Investigating EFL teachers' perceptions on their TPACK development: how EFL teachers view seven domains on TPACK framework

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ABSTRACT

Despite the fact that plenteous studies on educational technology and strategic domain have been conducted, various studies indicated that EFL teachers do not explore the full potential of information and communication technology (ICT) in their classroom. It requires EFL teachers' consideration to be able to intensify their knowledge, which emphasizes the understanding on how technology development nowadays may encourage the improvements of language learning, and it may change the professional teachers' roles and practices. In order to help EFL teachers integrate modern technology into their EFL classroom, EFL teachers need to understand better the fundamental elements that may foster technology integration. Technological Pedagogical Content Knowledge (TPACK) is a framework for understanding the varied forms of knowledge necessitated by EFL teachers to integrate ICT in their teaching. This study aimed to investigate how EFL teachers' perceptions of competences in their TPACK development. Hence, this study used a case study since it was an appropriate method in conducting the research. The data were collected from 20 EFL teachers by conducting online semi-structured interviews. The findings indicated that most EFL teachers rated their domain knowledge higher about CK, PK, and PCK rather than those domains concerned with technological knowledge, i.e., TK, TCK, TPK, and TPACK. The implication of this research is to add EFL teachers' understanding of the importance of the TPACK framework. In the future, it takes part in developing the competence of EFL teachers' TPACK development so that the quality of the teaching-learning process promotes.

Keywords: *Case Study; EFL, Seven TPACK Domains, Teachers' Perception*

Introduction

The emergence of modern technology has rapidly influenced the nature of teaching and learning across all educational aspects around the world. For instance, computer technology has been used in language teaching since the 1980s (Woznez, et al., 2006; Hubbard, 2008). Most researchers claim that technology has been one of the essential parts of teaching (Koehler & Mishra, 2009; Hauck & Guichon, 2011). The use of computer technology in educational institutional did not only bring several advantages, but it required some elements on teachers' instruction (Chin & Hortin, 1993). In the same vein, policymakers and educational institutions have promoted some factors related to the use of computer technology in the education sector.

Many researchers have researched second language/foreign language teachers' cognition toward the use of technologies in the classroom (Kessler, 2007; Park & Son, 2009; Aydin, 2013; Bostancıoğlu Handley, 2018; Baser, Kopcha & Ozden, 2015). The teachers mostly responded to the affirmative statement about the use of technology in the ESL/EFL classroom. Nevertheless, they stated that several complex problems in designing and implementing effective teaching with technology appeared. It is significant to straighten the way on which teachers adopt the framework in integrating technology into the subject matter.

Chin and Hortin (1993) opined that it is necessary when seeking to adopt a new view from abroad to see the effect of cultural and social forces and their appropriacy. Some studies found that teachers do not have enough

knowledge about and chances to apply technology in their classrooms (Ertmer & Ottenbreit-Leftwich, 2010). Related to this issue, Mishra and Koehler (2006) designed a conceptual framework, i.e., Technological Pedagogical Content Knowledge (TPACK) that furnishes a common language in talking about teaching, learning, and technology. The framework expresses the connections, interactions, affordances, and constraints between and among content, pedagogy, and technology (Mishra & Koehler, 2006).

A well-applied TPACK may provide teachers to achieve a better understanding of how technology may promote students' learning (Koehler & Mishra, 2008; Mouza, Nandakumar, Yilmaz & Karchmer-Klein 2017; Shih & Chuang, 2013). Many researchers conducted a study about teachers' TPACK framework in the EFL context (Archambault & Barnett, 2010; Archambault & Crippen, 2009; Wang, 2002; and Tran, 2009). However, there is a gap of research about the description of EFL teachers' view on TPACK and its impact on their professional development. Taking this into consideration, this research aims to fill the gap how EFL teachers view seven domains of TPACK, i.e. Content Knowledge (CK), Pedagogical Knowledge (PK), Pedagogical Content Knowledge (PCK), Technological Knowledge (TK), Technological Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK), and Technological Pedagogical and Content Knowledge. The research is expected to contribute to the broad field of research around EFL teachers in their practice.

