AN INVESTIGATION OF ENGLISH AS A FOREIGN LANGUAGE (EFL) PRE-SERVICE TEACHERS' TECHNOLOGICAL PEDAGOGICAL AND CONTENT KNOWLEDGE (TPACK)

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Abstract. The use of technology in instruction is highly emphasized in the contemporary education of English as a Foreign Language (EFL) teachers. However, to use technology properly, there must be a framework which can guide the teacher or pre-service teacher in using it. Many frameworks have been introduced by some experts and practitioners, and one of them and the most well-known one among researchers is Technological, Pedagogical and Content Knowledge (TPACK). This study reports an assessment of EFL pre-service teachers' perception and level of TPACK and its application in the class. By distributing a TPACK-EFL survey to 80 pre-service teachers who are majoring in English education, the writer later scored and ranked them, the six pre-service teachers who got the highest result were interviewed and observed. This study employed mixed-method which combines quantitative and qualitative method. The quantitative data were gathered by using the survey while the qualitative data were collected by doing interview and observation. The writer used SPSS in checking the data from the survey. Results from the study confirmed that TPACK level was influenced by gender while teaching courses and Grade Point Academic (GPA) did not contribute significantly on it. The observation data reveals that pre-service teachers had acquired technology integration skills but demonstrated relatively low competencies in blending the components of TPACK.

Key words: *Pre-service teacher, English as a Foreign Language (EFL), TPACK framework.*

INTRODUCTION

The use of technology in instruction is highly emphasized in the contemporary education of English as a Foreign Language (EFL) teachers. This study hence reports an assessment of EFL pre-service teachers' perception and level of TPACK and its application in the class. By distributing a TPACK-EFL survey to 80 pre-service teachers, the writer later scored them and the six pre-service teachers who got highest result were interviewed and observed. Results from the study confirmed that TPACK level was influenced by gender while teaching courses and grade point academic did not contribute significantly on it. The observation data reveals that pre-service teachers had acquired technology integration skills but demonstrated relatively low competencies in blending the components of TPACK.

Digital era has forced us to be able to integrate technology in all aspects in our life. It is from the simplest activity to the complicated one. The growing digital era has made people to do everything based on technology. However, the technology integration has proven that it does help people to do their activities. Technology integration cannot be denied as it is our way out to make our life easier and more leading. From all aspects in people life, technology has been also included in educational environment.

Technology integration has become a new and promising way in helping teachers delivering their material to students. Not only does it assist teachers in delivering material but also in preparing or creating the teaching material or media. Many teachers agree that by integrating technology into their classrooms, instructional process can achieve its objective

more effectively. Moreover, teachers also admit that by bringing technology into classroom, the students who are digital natives, can become more engaged and interested to the lesson.

Nowadays, numerous teacher training program to improve teachers' quality have been done by some government and non-government educational organization. One of the improvement that is intended here is to train teachers in applying technology in their teaching process as it is a high demand in this digital era. Moreover, many countries have also applied some project to support the use of technology in education field: Australia, United Kingdom, USA, Singapore, Korea and so on (Hunter, 2015: 13). And currently, Indonesia has also started to optimize the use of technology in education field. For instance, technology literation has been also attached in Indonesia curriculum.

Moreover, in language teaching, the use of technology cannot be avoided since it needs more exposure in that language and it can be easily done by integrating technology into the classroom e.g. showing the students a video consists of daily expression in the authentic situation and spoken by the native speakers. On the other hand, it is pivotal for teachers to show and introduce their students the culture and everything that relates to the language itself besides teaching grammar and the four skills: Speaking, Writing, Listening and Reading. Teachers need a device which can help them in doing so and technology is the answer to the problem. Technology also can be beneficial for teachers to improve their own skill to become fluent in that language.

