TPACK (Mishra & Thompson, 2007). Members made recommendations during the summit and TPACK was acquainted with the ideal replacement "A" after several reflections. This change looks sounding good, but it's not been received by everyone, the selection process was not pleasant, as stated. The renaming of TPCK made a reason for the confusion among publishers and researchers in education technology. In fact, Mishra and Thompson (2007) expressed two key viewpoints. First, it puts an emphasis on the three sorts of knowledge Technology, pedagogy, and Content which are the vital structure squares of astute and strong technology combination. Secondly, it illustrates a thorough understanding in which, in general and in a complete package or

more as a system, but not isolated, the three knowledge domains of knowledge are consistent. Nonetheless, the pronunciation trouble for specialists and teachers when showing TPCK to in-service and pre-service educators got so talked about and that was the noticeable explanation for the change.

2.3.3 Previous Studies on TPACK

A significant number of research studies have been conducted since the origination of TPACK to investigate TPACK in teachers. In Singapore, for example, a study was carried out with 1185 pre-service teachers (Koh, Chai & Tsai (2010). The results showed that TK and CK were distinguishable inside knowledge discernments of pre-service educators. Although the participants hypothesized PK, PCK, TPK, TCK and TPACK to be distinct structures, these were not seen as such.

Kurt et al. (2014) carried out a study on 800 ELT preservice teachers concentrated on getting whether as well as how TPACK of Turkish Pre-service Teachers (PS) of English was thought about their exercise arranging and introductions. The knowledge originating from the exercise plans and perceptions of three cases in the classroom was dissected using the observation instrument for technology integration. The discoveries revealed that both during the arrangement and implementation procedures, PS considered the relationship between content, teaching method, and technology to enhance the nature of their exercises through the viable coordination of innovative technology.

Öz (2015) conducted a study in Ankara/Turkey on 118 ELT pre-service teachers to investigate their TPACK and how it developed. The investigation found out that the members by and large communicated significant levels of TPACK improvement for their major purpose. The investigation found out that the training program for

educators ended up being successful in educating pre-service teachers with incredibly well-established TPACK expertise; this in effect gave them the technological skills and the technology of creativity to carry out their practical education. Furthermore, the aftereffects of another study recommended that the TPACK competent development program be effective, reflected in the improvement of the TPACK lecturers and their positive encounters (Ansyari, 2015).

Mahdum (2015) carried out a study on 74 in-service English educators in Pekanbaru/Indonesia about their TPACK and their teaching development. The findings showed that those educators had the option of integrating ICT, content and appropriate methodology into English language learning. The mean score of sub-areas related to technology was lower than sub-domains not related to technology. It can indicate instructors were not extremely familiar with the knowledge of technology. Accordingly, it is normal that instructors constantly build up their TPACK, particularly in technology related subdomains so as to accomplish better language educating and learning.

Kwangsawad (2016) carried out a study of 33 pre-service teachers of English as a Foreign Language (EFL) in Thailand. The results of the self-revealed knowledge as calculated by TPACK summary, assessment of the exercise plan and impressions of the classroom suggested high scores for all areas. Analysis of the lesson plan documents has shown a well-presented theoretical growth of EFL pre-service teachers' technology integration skills. Across all domains, the results of self-reported data (as measured by TPACK survey), assessment of the lesson plan, and classroom observations showed high scores. The EFL's pre-service teachers' real experience appeared to fit with their self-reported and lesson plans. The actual practice has gone

closer than the lesson plans to self-report survey data to determine the willingness of teachers to apply their knowledge of technology, pedagogy and content. The results also indicated that the teachers' lesson plans differ slightly from what they actually reflect in the classroom situation. In the actual activities of EFL pre-service teachers, all TPACK domains apart from TPK reported higher ratings, as compared to their self-report.

Ersanlı (2016) conducted a research in Samsun/Turkey into 59 preservice ELT teachers. The investigation recommended that preparedness and workshop contemplates be persuasive in enhancing the understanding of preservation English language educators with potential and effective use of computerized developments in the classroom for instructive purposes. Through providing actual earning materials, preservice English language educators may pick up knowledge and expertise in integrating technology into their CK and PK. This is therefore suggested that TPACK training workshops and materials production workshops will be integrated into training programs for instructors.

Another study was carried out by Alastuey and Esteban (2016) on two different groups of participants in Spain. The first group consisted of 26 pre-service teachers and the second one consisted of 29 pre-service teachers. The first category to graduate in either primary or pre-school education in their final year. The students did two specific subjects in English: Content and Language Integrated Learning (CLIL), applied to language learning, which had 60 hours of contact time and 90 hours of personal work, and Emerging Technology which had 30 hours of contact time and 45 hours of personal work. The second group was in a Pre-school Education Degree making their final year. The students did a subject called Designing in English and provided the

English Infant Classroom CLIL with productive lessons, consisting of 48 hours of contact time and 102 hours of personal work. Results suggest the students' attention focused on technology while discussing telecollaboration but on pedagogy and content when discussing the unit.

Turgut (2017) conducted a study for two separate countries, Turkish participants (53 ELT pre-service teachers) and Danish (46 pre-service teachers) with 99 pre-service teachers all together. The key point of the study was to provide a summary of the TPACK-related ELT systems to clarify the various uses of technology for different nations. The coding of the knowledge shows in both Danish and Turkish settings the depiction of technology was extraordinary at the time when both Turkish and Danish members' responses to the open-ended questions in the overview were analyzed. As indicated by the Turkish pre-service teachers, technology implied hardware and technological knowledge. For Danish members, technology, as opposed to hardware, was applications and programming empowering connection both among the learners themselves and between the instructors and the learners.

Hsu (2017) conducted a research in Taiwan on 158 in-service teachers and found out that the utilization of cell phones in EFL educating and learning was currently ordinary; accordingly, knowledge and acknowledgment of MALL among instructors was progressively significant. According to the simple measures, the scores for TPK, TPACK and TCK exceeded 5 points of attention to a possible 7; thus, in other three components, TK, PK and CK, members had technology integrated knowledge but required comprehension. As far as MALL acknowledgment, Continuous Usage (CU) was high, despite the fact that Perceived Ease of Use (PEU) and Perceived Usefulness (PU) were generally low. Notwithstanding, PU was somewhat higher than PEU, along

these lines showing that MALL's PU exceeded usability as far as significance among EFL educators.

Ramanair et al. (2017) conducted a study on 83 third grade ELT pre-service teachers in Malaysia, though findings showed that the teacher participants had the knowledge in the seven sections of the TPACK, but their level of technical certainty was limited. These results were in any case self-revealed and as such further work was needed to explore the integration of technology into their classroom rehearses. In addition, the study suggested that these teachers specifically need more competent development to extend their degree of confidence in the use of motivational technology.

Bostancıoglu and Handley (2018) conducted a study on 542 English language teachers including 144 English-speaking native speakers and 391 non-native speakers in 72 countries around the world. The study investigated and presented another instrument of self-evaluation for estimating TPACK among EFL instructors. The results also provide additional support for ways of dealing with ELT education that seek to incorporate TK, PK, and CK, as opposed to presenting them independently, and that feature ways in which rising and establishing technologies can be used to represent language and provide opportunities for correspondence that are known to advance language acquisition.

Setiawan et al. (2018) conducted qualitative research on some individual Indonesian teachers who are using technology to educate. The findings of this research showed that the interpretation of TPACK by the teacher educator made them model their learning process on what the researcher called a contextualized TPACK using Project Based Learning (PBL) with PACIFiC. His inventive thinking lies in the combination

of different programming, he names PACIFiC to make English language sight and sound that can be used to educate or learn media.

İşler and Yıldırım (2018) carried out a research on 94 pre-service teachers in Turkey. The study has found out that practically the entirety of the interviewees conceded the significance of technology integration into ELT education. They announced that ELT education requires technology use in classes such as exercises for listening, introduction of visual and authentic materials. Albeit the entirety of the interviewees referred to the significance of technology use in ELT, while most of them detailed fluctuating levels for utilizing technology in their future classrooms.

Sarıçoban et al. (2019) conducted a study again in Turkey with 77 pre-service teachers in ELT department. In the light of the self-assessment of the participants, it was seen that they saw themselves adequate in-terms of practically in all sub-components of TPACK. As far as TK, they were seen as especially proficient in utilizing computerized classroom tools, for example, smart boards and projectors notwithstanding having the option to utilize office programs and other innovative devices. As for CK, it was discovered that they can communicate their emotions in composed English in writings. With regard to PK, they explained in detail that they could think of the encounters they took from their practice procedure; they could work with their companions and help learners to learn according to their physical, mental, passionate, and social.

Fathi and Yousefifard (2019) carried out a study on 148 EFL pre-service teachers in Iran. The study surveyed the degree of technology related knowledge on EFL instructors, and their skill in displaying the language learning materials through the

work of various professional technologies was critical. The present investigation for this research, which was a survey-based study, revealed the points of view of Iranian English Foreign Language students at the level of their teachers' TPACK. Consequences of the overview revealed that most of learners kept up that their educators were capable concerning of the TPACK.

Wulandari (2019) carried out a study on 26 Indonesian pre/in-service teachers in 24 different schools regardless of whether educators are adequately prepared for creating materials, particularly those coordinated with technology. The TPACK system has given a premise to portray pre-service and in-service educator's abilities in creating learning materials. While the influential instructional plan and the instructional capabilities regulations govern the use of ICT in the classroom, instructor(s), their individual learning materials that promote technology's use in the teaching and learning process need to be reviewed, chosen, modified and, where appropriate.

This analysis of study literature shows that the technology has turned the traditional way of teaching into better and more fascinating forms. To learn the target language wherever possible, teachers designed many software programs, resources, and materials for learners. CALL and MALL technologies are used by students in a number of ways to improve the language through online content availability. Learners are motivated with this new approach and their attitude and motivation towards the technology is remarkable as well as learning the language in a friendly and convenient environment.

Some of the researchers above in this review featured that since educating with technologies requests imaginative arrangement, issues emerge in light of the fact that

most mechanical tools that are utilized such as blogs, application software and so on, are not intended for teachers and should be repurposed for their necessities. They have expressed that this issue is not an issue if the instructors utilize the inventive capacity of TPACK by creating mind habits that support progression across branches of knowledge, in regard to new technological tools and making new educational methodologies. They also expressed that the potential to deliberately subvert signs obtained is an advantageous method for survey skill because technology is rapidly developing and changing. Therefore, it is expected that adaptable, imaginative and versatile technological knowledge and specialized knowledge of the educator, willingness to experiment and set their specialized skills to fill in as attentive creators of technology and that teacher will be able to structure, repurpose technology and finally overthrow advances. Finally, teachers were trained in many ways to utilize the technology into their classroom routine but not all the teachers are the same in using technology. All teachers have to know how to integrate the technology in their teaching because in the future everything may go online for many reasons such as long distances, having not enough classrooms because of rising population, economical reasons, environmental reasons, and health issues such as the recent COVID-19 pandemic.

2.4 Related Studies Conducted in the Kurdistan Region of Iraq (**KRI**)

The studies on the use of technology in education are rather limited in the Kurdistan Region of Iraq (KRI); what is more, there are not any studies specifically related to TPACK in KRI, as far as the researcher knows.

There are currently about 19 public and private higher education institutions in the Iraqi Kurdistan Region (Ministry of Higher Education and Scientific Research, 2017).

Fadhil et al. (2016) attempted to assess the current level of e-learning for many private universities in the Kurdistan Region of Iraq. They noticed that tablets and smart boards are only in limited use in the e-learning process.

Another study by Al-Hakeem and Abdulrahman (2017) showed that an E-exam experience (in quizzes, midterm and final exam) in one of the private universities in KRI was received very positively by teachers and students who were familiar with conventional exam systems, because the new experience presented a great deal of advantages, yet challenges as well.

A recent study by Sadik (2018) revealed the common belief of many academicians working in private universities within Kurdistan region about the need for more investment in technology in order to develop quality control systems and include today's technology in classrooms. Some of the complaints made were related to the weak electronic teaching tools and limited internet access, which negatively affected students' ability to use the IT facilities both in social media and for other knowledge transmission purposes (Ahmad et al., 2018).

Lastly, Abdulrahman (2019) conducted a study in four private universities in Erbil in KRI to investigate the status of educational technology. The findings showed that most private universities do not yet have a Learning Management System (LMS) for the control of classroom activities. Moreover, many teachers are interested in using some LMS in classrooms to integrate technology. Also, the result demonstrated that using projectors and emails technology inside the classroom is not enough for educational purposes.

2.5 Summary

The literature reviewed in this chapter reveals that researchers' interest in the use of technology for pedagogical purposes has grown in the last few decades. Starting in the 1980 with computer-assisted language learning (CALL), and later in 2000s mobile-assisted language learning (MALL), the focus has shifted more to the teachers' knowledge of technological pedagogy. Especially in the last decade, numerous studies have been conducted on teachers' Technological Pedagogical and Content Knowledge (TPACK). Most of these studies focused on pre-service teachers' TPACK (Alastuey & Esteban, 2016; Ersanlı, 2016; Fathi & Yousefifard, 2019; İşler & Yıldırım, 2018; Koh, Chai & Tsai, 2010; Kurt et al., 2014; Oz, 2015; Kwangsawad, 2016; Ramanair et al., 2017; Sarıçoban et al., 2019). There were also studies, though relatively smaller in number, conducted with in-service teachers on their TPACK (Hsu, 2017; Mahdum, 2015), and a study which compared pre- and in-service teachers' TPACK (Wulandari, 2019). Another study (Turgut, 2017) compared the TPACK of pre-service teachers in two different countries. The literature review has also shown that the investigation of TPACK has been conducted by researchers from different parts of the world (including Turkey, Indonesia, Spain, Taiwan, Malaysia, and Iran) whereas no study has been detected on teachers in the context of Iraq (or specifically in the Kurdistan region of Iraq - KRI). Therefore, this present study seems to be a necessary and timely attempt to investigate the perceptions of pre-service teachers of English in KRI.

Chapter 3

METHODOLOGY

In this chapter first the research design, the research context and the participants of the study are presented. Then, the data collection tools and procedures, as well as data analysis procedures are explained in detail.

3.1 Research Design

As previously mentioned, this research aims to examine the experiences of EFL (English as a Foreign Language) pre-service teachers studying at Duhok University with respect to their TPACK. It also aims to discuss views of how well the ELT teacher education system contributes to their TPACK as well as suggestions for further development of TPACK.

Subsequent research questions were addressed for this purpose:

1. What are the pre-service EFL teachers' perceptions as regards their current technological pedagogical content knowledge (TPACK)?

2. What are the pre-service EFL teachers' and instructors' perceptions as regards the effect of the teacher education program on pre-service teachers' TPACK development?

3. What are the pre-service EFL teachers' and instructors' suggestions for further development of pre-service teachers' TPACK?

This case study followed a mixed-method approach, using both quantitative and qualitative data, to find answers to those questions. Researchers have reported studies that incorporate qualitative and quantitative approaches under various names, such as interrelated qualitative and quantitative data, multitrait-multimethod research, multi-methodological research, methodological triangulation, mixed method studies, and mixed method research (Creswell et al., 2003). Only quantitative or qualitative research studies may have some shortcomings despite their strengths.

Quantitative strategies highlight target estimations and numerical investigation of data that are created through studies represented by questionnaires or polls. A quantitative analysis approach, as described by Aliaga and Gunderson (1999), is used to explain events through the collection of numerical data, which is then deciphered based on empirical science strategies. One of the strengths of quantitative approach is that it allows for greater number of informants to participate in order to generalize the results; also the study can be replicated in different contexts to compare the findings. However, reducing data to numbers may result in loss in data; in other words, going into the depths of some sensitive issues may not be possible by using such structured data collection tools as surveys and questionnaires.

Qualitative research, on the other hand, allows the researcher to collect more detailed knowledge about a complex issue with the help of more flexible and various data collection tools such as observations, interviews, field notes, and document analysis (Dörnyei, 2007). Nevertheless, limited number of participants prevents the researcher from generalizing the findings to other contexts. Also, collecting, analyzing and interpreting the verbal data may be more difficult compared to quantitative data.