Materials and Methods

This case study was conducted to answer a 'how' question. Creswell (2007) and Ary, et al. (2010) explained that case studies could answer descriptive questions (what happened) or attempt to explain why a phenomenon occurs by considering the process. The context is fundamental, and richness of data collection methods is provided in this research method (Patton, 1990). The study investigated the single case through multiple data sources, i.e., the demographic questionnaire and the semi-structured interview. The study investigated 20 professional EFL teachers' perceptions in Indonesia about their view on seven TPACK domains. The participants were selected by applying purposive sampling strategies. All were pseudonym.

The study lasted six months. The procedure included three main steps, i.e. preparation, data collection, and data analysis. There were three stages on data analysis, i.e., data reduction, data display, and conclusion. First, in the data reduction stage, the researcher selected, focused, and summarized the data in this stage. Then, the researcher carried out unimportant or inaccurate information during the research activities. Second, in the data display stage, the researcher presented the data in the descriptive form. The researcher explained the findings descriptively based on the field. The data were organized in logic and systematic order. Third, in the conclusion stage, the researcher drew the conclusion based on interviews. The researcher inclined to accumulate and formulate the interpretations as verifying findings in conclusion.

Results and Discussion

TPACK is teachers' understanding of when, where, and how to promote students' competence through proper instructional strategies with appropriate supporting technologies (Koehler, Mishra, & Yahya, 2007; Mishra & Koehler, 2006; Mouza, Nandakumar, Yilmaz & Karchmer-Klein 2017). Applied by several educational institutions, it has been used to help teachers develop their TPACK and promote teaching activities related to technology (Jang, 2010; Tseng, Lien, & Chen, 2014). At the intersection of these three knowledge varieties is a spontaneous understanding of teaching content with proper pedagogical methods and technologies. This research focuses on TPACK in the area of EFL teaching. The result are as follows.

Content Knowledge (CK) Domain

The first knowledge domain is content knowledge (CK). Mishra and Koehler (2006) termed content knowledge as the knowledge domain about the teachers are supposed to have about the content matter. The domain is to be taught and to be learned. This knowledge domain covers facts, scientific theories, methods, and mind maps from proof and evidence. To teach efficiently and appropriately, a teacher should know concepts, theories, key facts, and procedures of the subject matter (Mishra & Koehler, 2006), and rules of evidence and proof (Shulman, as cited in Mishra & Koehler, 2006).

From Mishra and Koehler's (2006) perspective, content knowledge is very dissimilar for varied subjects, e.g., Biology, Geography, Maths, or English. EFL researchers should consider this issue when they do research about TPACK. Keengwe & Kang (2012) said that content knowledge in EFL context covers (1) language skills, i.e., conversation function, and vocabulary usage; (2) linguistic components, i.e. phonetics, pronunciation, speech styles; and (3) cultural understanding, i.e., examining the similarities and the dissimilarities between English as native language countries and English as second/foreign language countries.

The findings in the first aspect, namely

Content Knowledge (CK) showed that the CK level of the majority of participants was excellent. It revealed that they seemed to have confidence in basic knowledge of English, i.e., developing knowledge from understanding the material and delivering material systematically. The teachers seemed to master how students acquired the second language. For example, the participant R1 said, " I have sufficient knowledge about EFL. I have various ways and strategies of developing my understanding of EFL." He claimed that he mastered the teaching materials widely and deeply about the material he taught. He could decide whether the material would be easy to understand for students or not and the anticipation.

It also showed that they could mention the learning objectives in a material. For example, the participant R14 told that in one of the learning objectives, his students were expected to be able to explain narrative material. Students indicated that they could explain narrative material in the classroom. They could divide material concepts into simple content into representational forms in order to ease students. The participant R19 stated that she easily accessed academic sources and resources for additional material. From those examples, it was proved that English teachers could organize the material by delivering material and dividing the material into the concepts of components that are easy to understand.

Pedagogical Knowledge (PK) Domain

The second knowledge domain is pedagogical knowledge (PK). Mishra and Koehler (2006) illustrated pedagogical knowledge as a knowledge domain that covers the comprehensive knowledge about the teaching process, practices, and methods, i.e., student learning, classroom management, lesson plan development, teaching techniques, teaching methods, and student evaluation. Cox and Graham's (2009) claimed that pedagogical knowledge is the general knowledge about teaching pedagogies that all teachers should have. Pedagogical knowledge needs understanding cognitive, classroom administration, and developmental theories of learning (Koehler & Mishra, 2008; Koehler & Mishra, 2009). As consequence, EFL teachers in the pedagogical knowledge domain context should know and practice those elements discussed above in their EFL classroom.

