A CASE STUDY OF USING TPACK FRAMEWORK AS A TOOL TO EVALUATE A TESL PRE SERVICE TEACHER EDUCATION PROGRAMME

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SULTAN IDRIS EDUCATION UNIVERSITY

2022

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THESIS PRESENTED TO QUALIFY FOR A
MASTER'S DEGREE IN EDUCATION
(RESEARCH MODE)

FACULTY OF LANGUAGES AND COMMUNICATION
SULTAN IDRIS EDUCATION UNIVERSITY

2022

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ACKNOWLEDGEMENT

First and foremost, Alhamdulillah, all praise be to Allah who with His compassion has enabled me to finish my thesis. This thesis does not only represent about TPACK among TESL Pre-Service Teachers through an English teacher point of view but it is also a proof of that as a language teacher, there are many wonderful things to explore with technology knowledge. More importantly, this thesis is my second chance to put my research back on track. I was at a juncture of turbulence to choose between having a career or to further studies. After the NRGS interview, when Prof Madya Dr. Raja Nor Safinas offered me the golden opportunity to be under her supervision with NRGS I was excited. Honestly, I am incredibly grateful for her compassion, flexibility, perseverance, and encouragement to mould me from an average secondary school English teacher to a graduate research assistant. Along the way, I met several key persons who have changed my life and they included Dr Jeff, Dr Ainon, Dr Hafiz (NRGS Curriculum Group). Without the exposure and the motivational push they gave, I would not even know what the terms 3 E's "Scholar Teachers" Emancipate, Engage and Empower. My ultimate thanks go to my late lovely mother, Hafsah binti Yaakub, and my wonderful brother who had have always been encouraging and supportive throughout my journey, keeping me sane during my busy days, and constantly reminding me to write my thesis. Not forgetting my great family who have relentless given me the emotionally support, I must declare my gratitude to all of them. Last but not least, my dearest friends, Yip,Loges,Poon and Emilyn,

ABSTRACT

This study aims to investigate a case study using the TPACK framework as a tool to evaluate a TESL pre-service teachers education programme. A qualitative approach with a case study design was selected for this study to examine the TPACK competencies level among pre-service teachers. In addition, the study is intended to explore the TESL pre-service teachers TPACK learning experiences in technology courses as well as to investigate on how TPACK has been integrated by TESL pre-service teachers in their pedagogical skills. The data was collected using a questionnaire, observation of pre-service teachers, focus group interviews with the pre-service teachers and lecturers teaching the technology course, and document analysis of course instructional planning. A class of thirty TESL pre-service teachers in a teacher education programme was chosen as the participants of the study using the purposive sampling method. The findings showed that TESL pre-service teachers are competent and had an average level of TPACK competencies. The findings from the interviews showed that pre-service teachers had the meaningful learning experience via active learning in which they had hands on teaching experience by bringing their own device. Furthermore, the TESL pre-service teachers has applied TPACK in developing the pedagogical skills through the use of technology integration of language content and pedagogical content knowledge. The study implicates that teacher education programmes should integrate the TPACK knowledge through technological courses. Pre-service teachers also are encouraged to equip themselves with Technological Pedagogical Content Knowledge (TPACK). It is essential in fostering pedagogical improvement for education in twenty-first-century learning. It involves using technology that has identified ICT-based learning as a standard element across all twenty-first-century knowledge frameworks.

KAJIAN KES MENGGUNAKAN RANGKA KERJA PENGETAHUAN TEKNOLOGI PEDAGOGI KANDUNGAN (TPACK) SEBAGAI ALAT UNTUK MENILAI PROGRAM PENDIDIKAN GURU PRA-PERKHIDMATAN TESL

