

EXPLORING TPACK COMPETENCIES OF PRIMARY SCHOOL TEACHERS
IN ESL CLASSROOM

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DEDICATION

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Thank you for the endless support.

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ABSTRACT

The Malaysian education system has gone through a lot of changes and now moving towards Education 4.0. In this case, technology plays a vital role in making the education system to achieve the goals. The TPACK framework comprises of the knowledge needed by the teachers in bringing together Technological Knowledge, Pedagogical Knowledge and Content Knowledge. This study aims to know the TPACK level of the primary school English teachers in Pasir Gudang District. A total of 240 teachers from Pasir Gudang District took part in this study. A mix-method was employed to gather the data in two phases. For the first phase, quantitative data were collected through the TPACK questionnaire. The questionnaire consists of 8 sections with 46 items on the domains and sub-domains of TPACK. For the qualitative, a semi-structured interview was conducted to gather data in the second phase. 5 teachers volunteered themselves to be interviewed in the second phase. The quantitative results indicated that teachers are at an average level of TPACK and there is no significant difference between their TPACK level with their gender, age and teaching experience. The qualitative result revealed that the effect of TPACK level in the English teaching perceived by primary school English teachers are positive. Teachers claimed that technology integration in their pedagogical and content knowledge creates a fun learning environment, promotes active participation of students and the learning objectives are easily achievable.

ABSTRAK

Sistem pendidikan Malaysia telah mengalami banyak perubahan dan kini menuju ke arah Pendidikan 4.0. Dalam hal ini, teknologi memainkan peranan penting dalam menjadikan sistem pendidikan mencapai matlamatnya. Kerangka TPACK merangkumi pengetahuan yang diperlukan oleh guru dalam menyatukan pengetahuan teknologi, pengetahuan pedagogi dan pengetahuan kandungan. Kajian ini bertujuan untuk mengetahui tahap TPACK guru Bahasa Inggeris sekolah rendah di daerah Pasir Gudang. Seramai 240 orang guru dari daerah Pasir Gudang mengambil bahagian dalam kajian ini. Kaedah kualitatif dan kuantitatif digunakan untuk mengumpulkan data dalam dua fasa. Untuk fasa pertama, data kuantitatif dikumpulkan melalui soal selidik TPACK. Soal selidik ini mengandungi 43 soalan mengenai domain dan sub-domain TPACK. Bagi data kualitatif, wawancara separa berstruktur dilakukan untuk mengumpulkan data pada fasa kedua. 5 orang guru telah melibatkan diri dalam fasa kedua untuk ditemu ramah. Hasil kuantitatif menunjukkan bahawa guru berada pada tahap sederhana dalam TPACK dan tidak ada perbezaan yang signifikan antara tahap TPACK mereka dengan jantina, usia dan pengalaman mengajar mereka. Hasil kualitatif menunjukkan bahawa kesan tahap TPACK dalam pengajaran Bahasa Inggeris dalam kalangan guru Bahasa Inggeris sekolah rendah adalah positif. Guru mendakwa bahawa integrasi teknologi dalam pengetahuan pedagogi dan kandungan mereka mewujudkan persekitaran pembelajaran yang menyeronokkan, mendorong penyertaan aktif pelajar dan objektif pembelajaran dapat dicapai dengan mudah.

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LIST OF ABBREVIATIONS

TPACK	-	Technological Pedagogical and Content Knowledge
IT	-	Information technology
ICT	-	Information and Communication Technology
VLE	-	Frog Virtual Learning Environment
ESL	-	English as Second Language
CALL	-	Computer Assisted Language Learning
TK	-	Technological Knowledge
PK	-	Pedagogical Knowledge
CK	-	Content Knowledge
TPK	-	Technological Pedagogical Knowledge
TCK	-	Technological Content Knowledge
PCK	-	Pedagogical Content Knowledge
CEFR	-	Common European Framework of Reference

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Today is the era where everything functions in a single click using Technology as this era is named as the digital era. This is because technology engulfs not only adults but also children as young as one year old. Ersanli (2016) also states that technology is an inseparable element from children's lives as they grow up with that. Wahab, Rose & Osman (2012) make clear deliberation on the definitions of technology in their study. They claimed that past literature shows different definitions for the term technology as the past researchers viewed it in different perspectives. Technology is not new to many fields including education and therefore it is defined in many ways. So, technology in education is defined as the incorporated use of hardware, software together with theories and practices in education to ease learning (Stosic, 2015).