The findings in the second aspect, namely Pedagogical Knowledge (PK) showed that the PK level of the majority of teachers is excellent. It revealed that they could manage the teaching-learning process in the classroom, including student understanding, planning, implementation of learning, evaluation of learning outcomes, and actualizing all potential students. The participant R5 said, "I initially had to create a pleasant atmosphere to get students' attention. I can adapt my teaching based upon what students currently understand or do not understand." He opined he initially had to create a pleasant atmosphere to get students' attention. The participant R11 claimed he had to be kind in the classroom.

They seemed to be able to raise students' knowledge by exploring or remembering previous material and the material to be taught by reading books first. Most of them disclosed that the students' skills and psychomotor regarding English material promoted since they instructed students to make a group and to present the results. The participant R12 argued the English teachers should know teaching technique that appropriates in their classroom since the characteristics of the students were different.

The activities of English teachers in teaching and learning activities through the PK showed that they could give understanding to students by actualizing all potential students through the formation of these groups so that students had good pedagogical knowledge. The majority of participants claimed they updated about professional teaching development in the English teachers forum. It was also known that PK is vital since it determined the learning objectives. However, some participants were not maximal in giving additional scores for students who were active in the class.

Pedagogical Content Knowledge (PCK) Domain

The third knowledge domain is pedagogical content knowledge (PCK). Shulman (1986) argued that pedagogical content knowledge is required to master for efficient subject matter teaching. It includes the knowledge of the most regularly taught topics in one's subject, the most efficient demonstration/comparison, and the most beneficial kinds of representation of the ideas. It provides an understanding of matters that determine whether the learning of particular subjects are straightforward or challenging, and it illustrates the concepts and preconceptions that students who have different ages and backgrounds bring with them to the teaching-learning process.

Mishra and Koehler (2006), in line with Shulman (1986) indicated that a teacher's pedagogical content knowledge should include cognizing what teaching approaches, teaching technique, and teaching method suit the content; and knowing how aspects of the subject matter can be organized effectively for better teaching. Mishra and Koehler (2006) added that this knowledge domain also covers knowledge about students and students' characteristics.

Murray and Christinson (2010) claimed a number of elements pedagogical content knowledge in EFL context, i.e. (1) EFL/ESL teach-

er' knowledge about the target language (English) input and how to transform this input to fit various types of learners; (2) EFL/ESL teacher's knowledge about learners' interaction and how they utilize the target language (English) to negotiate the meaning; and 3) EFL/ ESL teachers' knowledge about taking efficient teaching approach, technique, and method to lead students' acquisition in the EFL context. It does not matter whether the approach, technique, and method follow behaviorists or communicative language teaching methods as long as these three aspects are proper for learners' characteristics (Bax, 2003).

The findings in the third aspect, namely Pedagogical Content Knowledge (PCK) showed that the PCK level of the majority of participants was good. It revealed that they prepared education administration, e.g., lesson plans, syllabus, annual programs, and semester programs themselves. It could be stated that the preparation of the education administrative is a crucial aspect since it is a determinant and as a director of the direction to be achieved. They could understand the material with several sub-concepts and their application in a flexible manner. The application of English language development that applied while they taught the material became creative and innovative in learning in the classroom. Therefore, they seemed to have a deep mastery of the content (content) in how to teach it, so that it appeared that English teachers could improve their abilities to become professionals. Some of them used educational games to promote students' skills, e.g., puzzle games. However, some participants (R7, R8, R11, and R18) thought that technology was not a must in their teaching.

Technological Knowledge (TK) Domain

The fourth knowledge domain is technological knowledge. Mishra and Koehler (2006) formulated technological knowledge as the ability to operate technologies, e.g., installing or uninstalling software programs; turning on or turning down software programs; creating and archiving documents and the abilities to learn and to adopt new technology (Mishra & Koehler, 2006). Schmidt et al., (2009) proposed that technological knowledge engage some abilities, e.g., solving technical problems thoroughly, learning technology well, keeping up with relevant technology consistently, playing around with technology regularly, knowing many technologies quickly, having technical skills and having chances to teach with various technologies. In the EFL context, technological knowledge of EFL teachers includes EFL teachers' knowledge on how to use popular technological language applications, how to overcome fundamental technical problems, and how to update new technologies.