ABSTRAK

Kajian ini bertujuan untuk menyiasat kajian kes menggunakan rangka kerja TPACK sebagai alat untuk menilai program pendidikan guru pra-perkhidmatan TESL. Pendekatan kualitatif dengan reka bentuk kajian kes telah dipilih untuk kajian ini bagi mengkaji tahap kompetensi TPACK dalam kalangan guru pra-perkhidmatan. Di samping itu, kajian ini bertujuan untuk meneroka pengalaman pembelajaran TPACK guru pra-perkhidmatan TESL dalam kursus teknologi serta untuk menyiasat bagaimana TPACK telah diintegrasikan oleh guru pra-perkhidmatan TESL dalam kemahiran pedagogi mereka. Data dikumpul menggunakan soal selidik, pemerhatian guru pra-perkhidmatan, temu bual kumpulan fokus dengan guru pra-perkhidmatan dan pensyarah yang mengajar kursus teknologi, serta analisis dokumen perancangan pengajaran kursus. Sebuah kelas dengan tiga puluh guru pra-perkhidmatan TESL dalam program pendidikan guru telah dipilih sebagai peserta kajian menggunakan kaedah persampelan bertujuan. Dapatan kajian menunjukkan guru pra-perkhidmatan TESL adalah kompeten dan mempunyai tahap kompetensi TPACK purata. Dapatan daripada temu bual menunjukkan bahawa guru pra-perkhidmatan mempunyai pengalaman pembelajaran yang bermakna melalui pembelajaran aktif di mana mereka mempunyai pengalaman mengajar secara langsung dengan membawa peranti mereka sendiri. Tambahan pula, guru pra-perkhidmatan TESL telah mengaplikasikan TPACK dalam membangunkan kemahiran pedagogi melalui penggunaan teknologi integrasi kandungan bahasa dan pengetahuan kandungan pedagogi. Kajian ini memberi implikasi bahawa program pendidikan guru harus mengintegrasikan pengetahuan TPACK melalui kursus teknologi. Guru pra-perkhidmatan juga digalakkan untuk melengkapkan diri dengan Pengetahuan Kandungan Pedagogi Teknologi (TPACK). Ia adalah penting dalam memupuk peningkatan pedagogi dalam pendidikan untuk pembelajaran abad kedua puluh satu. Ia melibatkan penggunaan teknologi yang telah dikenal pasti sebgai pembelajaran berasaskan ICT sebagai elemen standard merentasi semua rangka kerja pengetahuan abad kedua puluh satu.

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CALL	Computer Assisted Language Learning
KPD 3016	Instruction Technology and Assessment 1
KPD 3026	Instruction Technology and Assessment 2
MTE	Information and Communications Technology Competency

LIST OF APPENDICES

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter presents the background of the study, problem statement, research objectives, research questions, theoretical framework, significant of the study, limitations of the study and operational definitions.

1.2 Background of the study

In the twenty-first century, the phrase "technology" has become a critical concern in a wide variety of sectors, including education. Technology has evolved into the primary mode of knowledge transfer in most countries. Technological integration has expanded and reshaped the societies, changing people's thinking, working, and daily lives in profound ways. Agrawal and Mittal (2018) have stated that the term of "Integration of Information, Communication, and Technology (ICT) in Education" refers to the

incorporation of computer-based communication into the everyday teaching process in the classroom. Along with training pupils for the digital era, teachers are viewed as crucial participants in integrating ICT into their regular classroom activities. This is because ICT enables the provision of a dynamic and proactive teaching-learning environment.

There has been plenty of discussion about 21st-century learning. Information and communication technology (ICT) in education fosters emerging pedagogies. It is a qualitative technical method that has a significant influence on the educational system. It has improved the quality of education, enhanced production, and altered the educational system's general style and functioning, as well as its governance. ICT is getting more and more integrated into our daily lives and educational systems. Educational institutions are increasingly being urged to employ ICT to provide students with the skills and knowledge necessary for success in the digital age. The incorporation and use of ICT in the teaching and learning environment increases teachers' and students' opportunities for effective collaboration in the globalised digital era. ICT also has the potential to play an increasingly important role in education, whether in the classroom, administration, online instruction, or other settings. Teachers and students alike have immense opportunity to utilise the power of ICT to improve the quality of classroom teaching and learning (Beetham and Sharpe,2013; Kalantzis and Cope, 2012; Martinovic and Zhang 2012; Bari ,Djouab and Hoa, 2018 ; Das,2019).

Sánchez-García, Marcos, GuanLin, and Escribano (2013); and Maor and Currie (2017) have postulated that teaching and learning strategies and methods should adapt to technology in 21st-century learning. Teachers are required to keep up to date by incorporating new information and techniques. Teacher education methods such as

chalk and talk appear to be less effective in getting students engagement and participation. Teachers' competencies must be updated to meet the demands of the twenty-first century. Teaching practises must evolve, as well as the competencies that teachers must acquire to empower 21st-century learners. Therefore, teachers should accept changes and be able to manage them with flexibility in such a way that teaching, and learning can stay dynamic, insightful, and challenging.