Education is not an exception in this matter as technology has ever stopped spreading its wings over the education field. Technology has done a massive change in the education system where the traditional way of teaching is now mostly replaced with tech-based learning. Mushrooming of technological infrastructures, equipment and software always give a great platform for teachers to apply them in their lessons. The question arises when we evaluate whether teachers are integrating technology correctly and appropriately or the technology is just an 'add-on' in their lesson. There are a few studies analysed and they specified that English teachers are attempting to 'use' instead of integrating technology (Ozudogru & Ozudogru, 2019; Johnson et al. 2016; Montrieux et al. 2015). So, English teachers should be careful and aware of the purpose of integrating technology or using technological tools in their lessons.

A study by Akpabio & Ogiriki (2017) reveals that the education system faces challenges in terms of not having competent teachers in handling technology-based lessons but they still conduct classes using technology. Besides, Aagaard (2017) pointed out that teachers are comfortable integrating technology in their classes but inadequate training for them also has been highlighted. The researcher also suggested that teachers should be educated in the technology itself to integrate it into lessons effectively. Johnson et al. (2016) in their research claim that training insufficiency is one of the external challenges that teachers undergo. He stated that as teachers are always up for using technology in their lessons but it is changing constantly which makes the teachers feel less confidence in handling the new ones and they need to undergo new training to adapt themselves.

Singh (2018) from Nepal conducted a semi-structured interview among eight English teachers and found out that teachers are lacking in professional technological knowledge while integrating technology with their pedagogical skills. This study comes with a suggestion as the researcher says that teachers should be equipped with technological knowledge to integrate technology in a lesson with purpose. Moreover, the researcher added a suggestion of using Technological Pedagogical and Content Knowledge (TPACK) as an effective and practical framework-tool to help English teachers to integrate technology in lessons effectively. This is because TPACK Framework acts a productive approach in which there are three main domains namely Technological Knowledge, Pedagogical Knowledge and Content Knowledge and the intersection of all the three domains to produce the other sub-domains in helping teachers to face technology integration challenges in their classrooms.

Bloch (2018) states that technology is used as a tool for teachers to solve problems faced by learners rather than just use it as a technology by nature. Therefore, teachers should be aware of existing frameworks which would help them to pick or choose the most suitable and appropriate technology-based lesson that they would like to deliver. The growth of technological knowledge is essential for teachers as it helps the concepts to be easy to comprehend (Drew, 2015). Therefore, examining the knowledge of English teachers in handling technology well with their content and pedagogical skills in their classrooms is the aim of this research.

1.2 Background of Research

Chapman (2014) claims that earlier technologies helped the teachers by providing tools to replace the traditional teaching system. But now, educational technology has undergone a significant change where it created more opportunities for students to be independent learners as they are allowed to learn and search for resources in their own. Hence, many schools equipped themselves with technological tools to ease the teaching and learning process for involving teachers and students. A few studies show how educational technology evolved and being emphasised by reviewing the efforts taken by the government to embrace the change in education.

A research by Hamidi et al. (2011) on the comparison of a developed and developing country in educational technology showed how technology is absorbed into education over the years. Information technology (IT) was largely investigated in developed countries since 1990. Starting from 1994 to 2003, The United States improved an online connection for all the students from thirty percent to ninety three percent (Parsad, 2005). In 1998, Japan made enormous projects to integrate information and communication technology (ICT) in education. They initiated and established a program called computerization of education as an initiative to distribute computers and internet services for all schools in Japan. Furthermore, the Australian Education Council (1994) emphasis on the implementation of tech-based lessons for a student from year 1 to year 10 and a specialised program for secondary school students.

As for the developing countries such as Malaysia, started establishing technology in education around 2013 and improved further to adapt an e-learning platform from United Kingdom (UK) which is known as Frog Virtual Learning Environment (VLE) and 1BestariNet (Cheok, 2017). After layers of development Google Classroom launched in June 2019 is in use replacing the previous ones (**Mai & Hamzah, 2016**). Next, Thailand came up with an IT Policy in education in 2000 followed by the second policy in 2001-2010 to create a Knowledge-Based society (Ministry of ICT, 2008). In addition, Nigeria made an effort to accomplish technological advancement by introducing a subject/course named 'Electronics' in the elementary and secondary level, technical college and higher institutions (Emmanuel,

2019). So, the efforts of these countries in making technology as a part of education shows that technology is widely embraced and implemented.

