TPACK-EFL for the Improvement of the English Teacher Education Program

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Abstract. Talking about the use of technology in education realm, especially in ELT, is not a hot issue today. It is assumed that technology can improve the quality of education. Thus, teachers have a prominent role to fulfill the demand in globalization era, which is the integration of technology in teaching English. As the center of teacher professional development, teacher education programs need to consider evaluating the pre-service teachers' knowledge of integrating technology. This paper focuses on pre-service teachers' knowledge of technology integration in teaching English, named TPACK-EFL. In this preliminary research, a TPACK-EFL survey was done to the 50 pre-service teachers from two English teacher education programs. Then, the researcher observed, which is guided by TPACK rubric, 4 pre-service teachers to see the implementation of TPACK-EFL. From the questionnaire, the pre-service teachers claimed that they have adequate TPACK-EFL. Otherwise, based on the observation, they have not been able to teach as well as what they have claimed. They could not integrate content, pedagogy, and technology in practice successfully. Therefore, the researcher suggests teacher education policy maker to consider the TPACK-EFL as an evaluation tool for the improvement of the English teacher education program.

Keywords: Technology Integration Knowledge · TPACK-EFL · English Teacher Education · English Pre-service Teachers

1 Introduction

Technology nowadays has a prominent role to human life. It helps people to make everything faster and closer. With its sophistication, technology helps and provides some conveniences in various aspects of life, both in working and communicating, and even to overcome various problems that exist in society. For instance, people do not need to visit the bank for paying the bills. They just need to utilize their smartphone by downloading supported application for any payment. Technology does not only help and make human life easier, but it also offers new ways of doing things, for example in education, technology enables the distance learning. It means that the students do not have to go to school. In distance learning, students can study anytime and anywhere through the internet. It changes the conventional way to the digital one. People also can get in touch to worldwide connection by using technology. They can see the world while enjoying the coffee break and weekends. So that, many people get interested to the sophisticated technology which continues developing during this digital era.

Why have I said 'digital era'? Today is the era when technology develops from analog to digital and the internet is the example of the development and advancement of digital technologies. As the technology develops, it cannot be denied that every nation also needs to develop and continue developing. To do this, the nation needs to fulfill the Sustainable Development Goals (SDGs). According to the United Nations (UN), SDGs are the blueprint to achieve a better and more sustainable future for all [1]. One of the SDGs by the UN on envisioning 2030 is quality education. It is stated that the nation needs to ensure the inclusive and equitable quality education and promote lifelong learning opportunity. It means that a nation must ensure that all girls and boys can equally get the quality education. In addition, Oluremi stated that education is the key to develop a nation [2] and "the success of any education system depends on the quality of teachers" [3]. Accordingly, the nation needs to have qualified teachers making the education well-implemented.

The rapid development of digital technology and the demands to use it cannot be avoided. Those have impacts on various domains, including educational realm. Global demands require education to adjust the development of technology in improving the quality of education, especially the use of information and communication technology (ICT) in teaching and learning process. Integrating technology in education is an effort to combine information technology with teaching and learning theories in order to produce new ways and strategies in teaching and learning implementation. The use of technology can also improve teachers' quality and learners' learning outcomes for better learning in the 21st century [4]. The use of technology in education is an effort on how learners can learn and develop their skills to get job and survive in the future. As we know that education is an effort to create learning process so that learners can develop their potential to have the necessary skills. It cannot be denied that the use of technology supports the teaching and learning process to achieve learning goals in the era of globalization.

In Indonesia, talking about the use of technology in education, especially in language teaching context, is a not new issue today. It is expected that technology can make a better and more interesting learning experience. In the context of English language teaching (ELT), peculiarly in English foreign language (EFL) teaching and learning, authentic materials can be conveyed to learners through technology. It can make language learning more authentic or meaningful for language learners if it is appropriately and effectively integrated [5]. In other words, language learning can be more effective to EFL learners because technology can provide many native sources of English materials. With the authentic materials, EFL learners are able to gain the knowledge well. Technology can encourage the use of target language based on native sources and with authentic tasks [6]. Thus, the integration of technology into English as foreign language teaching and learning is very valuable. To overcome this challenge, teachers should continue to update and upgrade their knowledge of the content, competence on teaching pedagogy and skills in the use of technology to fulfill current and future needs.