The Malaysian government has implemented several major educational reforms in recent years. The MOE has revised its priorities to put equal emphasis on education from primary to post-secondary. As part of Malaysia's 21st-century learning initiatives, Malaysia Education Blueprint (MEB) 2013-2025 was introduced in 2014. The main aim of MEB is to empower all Malaysians by providing all people with an equal educational opportunity that produces well-skilled, educated, and well-united citizens. Since 2015, the implementation has been underway across the country. There are eleven shifts in MEB 2013-2025 to improve and transform the education system that all Malaysians can embrace, including educationists, academics, parents, and students (Ministry of Education Malaysia, 2013). One of the shifts in the blueprint is transforming teaching into a career of choice, which can be seen as a critical factor in producing quality teachers, a crucial component of every educational system (Ministry of Education Malaysia, 2013). It is intended to the quality of schools and students, which is affected by the quality of teachers involved in teaching and learning. As a result, teacher education must be strengthened to develop qualified, skilled, and efficient teachers (D.N.Harris and Sass,2009; Adams and Muthiah,2020; Raja Safinas Raja Harun, 2020).

The government has also implemented various programs to improve the readiness and the use of ICT among teachers and students. The 7th shift in MEB 2013-2025 has concentrated on teachers being able to leverage the effectiveness of advanced technology with the added goal of educating and stimulating students' (Ministry of Education Malaysia, 2013). The implementation of smart ICT throughout Malaysia as providing internet access and a virtual learning environment is an ongoing effort to prepare students and teachers with the latest technology skills (Ministry of Education Malaysia, 2013). The Malaysian Education Blueprint (MEB) also outlines the roadmap for tertiary education between 2015 and 2025. These shifts focus on helping students succeed in the educational system. It fosters the use of the internet's impact on academic discovery while at the same time being open to all types of learners.

Several reforms to the national curriculum have been made under MEB 2013-2025 to develop students who are resilient, curious, creative, and able to interact effectively. *Kurikulum Standard Sekolah Rendah (KSSR)* and *Kurikulum Standard Sekolah Menengah (KSSM)* are learning standards that students must meet at various levels of their education. Students are expected to achieve a pre-set standard of knowledge, skills, and values. Additionally, the new curriculum has also been designed to go beyond acquiring communication skills, self-development, and the student's immediate environment as in the previous curriculum of *(KBSR) and (KBSM)*. It is intended to improve and embrace the use of science and technology, as well as to establish values, comprehend humanitarian concerns, and concentrate on the physical and aesthetic advancement of students (Ministry of Education Malaysia, 2000).

For all subjects, including the English Language, the standard-based curriculum of KSSR and KSSM is represented through Dokumen Standard Kurikulum Pentaksiran

(DSKP). The standard-based curriculum for English subject is known as The Standard-Based English Language Curriculum for Schools (SBELC). The SBELC document includes the following: content standards, learning standards, assessment, and pedagogical approach. From a pedagogical standpoint, all language skills are taught in a modular approach, beginning with the easiest and progressing to the most difficult. A selection of key elements across the curriculum is provided for teachers to improve students' ability to communicate correctly, confidently, and effectively in English and meet 21st-century teaching and learning demands. The cross-curricular elements are embedded into the instructional processes and are concurrent with the Content and Learning Standards in SBELC (Ministry of Education Malaysia, 2015). One of the education approach elements is focusing on the use of technology in teaching and learning. This element is essential because it allows teachers to pique students' interests, making teaching and learning more productive and enjoyable to meet personal, local, and global needs. It also helps students because, in today's dynamic and multi-dimensional world, it is vital for them to be able to link diverse sources of information.

