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Exploring Students' Perceptions of EFL Teachers' TPACK Knowledge in Online Classroom Environment

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ABSTRACT

Many studies have investigated students' perceptions of experiencing technology-based English as Foreign Language (EFL) learning, particularly as a result of the Covid-19 Pandemic period. Only a few studies have considered the students' perceptions of the teachers' knowledge of integrating technology into the teaching and learning process. Thus, this study explored how students perceived their teacher's knowledge of technology integration in teaching, especially in the case of technology pedagogy and content knowledge (TPACK) in the online classroom. A case study was applied in this study with five participants selected purposively. This study was mainly guided by six survey items validated by Chuang et al. (2018) about assessing teachers' TPACK from the students' perspectives. These six items were used as the guiding questions during the semi-structured interview. Further, this study also gathered data from the students' responses or written reflections after class. Data were then analyzed thematically. The results indicated that these students perceived the teacher as having sufficient knowledge of teaching the subject matter. The TPACK knowledge, however, needed more attention to developing. It implied that educational policymakers, not limited to the institutional stakeholders and practitioners, should provide a TPACK-based professional development program to strengthen the teachers' proficiency in technology-enhanced foreign language teaching.

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1. INTRODUCTION

The development of technology over decades has led to innovations affecting people's life, including changes in how education is delivered (Tan et al. 2017). Such development is growing more rapidly in an

educational environment as a result of the Covid-19 pandemic recently. Studies in the field of education have closely given attention to teachers' professional development, particularly those about technology integration in teaching (Mishra & Koehler, 2006; Koh, Chai, & Lim, 2016). Concerning technology integration in education, Mishra and Koehler (2006) have proposed a construct expected to assist teachers to have the ability of self-evaluation and understand their technological professional development, namely technology pedagogy and content knowledge (TPACK). Angeli and Valadines (2009), later claimed that TPACK is an integrated construct of teachers' knowledge.

The pedagogical content knowledge, introduced by Shulman (1986), describes the teachers' understanding of teaching the subject matter. Finally, technology pedagogy and content knowledge (TPACK) were introduced as an integrative core that describes the teachers' knowledge of teaching specific content mediated by appropriate technologies (Koehler & Mishra, 2009). Scholars have contributed to the development of the TPACK framework. Jaipal-Jamani and Figg (2015), for example, have proposed the conception of TPACK in practice through several TPACK-related pre-observations. The results maintained that there were three most significant dimensions of TPACK in practice: teachers' knowledge of TPCK, TCK, and TPK in practice. They argued that teachers who know the three core dimensions of TPACK (i.e., TK, PK, and CK) should consider the technology-related dimensions (e.g., TPCK, TPK, and TCK). The study, however, failed to prove that the proposed conception worked in one specific subject matter. Thus, the present study aimed to adopt the concept of assessing teachers' TPACK knowledge by considering the students' perspectives. In other words, this study aimed to see how students perceive their teacher's technological knowledge in online English classrooms.

Mishra and Koehler (2006) argued that teachers' knowledge of technology, pedagogy, and the subject matter (i.e., content knowledge) are the main aspects of effective teaching. Technological knowledge (TK) refers to the teachers' knowledge of applicable technologies that can be used in education. Pedagogical knowledge (PK) refers to the teachers' ability to teach such as teaching methods and strategies. Content knowledge (CK) refers to the teachers' mastery of the subject matter. Then, these cores interplay with one another shaping a concept that guides teachers' teaching practice. Technological pedagogical knowledge (TPK), for example, is the integrated component that points out the teachers' understanding of teaching practice through the use of technologies. Meanwhile, technological content knowledge (TCK) refers to the teachers' knowledge of selecting appropriate technologies based on the content.

Studies discussing TPACK adoption in teaching have been growing over decades. Some of these studies have been focused on the TPACK framework in foreign language teaching and learning environment. Abu-Hardan et al. (2019), For example, studied the use of TPACK in English reading instruction. The study revealed that students with controlled treatment using TPACK significantly improved their reading scores, indicating that their reading skills arose. Technology integration in a language classroom does not only work as a tool to mediate the teaching and learning activities but also as a tool to stimulate students' willingness to learn autonomously. In the same vein, Tseng et al. (2019) explored English pre-service teachers' teaching practices in China. The findings revealed that the TPACK framework facilitated their practice through continuous support from the teacher educators. Those previous studies have shown the effectiveness of adopting TPACK in language classrooms, and it helps teachers accelerate teaching and learning.

Teacher-centred exploration of the TPACK practice is insufficient to generalize the teachers' TPACK knowledge since students take a significant role in the process of teaching and learning (Barkhuizen, 1998). Responding to the previous claim, scholars have recently considered exploring the students' perceptions of technology-enhanced classrooms and found them meaningful for teachers' improvement in the future. Tseng (2014), for instance, explored the students' perceptions of the teachers' TPACK knowledge in Iran. The results showed that the teachers have sufficient knowledge of the three-basic core of TPACK (i.e., TK, CK, and PK) but less knowledge of each integrative dimension, such as TPCK, TCK, TPK, and others. The study further implied that teachers should consider the students' perceptions while reflecting on the teaching practice for better teaching in the future.