In Law of The Republic Indonesia Number 14 of 2005 concerning teachers and lecturers, it is stated that national development in the field of education is an effort to educate the nation's life. One of the targets of the national development is to improve the quality of Indonesian people on mastering science, technology and art. Educating the Indonesian nation is the task that is carried out by the teachers and lecturers. To

achieve the target of national education development, teachers and lecturers should meet some competencies required [7]. Based on Government Regulation Number 17 of 2010 concerning Management and Implementation of Education, it is stated that the competencies referred are follows: (1) personality foundation; (2) mastery of science, technology, art, and / or sports; (3) ability and work skills; (4) attitude and behavior in work according to the level of expertise based on knowledge and skills mastered; (5) mastery of the rules of social life in accordance with the choice of expertise in work [8]. Consequently, teachers' ability to use ICT has become a new requirement for effective education systems.

In the digital era, teacher competence in the use of pedagogical technology has become one of the key components in efforts to reform education [9]. According to PERMENDIKNAS number 16 of 2007 concerning the academic qualification standards and teacher competencies, one of pedagogical competencies that teachers must have is the capability to utilize ICT [10]. As teachers' task is to achieve some learning goals, teachers should 'willy-nilly' keep learning to be the best teachers in the future. Teachers as educators need to have sufficient ability to operate computers and other technologies supporting teaching and learning process to enhance human quality in this modern era. In order to use technology successfully, the integration of technology into teaching and learning should be done properly. To integrate technology, it requires an adequate knowledge that is teachers' knowledge of technology selection on integrating technology appropriately to the content and the teaching techniques/methods and it is very challenging to the teachers.

Most of the teachers are only aware of the importance of ICT for education, but they have not attempted to implement it yet. Meanwhile, integrating technology into teaching by teachers is important today and the successful implementation of technology integration in education is in accordance with teachers' literacy. Accordingly, before integrating technology into teaching, teachers need to master three basic knowledge in teaching, namely content knowledge (CK), pedagogical knowledge (PK), and technological knowledge (TK). After they have mastered the knowledge, they should know how to combine the knowledge properly into technological pedagogical content knowledge (TPCK, which was changed into TPACK to be more easily remembered as "tee-pack" or "total package", see Fig. 1) [11]. TPACK is the integration of three core components - technology knowledge, pedagogy, and content. It is known as technology integration knowledge is known as technological pedagogical content knowledge. TPACK is the knowledge acquired by teachers in order to integrate technology in education while teaching subject content to the students [12].

TPACK is knowledge needed by teachers to be able to use educational technology appropriately in accordance to the content and pedagogy used [13]. It means that it is important for teachers to have adequate TPACK to be able to integrate technology when teaching content. The TPACK framework builds on Shulman's (1987) descriptions of PCK (pedagogical content knowledge) to describe how teachers' understanding of educational technologies and PCK interact with one another to produce effective teaching with technology [14]. In order to have an adequate TPACK, teachers must first have good PK, CK, and TK. Second, teachers are required to integrate PK and CK (PCK), CK and TK (TCK), and also PK and TK (TPK). Knowing how to use technology is not the
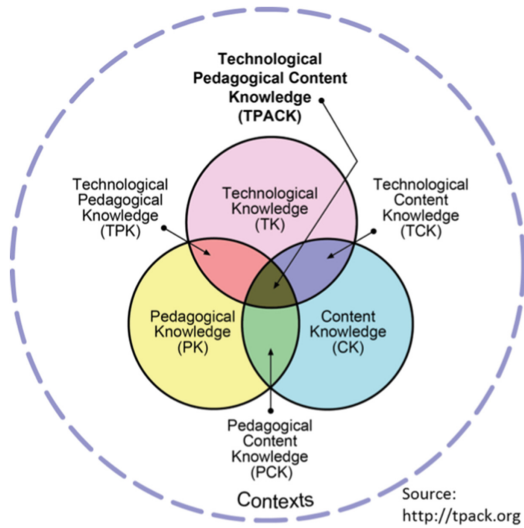
Fig. 1. The TPACK Framework

same as knowing to teach with it. Because TK cannot simply be an overlay, teachers should integrate all the knowledge (TPCK or TPACK) for the meaningful technology integration in teaching, for example teaching communicative English with Skype.