The implementation of the Malaysian Education Blueprint 2013-2025 has resulted in several curriculum adjustments in the Malaysian ESL (English as a Second Language) syllabus, teaching, and assessment. The adoption and implementation of the Common European Framework of Reference for Languages (CEFR) in Malaysian schools, which began in primary and secondary schools in 2017, requires a few significant modifications in English classroom teaching, learning, and assessment. The CEFR (Common European Framework of Reference for Languages) is the most widely recognized language standard competencies. It is a universally accepted framework for

describing language learning, teaching, and assessment. The CEFR explains what foreign or second language learners can do in terms of listening, speaking, reading, and writing at six levels of proficiency ranging from A1 to C (Zuraidah Md Don and Mardziah Hayati Abdullah, 2019).

Teaching and learning will undergo a fundamental transformation throughout the 21st century. This positive change is in line with technological developments and the progress of the education system. With the growth of technology, teachers in the twenty-first century would definitely need to strengthen their skills in motivating and facilitating the learning process among pupils who are more prepared for 21st century learning. Furthermore, in the twenty-first century, teaching and learning goals are to take students beyond the basics and embrace the "4C's" super skills; communication, collaboration, critical thinking, and creativity. During the lesson, the students are led by the talents of exchanging thoughts and ideas, working to accomplish goals, strategic thinking in problem-solving, and finding new ways to get things done using their imagination. Teachers play an essential role in helping students explore how to apply the "4C's" effectively in a technology-infused learning environment that encourages the growth of lifelong learning skills (Ganapathy, 2016).

According to Melor Md Yunus (2007); Susanty, Yunos, Ahmad, and Razali (2019), information and communication technology (ICT) has evolved rapidly and is now used in all fields of expertise, including education. Teachers should understand the significance of information technology in language learning and help students meet their objectives throughout the lesson. It represents the change in direction in education policy, announced by the Minister of Education in 2010. ICT is now the primary medium of teaching, and teachers function as facilitators (Chen, Lim, and Tan, 2010;

S.H Khan, 2015; Saravanakumar, 2018). It is undeniable that incorporating new technology is essential in today's classrooms, but it is not supposed to replace teachers; it is meant to make learning more enjoyable, helpful, and interesting for students. The use of such technologies as the internet, web tools, webcams, game cameras, video clips, cell phones, and social media certainly influences the classroom's learning environment.

According to Ersanli (2016) and Voogt and McKenney (2017), the ultimate aim of using technology in teacher education is to improve learning opportunities for potential students. Future teachers need to be trained to carry out differentiation and individualization to adapt the instruction to the students' individual characteristics. It has the implications for the concepts and theories that form the basis of the curriculum and practice of teacher education to produce thinking teachers. It will, therefore, lead students to function locally and globally in a variety of contexts.

Therefore, the challenge of implementing 21st-century learning depends on how teachers use various technological resources and information to promote quality and effective teaching and learning in the light of current developments in education (Ministry of Education Malaysia, 2015).

1.3 Problem Statement

The recent advancement of modern technology has given today's generation the ability to optimise all functions and use of technology as part of our daily life. The usage of

the Internet and digital devices is a remarkable feature of this new generation. They are skilled in interacting with technology and using social media.

A change in the education system is essential to positively impact the success of the young generation, particularly in preparing them for the challenges of the 21st century, including technological development. However, it is well recognised that as opposed to digital native students, teachers' technology-related information and skills are rarely used. It is also valid to some extent in which "teachers are unable to successfully incorporate technology in both their pedagogical skills and their technology (Donnelly, McGarr and O'Reilly, 2011; O'Neal, Gibson and Cotton, 2017; Farjon Smits and Voogt, 2019).

According to Britto (2005) and Kimm, Kim, Baek, and Chen (2020), pre-service teachers do not demonstrate their full ability in knowledge, skills, and experience to integrate the use of technology effectively during teaching in the classroom due to a lack of preparation and expertise while they went through their teacher education programs. Studies have shown that teacher education programmes are being criticized for "failing to prepare pre-service teachers with the prerequisite knowledge on using technology especially when pre-service teachers attended their teaching practice" (Irvine and Montgomerie, 2001; Wilhelmsen, Ornes, Kristiansen and Breivik, 2009; Tondeur, Pareja Roblin,Van Braak, Voogt and Prestridge, 2017). Furthermore, Hsu (2013) and Brenner and Brill (2016) reported that some teacher education programs recommended only one technology course for pre-service teachers to expose ICT during their teaching preparation. When the technologies and tools are constantly changing, it is more challenging to prepare pre-service teachers for classroom technology integration which has more technology applications, programs, and

software programs from which to choose (Betrus, 2012; Mouza, Yang, Pan, Ozden, and Pollock,2017; Redmont and Lock, 2019).