By blending both methods, the researcher can overcome those shortcomings and reinforce the results of the exploration (Schoonenboom & Johnson, 2017) since the data collected from qualitative and quantitative approaches complement each other and offset the limitations that may arise if only one is used in isolation (Creswell & Plano Clark, 2007; Johnson & Onwuegbuzie, 2004).

Based on the descriptions above, in order to draw a thorough and unbiased picture of the research questions under study, this study adopted a triangulation methodology that aimed to gather both quantitative and qualitative data from two different groups (i.e., pre-service EFL teachers and instructors) by means of a survey and semi-structured interviews.

The study is a case study, as well. A case analysis, according to Dörnyei (2007), is the analysis of the particularity and difficulty of a single case, such as a single individual, group or event, as its term suggests, within its real life context. Usually used in social sciences, the case study is an excellent way to get a thick overview of a complex and cultural social issue. Researchers in case study rely on numerous evidence sources and benefit from the previous production of theoretical propositions. Typically, case studies incorporate different forms of data collection, such as interviews, observations and records. As Duff (2008) pointed out, qualitative case studies provide depth and insight into the learning processes of the participants.

In this study the researcher investigated the department of English Language at the University of Duhok regarding the use of technological TPACK as a case study. This case is introduced for the first time to the University of Duhok and KRI in general.

3.2 The Context

The study was conducted in the department of English Language at Duhok University (UoD), Iraqi region of Kurdistan. Duhok University, in northern Iraq, is a government institution. It was founded on 31 October 1992 and since then the UoD has grown to include an institution of 18 colleges with 78 departments, 21265 undergraduate students, 1607 academic staff and 2353 administrative staff (according to records from 2020). Duhok University is a member of the International Association of Universities (IAU), the European Association for International Education (EAIE) and the Association of Arab Universities (AARU).

The English Language department takes place in the College of Languages, which accommodate three departments: Kurdish Language, English Language, and Translation. The Department of English, created under the College of Arts in 1994 and then transferred to the newly formed College of Languages in 2016, has 28 teachers: 6 PhDs and 22 MA holders. Since 1996, it has graduated hundreds of undergraduate students, and tens of postgraduate students since 2007, when the MA program first started.

The department's aims and objectives are expressed as follows in the department's webpage, English Language (2016), The Department of English Language and Literature:

1. Improving and promoting the continued professional growth of the Faculty.
2. To provide a curriculum which meets the needs of all departmental areas of emphasis.
3. Developing communication skills and English language mastery for the students.

4. To promote the ability of students to read closely, think objectively, and write persuasively through a systematic study of English and literature;

5. To train students to conduct proper linguistic and/or literary research by finding and using library, internet and field sources.

The department accommodates approximately 350 students (i.e., pre-service teachers) who are qualified to become English teachers or linguists in general upon graduation. The 4-year curriculum includes the following courses:

Table 3.1: Four-year Curriculum of the English Department

Year 1		Year 2	
Subject	Hrs/Week	Subject	Hrs/Week
Grammar 1	4	Grammar	3
Reading & Writing 1	4	Interaction 1 Listening & Speaking	4
Listening & Speaking 1	4	Interaction 2 Reading & Writing	4
Academic Debate	2	Poetry	2
Computer Skills	2	Novel	2
Kurdistani Studies	2	Drama	2
Year 3		Year 4	
Pedagogical Grammar	3	Syntax	3
Academic Writing	2	Topics in Literature	4
Linguistics	2	Criticism	2
Translation	2	Linguistics	2
Critical Thinking	1	Translation	2
British Literature	3	Methods of Teaching	2
American Literature	3	Graduation Research	
World Literature	3		

As the table shows, the department offers a course on computer skills only in the first year for two hours per week, eight hours per month and about 48 hours per year.

3.3 Participants

Data was collected from the senior (i.e. final year) year English department. The total number of senior year students was 115 but only 72 volunteered to take part in the study. They will be termed pre-service teachers throughout the study.

The participating pre-service teachers' demographic information is shown in Table 3.2. As can be seen, 46 of the participants (63.9%) were male, and 26 of them (36.1%) were female. As regards their age, the majority of students (34 in number, 45.8%) were between 21-22 years old, and 18 of them (26.4%) were between 23-24 years old. While only 7 participants (9.7%) were between 25-26 years old, the remaining 13 participants (18.1%) were above 27 years old. Among the variables about participants' profile such as age, gender, economic status, family background, and motivation, only the gender and age variables are considered in this study.

Table 3.2: The Demographic Information about the Participating Pre-service Teachers

Gender		
	Number	Percentage
Male	46	63.9%
Female	26	36.1%
Total	72	100%
Age		
21-22 years	34	45.8%
23-24 years	18	26.4%
25-26 years	7	9.7%
Over 27 years	13	18.1%

In addition to 72 pre-service teachers, five instructors participated in this study. The English language department has about 30 academic staff but within this number of staff, the researcher decided to interview only five instructors', namely the head of the department and four lecturers, one female and four males. The reason to interview instructors' to justify this triangulation purposes for better having in size, therefore, instructors' asked to be interviewed as additional source of information and their information analyzed and their suggestions have been presented in this study. Four of the lectures were teaching to the senior students (i.e., the pre-service teachers) and one lecturer was teaching other levels. Two instructors' are PhD and other three are MA holders. First instructor has 40 years, the second one 25, the third one 8, the fourth one also 8, and the last one has 6 years of experience. Two PhD instructors started working in the English department after 2003 and other three MA holders started working after 2012.

3.4 Data Collection Instruments

In this research the TPACK-EFL survey, developed with 39 items by Baser et al. (2016), was used as a quantitative data collection instrument. Semi-structured interviews with 10 pre-service English teachers were conducted to triangulate the findings. Five instructors from the ELT department were interviewed as well, to enrich the data coming from the pre-service teachers, especially for the 3rd research question, which was about the suggestions to improve the TPACK of pre-service teachers.

3.4.1 The Survey

The quantitative data was collected in this research through the survey TPACK-EFL developed by Baser et al. (2016). The survey contains 39 items with 9-point rating scales that ranged from 'nothing/none' (1) to 'very little' (3) to some (5) to 'quite a bit' (7) to 'a great deal' (9). However, a 5-point rating scale was used for practical

purposes in the present study. The survey is made up of seven components as shown in Table 3.3 below.

Table 3.3: Components and Items of TPACK-EFL Survey

Name of the Components	Items
TK	9
CK	5
PK	6
PCK	5
TCK	3
TPK	7
TPACK	4
Total	39

The total TPACK-EFL survey is given in Appendix A. Some of the survey items are at the followings:

- I can use basic technological terms (e.g. operating system, wireless connection, virtual memory, etc.) appropriately. (TK)

- I can express my ideas and feelings by speaking in English. (CK)

- I can collaborate with school stakeholders (students, parents, teachers, etc.) to support students' learning. (PK)

- I can manage a classroom learning environment. (PCK)

- I can take advantage of multimedia (e.g. video, slideshow, etc.) to express my ideas about various topics in English. (TCK)

- I can support students as they use technology such as virtual discussion platforms to develop their higher order thinking abilities. (TPK)

- I can support my professional development by using technological tools and resources to continuously improve the language teaching process. (TPACK)

Proof of internal consistency of the established TPACK instrument was established through the use of Cronbach's alpha. With regard to the reliability of the sample, it is stated that the coefficients of reliability for the TPACK variables ranged from.81 to.92, TK (.89), CK (.88), PK (.92), PCK (.91), TCK (.81), TPK (.91), TPACK (.86) (Baser et al., 2016).

3.4.2 Semi-structured Interviews

The interview is defined, according to Moser and Kalton (1971) and Merriam (2009), as a dialogue between an interviewer and a respondent for the purpose of extracting certain information from the respondent. Similarly, Kvale (1996) defined the interview as a means of acquiring thoroughly checked information which, if used with caution, can be an essential and rich source of data, and added that interviews should be clear, accurate and unambiguous. The literature includes three kinds of interviewing systems, namely highly organized structured, semi-structured and unstructured (Merriam, 2009). In the structured interview, the interviewer asks a number of questions that have already been asked, which require only a limited number of answer categories. In the unstructured interview it is presumed that all the requisite questions are not understood beforehand by the interviewees. In order to make the interviewers relaxed and uneasy, the unstructured interview process shapes the individual situation and context. In the present study, the participants were conducted with semi-structured interviews. The

questions should not be in order in semi-structured interviews, or the interviewer may ask additional questions which will certainly broaden the insight or bring up new ideas.

The interview questions were 12 in number, as can be seen in Appendix B. Pre-service teachers were asked questions relating to the use of technology and how technology improves their learning process, whether they are prepared to incorporate technology into their future teaching, and finally if their departmental education prepares them for how to benefit from technology in their future teaching.

In addition to the interviews held with ten pre-service teachers, the researcher also conducted semi-structured interviews with five course instructors. The eight interview questions directed to the instructors can be found in Appendix C.

3.5 Data Collection Procedures

Data collection is the method of gathering and analyzing data on specific variables systematically, in such a way that the information can be addressed, conclusions drawn and findings analyzed. Prior to the data collection procedures, all the necessary permissions were obtained from the Foreign Language Education Department and the Research and Ethics Board of the Eastern Mediterranean University (Appendix G) as well as the administration of the University of Duhok (Appendix F) and the participants themselves.

In this study, the aim for collecting quantitative data was to distribute the questionnaires to 115 participants within the classroom but for some reasons outside the researcher's approach it was modified to a different direction. In fact, the reason was the epidemic coronavirus in 2020 as schools were shut down and the education system went online. Thus, the researcher had to convert the survey questionnaire to be

answered online on the Google. The researcher sent the Google form document to 115 participants via emails, WhatsApp, Viber and Messenger, but only 72 of them responded on their mobile devices and computers by clicking the 'submit' option, and the filled in forms were directly sent to the researcher's email. The consents of the participants were obtained via e-mail messages as it was not possible to get their signatures because of the lockdown period caused by epidemic coronavirus.

The researcher randomly selected ten pre-service teachers and five instructors to collect the qualitative data. The semi-structured interviews were conducted in English and online through social networks such as WhatsApp, Viber and Facebook Messenger and the participants' names were kept anonymous. Also, before starting the interview the researcher sent the consent letter to all participants to put a tick into the box for signature and send it back to the researcher.

It is worth noting that the researcher downloaded a separate application called AZ Screen Recorder to record the whole interviews after getting permission from the participants to record the interviews confidentially only for the research purposes. Refer to both the pre-service teachers and instructors (Appendix B and Appendix C) for several questions. Most of the questions related to the use of in-class integration technology, that application they use online to enhance students awareness and what obstacles they face when using technology. In addition, pre-service teachers and instructors have been asked questions relating to the use of technology and how technology increases their learning process and whether they are willing to integrate technology into their future teaching, and finally whether university education prepares them for how to take advantage of technology in their professional lives. The

interviews of both instructors and students were recorded and a transcript was produced to be analyzed qualitatively.

3.6 Data Analysis Procedures

Data analysis is the data testing process for answering the research questions (Merriam, 2009). As already mentioned, both quantitative and qualitative data have been used in this study. The quantitative data were collected through survey questionnaires. In the quantitative process, numeric data from student survey responses were collected and imported into the Statistical Package for Social Sciences (SPSS) 22. The normality of the data was verified using tables. The quantitative data was analyzed using the software program SPSS22. Following the administration of the questionnaire (TPACK-EFL survey), the results of the items in the questionnaire were coded and fed into the SPSS22 package system to assess the response frequency by conducting a descriptive statistical analyzes.

The qualitative data from the interviews, on the other hand, were transcribed and analyzed by following the procedures of content analysis, which is the most widely used analysis type in social studies (Creswell, 2012; Merriam, 2009). Initially, the transcriptions of the video-recorded interviews by AZ Screen Recorder, which can be found in Appendix D and Appendix E for pre-service teachers and instructors, were carefully read as regards qualitative details. These were then sorted and classified according to the questions posed by the interview, and a closer reading was carried out again to identify any emerging codes and themes from each participant (Merriam, 2009). The individuals interviewed were labeled as PS1, PS2, PS3, … PS10 (PS standing for Pre-service Teacher).

In this analysis, qualitative results obtained from semi-structuring interviews with five instructors were analyzed using the same method. While referring to the instructors, the codes I-1, I-2, I-3, I-4, and I-5 (I standing for Instructor) were used.

3.7 Summary

This chapter presented the research design and the research context, including the participants, in detail. It then introduced the data collection tools and procedures, as well as data analysis procedures. The analysis of data gathered by the tools explained in this chapter is reported in the next chapter.

Chapter 4

RESULTS

This chapter presents the results obtained from the analysis of both quantitative and qualitative data collected throughout the study in the order of research questions. The first research question analyzed the pre-service EFL teachers' perceptions with regard to their current technological pedagogical content knowledge (TPACK). The second research question focused on the pre-service EFL teachers' perceptions as regards the effect of the teacher education program on their TPACK development. Finally, the third research question explored the suggestions of the pre-service EFL teachers and the instructors of the department for further development of pre-service teachers' TPACK.

4.1 Research Question #1: What are the Pre-service EFL Teachers' Perceptions as regards Their Technological Pedagogical Content Knowledge (TPACK)?

Before reporting the results obtained about the first research question, it is necessary to give some preliminary information about the participating pre-service teachers' interest and familiarity with technological tools. This information was elicited from the first part of the survey (Part A). In this part, there were nine questions in total, the first two of which (about age and gender) have already been reported in Chapter 3 under the Participants section. Here the answers given to questions 3 to 9 will be presented.

Question 3 in Part A of the survey asked whether the respondents (72 in number) had a personal computer or laptop. The descriptive statistical analysis of the answers indicated that 39 of the respondents (54.2%) had a personal computer or laptop while 33 of them (45.8%) gave a negative answer to this question.

Question 4 asked if they had a smart phone. Sixty-four of the respondents (88.9%) said they had and only 8 of them (11.1%) said no to this question. In question 5, the respondents were asked whether they surf on the internet, and if they do, how much time a day they spare. To this question, 70 respondents (97.2%) gave a positive answer, and only two respondents (2.8%) gave a negative answer. As regards the amount of time these 70 respondents spend for it, it is seen that the respondents spent between 4-6 hours a day surfing on the internet.

Table 4.1: Time spent by the participants surfing the Internet (Question 5)

Time	Fr	%	Mean	STD
1 Hour	1	1.4		
2 Hour	15	20.8		
3 Hour	4	5.6		
4 Hour	26	36.1	4.23	1.67
5 Hour	1	1.4		
6 Hour	17	23.6		
7 Hour	6	8.3		
Total	70	97.2	-	-

Note: Fr (Frequency); STD (Standard Deviation)

However, this result does not mean that the respondents spent this time on studying English language when they surfed on the Internet.

Question 6 inquired whether the respondents use social media such as Facebook, WhatsApp, Instagram. According to the results, 67 of the respondents (93.1%) use the social media such as Facebook, WhatsApp, Instagram, while 5 of them (6.9%) do not use any site of social media.

In question 7, the respondents were required to indicate their interest in especially internet-based technology by writing a number between 1 and 10 (1 being very little interest, 10 being ultimately high interest). The gathered responses revealed that 20 of the respondents (27.8%) had an interest in internet-based technology at the level of 5 (out of 10), and 10 others (13.9%) indicated their interest at the level of 10 (the highest level). The others had various responses: only 17 respondents (23.6%) used various numbers below 5, indicating their low interest. In other words, 55 of the respondents (76.4%) indicated their interest in internet-based technology at the level of 5 and above.

Table 4.2: Participants' Interest in Internet Technology (Question 7)

Scale	Fr	%	Mean	STD
1	5	6.9		
2	2	2.8		
3	6	8.3		
4	4	5.6		
5	20	27.8	5.88	2.57
6	8	11.1		
7	7	9.7		
8	7	9.7		
9	3	4.2		
10	10	13.9		
Total	72	100.0	-	-

Note: Fr (Frequency); STD (Standard Deviation)

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Question 8 inquired whether the respondents were asked in their department to use technology in any of the courses, and if they were for what purposes. The responses given to this question varied like this: 34 respondents (47.2%) said 'yes' and 38 respondents (52.8%) said 'no'. Those who gave a positive response did not indicate any purpose.