Knowing that, in this digital era, which the students are digital natives, it is highly suggested to integrate technology into classrooms. However, technology still cannot substitute the role of teacher in the class as stated by Clifford, "Technology cannot replace teachers, but teachers who do not use technology will soon be replaced." To that reason, many teachers respond to this phenomenon positively as it also helps them in many ways such as designing and preparing learning material and delivering the material itself to students. Moreover, as the demand of 21st century skills, it is necessary for teachers to "requiring and applying new knowledge with dexterity in problem solving, communication, teamwork, technology use and innovation. (Hunter, 2015:29). According to one of the quotes in *Edutopia* website which is quoted by Hunter in her book that "improving schools through technology planning impacts student achievement and academic performance in content learning, higher-order thinking and problem solving skills and preparation for the workforce." (Hunter, 2015: 30). Those impacts clearly define how important it is to integrate classroom with technology as we know that technological skill is quite important to suit the current era.

Realizing that technology integration is needed in education field, many scholars are interested in examining the use of technology in their studies (Davies et al, 2013; Morris, 2011; Tomlinson and Whittaker, 2013; Motteram, 2013). Those studies have successfully approved that technology integration is really effective in enhancing the learning achievement. Technology integration is gradually increasing and captivating many more scholars as it gives many positive impacts to educational field. Following that condition, there are also many ICT practitioners who create some platforms and courseware for educational purpose.

However, despite technology integration is considered pivotal in today's teaching and learning process and many studies have also approved it, one of the pivotal topic that seems never been explained is how to apply it properly. To that reason, many experts have been trying to construct a framework to underlie the use of technology in educational and research field. To date, there are some conceptual framework constructed by experts such as SAMR (Puentedura, 2006), HPC (Hunter, 2015) and the most recognized among researchers and teachers, TPACK (Mishra and Koehler, 2005). Among those framework mentioned earlier, TPACK is considered as the most reliable and practical framework since "the central focus of TPACK framework is on a specialized kind of teacher knowledge, involving the interplay of three essential forms of knowledge: Content, Pedagogy, and Technology. The most purposeful

and gainful use of technology in teaching subject matter means that teachers must understand and negotiate the relationships between these three forms of knowledge. As teachers develop such sophisticated and interrelated knowledge, they develop a form of expertise for teaching with technology." (Hunter, 2015).

Using PCK framework which is constructed by Shulman (1986) as the underlying theory, many researchers have tried to integrate technology into the framework with various terms e.g. Niess (2005) with technology-enhanced PCK and Angeli and Valanides (2005) with ICT-related PCK (ICT-TPCK). The combination of technology into PCK has not been recognized until Mishra and Koehler (2005) proposed a new framework by adding "T" abbreviation in the first order as it stands for technology in PCK framework which is constructed by Shulman (1986). Then it is extended into TPCK which stands for Technological, pedagogical and content knowledge. Years after it is extended into TPCK, Thompson and Mishra give their idea to add "A" as to make it easier to pronounce (Angeli and Valanides, 2015). Since then, TPACK is widely known among researchers, teachers and practitioners as a framework which can be used as a framework in technology integration and the assessment itself.

TPACK framework has been applied in many studies with various purposes. TPACK framework has been used to evaluate teachers' knowledge, framework in evaluating a technological-based teaching process or conduct a technological-based courses. Moreover, there are also some researchers who create and evaluating TPACK assessment in their studies.

Despite TPACK is a young research field, many researchers are captivated in doing a study in this topic. As the result, many studies have been conducted related to TPACK topic. Some studies focus on constructing and developing the instruments assessment. The rest of them focus on applying the TPACK framework into their teaching process. As many advantages given by TPACK framework, the writer is eager to conduct this research which will focus on pre-services teachers.

Nevertheless many TPACK studies done in Indonesia, there are only few which concentrate on pre-service teachers especially in English subject. To that reason, a research focusing in English pre-services teachers are needed to investigate their perceived level of TPACK. Thus, this research aims to know the pre-service teachers TPACK and it can tell whether or not they are ready to integrate technology in their own classroom and the way teacher educator program teach technology to the pre-service teachers.