Empirical evidence has shown that pre-service teachers feel that they lack experience in integrating ICT effectively into their classroom (Kay, 2006; Ottenbreit-Leftwich, Glazewski, Newby and Ertmer,2010; Redmond and Lock, 2019). Based on the findings, pre-service teachers are less exposed to the pedagogical use of ICT. They have not gotten clear guidelines and sufficient hours to incorporate ICT into their lesson during their teacher education programmes. Less time in training and the chance to learn computer skills are significant challenges for teachers in using ICT and integrating it into their teaching and learning strategies (Melor Md Yunus, 2007; Bingimlas, 2009; Park and Son, 2020). Moreover, the studies by Earle (2002), Bingimlas (2009), and Ranellucci, Rosenberg, and Poitras (2020) have revealed that pre-service teachers felt distrustful to use ICT in teaching**.** Having little knowledge on technical support of using ICT can mislead pre-service teachers on using technology successfully. Feeling fear of making mistakes in front of friends hinders them from exploring on using ICT effectively.

A few studies have shown that pre-service teachers do not use the technology to deliver their courses (Al-Ruz and Khasawneh, 2011; S.-H Liu, 2012; Batane and Ngwako, 2017) . It has been observed that the training programmes provide the students with technological skills, but not with the knowledge of integrating technology into the curriculum successfully.

The availability and accessibility of ICT tools such as hardware and software are critical for effective ICT incorporation into teaching. Teachers would certainly not

use ICT services if they cannot reach them. Restricted access to required ICT resources, software, and facilities, as well as insufficient technological support, such as unsuitable computer labs or classrooms, as well as problems with high-speed internet connectivity and coverage, create some obstacles to encouraging teachers to use technology in their lessons (Khan, Hossain, Hassan and Clement,2012; Bindu, 2019).

While Malaysia's education system is adjusting to 21st century education, implementation among teachers in schools has been a challenge. In-service teachers' attitudes toward technology have a significant impact on their willingness to accept and integrate computers into their classroom instruction. According to Raman and Yamat (2014) teachers aversion to using ICT is a significant impediment to ICT integration and use in English language schools. They face significant obstacles in integrating ICT resources into English language classes due to workload. Similarly, Yamat and Kaur (2016) identify workload, a lack of time, insufficient teaching experience and age, and a lack of ICT skills as impediments to integrating ICT resources into ESL classrooms. Teachers, according to their research, are overburdened with administrative responsibilities and focus only on tests and syllabi. They discovered that integrating ICT into courses with many students while also being saddled with the responsibility of grading test papers, practise books, and workbooks is difficult.

Another study by Yunus and Suliman (2014), teachers concurred that ICT facilitates the teaching and learning processes. Yet, when they were asked about their approaches, teachers reported that they continued to rely heavily on traditional methods such as explaining, comprehension question strategies, and copying notes. Moreover, teachers mostly use ICT tools for routine tasks such as typing and creating PowerPoint slides. They did not, however, demonstrate a genuine interest in using social media as

an ICT tool for education. Teachers tend to struggle the skills and expertise necessary to blend technology and pedagogy.

Tee et al. (2018) concluded in their study that teachers' classroom practise (both pre-service and in-service instructors) is deficient in activities that foster 21st-century skills development. Additionally, teachers are unable to integrate technology into their instruction. This topic is directly tied to earlier research on teachers' skills in the technological pedagogical content knowledge (TPACK) framework. Even though various studies on TPACK have been conducted in Malaysia (Hasniza & Tengku Faekah, 2016; Nor'ain & Noor Zarinawaty, 2014; Junnaina & Hazri, 2012; Nur Filzah, 2016), research on using TPACK framework as a tool to evaluate an education programme is limited and rarely explored.