The last question (question 9) in Part A inquired whether the respondents, as prospective teachers of English, feel that they are ready (in terms of knowledge and skills) to integrate technology into their teaching after their graduation. They were also asked to justify their responses by writing the reasons why they feel so. The results showed that the majority of the respondents (57 in number, 79.2%) had a positive feeling about it, while 15 of them (20.8%) did not feel ready for using technology in their own teaching. None of the respondents provided any explanation for their responses.

The table below shows the statistical analysis of the answers given to questions 3-9 in Part A of the survey.

Table 4.3: The Descriptive Statistics for Part A of the Items of the Questionnaire

Item	No (1)		Yes (2)		Mean	STD
	Fr	%	Fr	%		
Q3	33	45.8	39	54.2	1.54	0.50
Q4	8	11.1	64	88.9	1.89	0.32
Q5	2	2.8	70	97.2	1.97	0.17
Q6	5	6.9	67	93.1	1.93	0.26
Q8	38	52.8	34	47.2	1.47	0.50

Q9	15	20.8	57	79.2	1.79	0.41

Note: Fr (Frequency); STD (Standard Deviation)

Having provided some preliminary information about the participating pre-service teachers' interest and familiarity with technological tools, we can now move to the analysis of the responses given to the main TPACK-EFL survey items, which was Part B of the survey.

As explained in the previous chapter (Chapter 3), the survey has seven parts, each of which has a number of items related to different knowledge types which compoesd the TPACK. The first part is related to the **Technological Knowledge (TK),** which has 9 items:

1. I can use basic technological terms (e.g. operating system, wireless connection, virtual memory, etc.) appropriately.

2. I can adjust computer settings such as installing software and establishing an Internet connection.

3. I can use computer peripherals such as a printer, a headphone, and a scanner.

4. I can troubleshoot common computer problems (e.g. printer problems, Internet connection problems, etc.) independently.

5. I can use digital classroom equipment such as projectors and smart boards.

6. I can use Office programs (i.e. Word, PowerPoint, etc.) with a high level of proficiency.

7. I can create multimedia (e.g. video, web pages, etc.) using text, pictures, sound, video, and animation.

8. I can use collaboration tools (wiki, Edmodo, 3D virtual environments, etc.) in accordance with my objectives.

9. I can learn software that helps me complete a variety of tasks more efficiently.

The descriptive statistics for these items can be seen in the table below (Table 4.4). The analysis shows that on the micro-level for the statements of TK, the highest point; i.e. 5, according to the scale with a mean value of 3.46 and standard deviation value of 1.22, was given to the statement X6 with a percentage of 25%, which indicates that the respondents can use office programs (i.e. Word, PowerPoint, etc.) with a high level of proficiency, whereas the lowest point given to the same statement was 6.9%.

Table 4.4: The Descriptive Statistics for the TK

Item	Nothing none (1)		Very little (2)		Some (3)		Quite a bit (4)		A great deal (5)		Mean	STD
	Fr	%	Fr	%	Fr	%	Fr	%	Fr	%		
X1	4	5.6	16	22.2	30	41.7	11	15.3	11	15.3	3.13	1.10
X2	12	16.7	15	20.8	23	31.9	11	15.3	11	15.3	2.92	1.29
X3	8	11.1	11	15.3	25	34.7	11	15.3	17	23.6	3.25	1.29
X4	15	20.8	13	18.1	28	38.9	6	8.3	10	13.9	2.76	1.27
X5	18	25.0	12	16.7	23	31.9	9	12.5	10	13.9	2.74	1.34
X6	5	6.9	11	15.3	20	27.8	18	25.0	18	25.0	3.46	1.22
X7	8	11.1	11	15.3	27	37.5	14	19.4	12	16.7	3.15	1.21
X8	16	22.2	19	26.4	20	27.8	10	13.9	7	9.7	2.63	1.25
X9	4	5.6	14	19.4	29	40.3	13	18.1	12	16.7	3.21	1.11
Total	10	13.9	14	18.8	25	34.7	11	15.9	12	16.7	3.03	0.84

Note: Fr (Frequency); STD (Standard Deviation)

On the other hand, statement X8 was given the lowest point compared with the rest of the statement; 9.7% with a mean value of 2.63 and SD value of 1.25. This result indicates that the respondents can use collaboration tools (wiki, Edmodo, 3D virtual environments, etc.) in accordance with their objectives, whereas the lowest point given to the same statement was 22.2%. The other statements included to measure the TK, the values ranged between those indicators (X6 and X8) with the different values of percentages, means, and standard deviations.

At the macro level of TK, the results indicated the respondents' agreement on the content of all statements that measure this dimension in terms of percentages 13.9% for none, 18.8% for very little, 34.7% for some, 15.9% for quite a bit, and 16.7% for a great deal; therefore, according to these results and depending on mean values 3.03, it can be induced that the sample agree that they have quite a bit of TK.

Based on the (t) value, which is 44.47, it can be concluded that the statement X6 was the most important statement regarding the TK, which in turn indicates that the participants could use office programs. It is worth confirming that the result of this statement was significant; 0.000 against the default significant value of the study which is 0.05.

The second component of the TPACK is related to **Content Knowledge (CK)** with five items as shown below:

10. I can express my ideas and feelings by speaking in English.

11. I can express my ideas and feelings by writing in English.

12. I can read texts written in English with the correct pronunciation.

13. I can understand texts written in English.

14. I can understand the speech of a native English speaker easily.

As can be seen in Table 4.5, on the micro-level for the statements of CK, statement X10 received the highest rank with 43.1%, mean value 3.93 and SD value of 1.11, which indicates that the respondents can express their ideas and feelings by speaking in English, whereas the lowest rank this statement received was 2.8%.

On the other hand, statement X14 received the lowest rank among all the statements with 29.2%, a mean value of 3.56 and an SD value of 1.16. This result indicates that the participants could understand the speech of native speakers easily. However, the lowest rank that this statement received from the participants was 2.8. The other statements included to measure the CK, the values ranged between those indicators (X10 and X14) with the different values of percentages, means, and standard deviations.

Table 4.5: The Descriptive Statistics for the CK

Item	Nothing none (1)		Very Little (2)		Some (3)		Quite a bit (4)		A great Deal (5)		Mean	STD
	Fr	%	Fr	%	Fr	%	Fr	%	Fr	%		
X10	2	2.8	4	5.6	22	30.6	13	18.1	31	43.1	3.93	1.11
X11	2	2.8	6	8.3	22	30.6	12	16.7	30	41.7	3.86	1.14
X12	0	0	9	12.5	20	27.8	20	27.8	23	31.9	3.79	1.03
X13	0	0	5	6.9	17	23.6	22	30.6	28	38.9	4.01	0.96
X14	2	2.8	12	16.7	23	31.9	14	19.4	21	29.2	3.56	1.16
Total	1	1.7	7	10	21	28.9	16	22.5	27	37.0	3.83	0.87

Note: Fr (Frequency); STD (Standard Deviation)

Analysis at the macro level for CK showed that the respondents agreed on the content of all statements that measure this dimension in terms of percentages 1.7% for nothing none, 10% for very little, 28.9% for some, 22.5% for quite a bit, and 37% for a great deal; therefore, according to these results and depending on mean value 3.83, it can be induced that the respondents agree that they have quite a bit of CK.

Based on the (t) value, which is 35.60, it can be concluded that the statement X13 was the most important statement regarding the CK, which in turn indicates that the participants could understand texts written in English. It is worth confirming that the result of this statement was significant; 0.000 against the default significant value of the study which is 0.05.

The third component of the TPACK is related to **Pedagogical Knowledge (PK)** with six items as shown below:

15. I can use teaching methods and techniques that are appropriate for a learning environment.
16. I can design a learning experience that is appropriate for the level of students.
17. I can support students' learning in accordance with their physical, mental, emotional, social, and cultural differences.
18. I can collaborate with school stakeholders (students, parents, teachers, etc.) to support students' learning.
19. I can reflect the experiences that I gain from professional development programs to my teaching process.
20. I can support students' out-of-class work to facilitate their self-regulated learning.

As can be seen in Table 4.6, on the micro-level for the statements of PK, statement X17 received the highest rank from the participants with a 29.2%, a mean value of 3.60 and an SD value of 1.08, which indicates that the respondents could support students' learning in accordance with their physical, mental, emotional, social, and cultural differences, It is worth mentioning that no point was given against this statement by any of the participants; i.e. 0%.

On the other hand, statement X16 was given the lowest rank among all the statements here with 16.7%, a mean value of 3.18 and an SD value of 1.16, which indicates that the respondents could design a learning experience that is appropriate for the level of students. However, the lowest percentage given to the same statement was 6.9. The other statements included to measure the PK, the values ranged between those indicators (X16 and X17) with the different values of percentages, means, and standard deviations.

Table 4.6: The Descriptive Statistics for the PK

Item	Nothing none (1)		Very Little (2)		Some (3)		Quite a bit (4)		A great Deal (5)		Mean	STD
	Fr	%	Fr	%	Fr	%	Fr	%	Fr	%		
X15	2	2.8	10	13.9	30	41.7	12	16.7	18	25.0	3.47	1.10
X16	5	6.9	15	20.8	26	36.1	14	19.4	12	16.7	3.18	1.16
X17	0	0	10	13.9	26	36.1	15	20.8	21	29.2	3.60	1.08
X18	1	1.4	8	11.1	27	37.5	17	23.6	19	26.4	3.63	1.04
X19	3	4.2	11	15.3	26	36.1	12	16.7	20	27.8	3.49	1.18
X20	1	1.4	8	11.1	29	40.3	15	20.8	19	26.4	3.60	1.04
Total	1	2.8	7	14.4	21	38.0	16	19.7	27	25.3	3.49	0.90

Note: Fr (Frequency); STD (Standard Deviation)

Analysis at the macro level for PK showed that the respondents agreed on the content of all statements that measure this dimension in terms of percentages 2.8% for nothing none, 14.4% for very little, 38% for some, 19.7% for quite a bit, and 25.3% for a great deal; therefore, according to these results and depending on mean value 3.49, it can be induced that the respondents agree that they have quite a bit of PK.

Based on the (t) value, which is 29.56, it can be concluded that the statement X17 was the most important statement regarding the PK, which in turn indicates that the participants could support students learning. It is worth confirming that the result of this statement was significant; 0.000 against the default significant value of the study which is 0.05.

The fourth component of the TPACK is related to **Pedagogical Content Knowledge (PCK)** with five items as shown below:

21. I can manage a classroom learning environment.

22. I can evaluate students' learning processes.

23. I can use appropriate teaching methods and techniques to support students in developing their language skills.

24. I can prepare curricular activities that develop students' language skills.

25. I can adapt a lesson plan in accordance with students' language skill levels.

According to Table 4.7, on the micro-level for the statements of PCK, statement X22 received the highest rank or percentage of 31.9% with a mean value of 3.74 and an SD value of 1.08, which indicates that the participants /respondents could evaluate the students' learning process. The lowest percentage that this same statement received was 1.4%.

On the other hand, statement X25 received the lowest percentage of 16.7% with a mean value of 3.36 and an SD of 1.09. However, the lowest percentage this statement received was 6.9%. The other statements included to measure the PCK, the values ranged between those indicators (X22 and X25) with the different values of percentages, means, and standard deviations.

Table 4.7: The Descriptive Statistics of the PCK

Item	Nothing none (1)		Very Little (2)		Some (3)		Quite a bit (4)		A great Deal (5)		Mean	STD
	Fr	%	Fr	%	Fr	%	Fr	%	Fr	%		
X21	6	8.3	8	11.1	20	27.8	17	23.6	21	29.2	3.54	1.26
X22	1	1.4	8	11.1	23	31.9	17	23.6	23	31.9	3.74	1.08
X23	0	0	7	9.7	22	30.6	26	36.1	17	23.6	3.74	0.93
X24	4	5.6	10	13.9	15	20.8	21	29.2	22	30.6	3.65	1.21
X25	5	6.9	7	9.7	29	40.3	19	26.4	12	16.7	3.36	1.09
Total	1	4.4	7	11.1	21	30.3	16	27.8	27	26.4	3.61	0.92

Note: Fr (Frequency); STD (Standard Deviation)

Analysis at the macro level for PCK indicated that the respondents agreed on the content of all statements that measure this dimension in terms of percentages 4.4% for nothing none, 11.1% for very little, 30.3% for some, 27.8% for quite a bit, and 26.4% for a great deal, so according to these results and depending on mean value 3.61, it can be induced that the participants agree that they have quite a bit of PCK.

Based on the (t) value, which is 33.93, it can be concluded that the statement X23 was the most important statement regarding the PCK, which in turn indicates that the participants could use appropriate teaching methods and techniques that help students

develop their language skills. It is worth confirming that the result of this statement was significant; 0.000 against the default significant value of the study which is 0.05.

The fifth component of the TPACK is related to **Technological Content Knowledge (TCK)** with three items as shown below:

26. I can take advantage of multimedia (e.g. video, slideshow, etc.) to express my ideas about various topics in English.

27. I can benefit from using technology (e.g. web conferencing and discussion forums) to contribute at a distance to multilingual communities.

28. I can use collaboration tools to work collaboratively with foreign persons (e.g. Second Life, wiki, etc.).

Table 4.8 below shows that on the micro-level for the statements of TCK, statement X26 received the highest rank from the participants with a 29.2%, a mean value of 3.53 and an SD value of 1.22, which indicates that the respondents could take advantage of multimedia (e.g. video, slideshow, etc.) to express their ideas about various topics in English. It is worth mentioning that the lowest percentage that this same statement received was 8.3%.

Table 4.8: The Descriptive Statistics of the TCK

Item	Nothing none (1)		Very Little (2)		Some (3)		Quite a bit (4)		A great Deal (5)		Mean	STD
	Fr	%	Fr	%	Fr	%	Fr	%	Fr	%		
X26	6	8.3	5	6.9	27	37.5	13	18.1	21	29.2	3.53	1.22
X27	4	5.6	15	20.8	31	43.1	10	13.9	12	16.7	3.15	1.11
X28	3	4.2	17	23.6	29	40.3	13	18.1	10	13.9	3.14	1.07
Total	4	6.0	13	17.1	29	40.3	12	16.7	14	19.9	3.27	0.90

Note: Fr (Frequency); STD (Standard Deviation)

On the other hand, statement X28 was given the lowest rank among all the statements here with 13.9%, a mean value of 3.14 and an SD value of 1.07, which indicates that the respondents could use collaboration tools to work collaboratively with foreign persons (e.g. Second Life, wiki, etc.). However, the lowest percentage given to the same statement was 4.2%. The other statements included to measure the TCK, the values ranged between those indicators (X26 and X28) with the different values of percentages, means, and standard deviations.

Analysis at the macro level for TCK showed that the respondents agreed on the content of all statements that measure this dimension in terms of percentages 6% for nothing none, 17.1% for very little, 40.3% for some, 16.7% for quite a bit, and 19.9% for a great deal; therefore, according to these results and depending on mean value 3.27, it can be induced that the respondents agree that they have a quite a bit of TCK.

Based on the (t) value, which is 24.51, it can be concluded that the statement X26 was the most important statement regarding the TCK, which in turn indicates that the participants could take advantage of multimedia. It is worth confirming that the result of this statement was significant; 0.000 against the default significant value of the study which is 0.05.

The sixth component of the TPACK is related to **Technological Pedagogical Knowledge (TPK)** with seven items as shown below:

29. I can meet students' individualized needs by using information technologies.
30. I can lead students to use information technologies legally, ethically, safely, and with respect to copyrights.

31. I can support students as they use technology such as virtual discussion platforms to develop their higher order thinking abilities.

32. I can manage the classroom learning environment while using technology in the class.

33. I can decide when technology would benefit my teaching of specific English curricular standards.

34. I can design learning materials by using technology that supports students' language learning.

35. I can use multimedia such as videos and websites to support students' language learning.

Table 4.9 below shows that on the micro-level for the statements of TPK, statement X32 received the highest rank from the participants with a 33.3%, a mean value of 3.63 and an SD value of 1.20, which indicates that the respondents could manage the classroom learning environment while using technology in the class, it is worth mentioning that the lowest percentage that this same statement received was 4.2%.