The efforts taken by the countries shows the realisation of the importance of technology in education and there is also a piece of proven evidence which shows that technology has a constructive effect on education advancement particularly in Malaysia. Stosic (2015) states that educational technology's use can be explained in three domains. First, technology as a tutor. For instance, the user is guided by the computer to use it. Second, technology as a teaching tool for teachers and third is technology as a learning tool for students. Mitra & Dangwal (2010) state that technology promotes both directive and nondirective teaching strategies and at the same time it would boost student-centered learning environment. Besides, Sharma and Hannafin (2007) claim that effective scaffolding can be accomplished in the teaching and learning process when technology is given good attention.

The changes in education directly link to the teachers as they are the implementers of the plans into effect. Traditionally, teachers were required to master their contents of teaching but nowadays teachers have to master their knowledge in technology on par with educational changes. Thus, technology in education has been introduced to teachers by the use of computers at first then office applications, web tools, emails, online games and smartboards were also introduced gradually. Teachers were expected to utilise technology in their daily class because varied teaching and learning activities can be conducted when teachers widen their horizon in technology.

Along with this advancement, technology had even stronger grip when 21st - century skills were introduced in education. Technology literacy is one of the significant literacies that has been highlighted in 21st-century learning where teachers together with students have to make use of and learn the use of technology in teaching and learning. This becomes every teacher concern to integrate technology in their lessons. Glowatz & O'Brien (2017) say that 21st-century learning is an international effort and a paradigm shift to enhance educational technology.

So, there is no doubt on how technology penetrated all the subjects including English Language classrooms. Looking back the history, English language is rooted from The British and they became the native speakers of the language (Eleni, 2002). Gradually, with the influence of British colonialism, many countries such as Malaysia, Sri Lanka, India, Hong Kong, Pakistan and Indonesia accepted English as the second language and started using it in education and there are also countries which use English as a medium of instruction. (Rao, 2019). This shows that the English language in education plays a prominent role. Teaching a language requires a teacher to deliver it naturally to learners and this is where technology plays its crucial part.

Ghanizadeh, Razavi & Jahedizadeh (2015), Jin (2018) and Shadiev & Huang (2015) state that technology usage is found to be more effective compared to traditional classroom practices in teaching language through their studies. A review is done by Ghanizadeh et al. (2015) on technology-based language learning from 2004 to 2014 revealed that the input quality is enhanced, creates authentic communication, supports the improvement of all the language skills (listening, speaking, reading and writing). Similarly, another study by Shadiev & Yang (2020) reviewed a total of 38 articles from 2014 to 2019. They found out that teachers used twenty types of technology throughout the years where games and online video recorded in the top positions among the others. In their discussion, they also highlighted that English and Chinese Language are the most targeted languages in using technology and studies on technology-based English language teaching was found ten times higher than Chinese. Most outstandingly, they state that there is no framework is involved in the studies. Even though there are sufficient studies conducted to show the success of using of technology but there is less evidence of the teachers integrating technology for an appropriate purpose. Thus, importance should be given by the teachers to know why they integrate a specific technology in their lessons effectively.

1.3 Problem Statement

An effective teaching and learning lesson involves mastering the content and pedagogical knowledge in demonstrating the lesson. As the education system evolves, technology has become one of the important instructional tools. Hardisky (2018) stated that technology has remoulded the way instruction delivered in classrooms. Challenges faced by most of the countries in 21st-century is producing a technology competent teacher (Timperly, 2012). According to Davis (2014) governments are spending billions for the betterment of technology facilities, creating policies and implementing them. These efforts mainly expect the teachers to get prepared with all necessary technological knowledge to sail along with the contemporary learning environment. Yet, the result gained from some studies is still not desirable.

Meanwhile, primary school teachers are given little attention in TPACK studies. Some studies around the world claim that teachers are less knowledgeable and skilful in technology. For instance, English teachers in Saudi Arabia are found lacking in technological knowledge (Alhababi, 2017). The researcher states that limited experience and exposure to technology can be the cause. In addition, Castera (2020) listed out some demographic factors such as age, gender, academic level and teaching experience can be also some influencing factors of teachers' TPACK knowledge. Meanwhile, in United States only 25% of primary and secondary school teachers were prepared in terms of integrating technology effectively in lessons which means more than half of the teacher population were not ready (Alhababi, 2017). These studies indicate that their perceived learning in integrating technology is undersupplied among primary school teachers. A research in Malaysia claimed that only a minority of the teachers know the technology basics (Ghavifekr & Rosdy, 2015). The researchers also stated that a deep understanding of technological role in pedagogy is crucial for meaningful integration of technology in lessons.