The discussion of teaching English with technology has been very much today. Many research discuss what kind of technology is suitable and effective for English learners, but some of the researches do not consider whether the teachers are able to integrate the technology at their school and whether teachers' selection of the technology is in accordance with the subject matter and the teaching method used. Based on researcher's experience, teacher education program has not introduced yet TPACK to the students who are the pre-service teachers. They studied content, pedagogy, and technology separately, so that they did not have sufficient TPACK or even PCK. TPACK of the pre-service teachers are very important to know as they are going to be the future teachers, because TPACK can represent the pedagogical competence, mastery of content and technological skills of the pre-service teachers [15]. Therefore, this research aims to study the pre-service teachers' TPACK and to investigate how the implementation of TPACK by pre-service teachers.

In Indonesia, English is taught as a foreign language (EFL) and most of English teachers in Indonesia are non-native teacher. EFL teachers should master English language well so they can teach the EFL students properly. In addition, they should know how to use a suitable pedagogy for English language learning. Then they need to integrate technology into teaching to support the ELT. Teachers who do not have the knowledge and skills to integrate technology into teaching can lead to a lack of support for learners in using authentic language and have little opportunity to practice language with technology. Even though, technology can provide a variety of authentic examples from English speaking countries. There are also cases of teachers who are able to use technology but cannot adapt to teaching content. For example, when lecturers teach listening to English,

many do not use relevant technology which is very important to expose the native oral language of English speakers to students [16].

Based on this, researchers argue that there are several factors that need to be considered in integrating technology into learning English. First, the instructor must first possess PCK as a sign that he/she is familiar with English teaching techniques or methods. Second, if the instructor wants to use technology in teaching, he/she must have TK itself to operate technology devices properly. Then, if the instructor wants to integrate technology into English teaching, he/she must have adequate TPACK so that English teaching and learning can run effectively as planned. The research focuses on pre-service teachers' knowledge of technology integration in teaching English (TPACK-EFL). In this research, the TPACK-EFL of pre-service teachers and how they can implement TPACK-EFL are analyzed. TPACK-EFL is a self-assessment for pre-service teachers. It focuses specifically on TPACK within the EFL content area. An EFL-specific TPACK survey would give teacher educators a tool for assessing future teachers and their potential to integrate technology into EFL teaching [17].

2 Method

2.1 Research Context

Teacher education has a significant role to the teacher professional development. Teacher education is aimed at ensuring pre-service teachers (a) master the subject matter being taught; (b) engage in long-term implementation of the procedures being taught; (c) develop the required attitudes, values and behavior patterns;(d) integrate the new procedures into their professional identity; and (e) achieve membership in the community of practice [15]. Teacher education mentioned in this research is the faculty of teacher training and education (FKIP) which aims to produce pre-service teachers who are expected to be the professional teachers and become part of the world community. The research was conducted at two different FKIPs. They are in Tangerang, Tangerang City and South Tangerang. In this research, each FKIP was named by X and Y. The FKIP has several study programs that are English, Arabic, Indonesian, mathematics, and economics. This research focuses on English study program because the researcher's major study is ELT. Both English study programs have some similar subjects such as basic English, Teaching Method, and ICT, in which the knowledge from the subjects is needed to implement teaching English with technology.