On the other hand, statement X29 was given the lowest rank among all the statements here with 16.7%, a mean value of 3.35 and an SD value of 1.13, which indicates that the respondents could meet students' individualized needs by using information technologies. However, the lowest percentage given to the same statement was 8.3%. The other statements included to measure the TPK, the values ranged between those indicators (X29 and X32) with the different values of percentages, means, and standard deviations.

Table 4.9: The Descriptive Statistics of the TPK

Item	Nothing none (1)		Very Little (2)		Some (3)		Quite a bit (4)		A great Deal (5)		Mean	STD
	Fr	%	Fr	%	Fr	%	Fr	%	Fr	%		
X29	6	8.3	7	9.7	27	37.5	20	27.8	12	16.7	3.35	1.13
X30	3	4.2	13	18.1	28	38.9	12	16.7	16	22.2	3.35	1.14
X31	3	4.2	12	16.7	26	36.1	17	23.6	14	19.4	3.38	1.11
X32	3	4.2	8	11.1	22	30.6	15	20.8	24	33.3	3.63	1.20
X33	3	4.2	10	13.9	22	30.6	16	22.2	21	29.2	3.58	1.17
X34	4	5.6	14	19.4	19	26.4	12	16.7	23	31.9	3.50	1.28
X35	2	2.8	10	13.9	22	30.6	16	22.2	22	30.6	3.64	1.14
Total	2	2.8	10	13.9	22	30.6	16	22.2	22	30.6	3.49	0.90

Note: Fr (Frequency); STD (Standard Deviation)

Analysis at the macro level for TPK indicated that the respondents agreed on the content of all statements that measure this dimension in terms of percentages 2.8% for nothing none, 13.9% for very little, 30.6% for some, 22.2% for quite a bit, and 30.6% for a great deal, so according to these results and depending on mean value 3.49, it can be induced that the sample agree that they have quite a bit of TPK.

Based on the (t) value, which is 27.04, it can be concluded that the statement X35 was the most important statement regarding the TPK, which in turn indicates that the participants could use multimedia such as videos and websites to support students' language learning. It is worth confirming that the result of this statement was significant; 0.000 against the default significant value of the study which is 0.05.

The seventh and last component of the TPACK is related to **Technological Pedagogical Content Knowledge (TPACK)** with four items as shown below:

36. I can use collaboration tools (e.g. wiki, 3D virtual environments, etc.) to support students' language learning.

37. I can support students as they use technology to support their development of language skills in an independent manner.

38. I can use Web 2.0 tools (animation tools, digital story tools, etc.) to develop students' language skills.

39. I can support my professional development by using technological tools and resources to continuously improve the language teaching process.

As Table 4.10 below shows, on the micro-level for the statements of TPACK, statement X37 received the highest rank from the participants with a 33.3%, a mean value of 3.63 and an SD value of 1.19, which indicates that the respondents could support students as they use technology to support their development of language skills independently. It is worth mentioning that the lowest percentage that this same statement received was 4.2%.

Table 4.10: The Descriptive Statistics of the TPACK

Item	Nothing none (1)		Very Little (2)		Some (3)		Quite a bit (4)		A great Deal (5)		Mean	STD
	Fr	%	Fr	%	Fr	%	Fr	%	Fr	%		
X36	7	9.7	20	27.8	17	23.6	20	27.8	8	11.1	3.03	1.19
X37	3	4.2	9	12.5	24	33.3	12	16.7	24	33.3	3.63	1.19
X38	4	5.6	20	27.8	21	29.2	15	20.8	12	16.7	3.15	1.17
X39	6	8.3	7	9.7	22	30.6	18	25.0	19	26.4	3.51	1.22
Total	5	7.0	14	19.5	21	29.2	16	22.6	16	21.9	3.33	0.98

Note: Fr (Frequency); STD (Standard Deviation)

On the other hand, statement X36 was given the lowest rank among all the statements here with 11.1%, a mean value of 3.03 and an SD value of 1.19, which indicates that the respondents could use collaboration tools (e.g. wiki, 3D virtual environments, etc.) to support students' language learning. However, the lowest percentage given to the same statement was 9.7%. The other statements included to measure the TPACK, the values ranged between those indicators (X36 and X37) with the different values of percentages, means, and standard deviations.

Analysis at the macro level for TPACK showed that the respondents agreed on the content of all statements that measure this dimension in terms of percentages 7% for nothing none, 19.5% for very little, 29.2% for some, 22.6% for quite a bit, and 21.9% for a great deal, therefore, according to these results and depending on mean value 3.33, it can be induced that the sample agree that they have a quite a bit of TPACK.

Based on the (t) value, which is 25.81, it can be concluded that the statement X37 was the most important statement regarding the TPACK, which in turn indicates that the participants could get support from technology to support their development of language skills in an independent manner. It is worth confirming that the result of this statement was significant; 0.000 against the default significant value of the study which is 0.05.

After reporting the details of the participating pre-service teacher' responses to different components of TPACK, now we can have a look into the statistical analysis of respondents answers to the TPACK survey in more general terms.

Table 4.11: The Participants' General Responses to TPACK

Item	Nothing none (1)		Very Little (2)		Some (3)		Quite a bit (4)		A great Deal (5)		Mean	STD	T	Sig
	Fr	%	Fr	%	Fr	%	Fr	%	Fr	%				
TK	10	13.9	14	18.8	25	34.7	11	15.9	12	16.7	3.03	0.84	30.64	0.00
CK	1	1.7	7	10	21	28.9	16	22.5	27	37.0	3.83	0.87	37.22	0.00
PK	1	2.8	7	14.4	21	38.0	16	19.7	27	25.3	3.49	0.90	33.03	0.00
PCK	1	4.4	7	11.1	21	30.3	16	27.8	27	26.4	3.61	0.92	33.35	0.00
TCK	4	6.0	13	17.1	29	40.3	12	16.7	14	19.9	3.27	0.90	31.01	0.00
TPK	2	2.8	10	13.9	22	30.6	16	22.2	22	30.6	3.49	0.90	32.73	0.00
TPACK	5	7.0	14	19.5	21	29.2	16	22.6	16	21.9	3.33	0.98	28.72	0.00
Total	3	5.3	10	14.2	23	33.8	14	20.8	22	26.0	3.50	0.90	33.00	0.00

Note: Fr (Frequency); STD (Standard Deviation); T (T-test); Sig (Significant)

According to the views of respondent's and depending on the values of (t) test, the dimensions of the study can be arranged in a descending order from the most to least important as follows:

a. CK with t value equal to 37.22, and mean value 3.83.

b. PCK with t value equal to 33.35, and mean value 3.61.

c. PK with t value equal to 33.03, and mean value 3.49.

d. TPK with t value equal to 32.73, and mean value 3.49.

e. TCK with t value equal to 31.01, and mean value 3.27.

f. TK with t value equal to 30.64, and mean value 3.61.

g. TRACK with t value equal to 28.72, and mean value 3.33.

These results reflect the perceptions of EFL pre-service teachers regarding their TPACK. Another analysis to report here is whether there were any differences between the respondents' gender (i.e., being male or female) and their perceptions as regards the different components of TPACK.

Table 4.12: The TPACK Differences According to Gender

Item	Gender	Fr.	Mean	Df.	T	Sig.
TK	Male	47	3.024	70	.971	.136
	Female	25	3.031			
CK	Male	47	3.779	70	4.688	.024
	Female	25	3.928			
PK	Male	47	3.489	70	.348	.422
	Female	25	3.500			
PCK	Male	47	3.621	70	7.198	0.004
	Female	25	3.576			
TCK	Male	47	3.213	70	11.782	0.000
	Female	25	3.387			
TPK	Male	47	3.465	70	16.295	0.000

	Female	25	3.531			
TPACK	Male	47	3.303	70	21.313	0.000
	Female	25	3.380			

Note: Fr (Frequency); Df (Degree of freedom); T (T-test); Sig (Significant)
Value of tabulated (t) with degree of freedom (70) = 1.667
Notes: The **degrees of freedom** in a statistical calculation represent how many values involved in a calculation have the freedom to vary. The degrees of freedom can be calculated to help ensure the statistical validity of chi-square tests, t-tests and even the more advanced f-tests. These tests are commonly used to compare observed data with data that would be expected to be obtained according to a specific hypothesis.

From the table above, the following results can be inferred. The above table shows no differences between respondents according to their gender (male and female) toward dealing with the technological knowledge, as the significance value is 0.136 which is bigger than the value of the default level of the study 0.05 that is confirmed by (t) test value 0.971 which in turn is smaller than the tabulated (t) 1.667 with a degree of freedom 70.

There are significant differences between male and female respondents toward dealing with the content knowledge, as the value of significant level is 0.024 which is smaller than the value of the default level of the study 0.05 that is confirmed by (t) test value 4.688 which is bigger than the tabulated (t) 1.667 with degree of freedom 70. To know the source of these differences one must return to the mean values; the mean value of the female 3.928 is bigger than the mean value of the male 3.779; thus, this means that the female participants in the sample prefer to own the content knowledge in this study program than the male participants.

On the other hand, there are no differences between male and female respondents toward dealing with the pedagogical knowledge, as the value of significant level is

0.422 which is bigger than the value of the default level of the study 0.05 that is confirmed by (t) test value 0.348 which is smaller than the tabulated (t) 1.667 with a degree of freedom 70.

Toward dealing with the pedagogical content knowledge, there are significant differences between male and female respondents, as the value of significant level 0.004 that is smaller than the value of the default level of the study 0.05 which is confirmed by (t) test value 7.198 which is bigger than the tabulated (t) 1.667 with a degree of freedom of 70. To know the source of these differences one has to return to the mean values, as the mean value of the male 3.621 is bigger than the mean value of the female (3.576); therefore, this means that the male participants in the sample prefer to own the pedagogical content knowledge in this study program than the female participants.

Similarly, there are significant differences between male and female respondents toward dealing with the technological content knowledge, as the value of significant level is (0.000) that is smaller than the value of the default level of the study 0.05 which is confirmed by (t) test value 11.782 that is bigger than the tabulated (t) 1.667 with a degree of freedom 70. To know the source of these differences, one has to refer to the mean values, as the mean value of the female 3.387 is bigger than the mean value of the male 3.123. This means that the female participants in the sample prefer to own the technological content knowledge in this study program than the male ones.

There are significant differences between male and female respondents toward dealing with the technological pedagogical knowledge, as the value of significant level is (0.000) that is smaller than the value of the default level of the study 0.05 which is

confirmed by (t) test value 16.295 that is bigger than the tabulated (t) 1.667 with a degree of freedom of 70. To know the source of these differences one has to refer to the mean values, as the mean value of the female 3.531 is bigger than the mean value of the male 3.465; thus, this means that the female participants in the sample prefer to own the technological pedagogical knowledge in this study program than the male ones.

Considering the technological pedagogical content knowledge, there are also significant differences between male and female respondents. This conclusion depends on the value of significant level, which is 0.000, smaller than the value of the default level of the study 0.05 which is confirmed by (t) test value 21.313 that is bigger than the tabulated (t) 1.667 with a degree of freedom of 70. To know the source of these differences, one has to refer to the mean values, as the mean value of the female 3.380 is bigger than the mean value of the male 3.303; therefore, this means that the female participants in the sample prefer to own the technological pedagogical content knowledge in this study program than the male ones.

Another correlation searched in this study was the one between the age of the participants and the TPACK. Table 4.13 shows the following statistical results and details:

Table 4.13: The TPACK Differences According to the age

Item	Age	Fr.	Df.	F	Sig.
	22 – 23	34			
TK	24 – 25	18	3 , 68	1.876	.142
	26 – 27	7			

	Over 27	13			
CK	22 – 23	34	3 , 68	.429	.733
	24 – 25	18			
	26 – 27	7			
	Over 27	13			
PK	22 – 23	34	3 , 68	.634	.596
	24 – 25	18			
	26 – 27	7			
	Over 27	13			
PCK	22 – 23	34	3 , 68	.410	.747
	24 – 25	18			
	26 – 27	7			
	Over 27	13			
TCK	22 – 23	34	3 , 68	.137	.937
	24 – 25	18			
	26 – 27	7			
	Over 27	13			
TPK	22 – 23	34	3 , 68	1.163	.330
	24 – 25	18			
	26 – 27	7			

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			Df	F	Sig
	Over 27	13			
	22 – 23	34			
	24 – 25	18			
TPACK			3 , 68	2.129	.105
	26 – 27	7			
	Over 27	13			

Note: Fr (Frequency); Df (Degree of freedom); F (Freedom); Sig (Significant) Value of tabulated (F) with degree of freedom 3, 68 = 2.740

Notes: The **degrees of freedom** in a statistical calculation represent how many values involved in a calculation have the freedom to vary. The degrees of freedom can be calculated to help ensure the statistical validity of chi-square tests, t-tests and even the more advanced f-tests. These tests are commonly used to compare observed data with data that would be expected to be obtained according to a specific hypothesis.

An F statistic is a value to get when running an ANOVA test or a regression analysis to find out if the means between two populations are significantly different. It is similar to a T statistic from a T-Test; A-T test will tell if a *single* variable is statistically significant and an F test will tell you if a *group* of variables are jointly significant.

There are no differences between respondents in terms of their age and dealing with the technological knowledge, because the value of significance is 0.142 which is bigger than the value of the default level of the study 0.05 which is confirmed by (F) test value 1.876 that is smaller than the tabulated (t) 2.740 with a degree of freedom of 3, 68.

The analysis showed no differences between respondents with respect to their age and dealing with the content knowledge, because the value of significance is 0.733 which is bigger than the value of the default level of the study 0.05 which is confirmed by (F) test value 0.429 that is smaller than the tabulated (t) 2.740 with degree of freedom 3, 68.

Regarding the age of respondents, no differences are found between respondents in dealing with the pedagogical knowledge, because the value of significance is 0.596 which is bigger than the value of the default level of the study 0.05 which is confirmed by (F) test value 0.634 that is smaller than the tabulated (t) 2.740 with a degree of freedom of 3, 68.

In the same vein, there are no differences between respondents' age and the pedagogical content knowledge, because the value of significance is 0.747 which is bigger than the value of the default level of the study 0.05 which is confirmed by (F) test value 0.410 that is smaller than the tabulated (t) 2.740 with a degree of freedom of 3, 68.

With respect to respondents' age and the technological content knowledge, there are no differences between respondents because the value of significance is 0.937 which is bigger than the value of the default level of the study 0.05 which is confirmed by (F) test value 0.137 that is smaller than the tabulated (t) 2.740 with a degree of freedom of 3, 68.

Similarly, there are no differences between respondents' age and the technological pedagogical knowledge, because the value of significance is 0.330 which is bigger than the value of the default level of the study 0.05 which is confirmed by (F) test value 1.163 that is smaller than the tabulated (t) 2.740 with a degree of freedom of 3, 68.

Lastly, no differences are found between respondents' age and the technological pedagogical content knowledge, because the value of significance is 0.105 which is

bigger than the value of the default level of the study 0.05 which is confirmed by (F) test value 2.129 that is smaller than the tabulated (t) 2.740 with a degree of freedom of 3, 68.

4.2 Research Question #2: What are the Pre-service EFL Teachers' and Instructors' Perceptions as Regards the Effect of the Teacher Education Program on Pre-service Teachers' TPACK Development?

In order to elicit the perceptions about the effect of the teacher education program on pre-service teachers' TPACK development, the researcher used semi-structured interview questions directed both at the pre-service teachers (10 in number) and department instructors (5 in number). The abbreviations PS and I (with numbers 1, 2, 3, etc.) will be used in the text below to refer to the pre-service teachers and instructors, respectively, when needed.