The findings in the fourth aspect, namely Technological Knowledge (TK) showed that the TK level of the majority of participants was good enough. It revealed that most of them could use computer hardware in the form of the input device, the processing device, and the output device. Other proofs were few participants could use software with computer application programs in the form of video players, music players, Microsoft Word, Microsoft Excel, and Microsoft PowerPoint. Nevertheless, it appeared that most of them rarely used online learning applications, e.g., Edmodo. The participant R1 said, "I know how to solve my own technical problems. However, my students are more understand than me." He admitted that his students were more understand about learning applications than him.

It disclosed that they could use computer software technology related to knowledge of hardware, software, and brainwave. In the knowledge of computer devices, they applied TK as a practical learning tool, and they applied TK in teaching and learning activities. In addition, it showed that they used a laptop, a projector, an audio system, and other devices to support classroom learning and made use of device use (software) with a slide presentation in Microsoft PowerPoint. Hence, their students were very enthusiastic about moving forward and contributing directly to the material. Most of the participants argued that they tried to employ technology as often as possible in the classroom.

Technological Content Knowledge (TCK) Domain

The fifth knowledge domain is technological content knowledge. Technological content knowledge is the knowledge domain about the mutual relationship between technology and content (Mishra & Koehler, 2006). Based on the definition of this knowledge domain above, Mishra and Koehler (2006) are suggesting that technology may be used to vary the conveyance of the subject matter. Cox & Graham (2009) proposed that technological content knowledge indicates a knowledge of the topic-specific representations (RT) in a granted content domain that employs new technologies. Since the technologies utilized in the representations transform to be shared, the knowledge metamorphoses into content knowledge. For instance, the electronic dictionary was once recognized as appearing in technologies in English. However, knowledge of how teachers use it is nowadays kind of the content of English itself.

The findings in the fifth aspect, namely Technological Content Knowledge (TCK) showed that the TCK level of the majority of participants was good enough. It revealed that they could choose the primary competency material in English learning that was appropriate in teaching us-

ing technology. They also could use appropriate technology with multimedia resources and carry out the learning process with technology media, e.g., LCD and laptops. Nevertheless, most of them rarely gave assignments to students by making the material in the form of Microsoft PowerPoint, learning videos, and electronic books. The participant R2 said, " I and my students use some online platforms. For example, I use Whatsapp for online discussion and Blogspot to peer assesment." She admitted that she created Whatsapp for online discussion. The participant R13 said that he assigned his students to watch English movies to enrich their vocabulary.

Technological Pedagogical Knowledge (TPK) Domain

The sixth knowledge domain is technological pedagogical knowledge (TPK). According to Mishra and Koehler (2006), technological pedagogical knowledge is a knowledge domain about the existence, elements, and susceptibilities of various technologies as they utilized in teaching-learning settings, and knowledge about how teaching may alter as the consequence of using a peculiar technology. Essentially, it means that a teacher should consider which appropriate pedagogy concept is employed with each proper technology in their teaching. Cox and Graham (2009) stated that as the technologies that are used by teachers are now transparent, technological pedagogical knowledge metamorphoses into the pedagogical knowledge domain as the focuses on the technology is no more required.

The findings in the sixth aspect, Technological Pedagogical Knowledge (TPK) showed that the TPK level of the majority of participants was good enough. It revealed that they had prepared their own information technology learning media before the learning process began. They could use computer applications in learning. They could practically deliver material following the information technology media. Most of them suggested students use educational applications or programs that the participants knew from the English teacher forum. The participant R17 said, "I often suggest my students to use educational application or programs. I also shared E-books and E-tests so that students could learn the material in their phone." He informed that he shared E -books and E-tests for his students so that students could learn the material in their phone.

In the use of technology-based media, some of them used laptops and computer software, e.g., Microsoft PowerPoint applications. They could present the material by using a slide presentation so that the material could be understood for students. They also immediately guided and explained the problematic material again by using Microsoft PowerPoint. However, a few participants did not utilize the school Wi-Fi for teaching and learning activities. They reasoned that most students did not have a netbook or laptop for internet access and the use of Wi-Fi and internet services were limited. Another reason is explained by the English teachers that if students could misuse Wi-Fi, e.g., accessing lousy content.