As the scope of this study will be based on a group of 30 TESL students in a teacher education university, an extensive effort has been made to strengthen the integration of technology among pre-service teachers as it is an essential point to an outstanding curriculum technology integration. The university programme learning outcome of Bachelor of Education TESL has listed out that pre-service teachers need to master technical skills, including educational technologies and ICT, which in Programme Learning Outcome 3 - Use educational technology and ICT. Therefore, this study investigates of using TPACK framework as a tool to evaluate a TESL pre-service teacher education programme. This research investigates the 30 TESL students' TPACK competencies and their TPACK learning experiences in technology integration courses such as Information and Communications Technology Competency (MTE), Computer Assisted Language and Learning (CALL) and Instruction Technology and Assessment (CALT) and how TPACK is being integrated in their pedagogical skills.

1.4 Research Objective

This study intends to:

1) examine the TPACK competencies level among TESL pre-service teachers.
2) explore the TESL pre-service teachers TPACK learning experiences in technology integration courses.
3) investigate on how TPACK has been integrated by TESL pre-service teachers in their pedagogical skills.

1.5 Research Questions

The following are the questions for the research:

1) What are the TPACK competencies level among TESL pre-service teachers?
2) What are the TPACK learning experiences that the pre-service teachers have gone through in the technology integration courses?
3) How has TPACK framework been integrated by TESL pre-service teachers in their pedagogical skills?

1.6 Theoretical Framework

The Technological Pedagogical Content Knowledge (TPACK) framework guides this research because it provides valuable insights into teachers' knowledge to teach effectively with technology (Koehler & Mishra, 2009). The structure integrates three domains of knowledge known as technology, pedagogy, and content (Mishra & Koehler, 2006).

In 1986, TPACK (a combination of Pedagogical Content Knowledge (PCK) and Technological Knowledge (TK)) was created by merging Schulman's PCK (which contained both Content Knowledge (CK) and pedagogy) with TK (Technology Knowledge). The short name of TPCK was shortened to TPACK after it was founded to aid in pronunciation and make it easier to remember and integrate the three types of learning (Thompson & Mishra, 2007).

TPACK framework also highlights teachers' comprehension of technologies that act as knowledge during teaching and learning. The focus is more on the two combinations of ideas regarding general pedagogical knowledge and knowledge about content in teacher's instruction, which leads to a new understanding of delivering the subject distinctively. Currently, it is one of the most important ways of providing technological support for integrating complex problems of knowledge from pedagogy, content, technology, and different forms of interactions among these elements in the classroom (M. J. Koeheler, Mishra, Kereluik, Shin and Graham , 2014; Swallow and Olofson,2017).

TPACK was initiated by Mishra and Koehler in 2006 can be used by teachers and pre-service teachers in integrating technology for their teaching. Teacher's knowledge regarding technology should be varied, and the combination of technology, pedagogy, and content in the classroom should be fully optimised between one and another. TPACK distinguishes the effective collaboration between Technological Knowledge (TK), Pedagogical Knowledge (PK), and Content Knowledge (CK). Technological knowledge (TK), which refers to both complex and straightforward digital tools; pedagogical knowledge (PK), which refers to the method and practice of

teaching; and content knowledge (CK), which relates to the subject matter being taught and learned (M. Koehler & Mishra, 2009). (Refer to figure 1.1)

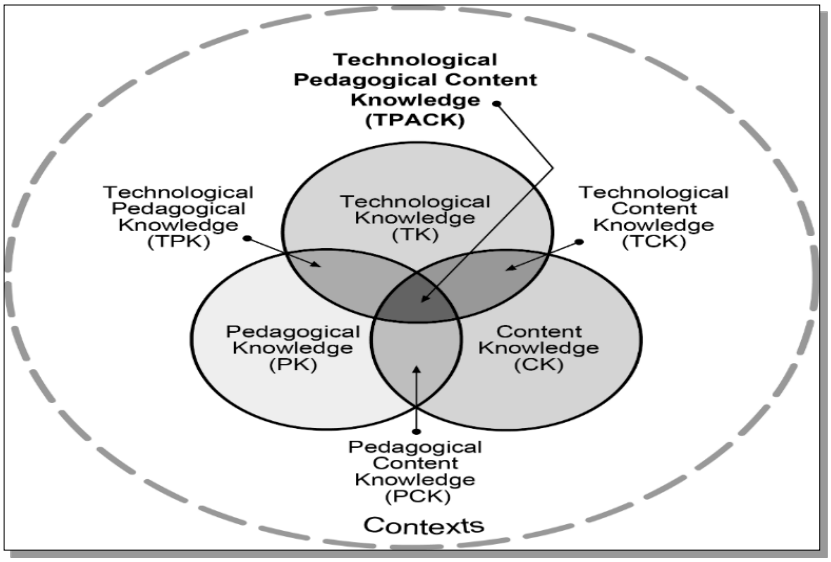

Figure 1.1. TPACK Theoretical Framework (Koehler and Mishra, 2009)