2.2 Participants

The subjects of this study were the teacher education students at senior level in ELT program who are the EFL pre-service teachers. Because it comes from two different places, the population of this study has heterogeneous characteristics. The researcher included 30 pre-service teachers from each teacher education center, so the total of the population was 60 pre-service teachers. From the total of population, the researcher selected 50 pre-service teachers as the valid research sample. In this research, 7 male and 43 female teacher education students are involved in this study. Based on the TPACK-EFL

self-assessment, the researcher observed need to see pre-service teachers' TPACK-EFL implementation in teaching English. Thus the researcher chose 4 pre-service teachers to be investigated, based on informal conversations that researchers found 4 pre-service teachers who explicitly state their interest to use technology in teaching English.

2.3   Data Collection and Analysis

This preliminary quantitative research is a cross sectional survey to study the implementation of TPACK-EFL by pre-service teachers. The main instrument of this research to collect the data is TPACK-EFL questionnaire adopted from Baser, Kopcha, & Ozden [17]. It is used to see and to help researcher describing pre-service teachers' technology integration knowledge in English language teaching. The questionnaire consists of 39 item statements. The item statements are divided into seven categories. The categories are Technological Knowledge (TK), Content Knowledge (CK), Pedagogical Knowledge (PK), Pedagogical Content Knowledge (PCK), Technological Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK), and Technological Pedagogical Content Knowledge (TPACK). There are 9 items for TK, 5 items for CK, 6 items for PK, 5 items for PCK, 3 items for TCK, 7 items for TPK, and 4 items for TPACK.

There are six alternative options to each item statements, namely extremely doubtful (ED), very doubtful (VD), somewhat doubtful (SD), somewhat sure (SS), very sure (VS), and extremely sure (ES). The options are scored from 1 (ED) to 6 (VS). The researcher provides six alternative options in the Likert-scale questionnaire to exclude neutral option in the middle. It is meant to avoid the tendency of respondents to choose the middle option. Besides, the options are made to see the respondents' opinions tendency toward their beliefs on having technology integration knowledge in English teaching, whether they have positive or negative responses. The researcher also did an observation. The observation was done to support the data gained from the questionnaire by recording pre-service teachers' teaching performance and taking some notes of it. The researcher intends to prove the statements of pre-service teachers with their performance.

The adopted TPACK-EFL assessment rubric was used to guide the researcher observing and making some notes to see whether there are other (external) factors emerge, since this research only studies the internal factors (pre-service teachers) [16]. The 4 pre-service teachers, who have maximum total score of the questionnaire (very good TPACK-EFL result), were observed. The data gained from questionnaire were tabulated in Microsoft Excel. Then, the data were analyzed using the SPSS version 22.0 program using descriptive analysis to obtain the frequency, percentage, average score and standard deviation for each item in the questionnaire. The researcher made some categories to determine the questionnaire result, they are very good, good, quite good, and not good. The data from observation were transcribed, coded, and also categorized to make data interpretation. The researchers categorized the data into three, such as strong, minimal, and not at all.

3   Results and Discussion

3.1   Result of TPACK-EFL Questionnaire

Pedagogical Knowledge (PK)

From 50 pre-service teachers, there are 11 (22%) pre-service teachers claimed that they have very good PK. The mean (M) and standard deviation (SD) for PK are 4.227 and 0.136. They claimed that they are very sure that they can reflect the experiences that they gain from professional development programs to their teaching process.

Content Knowledge (CK)

The finding also shows that 25 (50%) of pre-service teachers have adequate CK with M and SD are 4.480 and 0.119. They claimed that they can understand written texts in English very sure, but they were not really sure about expressing ideas and feeling by writing and speaking with the correct pronunciation in English.

Technological Knowledge (TK)

The result for TK shows that 20 (40%) of pre-service teachers claimed that they extremely sure can use basic technological terms appropriately, but they were minimally able to design or use any applications that support the teaching. The M and SD for this knowledge are 4.513 and 0.138.

Pedagogical Content Knowledge (PCK)

For PCK, it can be seen that 10 (20%) of the pre-service teachers are very sure about evaluating students' learning process, using appropriate teaching methods to support students' language skills, and adapting a lesson plan in accordance with students' language levels. The M and SD for this knowledge are 4.396 and 0.132.