The statistical analysis of the quantitative data (from the survey) and the content analysis of the qualitative data obtained from the interviews with the participants (both from the pre-service teachers and instructors) revealed three themes regarding the effect of the teacher education program on pre-service teachers' TPACK development. They are: i) availability of the physical/technical facilities in the department, ii) exposure to technology-integrated classes, iii) feelings of readiness for integrating technology. Each of these will be explained in detail below.

i) Availability of the physical/technical facilities in the department

The participants were firstly asked to talk about what kind of physical and technical facilities were available in the department that they were studying. The response to this question was short and simple. The classes were traditional type classrooms,

lacking any technical or electronic equipment, such as a fixed desktop, or a screen. In addition, there was no access to the internet in the classes. However, the interviewed pre-service teachers added that when they needed to use, they mostly used their laptops and mobile devices (using their own 3G) in the classroom, but this was not possible for all students. The interviewees mentioned that the only technical equipment available was the data projector for PowerPoint presentations.

ii) Exposure to technology-integrated classes

It was clarified that the most commonly used technology in classes was the data projector, especially when making PowerPoint presentations on their laptops. Knowing that there was no fixed desktop in the classes, pre-service teachers were required to bring their own laptops to the class when they were assigned to present something. In addition to the laptops, some students mentioned that they used their phones for different purposes such as checking meaning of new words, taking notes, and making quick search on the internet about certain concepts. PS-6 added another function of using phones in the classroom as follows:

> We use laptops and data-show whenever there's a presentation (plus teachers use them on a daily basis)… also when there's a video related to the subject… and also phones especially for checking meaning of words and taking photos of the board. (PS-6)

From the PS-6 answered, the researcher concluded that from the TPACK survey in TK component X6 (I can use Office programs (i.e. Word, PowerPoint, etc.) with a high level of proficiency) is the most important element according to T value.

Taking photos of the board or PowerPoint slides that the instructor shares during the class appears to have become a very common practice among the students (pre-service

teachers) in class. This may be due to the accelerated pace of the lesson with the use of technology. Students may not be able to see on their notebooks the details on the slides, because the slides change very quickly.

When the pre-service teachers were asked whether or not they were introduced to any programs for the purpose of learning while inside and outside the classroom, they gave a variety of answers. While some of them gave a positive response to this question, others sounded to be hesitant about it. Below are some of the responses:

> No, not really. (PS-1)

> No. (PS-2) (PS-8)

> No, but just because of the coronavirus we used (E-learning Moodle) and (zoom meeting) for online teaching. (PS-5).

> Yes, but it was a little bit and I don't understand. (PS-3).

> Yes, teachers suggest some websites to enrich our knowledge on some materials. (PS-4).

> Yes, when I was in my first year at university one of my friends in senior year introduced me to a program about learning Basic English - it was a show consisting of 30 episodes- that helped me learning the language inside and outside the classroom. (PS-6).

From the above answers researcher revealed that PS teachers are not introduced to any online application program, therefore they have "quite a bit" of TK, TCK, TPK and TPACK regarding the TPACK survey.

The same questions were asked to the instructors in the department. It was inquired whether or not they, as instructors, use technology in the classes and if they do, in what ways they do it. Instructors also mentioned the lack of internet access in the school

environment which, as they said, prevented them from using the internet in class. Instead, they used a different technique. One instructor (I-1) expressed it as follows:

> To some certain extent I do use technology; for example, I use the laptop and data show but I don't use the Internet inside the classroom, because, unfortunately we do not have good access to the Internet in the classrooms. Therefore, if I need any material I usually download it at home such as PDFs, videos and audio tracks for my presentations and subject. Therefore, I usually access the internet at home and work there. (I-1)

Similar to the pre-service teachers, instructors mentioned the frequent use of PowerPoint presentations as integration of technology. It was highlighted by an instructor like this:

> Technology is essential in my classroom and I give a great deal of time to improve my skills to integrate technology in my classroom. I depend on PowerPoint presentations prepared by me to teach any subject of Reading and Writing. This is supported by PDF files, images, and sometimes videos to deliver clear and rich information to the students. I use the laptop, the projector, a laser pointing device and remote controller to control my PC in the classroom. (I-2)

Some of the interviewed instructors also emphasized that they do not use social media for teaching purposes. To exemplify:

> I use social media as a means of communication and exchanging data, not for teaching. (I-4)

One instructor added the following, regarding the use of social media for pedagogical purposes:

> Yes, I use YouTube, videos and PowerPoint slides. I don't use internet because it is not available inside the classroom. However, I sometimes ask my students to check things on the Internet from their mobile phones. I sometimes ask my students to share some stuff among themselves on Facebook or any other link where they have shared groups. Using technology definitely enhances my performance. (I-5)

When asked whether they introduced any technological program to their students (i.e., pre-service teachers) to use inside or outside the classroom, instructors' gave various responses, some of which were as follows:

> Sometimes I present websites and mobile phone apps which can help them get more information about a specific part of any material I give or some extra information for their own benefit. I use Google Classroom to teach my students, give them assignments, or make an announcement. (I-2)

> I haven't used online programs inside class before the COVID-19, but often, I do introduce and recommend some useful educational sites to my students that they can access at their own time outside class, at home, for example. I usually recommend such websites as the British Council official page, EnglishClub.com, Eric's Lounge. (I-1)

> No, not really, but I ask them sometimes to go and find things on the Google. I usually tell them 'if you are interested in more details go and Google it'. (I-5)

Instructors' showed that they are using some technology such as laptops and projectors to show powerpoint slides or YouTube videos. Also, instructors' revealed that they introduced some websides and applications but they did not reveal that how pre-service teachers going to use it without any demostrations inside the classroom by the instructors'.

iii) Feelings of readiness for integrating technology

Another issue that emerged during the analysis of interviews was whether the pre-service teachers were well-prepared and ready for technology integration into their education in terms of knowledge and skills when they start their career after graduation. This question was asked both to the pre-service teachers and instructors. From the perspective of pre-service teachers, there was a positive belief in that: seven interviwed pre-service teachers gave a positive response to this question. Some of the responses were very general. For example:

Yes, it has helped me to figure out a faster and more secured ways to find information for a certain topic from variety of sources. (PS-1)

I'm ready to do this because department have done everything to get us prepared, there is nothing left for us that we don't know. Teacher prepared us very well we shall pass this information to the next generation of learners'. (PS-3)

Yes, our department prepared us in great way of how to use technology. (PS-7)

Yes, the department helped me a lot about developing my English language and the use of technology for developing my style and strategies of teaching. (PS-8)

Some interviewees, on the other hand, were more specific about it:

Yes, especially when the teachers supported us to make a presentation about any topics, also helped us to learn how to create PowerPoint about any topics. (PS-5)

Yes, during the period in university our teachers showed us how to prepare presentations and how technology can make the teaching process much simpler and more fun. (PS-9)

Although they were small in number (only three), there were other pre-service teachers were not positive about it. They expressed that the program they attended did not prepare them for integrating technology into their teaching. Their responses were as follows:

No. (PS-2)

Not at all. (PS-4)

No, we didn't have enough information about technology, they didn't teach us well. We need more. (PS-10)

From the PS teachers prospective they are ready to use TPACK inside the classroom for future teaching but in the countray some instructors' believed that they are not ready to use technology in their future study because during the COVID-19 students faced many obstacles with online lessons.

With respect to the instructors' perspectives on the same interview question as to whether pre-service teachers were trained in the future to incorporate technology, instructors gave different answers. One of them, for example, sounded unsure about the students' (i.e., pre-service teachers') readiness level for using technology in their teaching:

> Before coronavirus I thought highly of the students' literacy in technology but when we introduced e-learning and Moodle during the corona virus global pandemic, I found out that they are mostly incompetent to use technology: we faced many problems of their complaining about and refusing to use the facility (Moodle). The students proved defective and unwilling to try the new approach, probably because of many reasons, such as the students have no internet access or smart phones. Many students were IDPs living in camps, their learning location is not convenient and they have no internet connection in the camp. Personally, however, I believe that 50% of the students are lazy to use technology and I am not sure whether they are ready to use it or not. (I-1)

Another instructor mentioned the existence of obstacles and hindrances in Iraqi Kurdistan Region, such as access to internet and electricity and computers, against advancement in their educational system. However, s/he viewed the COVID-19 crisis as an opportunity:

> ….. But the Covid19 Crisis which pushed many countries to shift to online learning was an experience which I personally found so beneficial and constructive because many students and teachers had to cope with the usage of online programs such as Zoom, Moodle, and various other soft-wares for meetings, lectures, and sharing and exchanging reports. I think providing the students with the technology requirements and necessary training would get them ready for an age which online education becomes a prerequisite for any professional development. A proof to this statement is our experience during the Coronavirus quarantines, when everything was managed and exchanged online between the instructors and the learners. (I-4)

From the two above answers intructors' revealed that after coronavirus pandemics PS teachers are better introduced to the use of online aplications for the purpose of learning. This showed that TPACK with its seven components are really important for teaching education.

This instructor emphasized the knowledge of and familiarity with softwares unlike the other three instructors who were supporting the view that pre-service teachers were ready to use technology in their future classes because they practised using mobile devices, laptop and projector inside the classroom, and this makes them ready to integrate technology.

4.3 Research Question #3: What are the Pre-service EFL Teachers' and Instructors' Suggestions for Further Development of Pre-service Teachers' TPACK?

The final research question was about ways to improve TPACK of pre-service teachers further. The data for this question came from semi-structured interviews with both PS teachers and instructors. The suggestions made by the pre-service teachers focused mostly on the things that instructors should be doing. For example, one interviewee said:

> Instructors should look for some resources online and develop themselves, and also, it's very important to teach us about new developments. (PS-4)

Another pre-service teacher expressed a similar thing in the words below:

> Sharing the strategies among teachers themselves can benefit students. (PS-5)

Another pre-service teacher, like the previous two, highlighted the need for instructors' own development in terms of technological knowledge and skills so that they can transfer these skills to their students (i.e., pre-service teachers) as a role model:

> We can develop our TPACK skills by consulting experienced teachers... I mean, our instructors... and seeing how they are treating their materials.... so we can have a better idea on how to prepare our own materials. (PS-6)

Still another interviewee mentioned that individuals can learn such things by searching on the internet:

> We, as teachers, always need to develop our technological skills by watching YouTube, searching for how to improve and know many things about technology because technology is a professional way of learning. (PS-8)

One pre-service teacher (PS-9) made no suggestion, saying that s/he had no ideas. When the instructors were asked to express their opinions about how the pre-service teachers' TPACK can be developed better, they gave different answers. The common point that they all emphasized was the need for training and practicing. One instructor (I-4) said:

> I believe it should be done first in our classrooms when they practice all the stuff that I mentioned in this interview (I-4)

Two of the instructors suggested extra courses where pre-service teachers can be trained on the techniques of integrating technology into teaching:

> They need to attend workshops, ask for help from their lecturers, use online tutorials, and surf the internet to find out how they can improve their skills. (I-2)

> This can be achieved by enrolling them in online course that offer unlimited goals and objectives. (I-3)

One last comment from another instructor was as follows:

> ...when they [pre-service teachers] become open-minded about using technology, and accept the fact that one day perhaps all teaching and learning will become electronic and online. (I-1)

This comment seems to summarize the rationale behind the development of TPACK. It emphasizes that if pre-service teachers want to develop their TPACK, they have to be open-minded to use technology in their careers.

4.4 Summary

In this chapter the results of both pre-service teachers' and instructors' questionnaire and interviews were analyzed (quantitatively and qualitatively) and the key findings were reported in the order of the three research questions. The study revealed that the pre-service teachers are mostly familiar with the use of Microsoft Word and PowerPoint since, as they reported, their instructors commonly use them inside the classroom. They agreed that they have 'quite a bit' of all seven TPACK components, two of which were the CK (perceived as the most important one) and the TPACK itself (perceived as the least important one). Regarding whether the pre-service teachers were well-prepared and ready (in terms of knowledge and skills) for technology integration into their future teaching, some pre-service teachers had positive perceptions, whereas some pre-service teachers expressed that the program they attended did not prepare them for integrating technology into their teaching because they have no familiarity with softwares. Also, some pre-service teachers stressed the need for professional development of their instructors in terms of TK and skills so that they can pass these skills to their students (i.e., pre-service teachers). The common point that they all emphasized was the need for training and practicing. The interviews showed the need to remain open-minded in the profession of teaching so that teachers can improve their TPACK. Instructors in this research believed that online lectures can be given but they need to get some training and attend a few workshops before that.

Chapter 5

DISCUSSION OF FINDINGS AND CONCLUSION

This chapter provides a detailed analysis of key research findings presented in Chapter 4, with reference to each of the research questions. The results of the study are compared with the findings of some previous research studies in the literature. The first section (Section 5.1) discusses the perceptions of pre-service teachers as regards their TPACK, whether they think the ELT teacher education program contributes to their TPACK, and the suggestions made by the pre-service teachers and instructors for improvement of pre-service teachers' TPACK. The following sections, then, provide the implications of the study, limitations of the study, and suggestions for further studies.

5.1 Discussion of Results

The study had a three-fold purpose. First, it aimed to examine pre-service teachers' expectations about their TPACK. Second, the study sought to find out the participants' perceptions about whether their TPACK contributes to the education program they attend. Finally, the study aimed to obtain suggestions from pre-service teachers and instructors for improving the TPACK of pre-service teachers. The thesis attempted to address the three research questions below in order to achieve these aims:

1. What are the pre-service EFL teachers' perceptions as regards their current technological pedagogical content knowledge (TPACK)?

2. What are the pre-service EFL teachers' and instructors' perceptions as regards the effect of the teacher education program on pre-service teachers' TPACK development?

3. What are the pre-service EFL teachers' and instructors' suggestions for further development of pre-service teachers' TPACK?

Considering the first research question, the study demonstrated that for the participating PS teachers among all seven components of the TPACK the most important component were Content Knowledge (CK) and the least important one was Technological Pedagogical Content Knowledge (TPACK). This result sounds quite normal and realistic, because CK should be the most essential and important type of knowledge for not only English language teachers, but all teachers whatever their study disciplines are, i.e. Mathematics, Physics, Geography, History etc. Without knowing the subject that one is going to teach, what is the use of having other types of knowledge, including the TPACK? Therefore, this finding is quite realistic and expected, as also reported in previous studies (Kind, 2009; Koh, Chai & Tsai 2010; Kwangsawad, 2016).

When looked at the macro level at how TPACK is considered among the participants, it is seen that the participating PS teachers agreed that they have quite a bit of all seven TPACK components. When each component of TPACK is considered, it is seen that in TK component a higher percentage of participants chose the statement saying that they can use office programs such as Word, PowerPoint, etc., with a high level of proficiency, and the least agreement was on the statement saying that they can use collaboration tools (wiki, Edmodo, 3D virtual environments, etc.) in accordance with their objectives. There is a parallelism between this result in the survey and the

interview conversations. In other words, the interviewed participants acknowledged that their technology knowledge is mostly related to presentation skills with PowerPoint, and they lack other technology-related tools and practices. This is in fact a reality reflecting the classroom practices where pre-service teachers were introduced mostly to the PowerPoint presentations by their instructors and also required to prepare their own presentations with that tool. Both the instructors and the pre-service teachers seem to be in need of training on integrating other tools that can be used in class. This issue has also been highlighted in the studies of Koehler and Mishra (2009), Fathi and Yousefifard (2019) and Turgut (2017).

On the TCK, the highest agreement was on the statement saying that the respondents can take advantage of multimedia (e.g. video, slideshow, etc.) to express the ideas about various topics in English, and the lowest agreement was on the statement referring that they can use collaboration tools to work collaboratively with foreign persons (e.g. Second Life, wiki, etc.). On the TPK, the highest agreement was on the statement saying that the respondents can manage the classroom learning environment while using technology in the class, and the lowest agreement was on the statement that they can meet students' individualized needs by using information technologies. This finding seems to be consistent with the finding of Bostancıoglu and Handley's (2018) study.

Finally, on the micro-level for the statements of TPACK, the highest agreement among respondents was on the statement saying that the respondents can support students as they use technology to support their development of language skills independently, and the lowest agreement among respondents was on the statement referring that they

can use collaboration tools (e.g. wiki, 3D virtual environments, etc.) to support students' language learning.