Technological Pedagogical and Content Knowledge Aspect (TPACK) Domain

The seventh knowledge domain is technological pedagogical and content knowledge (TPACK). Mishra and Koehler (2006) formulated the definition of TPACK as an understanding of concepts about technologies and pedagogical techniques so that technologies can be utilized structurally in order to teach content. It covers knowledge of aspects that determine whether the concepts are easy or difficult and how technology overcame those problems; knowledge of epistemology theories and students' preceding knowledge; and knowledge of how technologies may be used to construct on nowadays knowledge and to ameliorate new epistemologies theories or strengthen old theories. In their perspective, TPACK is a complex domain of knowledge that includes the interplay of the three knowledge components, i.e., technology, pedagogy, and content.

The findings in the last aspect, namely Technological Pedagogical and Content Knowledge Aspect (TPACK) showed that the TPACK level of the majority of teachers was good enough. It revealed that English teachers were good enough and capable of developing a blend of technological, pedagogical, and content abilities. It showed that English teachers' TPACK consideration was good enough. English teachers could apply seven aspects of TPACK, i.e., Technological Knowledge, Pedagogical Knowledge, Content Knowledge, Pedagogical Content Knowledge, Technological Content Knowledge, Technological Pedagogical Knowledge, and Technological Pedagogical And Content Knowledge. However, some of them had not known the term 'TPACK.' Some of them admitted that they teach a material with proper teaching method by using suportive technologies based on TPACK framework, while others teach a material by using technology for making the content look more amazing to students but no ideas about the term.

The findings informed that in the EFL teachers' perceptions, the participants had higher levels of knowledge about PK, PCK, and CK, than for TK, TCK, TPK, and TPACK. Most of them opined that CK and PK were more vital than technology-related knowledge in their teaching-learning process. The findings of this research were in line with Archambault and Crippen's

finding (2009) and Jordan's finding (2011). Archambault and Crippen (2009) found that teachers had the most confidence in their Pedagogical Knowledge (PK). Jang (2010) added that teachers had more self-confidence in Content Knowledge (CK). The findings were also in line with Archambault and Crippen's findings in their study that when using ICT, teachers seemed to perceive that they were firm in their subject knowledge and teaching ability.

The reasons for this condition might exist because their teacher educators taught education/training that concentrates more on English as Foreign Language knowledge, which was influenced by the teaching method, with a focus on grammar-translation methods when they were student-teachers (Tran, 2009). It was similar to Niederhauser et al.'s statement (as cited in Wang, 2002) that teachers' instructional beliefs are often firmly entrenched because of their experiences as students in traditional classrooms. Another reason might be that the implementation of ICT in EFL teaching in Indonesia was relatively new, so in this process from elementary school level to university level, the EFL teachers were more likely to stick to the non-ICT teaching tradition that they were used to, which focused more on the subject knowledge.

These integrated findings concluded that, on the one hand, the EFL teachers in this study could only differentiate between knowledge to teach with technology and knowledge to teach without technology. On the other hand, these EFL teachers perceived that knowledge to teach English with technology seems to be a specialized type of knowledge, which might exist separately from their knowledge of teaching English without technology in a traditional way. Thus, it can be seen that it was similar to previous studies (Archambault & Barnett, 2010; Archambault & Crippen, 2009), the EFL teachers in this study faced the same confusion about how to describe and explain domains on TPACK.

Conclusion

The study found that more EFL teachers rated their domain knowledge higher concerning CK, PK, and PCK rather than those domains concerned with technological knowledge, such as TK, TCK, TPK, and TPACK. This study also revealed two TPACK domains, i.e., non-technology related knowledge domain (CK, PK & PCK) and technology-related knowledge domain (TCK, TPK & TPACK). TK was found to have no associations with the other remaining TPACK constructs. This study hopefully, will contribute to add to the understanding of the importance of the TPACK framework in the EFL context. The study has suggested that the more teachers' understanding of the TPACK framework had, the more likely it was that they would be using ICT properly and effectively. Therefore, professional learning that has a particular focus on teachers' knowledge and how to develop teachers' TPACK, and not only on technical aspects is recommended.

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