Additionally, the TPACK framework identifies the interactions between these three primary areas to develop additional knowledge. For example, the overlap of Technological Knowledge and Pedagogical Knowledge is identified as Technological Pedagogical Knowledge (TPK). It refers to the teachers' understanding of how specific technologies can impact teaching and learn in a classroom setting. Additionally, the overlap of Pedagogical Knowledge and Content Knowledge is identified as Pedagogical Content Knowledge (PCK). Pedagogical Content Knowledge refers to the teachers' understanding of the subject matter and their ability to adapt and personalise it to meet the needs of individual students and create learning environments that are conducive to their success. The overlap of Technological Knowledge and Content Knowledge is known as Technological Content Knowledge (TCK). It refers to the teachers' understanding of how the application of various technologies can change subject matter. Lastly, the overlap of all three main areas, including Technological

Knowledge, Pedagogical Knowledge, and Content Knowledge, is known as Technological Pedagogical Content Knowledge (TPACK). Effective teaching with technology is built on a thorough grasp of all three of these domains and how they interact with one another (Koehler and Mishra, 2009; Swallow and Olofson, 2017).

Researchers suggest that Technological Pedagogical Content Knowledge (TPACK) to be integrated into teacher education institutions' curricula and that young future teachers can experience ICT that can enhance instruction in various disciplines, including language (Voogt and McKenny, 2017). Preparing pre-service teachers by integrating TPACK into the teacher education curriculum is critical in today's educational environment because they must be proficient with the relevant intelligence to progress towards becoming outstanding teachers (Mahdum, 2015; Tondeur, Scherer, Siddiq and Baran, 2017). Teacher education institutions are expected to produce a quality and knowledgeable pre-service teacher and guiding them to impart the information and communication technology (ICT) into their lessons. TPACK framework elements require pre-service teachers to receive training on how to connect their teaching skills with content and technology to support the use of those TPACK elements. It also aids in developing pre-service teachers' ability to integrate technology into the 21st-century classroom in order to have the most significant impact on students' learning outcomes (Tondeur, Scherer, Siddiq, and Baran, 2020).

1.7 Significance of Study

Firstly, this study will provide an approach for pre-service teachers on encouraging and improving technology integration in the classroom as teachers are continually challenged to meet the needs of a diverse population of digital learners. To meet these

teaching and learning needs, graduates of teacher education programs have to be competent in lessons that effectively integrate appropriate technology with content that supports student learning.

Secondly, this study will also contribute to the accumulation of information especially in Technological Pedagogical Content Knowledge and on how information technology is integrated with the teaching and learning of English among pre-service teachers. Hopefully, these findings will implicate on technology integration courses offered among pre-service teachers and provide an overview of TESL pre-service teachers' readiness and TPACK competencies.

Thirdly, it is hoped that this study can provide insights and knowledge for educators, education administrators, and the teacher education division when designing training programme for pre-service teachers with the integration of TPACK curriculum framework. This study can inform on the strengths and weaknesses of using and managing technology in a particular pedagogical and content knowledge.

1.8 The Operational Definitions

Terminology used throughout this study are listed as follows:

TPACK: -

TPACK (Technological Pedagogical Content Knowledge) is a theoretical framework for understanding technological pedagogical content knowledge. The structure consists

of integrating three domains (of knowledge), which are referred to as technology, pedagogy, and content (Mishra & Koehler, 2006; Mahdum, 2015; Tondeur, Scherer, Siddiq and Baran, 2017). This study applies the TPACK framework to a TESL programme at a teacher education university.

Content Knowledge (CK): -

Knowledge of the subject matter (CK) is what pre-service teachers are expected to have about the subject matter (Koehler and Mishra, 2009; Mahdum, 2015; Tondeur, Scherer, Siddiq and Baran 2017). This knowledge is comprised of four language skills: listening, speaking, reading, and writing, as well as other language aspects such as literature and grammar.