When looked at from the 'gender' perspective, the study findings reveal that female participants claim the possession of Content Knowledge (CK), Technological Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK), and Technological Pedagogical Content Knowledge (TPACK) more than their male counterparts. Male participants, on the other hand, were found to have the Pedagogical Content Knowledge (PCK) more than female participants, based on their responses to the survey. In general, female participants seem to claim the possession of the majority of TPACK compared to male participants. This finding may be due to the higher level of interest and enthusiasm that female participants may have in their school subjects as 'students', and as a result of this, they may have claimed that they have the knowledge and abilities described in the TPACK survey. Similar findings were reported also in some related studies such as Ersanlı (2016), Hsu (2017), and Setiawan et al. (2018). In that sense, this study's finding regarding the relationship between gender and TPACK is in line with the earlier studies.

The findings showed no significant differences between respondents according to their age toward dealing with the TK, CK, PK, PCK, TCK, TPK, and TPACK. The study revealed that teachers/instructors and teacher candidates must seek to learn the technology because of many reasons such as the possibility that everything will go online in the future, not having enough classrooms due to population, economic reasons, environmental reasons and health problems. The study also identified important implications that TPACK has on instructors' professional development from their perceived expertise, making it a proper structure that can allow the teacher to

move beyond the conventional teaching skills in a more techno-contextual way of teaching that appreciates the rich relationships between technology, material, and subject matter. Yet, this can only be done if teachers follow specific approaches as proposed by many other scholars (Mahdum, 2015; Mishra & Koehler, 2005), such as the approach to learning through design.

The interviews revealed that if the pre-service teachers wish to develop their TPACK, they must be open-minded in their careers to use technology. Technology became a part of our everyday lives in the 21st century; therefore, teachers cannot ignore it. Some instructors believe that everything may go online as it is happening now because of COVID-19; therefore, teachers have to develop themselves for online technology. Instructors in this research believed that it is possible to give lectures online but before that they have to get some training and attend some workshops. Furthermore, they believe online materials could support them to gain knowledge that they are seeking for and enhance their knowledge with ready programs online. Nowadays, if teachers struggle about how to use technology, the technology itself can help them to surf the Internet to get sufficient learning support online. This issue has been underlined in other studies such as Kurt et al. (2014) and Ramanair et al. (2017).

The participating pre-service teachers expressed their belief teachers are the agents of change; they have to develop themselves to develop their students. They believe that exchanging ideas among instructors can support students' learning. Instructors are their students' role model: they have to improve themselves constantly because teachers are lifelong learners. Teachers' responsibility is to educate learners in a better way. Pre-service teachers agree that technology, internet, and online instruction are possible to enhance TPACK teaching.

5.2 Conclusion

Many of the participants in this sample were males, they were between 21 to 22 years old, and more than half had their own PC. Most of the participants were interested in Internet surfing and the use of social media. Less than half of the students agreed that none of the instructors asked them to use technology inside the classroom; on the other hand, most of them agreed that they were prepared to use technology for teaching purposes in the classroom. The study has shown that the participants have interested in the Internet technology. Furthermore, the study showed significant differences between male and female respondents toward dealing with the content knowledge (CK); this means that the female participants in the sample prefer to develop CK in their study program more than the male participants. Males, on the other hand, prefer to develop the pedagogical content knowledge (PCK) more than the females. Furthermore, females in the sample prefer to own the technological content knowledge (TCK) and technological pedagogical knowledge (TPK) more than the males. Finally, in technological pedagogical content knowledge (TPACK), females in the sample prefer to own it more than the males. Overall, the most important component was content knowledge (CK) demonstrated by the study. Regarding the differences according to the age, the study showed that there are no differences between respondents according to their age toward dealing with the TK, CK, PK, PCK, TCK, TPK, and TPACK.

As regards the perceptions of pre-service teachers and instructors about the effect of the teacher education program on pre-service teachers' TPACK development, it can be concluded that majority of the pre-service teachers seemed to be satisfied with the

contribution of the program to their TPACK development, stating that they were ready to integrate technology.

However, the truth value of this satisfaction can be questioned when one considers the realities of the region in terms of the (un)availability of the facilities such as the internet access, and other technological infrastructure at the educational institutions. The participating pre-service teachers might have thought that they are equipped with enough TPACK to use in their own teaching without knowing the borders of the TPACK. In other words, not knowing the vast number of options and alternatives in technology-integrated tasks and materials that they can use, the respondents may have developed a narrow vision about the use of technology in teaching English. Interestingly enough, some instructors acknowledged this possibility and admitted that pre-service teachers were not ready to use technology.

In the study both the pre-service EFL teachers and the instructors of the department gave suggestions for further development of pre-service teachers' TPACK. The interviews revealed that if the pre-service teachers want to improve their TPACK, they need to be open-minded to use technology in their careers. This means they need to be open to new ideas and novelties in their field, including the inescapable use of technology in class. It is evident that online education or distance education will become a necessity. Therefore, instructors need to get a professional training and attend some workshops to improve their TPACK and its practice, so that pre-service teachers will be exposed to these techniques during their study.

To conclude, it is the responsibility of the ELT program and the instructors at the University of Duhok to better prepare the pre-service teachers for their future career

and enhance their abilities, skills, and awareness about the use of technology in English language teaching.

5.3 Pedagogical Implications

During the epidemic COVID-19 quarantine, the process of education all over the world, especially in some third world countries including the Kurdistan Region of Iraq, has experienced slowdowns but this does not mean that it should stay slow. On the contrary, teachers have to put the educational learning back to normal or even better than before.

In this study, the researcher found out that teachers (both pre-service teachers and their instructors) need to develop their TPACK; otherwise, nothing can continue in the same way that it used to be. In order not to lose any more time, as time is ticking, decision-makers (i.e. Minister of Education, school administrators, course instructors) should organize intensive trainings to train the teachers (both pre-service and in-service teachers) urgently to gain practical knowledge and abilities in using different technological tools so that they can start online education; otherwise, students may stay uneducated. In other words, the government has to make an obligation for all teachers to get ready to teach online, and the researcher believes that TPACK is the most important knowledge for teachers to know in this era.

The Department of Language at the University of Duhok has experienced rapid changes in learning since the epidemic coronavirus, processes of teaching and applications, due to the growing introduction of technology into teaching. In the midst of these changes, the following pedagogical implications can be stated:

1. Teachers should be inspired to strengthen their TPACK and participate in technical advancement.

2. They should actively engage in the use of innovative approaches, such as design learning, which, when used in combination with the values provided by the TPACK system, can lead instructors to a more relational and co-dependent construction that indicates a sensitivity to the complexities of technology integration, where technology, pedagogy and content are no longer separate structures.

3. More attention should be paid to the training of full-time instructors on how to integrate technological and pedagogical approaches, which will help students to better understand courses and educational practices.

4. In order to address the technical gap that exists as compared to the language department at Duhok University, more resources need to be provided to learn and incorporate the TPACK system in other departments.

5. In addition, the perceived skills and competencies of TPACK instructors should be calculated from time to time to inspire and enable instructors to improve technical pedagogy awareness of the content-TPACK.

6. For 21st century, instructors have to get prepared for providing technological education for individuals; they should be technologically proficient and should utilize their technical knowledge in getting the learning-teaching process so as to give important and stable learning. Instructors and pre-service teachers basically need to admit the role of innovational technology in training and to have the right skills to utilize technology for being effective in their expert lives. Instructors should watch improvements in the territory by utilizing Information Technology (IT) and ought to incorporate technology into getting

the learning-teaching process in their classes. Also, it is accepted that teaching courses, for example, extraordinary learning strategies and educator practice/school involvement with perspective on TPACK will be helpful for raising independence levels of pre-service teachers. TPACK structure and its hidden ideas are completely described through circumstances where the act of technology combination can arrive at the perfect situation of standardization (Chegini, 2014; Tuysuz, 2014).

7. Teachers should design many software programs, resources, and materials for learners. CALL and MALL technologies are used by students in a number of ways to improve the language through online content availability.

8. To conclude, if we want to develop the pre-service English teachers in Iraq's Kurdistan Region, we need to concentrate on the awareness of TPACK as the study results arranged them in the previous point to develop the contribution of the ELT teacher education program.

5.4 Limitations and Delimitations of the Study

Like in many studies, this study has also some limitations. The first limitation is related to the number of the participants. Seventy-two pre-service teachers and five instructors may seem small in number, and thus the outcomes may not be generalized to larger groups of pre-service teachers in other universities in Duhok or in KRI. Nevertheless, this number of preservice teachers constitutes almost 63% of the senior year students (115 in total) who were purposefully targeted as participants.

Secondly, the participants belong to only one university in Duhok. There could have been more preservice teachers and instructors involved both in quantitative and qualitative data collection stages from other universities in KRI to understand the state

of TPACK of the pre-service teachers of English better. This would allow generalization of the findings, as well. However, the study is structured as a case study, and as regards contextual facilities and constraints, participants from Duhok University can be considered representative of students in other KRI universities.

Thirdly, the TPACK-EFL Survey was given only to the pre-service teachers who were studying in the English Language department in order to investigate their perceptions regarding their TPACK; yet, the instructors teaching to these pre-service teachers were not administered the same survey. Of course, pre-service teachers' TPACK would be influenced by their instructors' TPACK and practices in the classroom. The possibility of their having teaching experience in their profession in relation to TPACK technology, and of their involvement in technology in their teaching, would certainly add a more practical dimension to the analysis. Nevertheless, the instructors (five in number) were interviewed to obtain their ideas and opinions about the second and third research questions (namely the contribution of the program to the pre-service teachers' TPACK and their suggestions to improve it further).

Fourthly, other techniques such as class observations could have been used for gathering data. This would give the researcher a much better view of the classroom's realities so that the researcher could also rely on his/her own observations, rather than the assumed/perceived knowledge and abilities only, in interpreting the pre-service teachers' TPACK.

Finally, the research used questionnaires and interviews to gather data on the assumption that the participating pre-service teachers were all familiar with the research topic, i.e. the TPACK, and were knowledgeable about it. Nonetheless, some

irrelevant answers specifically to the open-ended questions and interviews showed that the participants lacked the requisite knowledge of the subject because this topic is introduced for the first time in the University of Duhok and KRI overall. If time had been available, a brief description of the TPACK technology would have been provided during data collection and this might have yielded a better result. It is unfortunate that the data collection stage coincided with the lockdown of all universities in KRI, like in many other places in the world, due to coronavirus pandemic; therefore, providing explanations to the participants could not be possible.

5.5 Suggestions for Further Studies

As reported by the limitations above, a number of suggestions can be made for further studies. First, the same study can be replicated with greater number of participants so that the findings could be statistically more significant. Also, the number of participants can be higher in future studies so that the qualitative data would be richer.

Second, the future studies can involve participants from different contexts, i.e. other universities in the same city or various universities from different parts of the country. This may enrich the data elicited from the participants to have a wider picture of the issue under focus (i.e. the TPACK of participants), by comparing the similarities and differences between different contexts and understand the dynamics beyond them.

Third, future studies can include other data collection tools such as class observations. This will give the researcher a much clearer idea about the realities of the classroom, so that the researcher would rely on his/her own observations as well, rather than the perceived knowledge and feedback only in understanding the TPACK of pre-service teachers.

Fourth, further studies can investigate the instructors' TPACK as well, along with their students. This may enable the researcher to understand the relationship between how pre-service teachers can benefit from the instructors' practices in class.

Final Word: This study, despite its limitations, can still be considered significant because it addressed to investigate the pre-service EFL teachers' TPACK for the first time in the research context. It is hoped that more studies will follow it to make deeper and wider investigations.

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APPENDICES

Appendix A: TPACK-EFL Survey Items

TECHNOLOGICAL PEDAGOGICAL CONTENT KNOWLEDGE (TPACK) - EFL SURVEY

Dear Participant,

I am an MA student and currently working on my thesis entitled "An Investigation of Technological Pedagogical Content Knowledge (TPACK) of Pre-service English Teachers in the Kurdistan Region of Iraq". This research aims to investigate the perceptions of the pre-service teachers as regards their TPACK knowledge and the contribution of the ELT teacher education program to their TPACK at the University of Duhok, Iraq.

Your participation in this research is completely voluntary. If you choose to participate, you may subsequently withdraw from the study at any time without penalty or consequences of any kind. Please answer all the questions sincerely and be informed that your personal information and individual responses will be kept confidential and used only for research purposes. Collected data can be used for data analysis and publication of findings in journals and conference proceedings on condition that your identity will not be revealed in any documents or publications arising from the research.

I have been properly informed about the objectives of the study and I am willing to take part in it. *

◯ Signature

Thank you for taking time to complete this survey. Please answer each question to the best of your knowledge. You are not required to put down your name. Your thoughtfulness and candid responses will be greatly appreciated. Thank you for your cooperation.

◯ continue

Gender *

○ Male

○ Female

Age *

○ 21-22 years

○ 23-24 years

○ 25-26 years

○ 27 years and over

Do you have a personal computer or laptop? *

○ Yes

○ No

Do you have smart phone? *

○ Yes

○ No

Do you surf on the internet? If yes, how much time a day do you spare? *

○ Yes

○ 1-2

○ 3-4

○ 5-6

○ 7 and over

○ No

Do you use social media such as Facebook, WhatsApp, Instagram? *

○ Yes

○ No

If you give a number to your interest in technology between 1 and 10 (1 being very little interest, *
10 being ultimately high interest), which number would you give for your own interest (especially
in internet-based technology)?

○ 1

○ 2

○ 3

○ 4

○ 5

○ 6

○ 7

○ 8

○ 9

○ 10

While studying in this department, were you asked to use technology in any of the courses? If 'yes',
for what purposes? If 'No" leave the box empty.

Long answer text

Do you think as a prospective teacher of English, you are ready (in terms of knowledge and *
skills) to integrate technology into your teaching after you graduate? Yes/Why   No/Why

Long answer text

Please read the statements below carefully and select the most suitable one for you.