THEORETICAL FRAMEWORK

Nowadays, people tend to utilize technology to help their activity easier. Having known the importance of using technology, it is also realized that technology is crucial to enhance teaching and learning process. Yet, to integrate technology into teaching and learning, besides having technical skill, teachers also have to grasp technological knowledge, pedagogical knowledge and content knowledge. It is supported by Nancy Kassebaum in Lynch (2014), she says that "There can be infinite uses of the computer and of new age technology, but if the teachers themselves are not able to bring it into the classroom and make it work, then it fails." Thus, in teaching activity, teachers are demanded to gain so many knowledge so that they can handle this kind of complex activity (Mishra and Koehler, 2006).

Technological, Pedagogical and Content Knowledge (TPCK) framework is initially introduced as Pedagogical and Content Knowledge (PCK) by Shulman (1986) then it was extended by Mishra and Koehler (2005) by adding Technological Knowledge to the framework (Brantley-Dias and Ertmer, 2013). The TPCK framework then later is known as TPACK to make the pronunciation easier (Thompson & Mishra, 2007). The additional element of the framework is underpinned by the current phenomena in the world which technology is used in every life aspect including educational field. Brantley-Dias and Ertmer (2013:3) also endorse

that this conceptual framework is not a new concept in integrating technology into educational practice. Once Shulman (1986) introduced his PCK framework, many researchers also tried to combine the PCK along with technology namely Margerum-Leys and Marx (2002) who call it as "PCK of educational technology, Angeli and Valanides (2005) introduced a new term as "ICT-related PCK" and Neiss who names it as "technology-enhanced PCK". Yet, they do not really explain their concept clearly. Then Mishra and Koehler come to the surface introducing the new concept along with its clear purpose and explanation. In defining TPACK, Mishra et al (2009) describe it as follows:

TPACK is the basis of good teaching with technology and requires an understanding of the representation of concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how technology can help redress some of the problem that students face; knowledge of students prior knowledge and theories of epistemology, and knowledge of how technologies or strengthen old ones (p. 1029).

Many researchers are captivated to do a research using TPACK framework and give their thought on it. TPACK is defined as a form of knowledge that is complex, multifaceted, integrative and transformative (Chai et al, 2013; Angeli and Valanides, 2009; Harris et al, 2009; Koehler and Mishra, 2009; Manfra and Hammond, 2008). Voogt, Fisser, Roblin, Tondeur and van Braak (2013) assert that TPACK has been defined in four meanings: (a) as a new understanding on how to integrate technology within the classroom (Pierson: 2001); (b) as the integration of teachers' main areas of knowledge namely technological, pedagogical and content knowledge which means how to integrate technology properly (Niess: 2005); (c) as a base knowledge needed by teachers to deliver their material using technology (Mishra and Koehler: 2006); and (d) as a knowledge that can be developed and assessed to get a valid information about teachers' knowledge (Angeli & Valanides: 2009).

METHOD

This research conducted in University of Muhammadiyah Prof. DR. HAMKA (UHAMKA) specifically in Teacher Training and Education Faculty (FKIP). In Teacher Training and Education Faculty, ELT is one of the programs provided. The students who are administered in the 7th semester and fulfill the requirements to do teaching practicum i.e. they have joined some courses related to teaching and practice e.g. TEFL 1 to 3, Academic Speaking, Academic Writing and so on, must enroll themselves in Magang 3 course. Therefore, this research started in September which is the beginning of the new academic year.

The participants are the 80 students who are joining the Magang 3 course. Furthermore, the 80 students used as the participants of this research. Then the purposive sampling was chosen by taking only six participants who get the highest score from the TPACK self-assessment. At the first, the participants were given a survey which is employed to know their perceived TPACK level. After having the result from the survey, the pre-service teachers who have the highest score were chosen to be included the next steps e.g. interview and observation session.