In order to have a righteous understanding of meaningful technology integration, there were a few studies conducted among pre-service teachers with the application of TPACK Framework. Easter (2012) reviewed the usage of TPACK Framework to guide the technology literacy and the results showed that the framework

acted as a guide for the pre-service teachers to enhance their technological knowledge. Furthermore, Hervey and Watson (2013) in their study recorded significantly higher post-class test compared to the pre-class test when TPACK Framework is used in a graduate course. Similarly, Kurt, Mishra & Kocoglu (2013) found that there was a significant increase in technological-based subdomains of TPACK at the end of research compared to the beginning.

Looking back to the past studies, more and more emphasis was given to the TPACK exploration among pre-service English Language teachers compared to in-service primary school teachers. Among the studies focused on pre-service teachers are Kocoglu (2009); Lin et al. (2012); Kurt, Mishra & Kocoglu (2013); Raman (2014); Ekrem & Recep (2014); Kwangsawad (2016); Lambert & Siegi (2017); Vannatta (2000) and Polly (2011). These continuous studies on pre-service teachers show a little study gap in assessing their TPACK level and a huge gap for primary school teachers. Alqurashi & Samarin (2015) attempt to study the TPACK knowledge of in-service English teachers and stated that the teachers' knowledge is stronger in pedagogy and content compared to technological knowledge. A study by Akturk & Ozturk (2019) shows that the study focuses on secondary school teachers for a few selected subjects. Meanwhile, in Malaysia there are limited researchers assessed the teachers on TPACK. Shafie, Majid & Ismail (2019) explored on TPACK level of secondary school English teachers in Petaling Perdana Education Department.

Based on these reviews, it is obvious that primary school English teachers are also in need to furnish themselves with sufficient technological knowledge which also comes together with pedagogical and content knowledge and this research would fill the gap of studying TPACK on primary school English teachers. This is because there are little studies and attention given to teachers' competencies in integrating technology in the English language. Hence, TPACK framework is adopted in this study to know to what extent teachers are aware of why they use technology in their lesson. So, this study will explore the competencies of primary school English teachers in integrating technology effectively in their lesson.

1.4 Objectives of the Research

The researcher sets the objective to be explored in this study. The following are the objectives highlighted in this study.

- (a) to explore the TPACK level among primary school English teachers
- (b) to examine the significant difference in English teachers' TPACK level with their gender, age and teaching experience.
- (c) to explore how TPACK level affect the English teaching perceived by primary school English Teachers.

1.5 Research Questions

Throughout this study, the researcher aims to answer the following research questions.

1. What is the TPACK level among primary school English teachers?
2. Are there any significant difference in English teachers' TPACK level with their gender, age and teaching experience?
3. How does TPACK level affect the English teaching perceived by primary school English Teachers?

1.6 Research Hypotheses

The hypotheses of this research are:

Null hypothesis 1: There is no significant difference between the TPACK level and the gender of the teachers.

Null hypothesis 2: There is no significant difference between the TPACK level and the age of the teachers.

Null hypothesis 3: There is no significant difference between the TPACK level and the teaching experience of the teachers.

1.7 Theoretical Framework

1.7.1 Technological Pedagogical and Content Knowledge (TPACK) Framework

TPACK Framework is a unique framework designed by Mishra & Koehler (2006). It is formed by the three main domains (Technological Knowledge (TK), Pedagogical Knowledge (PK) and Content Knowledge (CK)) and these domains intersect with each other to produce three other sub-domains (Technological Pedagogical Knowledge (TPK), Technological Content Knowledge (TCK) and Pedagogical Content Knowledge (PCK). Archambault & Barnett, 2010) says that this framework blends all the underlying dynamics of teaching and learning with technology. TPACK Framework is widely used for a few settings. According to Agyel & Voogt (2012) and Chai et al. (2012), it is used to develop teaching and learning activities with proper integration of technology, as a guided framework to conduct workshops for teachers and also as an assessment on teachers' knowledge in integrating technology (Pamuk et al., 2013). The figure below shows how TPACK is organised and intersected with main domains and sub-domains.