Technological Content Knowledge (TCK)

There are 11 (22%) of pre-service teachers claiming that they have very good TCK. The M and SD of this knowledge are 4.393 and 0.146. They claimed that they can advantage multimedia to express their ideas about various topics in English.

Technological Pedagogical Knowledge (TPK)

The result also shows that 8 (16%) of pre-service teachers have sufficient TPK. The M and SD are 4.457 and 0.129. The pre-service teachers claimed that they can manage the classroom learning environment while using technology.

Technological Pedagogical Content Knowledge (TPACK)

For TPACK, the researcher found that 8 (16%) pre-service teachers have adequate TPACK with the M and SD, 9.950 and 0.145. The pre-service teachers claimed that they can support their professional development by using technological tools and resources to continuously improve the language teaching process. From the results, the researcher chose two pre-service teachers from each FKIP based on the informal interview that they intend to use technology in teaching practice. Therefore 4 pre-service teachers who are place in the good criteria on having sufficient TPACK-EFL and using technology were observed. (See Table 1 for the complete result).

Table 1. TPACK-EFL Questionnaire Result

Criteria	TPACK-EFL Aspects[a]						
	PK	CK	TK	PCK	TCK	TPK	TPACK
Very Good	11	25	20	10	11	8	8
Good	15	18	18	16	20	10	8
Quite Good	20	5	7	18	15	14	18
Not Good	6	2	5	6	4	18	16

[a] Number of pre-service teachers

3.2 Result of Pre-service Teachers' Practice

From the observation, the result (see Table 2) shows that none of the 4 pre-service teachers can integrate technology as well as they claimed their knowledge. Half of them could not spell out the subject matter of English lesson correctly and appropriately (CK aspect). They were minimally delivering teaching materials. They still need to check their notes when teaching, sometimes they make mistakes and feel confused. The others are good mastering the content. For PK aspect, the method used by the four pre-service teachers was not really clear. All of them were too minimal applying any teaching pedagogy. The researcher could not identify what method or technique used in their teaching. They also allowed the students to do the task in Indonesian when they claimed that the students need to be more active and communicative. Most of them (3 pre-service teachers) were able to use the computer application to support the learning well (TK aspect). They considered some digital technology applications and/or devices to support their teaching. They had knowledge of educational technology. All of the pre-service teachers used Microsoft PowerPoint Presentation program to show the learning materials.

When combining the pedagogy with the content (PCK aspect), they could only be positioned at the minimal criteria. They could not fit the teaching technique/method to the English lesson. They could spell what pedagogy they are going to use, but they could not implement the pedagogy well. All of them were good in aligning computer applications with the goals of the English lesson, but they could not optimize it. They could use

Table 2. TPACK-EFL Rubric Result

PST[a]	TPACK-EFL Assessment[b]						
	TK	CK	PK	PCK	TCK	TPK	TPACK
1	3	3	2	2	3	1	1
2	1	2	2	2	1	1	1
3	2	2	2	2	2	1	1
4	3	3	2	2	2	1	1

[a.] Pre-service Teachers
[b.] Number of pre-service teachers

the Microsoft PowerPoint in teaching English (TCK aspect), but they could not make it maximal. They can provide some authentic materials in a PowerPoint Presentation rather than only write long text on it. Only two of them can appropriately combine the computer applications to the method used in the teaching (TPK aspect). Integrating all the three knowledge (knowledge of pedagogy, content, and technology) seemed not easy for them. None of them can fit among English, method, and technology properly (TPACK aspect). They are 'not at all' integrating TPACK.

3.3 Discussion

Based on the results above, it can be seen that the final year students of teacher education, in this study are the pre-service teachers, have not ready yet to integrate the technology into teaching English as foreign language (TPACK-EFL). As English is studied as foreign language, most of the pre-service teachers are the non-native English speakers. They need to master English before teaching it to the foreign English learners. But in this research, we found that the pre-service teachers still have insufficient knowledge of English. They did not master the English topics well and they could not deliver the English lesson fluently. The less mastering content may bring some misunderstanding to students. Moreover, English is learned as foreign language, the misunderstanding may hinder the learning process.