RESEARCH DESIGN

In this research, the writer employed mixed method. The use of mixed method benefitted the research by combining the strengths from both methods e.g. quantitative and qualitative. By doing so, it will make the answer to the research question stronger and back up the limitations of each methods (Creswell, 2014). The researcher utilized the explanatory sequential mixed method design which means the quantitative method will be done first and it

will be followed by the qualitative one (Creswell, 2014). The quantitative data was gathered by survey instrument to investigate the pre-service teachers' perceived TPACK level by asking some questions related to their teaching practice in the class while the qualitative data used interview and observation instrument. The interview was utilized to know the pre-service teachers' perception on the use of technology in the classroom. The last instrument, observation, was done to investigate the pre-service teachers' teaching practice based on their answer from TPACK survey instrument. In observation and interview, the writer only chose some of the pre-service teachers who get the highest result in TPACK survey in order to get an in-depth result.

DISCUSSION

By distributing the survey to 80 pre-service teachers who were conducting internship program, the researcher got 6 pre-service teachers with the highest score. The 6 pre-service teachers were interviewed to know some characteristics that underlie their score on the survey such as grade point academic (GPA), gender and their experience in TEFL subject. From the result, the writer found that gender gave a significant influence in getting high score in TPACK while GPA and teaching course did not give any influences to their TPACK score.

The result showed that gender has affected the pre-service teachers' level of TPACK while GPA and teaching courses has no effect on it. However, the writer cannot prove the reason why gender can affect the TPACK assessment and it means further research could try to answer it. The result of survey in this research showed that female pre-service teachers were leading in the PK score than males. However, further research is needed to find the reason that influence the result why female pre-service teachers were better than the males in their pedagogical knowledge.

The result also showed that teaching course did not influence their TPACK level. They felt that teaching course encourage them in preparing them to become a professional teacher but it did not encourage them to teach with technology. This study proves a statement by Kay (2006) and Swain (2006) that many pre-service teachers who are not adequately prepared to use ICT in classrooms. One of them stated that even the teacher educator who taught the course was not really fluent in using technology so that the pre-service teachers were not really familiar and fluent in teaching using technology while teacher educator's use of ICT becomes the factor of the effectiveness of pre-service education for ICT (Chai et al, 2010: 64). While Akkoyunlu (2002) believes that teachers and teacher educators have a very crucial role in teaching technology in the most productive way and making both teachers and students to keep up with the rapid developments in technology and education to satisfy the constantly changing expectations of learners. As we have in digital era where the technology has becoming more leading every day, as a teacher, we need to update our ability as well. It might give bad effect on our teaching process if we do not respond the developments in technology. All of our students are digital natives which means we also have to be someone who is fluent in using technology so that there is no gap between students and teachers. According to Koehler and Mishra in Kose, "in the teaching process, teachers are the key for applying new technologies efficiently and successful integration of technology depends mostly on the teachers and their understanding of how it can help the students to enhance their learning. Therefore, it is essential not only how you teach (pedagogy) and what you teach (content), but also which materials (technology) you use while teaching." Therefore Pamuk (2011: 11) agrees that, "carefully designed case studies or exercises in teacher education programs could help pre-service teachers gain some teaching experience before doing actual teaching in the real classroom."

The researcher also found out whether their perspective on technology integration are in line with TPACK framework. The last step was observation. The researcher observed the use of technology inside the pre-service teachers' class during the internship program. The data from observation showed that Pre-service teacher 1 was not really good in operating technology. He told the writer in the interview that he was very fluent when it is about technology even he said that he used platform to help his students to learn outside the class. Yet, he did not support his students to operate technology inside the class to get more sources related to the topic discussed in class. Yet, from the observation, he did not use any teaching approaches at all. Then it means he only applied his technological and content knowledge while Hughes and Scharber in Doering et al agree that, "all teachers need to be explicitly aware of their current knowledge bases in the areas of TK, TCK, TPK, and TPACK. This metacognitive awareness of TPACK enables teachers to set learning goals for themselves and, in turn, makes thoughtful decisions for technology integration."