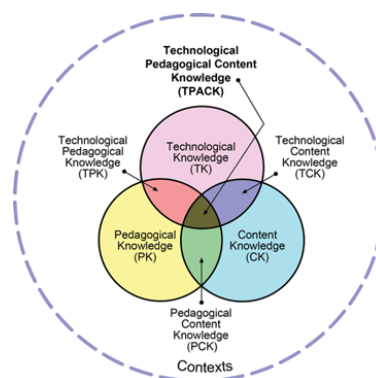


Figure 1.1 The TPACK Framework

Even though TK, PK and CK different types of knowledge, integration of this knowledge is emphasised in this framework. Thus, this framework requires teachers to have a balance in the three major domains in order to integrate technology meaningfully.

1.8 Conceptual Framework

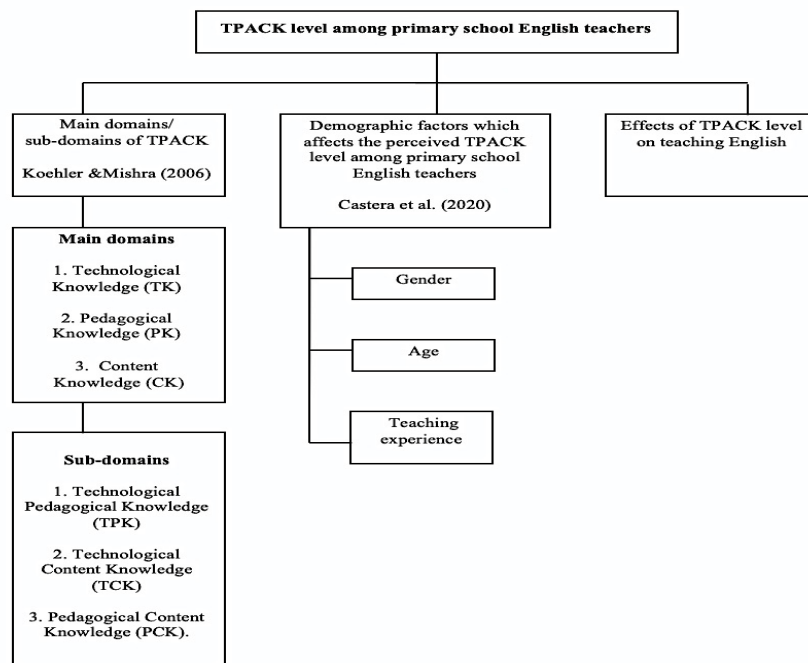


Figure 1.2 Conceptual Framework

This study is aimed to study the competencies of teachers in terms of TPACK. Thus, TPACK Framework is modified as the conceptual framework to assess the teacher's level of realising TPACK in their teaching and learning activities. In addition, the conceptual framework also comprises selected demographic details of teachers such as gender, age and teaching experiences to explore how far these factors can give an effect on a teacher's TPACK level. Finally, this framework also covers the effect of perceived TPACK level in teaching English by the primary school English

teachers. The figure below shows the complete conceptual framework with all the elements stated above.

Based on Figure 1.2, the teachers will be assessed on each of the main three domains which are then associated with three sub-domains in producing TPACK. From the first branch, each main domain is responsible for producing sub-domains by intersecting. When a teacher equips himself/herself with knowledge on PK and CK, he/she will apply various methods and strategies in order to deliver a specific concept which makes the mastering of PCK. Pamuk et al., (2013) say that PCK can be easily defined as representing a subject which might be complex in an easier and comprehensible way. Once PCK is mastered, there comes the integration of technology effectively in teaching and learning activities (Schmidt et al., 2009). Therefore, meaningful and purposeful integration of technology requires a strong interaction between the three main domains. The second branch, Castera et al. (2020) claimed that teachers' TPACK level is influenced by a few important factors. Among the identified factors, this conceptual framework uses three which are gender, age and teaching experience to explore how these factors can play a part in determining teachers' TPACK level. Lastly, this research will also explore how the TPACK level of teachers affect their teaching. These can be seen through the students' achievement, usage of technological tools and achieving lesson objectives. Hence, this conceptual framework best suits the aim of this study.

1.9 Significance of The Research

Analysing on 21st-century teachers' characteristics, Jan (2017) claimed that scheming, implementing and evaluating an instruction is the utmost goal of instructional technology. Hence, teachers in this era full of digital need to equip themselves with technological knowledge to avoid just to use technology in their lessons as a requirement but to integrate it meaningfully. It is also essential that teachers assemble technological knowledge with pedagogical and content knowledge

for effective integration. Topper (2004) states that confident and competent are the most supreme characters that teachers must possess in handling technology to assist their teaching and learning process as a substantial tool in today's education.