○ continue

Technological Knowledge (TK)

○ continue

1. I can use basic technological terms (e.g. operating system, wireless connection, virtual memory, etc.) appropriately. *

○ Nothing/none

○ Very little

○ Some

○ Quite a bit

○ A great deal

2. I can adjust computer settings such as installing software and establishing an Internet connection. *

○ Nothing/none

○ Very little

○ Some

○ Quite a bit

○ A great deal

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3. I can use computer peripherals such as a printer, a headphone, and a scanner. *

○ Nothing/none

○ Very little

○ Some

○ Quite a bit

○ A great deal

4. I can troubleshoot common computer problems (e.g. printer problems, Internet connection problems, etc.) independently. *

○ Nothing/none

○ Very little

○ Some

○ Quite a bit

○ A great deal

5. I can use digital classroom equipment such as projectors and smart boards. *

○ Nothing/none

○ Very little

○ Some

○ Quite a bit

○ A great deal

6. I can use Office programs (i.e. Word, PowerPoint, etc.) with a high level of proficiency. *

◯ Nothing/none

◯ Very little

◯ Some

◯ Quite a bit

◯ A great deal

7. I can create multimedia (e.g. video, web pages, etc.) using text, pictures, sound, video, and animation. *

◯ Nothing/none

◯ Very little

◯ Some

◯ Quite a bit

◯ A great deal

8. I can use collaboration tools (wiki, Edmodo, 3D virtual environments, etc.) in accordance with my objectives. *

◯ Nothing/none

◯ Very little

◯ Some

◯ Quite a bit

◯ A great deal

9. I can learn software that helps me complete a variety of tasks more efficiently. *

○ Nothing/none

○ Very little

○ Some

○ Quite a bit

○ A great deal

Content Knowledge (CK)

○ Next section

10. I can express my ideas and feelings by speaking in English. *

○ Nothing/none

○ Very little

○ Some

○ Quite a bit

○ A great deal

11. I can express my ideas and feelings by writing in English. *

○ Nothing/none

○ Very little

○ Some

○ Quite a bit

○ A great deal

12. I can read texts written in English with the correct pronunciation. *

○ Nothing/none

○ Very little

○ Some

○ Quite a bit

○ A great deal

13. I can understand texts written in English. *

○ Nothing/none

○ Very little

○ Some

○ Quite a bit

○ A great deal

14. I can understand the speech of a native English speaker easily. *

○ Nothing/none

○ Very little

○ Some

○ Quite a bit

○ A great deal

Pedagogical Knowledge (PK)

◯ Next section

---

15. I can use teaching methods and techniques that are appropriate for a learning environment. *

◯ Nothing/none

◯ Very little

◯ Some

◯ Quite a bit

◯ A great deal

---

16. I can design a learning experience that is appropriate for the level of students. *

◯ Nothing/none

◯ Very little

◯ Some

◯ Quite a bit

◯ A great deal

17. I can support students' learning in accordance with their physical, mental, emotional, social, and cultural differences. *

○ Nothing/none

○ Very little

○ Some

○ Quite a bit

○ A great deal

18. I can collaborate with school stakeholders (students, parents, teachers, etc.) to support students' learning. *

○ Nothing/none

○ Very little

○ Some

○ Quite a bit

○ A great deal

19. I can reflect the experiences that I gain from professional development programs to my teaching process. *

○ Nothing/none

○ Very little

○ Some

○ Quite a bit

○ A great deal

20. I can support students' out-of-class work to facilitate their self-regulated learning. *

○ Nothing/none

○ Very little

○ Some

○ Quite a bit

○ A great deal

Pedagogical Content Knowledge (PCK)

○ Next section

21. I can manage a classroom learning environment. *

○ Nothing/none

○ Very little

○ Some

○ Quite a bit

○ A great deal

22. I can evaluate students' learning processes. *

○ Nothing/none

○ Very little

○ Some

○ Quite a bit

○ A great deal

23. I can use appropriate teaching methods and techniques to support students in developing their language skills. *

○ Nothing/none

○ Very little

○ Some

○ Quite a bit

○ A great deal

24. I can prepare curricular activities that develop students' language skills. *

○ Nothing/none

○ Very little

○ Some

○ Quite a bit

○ A great deal

25. I can adapt a lesson plan in accordance with students' language skill levels. *

○ Nothing/none

○ Very little

○ Some

○ Quite a bit

○ A great deal

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Technological Content Knowledge (TCK)

○ Next section

26. I can take advantage of multimedia (e.g. video, slideshow, etc.) to express my ideas about various topics in English. *

○ Nothing/none

○ Very little

○ Some

○ Quite a bit

○ A great deal

27. I can benefit from using technology (e.g. web conferencing and discussion forums) to contribute at a distance to multilingual communities. *

○ Nothing/none

○ Very little

○ Some

○ Quite a bit

○ A great deal

28. I can use collaboration tools to work collaboratively with foreign persons (e.g. Second Life, *
wiki, etc.).

○ Nothing/none

○ Very little

○ Some

○ Quite a bit

○ A great deal

Technological Pedagogical Knowledge (TPK)

○ Next section

29. I can meet students' individualized needs by using information technologies. *

○ Nothing/none

○ Very little

○ Some

○ Quite a bit

○ A great deal

30. I can lead students to use information technologies legally, ethically, safely, and with respect * to copyrights.

○ Nothing/none

○ Very little

○ Some

○ Quite a bit

○ A great deal

31. I can support students as they use technology such as virtual discussion platforms to * develop their higher order thinking abilities.

○ Nothing/none

○ Very little

○ Some

○ Quite a bit

○ A great deal

32. I can manage the classroom learning environment while using technology in the class. *

○ Nothing/none

○ Very little

○ Some

○ Quite a bit

○ A great deal

33. I can decide when technology would benefit my teaching of specific English curricular standards. *

○ Nothing/none

○ Very little

○ Some

○ Quite a bit

○ A great deal

34. I can design learning materials by using technology that supports students' language learning. *

○ Nothing/none

○ Very little

○ Some

○ Quite a bit

○ A great deal

35. I can use multimedia such as videos and websites to support students' language learning. *

○ Nothing/none

○ Very little

○ Some

○ Quite a bit

○ A great deal

Technological Pedagogical Content Knowledge (TPACK)

○ Next section

36. I can use collaboration tools (e.g. wiki, 3D virtual environments, etc.) to support students' language learning. *

○ Nothing/none

○ Very little

○ Some

○ Quite a bit

○ A great deal

37. I can support students as they use technology to support their development of language skills in an independent manner. *

○ Nothing/none

○ Very little

○ Some

○ Quite a bit

○ A great deal

38. I can use Web 2.0 tools (animation tools, digital story tools, etc.) to develop students' language skills. *

◯ Nothing/none

◯ Very little

◯ Some

◯ Quite a bit

◯ A great deal

39. I can support my professional development by using technological tools and resources to continuously improve the language teaching process. *

◯ Nothing/none

◯ Very little

◯ Some

◯ Quite a bit

◯ A great deal

Thank you for your valuable time and participation!

◯ :-)

Appendix B: Participant Consent Form for Interviews (Pre-service Teachers)

Dear Participant,

I am an MA student and currently working on my thesis entitled "*An Investigation of Technological Pedagogical Content Knowledge (TPACK) of Pre-service English Teachers in the Kurdistan Region of Iraq".* I need your ideas and thoughts to investigate this topic in depth.

The interview will take about 10-20 minutes. I do not anticipate that there are any risks associated with your participation, but you have the right to stop the interview or withdraw from the research at any time.

The interview will be recorded and a transcript will be produced. Any summary interview content or direct quotations from the interview that are made available through academic publication or other academic outlets will be anonymized so that you cannot be identified, and care will be taken to ensure that other information in the interview that could identify yourself are not revealed.

If you have any queries about this research, please feel free to contact the researcher, Mohammed Sadeeq or the thesis supervisor Prof. Dr. Ülker Vancı Osam. Thank you for your participation and cooperation.

Mohammed Sadeeq	Prof. Dr. Ülker Vancı Osam
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✂ ---

Consent Form

I have been properly informed about the objectives and procedures of the interview and I am willing to take part in it.

Name, Surname : --------------------------------- Your Pseudo Name (Optional): -------

Signature: -- Date : -------------------------------------

The Interview Questions for the Pre-service Teachers

1. Are you allowed or required to use internet inside the classroom?

2. What technology do you use in the classroom?

3. What technology do you use for learning English?

4. Do you use any social media for learning your subject?

5. Have you ever been asked to use computers or mobile devices for any online activity programs inside the classroom?

6. Have you ever been introduced to the programs inside the classroom for the purpose of learning while inside and outside the classroom?

7. You are graduating at the end of this semester. Do you think you, as a prospective English teacher, are ready to use technology for your own learning and for your future teaching styles and strategies?

8. Do you think that your study in this department prepared you how to integrate technology into your teaching after you graduate and start teaching in schools?

9. Thinking about integrating technology into teaching English, in which parts do you think you need improvements?

10. If you could give me a number from 1 to 10, how comfortable are you on the subjects of using technology and integrating technology into your learning? Also into your teaching? Why did you choose that number?

11. How can pre-service teachers TPACK be developed?

12. Is there anything you would like to add?

Appendix C: Participant Consent Form for Interviews (University Instructors)

Dear Instructors,

I am an MA student and currently working on my thesis entitled "*An Investigation of Technological Pedagogical Content Knowledge (TPACK) of Pre-service English Teachers in the Kurdistan Region of Iraq*". I need your ideas and thoughts to investigate this topic in depth.

The interview will take about 10-20 minutes. I do not anticipate that there are any risks associated with your participation, but you have the right to stop the interview or withdraw from the research at any time.

The interview will be recorded and a transcript will be produced. You will be sent the transcript and given the opportunity to correct any factual errors. Any summary interview content or direct quotations from the interview that are made available through academic publication or other academic outlets will be anonymized so that you cannot be identified, and care will be taken to ensure that other information in the interview that could identify yourself are not revealed.

If you have any queries about this research, please feel free to contact the researcher, Mohammed Sadeeq or the thesis supervisor Prof. Dr. Ülker Vancı Osam. Thank you for your participation and cooperation.

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✁ --

Consent Form

I have been properly informed about the objectives and procedures of the interview and I am willing to take part in it.

Name, Surname : ------------------------------ Signature: ---------------------------------

Date : ------------------------------------

The Interview Questions for the Instructors

1. Do you use technology in your classroom? What technology do you use? Do you use internet inside the classroom? Do you use any social media for teaching your subject? If you use technology in your teaching, does it enhance your performance as an instructor?

2. Have you ever used or introduced any online programs inside the classroom for your students to use it for the purpose of learning and/or teaching in the future?

3. Have you ever used any online programs inside the classroom for pre-service teachers to use their computers or mobile devices?

4. Do you think in this department's students (as prospective teachers of English) are ready to use technology for their own learning and for their future teaching styles and strategies? Yes? No? Why do you think so?

5. If you could give me a number from 1 to 10, how comfortable are you on using technology and/or integrating technology into your teaching? Why did you choose that number?

6. Thinking about integrating technology into your own teaching area, in which parts do you think you still need some improvements?

7. How can pre-service teachers TPACK be improved?

8. Is there anything else you would like to add?

Appendix D: The Transcript of the Pre-service Teachers Interviews

Each number below represents one pre-service teacher

Question 1

Are you allowed or required to use internet inside the classroom?

1. Yes, we are allowed if we need to search for information.

2. Basically allowed.

3. Yes, internet is one of the important medium of education. Internet is very beneficial for students in many aspects. It helps us to get information easily. It requires but for all subjects e.g, translation.

4. It totally depends on the teacher. Some of them only allow us to use dictionaries inside the classroom.

5. No, because our people are so connected with the internet everywhere. When they came to class and use internet in their mobile they might disturb the teacher and also will not listening to the lesson well.

6. Yes, we are totally and completely allowed to use internet inside the classroom. I wouldn't say that we have ever been required because here in Kurdistan we don't have access to the internet 24/7, that's why we never have been required to use internet inside the classroom.

7. In my opinion we need to use it, but not in some subjects.

8. Actually not all the time, but rarely we use internet like for dictionaries or searching information.

9. Yes we are allowed to use internet only for classroom purposes, such as looking up vocabularies in dictionary or maybe searching for a subject that our teacher want us to do.

10. Yes, I am allowed.

Question 2

What technology do you use in the classroom?

1. We use smart phones, projector and rarely laptop.

2. It depends on the subject for example, to present something we use laptop with PowerPoint but often I use mobile for notes and quick search.

3. There are many new technologies being used in classrooms today: social networking, online teaching.

4. Beside the smartphone, I rarely use my computer in the classroom and that's when I have a presentation.

5. Mobile, laptop, data show.

6. We use Laptops and Data-show whenever there's a presentation (plus teachers use them on a daily basis) speakers also when there's a video related to the subject and also phones especially for checking meaning of words and taking photos of the board.

7. Computer, mobile, and data show.

8. We use data show for explaining the subject by using laptop.

9. We use our phones, laptop and data show for presentations and classroom activities.

10. Data-show and laptop.

Question 3

What technology do you use for learning English?

1. We use internet to watch videos for learning English language.

2. At most, laptop watching movies follow up lessons and videos, as well as the mobile, but lesser extent uses it only to learn synonyms and translate difficult words.

3. Now students use online teaching for learning. Like, Moodle.

4. I use varieties of websites to improve my English (those being Quora, medium, stack-exchange etc.)

5. Laptop, mobile.

6. I use laptop and TV for watching movies and shows which helps me in learning English and also phone for checking and gathering information on certain matter.

7. Computer, mobile.

8. Yes, I use laptop or mobile for watching movies and series.

9. Most of the time I use my phone to learn English by reading and studying English and sometimes I also use laptop.

10. I use Facebook because some special pages are sharing information about learning English and Viber and WhatsApp use for exchange ideas.

Question 4

Do you use any social media for learning your subject?

1. No, because most of them were not from verified sources.

2. YouTube

3. Social media can help to aid teachers in communicating with students even when they are outside of the classroom. There are many pages on Instagram posting information in English how to improve your English?

4. No, we've only been asked to use dictionaries.

5. Yes, YouTube too much, and sometimes Facebook.

6. Something for literature, my friends and I regularly use social media such as WhatsApp, Viber, Messenger and Instagram for asking each-other questions about the subject or asking one another for an illustration on a certain point that we haven't understood during the lecture, as for the language we chat in English to learn the language from each other and also to learn from our own mistakes.

7. YouTube and Twitter.

8. No, not that much but sometimes.

9. Yes, in matter of fact I am always using social media to make my English better such as videos on YouTube, Facebook and other social media.

10. Yes, I use it.

Question 5

Have you ever been asked to use computers or mobile devices for any online activity programs inside the classroom?

1. Yes, to check dictionary also to have an idea on a certain topic.

2. Yes.

3. Yes we have been asked to do this from our teachers when we did a presentation about linguistics, so we were gathering students' information to fill a list therefore, we use internet computer to do it.

4. No, but outside of the classroom there is a program, not while ago, by Duhok polytechnic and they're giving away free certificates on courses. As of right now I'm attending a certificate of ESL at the University of London (online).

5. No

6. Unfortunately, I don't remember anytime that we have been asked to use computers or mobile devices for an online activity program. But there was one time I remember, two of our colleagues prepared an activity- a sort of like a game activity- where they divided us into two groups and asked us questions (or riddles) that required thinking, so some other colleagues used their phone with an access to the internet to find out the answers without thinking for themselves.

7. No

8. Yes. We have been asked to do an activity inside the classroom by the use of computer to explain the subject.

9. No, we actually don't have any online activities during classes, most of our activities are done within the classroom but not online.

10. Yes

Question 6

Have you ever been introduced to the programs inside the classroom for the purpose of learning while inside and outside the classroom?

1. Not really.

2. No

3. Yes, but it was a little bit and I don't understand.

4. Yes, teachers suggest some websites to enrich our knowledge on some materials.

5. No, but just because of the coronavirus we used (E-learning Moodle) and (zoom meeting) for online teaching.

6. Yes, when I was in my first year at university one of my friends in senior year introduced me to a program about learning Basic English - it was a show consisting of 30 episodes- that helped me learning the language inside and outside the classroom.

7. Yes, I have been introduced to Messenger program outside classroom.

8. No.

9. Yes, many of our teachers recommended various types of programs and applications that could make our English strong and fluent.

10. Yes, we use it.

Question 7

You are graduating at the end of this semester. Do you think you, as a prospective English teacher, are ready to use technology for your own learning and for your future teaching styles and strategies?

1. Yes of course, because of ideal teachers are publishing their methods and strategies online that can help me as a prospective English teacher.

2. The technology we already have at the university unfortunately no. the only technology they used to teach us was PowerPoint and it was daily routine to be out of work.

3. I'm ready to do this because department have done everything to get us prepared, there is nothing left for us that we don't know. Teacher prepared us very well we shall pass this information to the next generation of learners'.

4. Definitely, I think the use of technology is crucial and everyone should use it nowadays.

5. Yes I will use it for better understanding

6. Yes, I am quite ready.

7. Yes I am ready to use it in the future for to help us more.

8. Yes, I will graduate at the end of this semester. I think I can handle it. I can use internet or technology, but there are many videos we can watch for learning how to develop our skills and being a good teacher.

9. Yes, I do believe that I am ready to use technology in my future class because with technology is simpler and it has been proven to be more efficient and easier for the teacher to teach and for students to understand.

10. Yes, but in fact isn't enough for teaching, we need to collect more information and develop more.

Question 8

Do you think that your study in this department prepared you how to integrate technology into your teaching after you graduate and start teaching in schools?

1. Yes, it has helped me to figure out a faster and more secured ways to find information for a certain topic from variety of sources.

2. No.

3. I'm ready to do this because department have done everything to get us prepared, there is nothing left for us that we don't know. Teacher prepared us very well we shall pass this information to the next generation of learners'.

4. Not at all.

5. Yes, especially when the teachers supported us to make a presentation about any topics, also helped us to learn how to create PowerPoint about any topics.

6. Yes, I have always admiring my teachers about how they combine technology within their own notes and knowledge on the subject. I have learned a lot from my teachers by following their footsteps I think I will be able to integrate technology into my teaching.

7. Yes, our department prepared us in great way of how to use technology.

8. Yes, the department helped me a lot about developing my English language and the use of technology for developing my style and strategies of teaching.