The pre-service teacher 2 has average grade point academic and she agreed that to use technology, teachers have to maintain their role and they must grasp the content before explain it to students as she said that "*they have to maintain their role. If they do not understand, how can they share their knowledge to their students*" Yet, she believes that technology in the class can only be used by teachers since students will misuse it.

The pre-service teacher 3 showed that she has high grade point academic and got introduced to technology in TEFL class but she was not taught how to use it well. It is described from her words that "*Hmm I do not know about other classes but honestly in my class the lecturer did not teach us about technology*." Her perspective on technology integration matches with TPACK framework that she said, "*I use PPT but sometimes I just put the point of my explanation and I will explain more in my speech*." Yet, she does not agree if students use technology inside the class. She said that it will be the biggest distractor for students as it is stated in her words, "*I think mobile could become the biggest distractor for students. In this era students are familiar with Snapgram and other social media so that I want to manage their mobile in their bag unless it is needed and can be used. I agree if students use their mobile outside the class for another activity such as sending task through E-mail or Whatsapp, but for inside the class, I personally disagree*."

When it comes to observation, she taught really well by using technology, but technology is only limited by teachers. Students could not access technology since it is restricted in the class. Teacher just optimized the use of technology for teacher and did not support students to use it. The pre-service teacher 4 said that technology can make instructional process easier. She has high grade point academic and she learned and prepared herself to do the internship from TEFL subject. She believes that ideal technology integration is "*we have to show them how to use technology properly so that they can follow us. For instance, if we assign them to present the material, we have to show them how to present it properly such as using video or something so that they can do it properly like we did*." She allowed her students to use technology but only when they do their tasks.

The pre-service teacher 5 has not got high grade point academic but she thinks that she is really fluent in using technology. She also feels that TEFL class was really meaningful in preparing herself before the internship program but again she was not taught about technology and the way to apply technology correctly. Her perspective is not in line with TPACK framework as she said that technology integration must be done by "*50% teacher's time to explain using PPT and the rest is time for students' activity, they apply what have been explained by teacher*" it is supported by the observation data that she just showed the PowerPoint and did not explain to students, after that students just asked to write the

explanation that she puts on the PowerPoint slide. Most of the time in explanation session just used for writing. As stated by Niess (2005) that to integrate technology, teachers have to grasp technological, pedagogical and content knowledge. The pre-service teacher 2 did not apply her pedagogical knowledge at all.

Pre-service teacher 6 feels that her students become more motivated when she applies technology like showing video in her teaching process. She point out that an ideal technology integration is "*like showing the students video, and I will explain them the materials and expressions stated in the video*." She limits the use of technology in classroom for students since she is afraid her students will get distracted by games or social media when they operate their mobile.

The findings of this research showed that the result from observation did not align with the survey result. It is supported by in line with the research done by Agyei and Voogt (2013) that, "the teachers' self-reported data (as measured by TPACK survey) for TPACK and all it domains showed high scores whereas data on their actual observations were relative low confirming that teachers in general tend to over estimates their stated pedagogical beliefs." This case also happened in So and Kim (2009) and in their research the survey result was also over estimated while in the observation result they had relative low scores.

In the interview, the pre-service teachers said that they are highly fluent in technology yet when it comes to the observation, some of them faced obstacles in operating technology. It is supported by Keating and Evans (2001) in So and Kim (2009) that "although student teachers (pre-service teacher) had high confidence with technology for personal use, it did not necessarily mean that they were capable of using technology as a teacher." While So and Kim (2009) also agree that "knowing how to use technology for personal use is different from knowing how to use technology for instructional purposes." From the interview as well the writer got information about the pre-service teachers' grade point academic. Only two of them got high point and the rest got average point. The teachers who got high point tend to be better in pedagogical knowledge and content knowledge.

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