English Language is a universal language and teaching this language is challenging for many teachers. For instance, Thai & Chuang (2012) conducted Computer Assisted Language Learning (CALL) workshop using TPACK framework as a guide. The result shows that when the workshop ended the teachers were able to know the rationale behind choosing and integrating a technological tool in their lesson. Furthermore, Graham, Borup & Smith (2012) in their study revealed that teachers were able to answer why they integrated a technological tool in their lesson when they choose technological tools based on TPACK framework. These studies clearly show that technological knowledge is essential in integrating the right technological tool.

Apart from teachers, this study will also benefit the learners in learning the English language. Integrating technology in classrooms provides them with an authentic language learning environment. An analysis by Li & Xia (2016) in China shows that TPACK-based lessons have caused an increase in students' attention span, boosted teaching content, allowed new learning opportunities and most importantly provided after-class interactions for further guidance and support for the learners. Furthermore, a study in Taiwan by Limbong (2006) showed that there was a positive result where learners were able to have constructive feedback by using Facebook as a mediator in the flipped-classroom in learning English. Therefore, TPACK helps learners to achieve the learning objectives and comprehend complex contents easily.

This study will also open the eyes of the policymakers as they should realise the benefits of introducing necessary models and frameworks which would help and guide the primary school teachers to be more effective in conducting lessons with technology. As the findings of this study will reveal the TPACK competencies of teachers, it creates an opportunity for the policymakers to initiate training or workshops for teachers as a part of their professional development.

1.10 Scope of The Research

This study aims to explore the TPACK competencies among primary school English Language teachers. Participants of this research are school teachers from primary schools who are teaching English language. Factors which may influence the competency of teachers such as computer literacy and geographical setting are an exception in this study while the participants' demographic information such as gender, age and teaching experiences are used in this research. Furthermore, the lesson plans used by the teachers in their lesson are also not included.

1.11 Definition of Terms

1.11.1 Technological Pedagogical and Content Knowledge (TPACK)

Technological Pedagogical and Content Knowledge (TPACK) is a framework used to explain the necessary knowledge that an educator needs to know which makes the pedagogical practise effective when technology is integrated successfully. TPACK consists of three main domains which are Technological Knowledge (TK), Pedagogical Knowledge (PK) and Content Knowledge (CK) together with three subdomains Technological Pedagogical Knowledge (TPK), Technological Content Knowledge (TCK) and Pedagogical Content Knowledge (PCK). The definitions were adapted from Alhababi (2017) and Haniza Nordin (2014).

1.11.2 Technological Knowledge (TK)

This knowledge shows that a teacher is knowledgeable in diverse technologies including low-tech technology up to digital technology.

1.11.3 Pedagogical Knowledge (PK)

This knowledge shows that a teacher is knowledgeable in planning, shaping and assessing teaching and learning by applying appropriate strategies and methods.

1.11.4 Content Knowledge (CK)

This knowledge shows that a teacher is knowledgeable in the subject that she/he teaching which links to the subject to the subject matter.

1.11.5 Technological Pedagogical Knowledge TPK

This knowledge shows that a teacher is knowledgeable in using various technological tools which helps and improves the teaching process.

1.11.6 Technological Content Knowledge (TCK)

This knowledge shows that a teacher is knowledgeable in creating a new learning environment to teach a particular content with the help of technology.

1.11.7 Pedagogical Content Knowledge (PCK)

This knowledge shows that a teacher is knowledgeable in the subject matter by applying the various strategies and methods to meet learners' need.

1.11.8 English as Second Language (ESL)

ESL is described English Language as a non-native language which is used by a big or small group of unrelated people mainly having communication as their primary purpose. ESL in this research context is Learning English as a second language for instructional, teaching and learning purposes.

1.12 Summary

An explicit discussion is done for the background of the research and statement of the problem in this introductory chapter. Reviewing the problem stated, this research aims to study on three research questions to be explored among primary English Language teachers on their TPACK competencies. Following this, the significance of the study clarifies this studies importance to teachers, students and policymakers. Lastly, there is also a clear explanation given on the important terms involved in this study. The next chapter will show in-depth details of the literature review.

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