9. Yes, during the period in university our teachers showed us how to prepare presentations and how technology can make the teaching process much simpler and more fun.

10. No, we didn't have enough information about technology, they didn't teach us well. We need more.

Question 9

Thinking about integrating technology into teaching English, in which parts do you think you need improvements?

1. I need improvement in listening and speaking.

2. Linguistic and accent.

3. I think online activities should be improved since students are already interested and engaged in technology. Teachers can harness that attention for educational purposes by incorporating the internet and laptops. And give students a tutorial about how to use technology.

4. I personally don't need any improvements from my department, I can search for things that I need.

5. We need programs that make a connection between students and teachers, because it will make the students live with subject outside and inside class.

6. During the past years I have been learning to use technology (as in making soft slides of Microsofts) very well. The problem I have is when to use technology and when to recite my own notes (time-management).

7. Listing and Speaking

8. Actually I need to watch many videos about technology because every day I think I need more to know.

9. For me I think I should work more on my listening and speaking, both parts can play a very big role in teaching because both sometimes can be misleading on how some words are pronounced and understand by the students.

10. Linguistics, speaking, and literature.

Question 10

If you could give me a number from 1 to 10, how comfortable are you on the subjects of using technology and integrating technology into your learning? Also into your teaching? Why did you choose that number?

1. I would give 8, because it is important for teaching but still we can teach appropriately without it.

2. I will give 10 out of 10 because the idea of integrating technology with teaching is a great idea and inevitably is a development that students deserve and easy for them but they have to put efforts into their development. However, if the idea is supported by the government authority to provide the equipment and necessary supplies to create an atmosphere that students and teachers feel comfortable.

3. 8, I choose this number because teachers and our department have done the best for us.

4. I'd say 10, as mentioned above we need to use technology to learn nowadays, because everything we want to learn, we can have it on our screens in the blink of an eyes.

5. This question is related to a question number 9, because if we improve a best program part for students will make students more comfortable, that's why I will give 8.

6. As in before the Coronavirus and the entire crisis, I would give 10 out of 10 because I am very comfortable with technology whether for learning or teaching. But now with the online classes I am not that comfortable. Last time I have attended the classes was in Ramadan I and many other students were up all night therefore taking the classes at 10 am was very difficult, for me personally. And also student's interrupt the teachers (due to bad internet service) and the background noises were very disturbing for me. So the number I will give is 5/10. (I prefer to be physically attached).

7. Number (9), because in my life Listening and speaking is more useful in our communication.

8. I can say 7 or maybe 8 because I may know many things but we always need improvement and develop our skills.

9. I would say 10. I personally think that technology can help the teaching process a lot. It will make the teachers job way easier and can help them simplify the subject no matter how hard it is by showing videos pictures and that will help the students understand the subject way better.

10. I give 4 because if they were making group and sending lectures the day before. We were ready for lectures. Of course we will read at home if we didn't understand something teachers will explain for us, and we will have all information about our subjects.

Question 11

How can pre-service teachers TPACK be developed?

1. In my opinion, TPACK can be developed by pushing more teachers to publish their strategies and methods that can help teachers.

2. Reading articles and literary books and quotations are good ways to develop the language, considering that, the articles do not contain grammatical complications such as educational books.

3. No ideas

4. They should look for some resources online and develop themselves, it's very important to teach their students too.

5. It will share the strategy of the teacher learning, by this way other teacher will get benefit from each other's ways of teaching

6. A pre-service teacher can develop their TPACK skills by consulting experienced teachers and seeing how they are treating with their materials, they can also ask to see the authentic materials that are in hand of students so they can have a better idea on how to prepare their own materials.

7. By using technology, for example if we have hard subject and have to explain it for all students, in this way we should search on Internet to get more explaining in that subject.

8. They always need to develop their technological skills; by watching YouTube, searching for how to improve and know many things about technology because technology is a professional way of learning.

9. No ideas

10. To make groups in different websites, and share information about subjects. If students have more information they can share with other students.

Question 12

Is there anything you would like to add?

1. No answer.

2. It is truly and seriously a great idea to merge education with teaching to keep pace with the times. The developed countries and the frightening development witnessed by educational authorities in the world, of course it's not easy but nothing impossible also with having wonderful people with thought and opinion like you, the dream will inevitably become true and we see our schools and educational centres use the best technology to educate their students.

3. I would like to say this again teachers must help students those who have no ability to perform with technology. Students and teachers can contact with each-other online if they face any problem. And give them the right to use internet in the classroom

because some teachers are not allowing to use it. So i mean this also a problem. In other words technology is a second teacher for students.

4. Having an additional subject as 'How to use technology properly' could be one of the most fundamental activities to enlighten the new generation.

5. There is nothing to add everything were completed.

6. No answer

7. I have nothing to add, because we talked about Technology in our system of Education, Technology is important to our Education.

8. No answer

9. I hope that you sir get benefit from my answers. And I really wish that all the universities consider this brilliant idea of combining technology and education together to provide the students the knowledge they need.

10. The university should have the networking Moodle online, all students could contact to the specific domain to see all the lectures uploaded related to different subjects. In this era teachers and learners have to develop their technological skills for the purpose of learning.

Appendix E: The Transcript of the Instructors Interviews

Each number below represents one instructor.

Question 1

Do you use technology in your classroom? What technology do you use? Do you use internet inside the classroom? Do you use any social media for teaching your subject? If you use technology in your teaching, does it enhance your performance as an instructor?

1. To some certain extent I do use technology; for example, I use the laptop and data show but I don't use the Internet inside the classroom, because, unfortunately we do not have good access to the Internet in the classrooms. Therefore, if I need any material I usually download it at home such as PDFs, videos and audio tracks for my presentations and subject. Therefore, I usually access the internet at home and work there. I don't use social media for learning but I use it for communication. However, during this corona virus pandemic I used online Moodle and Zoom for students' education.

2. Technology is essential in my classroom and I give a great deal of time to improve my skills to integrate technology in my classroom. I depend on PowerPoint presentations prepared by me to teach any subject of Reading and Writing. This is supported by PDF files, images, and sometimes videos to deliver clear and rich information to the students. I use the laptop, the projector, a laser pointing device and remote controller to control my pc in the classroom. When I need to show something related to a specific subject and it needs an instant explanation, I use the internet in the classroom. I don't use social media in teaching any of my subjects, but I use Google Classroom. I start the academic year by teaching my new students how to use Google Classroom.

These technology means help me a lot in teaching my students and they enhance my skills and the way I can deliver the material to the students.

3. I use technology quite frequently in my Translation classroom. Sometimes I show my students some videos or scenes from movies and then ask them to translate them for me. My students do like this technique and they find it interesting. I find it useful and interesting as well because I hear different feedbacks from my students.

4. Yes I use videos, online sources and PowerPoint's for presenting the material. The majority of the sources which are related to literary topics are available online, so I need to get online even in the classroom to share them. I use social media as a means of communication and exchanging data, not for teaching.

Surely, using technology gives a sort of variety, and more credit to the material offered to the learner. It facilitates learning and gets the students more engaged and focused.

5. Yes, I use YouTube, videos and PowerPoint slides. I don't use internet because it is not available inside the classroom. However, I sometimes ask my students to check things on the Internet from their mobile phones. I sometimes ask my students to share some stuff among themselves on Facebook or any other link where they have shared groups. Using technology definitely enhance my performance.

Question 2

Have you ever used or introduced any online programs inside the classroom for your students to use it for the purpose of learning and/or teaching in the future?

1. I haven't used online programmes inside class before the COVID-19, but often, I do introduce and recommend some useful educational sites to my students that they can access at their own time outside class, at home for example. I usually recommend such websites as the British Council official page, EnglishClub.com, Eric's Lounge.

2. Sometimes I present websites and mobile phone apps which can help them get more information about a specific part of any material I give or some extra information for their own benefit. As I have mentioned in the answer of the first question, I use Google Classroom to teach my students, give them assignments, or make an announcement.

3. I always encourage my students to use technology as a helping source for collecting information and general knowledge. When it comes to writing, for example, I recommend my students to use Grammarly; the free online writing assistant.

4. I have always tried to highlight the significance of online learning in all of my classes, using MOOCs and other course management systems and learning management systems like Canvas , Moodle etc, are some positive aspects of the advanced educational systems which I have always been focusing in any discussion.

5. No, not really, but I ask them sometimes to go and find things on the Google . I usually tell them if you are interested in more details go and Google it.

Question 3

Have you ever used any online programs inside the classroom for pre-service teachers to use their computers or mobile devices?

1. In my class (of Linguistics) I don't use, or recommend programs for pre-service teachers, because of the nature of the subject I teach (general linguistics) and because of the objectives of my subject. But I do assume that such programs are recommended to the students by the teacher in the Methods of Teaching class which they study in the 4th year. Also, I welcome students' to use technology and provided that they use it relevantly to the subject matter of the on-going lecture.

2. I use mobile phone applications and different types of files in my classroom to motivate my students to use their computer and mobile devices for the learning purposes.

3. Last year, I presented a seminar on how to use the UOD online platform for E-learning for the academic staff of the Department. Nowadays, the world witnesses the closure of educational institutions due to Covid19 and our teachers and students use this UOD online platform for distant learning.

4. I have used programs for checking the student's report in terms of plagiarism, and Google Forms for doing collaborative projects. As an online facilitator I worked with Arizona State University's Online Teacher training program from 2016 to 2017, and through that project which was managed by Dr Joseph Axel we engaged many Iraqi ESL teachers in online courses which primarily aimed at empowering and updating the Iraqi teachers in the usage of technology in classrooms. After this experience I have tried disseminate the idea of using technology in classes.

5. No.

Question 4

Do you think in this department's students (as prospective teachers of English) are ready to use technology for their own learning and for their future teaching styles and strategies? Yes? No? Why do you think so?

1. Before coronavirus I thought highly of the students' literacy in technology but when we introduced e-learning and Moodle during the corona virus global pandemic, I found out that they are mostly incompetent to use technology: we faced many problems of their complaining about and refusing to use the facility (Moodle). The Students proved defective and unwilling to try the new approach, probably because of many reasons, such as the students have no internet access or smart phones. Many students were IDPs living in camps, their learning location is not convenient and they have no internet connection in the camp. Personally, however, I believe that 50% of the students are lazy to use technology and I am not sure whether they are ready to use it or not.

2. Yes, they are. Nowadays, technology has made teaching and learning easier than before. Students learn easier and better with the presence of the technology means. Every generation has its own style of teaching and learning. Teachers who don't integrate technology in their own classroom tend to use much time and efforts in delivering their message. While students who lack basic technology skills are slow learners and don't reach all the rich resources available everywhere by using technology means.

3. Yes, I think the students became quite mature to use technology for their own learning. The students are using the UOD online platform to write reports, submit assignments, doing quizzes. They also use the online

platform to record audio and video files. In conclusion, our students are on the right track and they will become autonomous learners in the near future.

4. No doubt there are many obstacle and hindrances in Iraq and Kurdistan Region, access to internet and electricity and computers are issues which still could be challenges against advancement in our educational system. But the Covid19 Crisis which pushed many countries to shift to online learning was an experience which I personally found so beneficial and constructive because many students and teachers had to cope with the usage of online programs such as Zoom, Moodle , and various other soft wares for meetings, lectures, and sharing and exchanging reports. I think providing the students with the technology requirements and necessary training would get them ready for an age which online education becomes a prerequisite for any professional development. A proof to this statement is our experience during the Coronavirus Quarantines, when everything was managed and exchanged online between the instructors and the learners.

5. Yes

Question 5

If you could give me a number from 1 to 10, how comfortable are you on using technology and/or integrating technology into your teaching? Why did you choose that number?

1. I would say 7, because first, I don't have full mastery of using technology yet, and second, because I didn't find responsive students. But for me I was okay with it. Before coronavirus spread, my information regarding the

technology in teaching and learning was rather humble but now I am learning how to employ technology in my teaching.

2. I can say 7, because I think I still need to improve my skills and try to use as much technology as possible. Because I do believe how technology means can help students' comprehension and enhancing their learning skills, I always search for modern teaching strategies which depend on technology.

3. I would choose 5/10 before the lockdown but since the UOD has launched its online platform, I can say it is about 9/10 because all classroom activities are done via this platform.

4. I would give number 8, I believe using technology and/or integrating technology into any classroom is the thing that I have tried my best to master during my teaching career, but I believe I still need more training to get in control of it fully.

5. 9 to 10

Question 6

Thinking about integrating technology into your own teaching area, in which parts do you think you still need some improvements?

1. I think I still need some training in using technology as a whole for online teaching and e-learning.

2. Preparing well organized visual materials that help students learn easier and better. Since I have a lot of students in morning and evening classes, I am not happy with technology means I use in my classroom. I believe that teachers need to be creative and implement technology means in their classes, even when these means are not created for teaching purposes.

3. Well, we need more facilities to make it work perfectly such as speedy internet, laptop, and a good classroom atmosphere.

4. Although I have been able to manage my classrooms on LMSs such as MOODLE, but I think I still need to do more in terms of assessments and evaluating my students through online programs.

5. Practical part where they can be exposed to authentic materials

Question 7

How can pre-service teachers TPACK be improved?

1. When they become open minded it about using technology and accept the fact that one day perhaps all teaching and learning may become electronic and online!

2. They need to attend workshops, ask for help from their lecturers, use online tutorials, and surf the internet to find out how they can improve their skills.

3. This can be achieved by enrolling them in online course that offer unlimited goals and objectives.

4. I believe it should be done first in our classrooms when they practice all the stuff mentioned above, then legislating some certain laws that gives some support, accredit and value for online learning.

5. Training and practicing

Question 8

Is there anything else you would like to add?

1. No.

2. Students' positive reaction to all the technology means we use in the teaching process should make teachers look for new teaching methods that depend on technology.

3. We live in the age of speed. We need to track the development that takes place in the world as far as learning and teaching is concerned. At this point, the government should take its role by providing the facilities needed to improve the learning system.

4. In our region I believe it is not impossible to get the young generation trained for the upcoming age of technology, providing that we start from a thorough reform in all aspects of our Higher Education system.

5. The department is not specialized in preparing pre-service teachers. The teaching method class is intended to those who might be teachers in the future though most of them ultimately are obliged to be teachers if they can't find another job.

Appendix F: Letter Permission from University of Duhok

UoD
University of Duhok
International Relations Office (IRO)
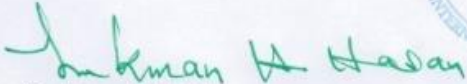
No.:7379
January 06, 2020

Attn.: To whom it may concern

CERTIFICATION

Dear Sir / Madam,

This is to certify that the University of Duhok has no objection about **Mr. Mohammed Nafie Sadeeq**, a master student at the Eastern Mediterranean University, request to collect the needed data for his master thesis at our university.

Sincerely,

Dr. Lukman H. Hasan
Vice President for Scientific Affairs and Postgraduate Studies
University of Duhok (UoD)

Appendix G: Approval letter of the Graduate Institute

Doğu Akdeniz Üniversitesi
"Erdem, Bilgi, Gelişim"

Eastern Mediterranean University
"Virtue, Knowledge, Advancement"

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Faks/Fax: (+90) 392 630 2919
E-mail: bayek@emu.edu.tr

Etik Kurulu / *Ethics Committee*

Sayı: ETK00-2020-0036   31.01.2020

Konu: Your application for ethical approval.

Re: Mohammed Nafie Sadeeq (18500391)

Faculty of Education.

EMU's Scientific Research and Publication Ethics Board (BAYEK) has approved the decision of the Ethics Board of Education (date: **29.01.2020**, issue: **2020/64**) granting Mohammed Nafie Sadeeq from the Faculty of Education to pursue with his/her MA thesis work titled **"An Investigation of Technological Pedagogical Content Knowledge (TPACK) of Preservice English Teachers in the Kurdistan Region of Iraq"** supervised by Prof. Dr. Ülker Vancı Osam.

Prof. Dr. Yücel Vural

Chair, Board of Scientific Research and Publication Ethics - EMU

YV/ns.

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