Although they understand the English lesson or the content well, they are still not ready yet to teach it by using suitable method. They have lack knowledge of the pedagogy. They can mention some teaching techniques and/or methods, but they could not properly implement any technique/method. They were frequently missing some parts of teaching technique/method implementation. They need to practice more on using useful teaching techniques or methods, especially for EFL teaching and learning, so that they can take the benefit of some English language teaching technique/method into their teaching practice. The pre-service teachers observed in this study are the so-called Generation Z, who is the digital generation and proficient in information technology and various computer applications, so that they have sufficient technological knowledge.

The pre-service teachers are able to operate the Microsoft programs, such as Power-Point, and also the digital technologies like internet and applications. They can compile the teaching and learning materials into PowerPoint Presentation and other teaching and learning media. They can use Duolingo, Edmodo, and YouTube as learning media. However, they still find it difficult to match the learning media to the teaching techniques/methods. Using technology for teaching is not as simply as using technology itself. Pre-service teachers should know what kind of technology suits to teach English lesson. Combining or integrating knowledge of pedagogy, content, and technology is still very hard for the pre-service teachers. Choosing what suitable technique/method or suitable technology to teach English is not enough.

To be a professional future teacher, they need to be an expert person on integrating technology into teaching English. It is believed that technology can facilitate teaching and learning process, especially for teaching and learning EFL. Technology can help teachers to provide some authentic materials, so the students can get the correct information about English language and produce it like native. The use of technology in learning is also intended to motivate learners and reduce boredom against techniques or teaching

methods that are repeatedly used. In this digital era, learners are actively using internet, so they can find whatever they need to know. They might be smarter than the teacher. Thus, the future teachers are required to use collaboration tools to support students' language learning and students' development of language skills and always follow the learners' development, both in technology and English learning.

4 Conclusion

The current problem of Indonesian education lies in the system that has not synchronized with human resources (HR). Rules that are made sometimes do not adjust HR capabilities. HR is sometimes reluctant to comply with the applicable rules. This problem also occurs in educational field. As discussed above, education requires teachers to be able to keep up with the times by incorporating technology into teaching to improve students' learning quality. Teachers are the key on implementing an educational program that is expected to be realized in accordance with national development needs. As we know, teachers are components of education that play an important role in teaching and learning activities. They have an important position in educational realm, especially in Indonesian formal education. In consequence, teacher education program, which produces some pre-service teachers, should be careful to make sure that their pre-service teachers are eligible to be the real teachers. Teacher education program should follow the recent and future demands and provide the updated technological, pedagogical, and content knowledge to the pre-service teachers so that the pre-service teachers are also able to suit with the recent and future needs. Besides, teacher education program must be able to provide sufficient knowledge to pre-service teachers and also test/evaluate them to ensure that they have possessed the knowledge.

From the analysis and the discussion above, it can be concluded that the English teacher education programs need to ensure that the pre-service teachers have adequate knowledge to teach in this digital era. Moreover, English teacher education programs need to consider using an assessment tool to evaluate the teacher education students or pre-service teachers to make sure that pre-service teachers are ready to teach English in this era. It is TPACK-EFL self-assessment survey. TPACK-EFL self-assessment survey is important to be done to see whether the pre-service teachers have adequate knowledge to be the good teachers in the future. As English is learned and taught as foreign language, teacher education programs need to know how proficient the candidates are. Furthermore, they need to check whether the pre-service teachers are eligible to be the teachers or not by looking their knowledge and/or teaching practice. TPACK-EFL can be used as one of the assessment items in the graduation prerequisites for pre-service teachers. If the pre-service teachers fail, they should be retested or they will not get certification, or even fail to become a teacher candidate. Therefore, TPACK-EFL can help teacher education program to find out whether the program is running well so that it can produce better pre-service teachers. In other words, the better pre-service teachers are pre-service teachers who are able to integrate technology into teaching English. In addition, TPACK-EFL also helped both the teacher's education program and the pre-service teacher identify any knowledge that needed to be improved. Thus, TPACK-EFL is an alternative tool for the improvement English teacher education program.

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