Pedagogical Knowledge (PK): -

(PK) requires a thorough understanding of cognitive, social, and developmental theories of learning and the ability to apply these theories in the classroom setting. (Koehler and Mishra, 2009; Tondeur, Scherer, Siddiq and Baran, 2020). In this study, (PK) refers to the pre-service teachers' understanding of the teaching process and practices and methods. It also includes an understanding of how learners learn, classroom management, lesson planning, assessment, the development of materials, and the use of various teaching techniques and methods to facilitate learning.

Technological Knowledge (TK): -

It entails the knowledge and abilities required to work with various technologies (Mishra and Koehler, 2006; Tondeur, Scherer, Siddiq, and Baran, 2020). As in this study, it is the ability to use digital technologies, such as software and applications, the Internet, digital video, and the skills required to operate specific technologies evaluated in the study.

Technological Content Knowledge (TCK): -

It necessitates an understanding of the subject matter and how to teach it using technology (Koehler, Mishra, and Yahya, 2007; Tondeur, Scherer, Siddiq, and Baran 2017) . In this study, the term refers to the understanding that pre-service teachers gain about how technology supports in understanding the content area they teach in their classrooms.

Technological Pedagogical Knowledge (TPK): -

According to Heitink, Voogt, Fisser, Verplanken, and van Braak (2017), TPK, which integrates pedagogical strategies with technology, is the type of knowledge a teacher is expected to possess for managing instruction within computer-supported classrooms. As part of this study, pre-service teachers use TPK to decide on how technology can support an instructional strategy or activity in a classroom setting.

Pedagogical Content Knowledge (PCK): -

It is the knowledge necessary for effective subject matter instruction. A teacher with PCK, according to Can, Erökten, and Bahtiyar (2017), can plan and practice the subject matter to be taught. It is suitable for pre-service instructors to teach specific content or topics in the context of this study.

ICT (Information Communication Technology): -

In this study, information and communications technology (ICT) is defined as a collection of technological tools (hardware) and resources (applications, software) that are used to communicate, create, disseminate, store, and manage information. It is not a single technology but a combination of hardware, software, media, and delivery systems such as desktop, notebook, and handheld computers; digital cameras; local area networking; the Internet and the World Wide Web, CD -ROMs and DVDs; and applications such as word processors, electronic mail (email), digital libraries, computer-mediated conferencing, videoconferencing, and other forms of collaboration and information sharing (Mishra, Sharma and Tripathi, 2010; Lysenko, 2018).

Teacher Education Programme: -

Teacher Education Programme usually is offered teacher training institution, It is programme that equips prospective in teachers with the knowledge, attitudes, behaviours, and skills needed to carry out various functions successfully in the classroom, in the school, and the community (Paine, Aydarova and Syahril, 2017).

Pre-Service Teachers: -

Pre-service teachers are student teachers who study at a teacher's college or institution before they their careers as a teacher (Barmore,2017). In this study context, student teachers are pre-service teachers in a teacher education university who undergo training for eight semesters (four years) studying before becoming secondary school teachers.

TPACK Learning Experiences: -

Learning experience is the Interaction in courses or other experiences in which learning takes place, whether it occurs in traditional academic settings (schools, classrooms) or non-traditional settings (outside-of-school locations or any environments (Kolb, 2014; Gavillet, 2018). The context of the study revolves around the TPACK learning experiences which focus on technology integration courses that pre-service teachers attended.

1.9 Chapter Summary

In twenty-first-century learning, the TPACK framework plays a significant role in supporting pedagogical progress. Three fundamental elements, which are content, pedagogy, and technology, as well as the connections and interactions between them, are at the heart of effective technology-assisted instruction. The interactions between and among the three elements, which manifest themselves differently across various contexts, are what cause the enormous variances in the degree and calibre of educational technology integration. The foundation of the Technological, Pedagogical,

and Content Knowledge (TPACK) is made up of these three knowledge bases: content, pedagogy, and technology. The utilization of ICT and technology in the twenty-first-century classroom is a critical component that necessitates a high level of teacher knowledge and skill to meet learning objectives. As a result, this research aids in the exploration of TESL students' technology readiness, learning experiences in technology integration courses, and technology integration as a means of preparing pre-service teachers for 21st-century education.