The students' perceptions were helpful for teachers while reflecting on the teaching practice and could assist them in developing their teaching competence (Chang, Jang, & Chen, 2014). More recently, Chuang et al. (2018) also examined the students' perceptions of teachers' technological knowledge. They validated survey items for assessing teachers' technological knowledge through the students' perceptions. There are six items for assessing teachers' technological knowledge from the students' perspective; they are (1) the use of animations (e.g., 2D or 3D) to teach the lesson, (2) the use of information and communication technologies (ICTs), e.g., WhatsApp, Zoom, Google Meet, Skype that allow students to communicate and interact with the peers from a distance, (3) use of Cloud computing technologies (e.g., Google Docs) that allow students to work collaboratively with your peers, (4) use of appropriate technologies that meet the students' needs, (5) use of appropriate technologies allowing students to express opinions and interact with others, and (6) use of technologies allowing students to present learning outcomes. Through a structural equation model, the study found that the students' perceptions positively affect teachers' TPACK.

The TPACK framework has long been considered an effective construct to guide teachers in enacting technology-enhanced teaching practices (Drajati et al. 2021; Ergen et al. 2019). Moreover, the current situation worldwide, i.e., the Covid-19 Pandemic era, shifts the way education is delivered from in-person teaching to online teaching (Aljuaid, 2021; Sepulveda-Escobar & Marrison, 2020). Teachers in Indonesia, unfortunately, were not prepared for such a teaching environment (i.e., online teaching) (Atmojo & Nugroho, 2020). On the other sides, students' perception of teachers' knowledge plays a pivotal role in assessing teachers' knowledge and is influential in teachers' professional development (Barkhuizen, 1998). While previous studies developed teacher-centred parameters to assess teachers' technological knowledge (Jang & Chen, 2013; Koh, Chai & Lim, 2016; Tan et al., 2019), studies exploring student-perceived teachers' technological knowledge received little attention (Chuang et al., 2018; Fathi & Yousefifard, 2019). Thus, the purpose of this study is to explore Indonesian teachers' technological knowledge as perceived by the students. The research question under this study was: how did the students perceive the teacher's TPACK knowledge in the online classroom environment?

2. METHODS

To have a complex and intensive exploration of the case, this qualitative study adopted a case study design. Particularly, in the case of language teachers' TPACK knowledge as perceived by the students in the online classroom environment. This design allowed the researchers to have an in-depth exploration of how the students perceived their teacher's TPACK knowledge (Merriam, 1998) without controlling the events of the case (Yin, 2018).

Participant and Context

The present study was conducted in an English-language institution in Indonesia. This institution provides online courses preparing students who intend to take an English proficiency test (e.g., TOEFL, IELTS) and teaching students who want to improve their English skills. All classes in the institution were enacted at a distance (i.e., online classroom environment). The teachers were obligated to use several online platforms that supported their teaching, such as the ZOOM application, Google Classroom, Edmodo, Google Meet, and so on. The student's educational backgrounds varied but mostly those who were last-year college students.

Concerning this study, we, the researchers, employed five students who were selected purposively. These students aged in the range of 22 to 23 years old. The students' demographic details are displayed in table 1. The table informs their name, age, gender, and educational background. The participants' names were a pseudonym for the confidentiality of the study results.

Table 1. Demographic details of student-participant

Name	Age	Genre	Educational background
Ria	23	Female	Bachelor degree
Ana	22	Female	Bachelor degree
Rian	22	Male	Bachelor degree
Andi	23	Male	Bachelor degree
Tia	23	Female	Bachelor degree

Data Collection and Analysis

We gathered the data through multiple techniques (i.e., online classroom observation and semi-structured interviews). Firstly, the online classroom observation was used to see the online classroom environment, including the way the teachers create the classroom atmosphere. This technique allowed the researchers to go deeper into the case to gain a clearer depiction of the studied phenomena (Merriam, 1998). The researchers then studied the data from the online observation to arrange the semi-structured interview with the students. Then, the five students were invited to participate in a semi-structured interview. The semi-structured interview was conducted online through a WhatsApp video call. The interview questions were mainly based on the six survey items validated by Chuang et al. (2018) about assessing teachers' TPACK from the students' perspectives. The items are: (1) did your teacher use animations (e.g., 2D or 3D) to teach the lesson, (2) did your teacher use information and communication technologies (ICTs), e.g., WhatsApp, Zoom, Google Meet, Skype that allows you to communicate and interact with the peers from a distance, (3) did your teacher use Cloud computing technologies (e.g., Google Docs) that allow you to work collaboratively with your peers, (4) did your teacher utilize appropriate technologies that meet the students' needs, (5) did your teacher use appropriate technologies that allow you to express opinions and interact with others, and (6) did your teacher allows you to use technologies to present your learning outcomes.

The data were analyzed thematically (Braun & Clarke, 2006). The data analysis took three stages: familiarizing the data, coding the data, and finding the themes that emerged. First, the researcher familiarized the data by reading and re-reading while transcribing the interview session. Second, we reduced the data while coding the words, phrases, or sentences that were meaningful. Third, we conclude possible themes that emerged from the data. In the end, we used triangulation and member checking in this study to ensure the credibility of the study (Lincoln & Guba, 2006).

3. FINDINGS AND DISCUSSION

This study examined EFL teachers' TPACK knowledge as perceived by students in the online classroom environment. This section especially, describes the results regarding the students' perception of EFL teachers' knowledge and practice of teaching with technology in the online setting. The result, overall, showed that students' perceptions positively influence teachers' TPACK knowledge and stimulate the teachers to have self-reflection leading to the development of their technological competence.

Chuang et al. (2018) validated six assessment items of teachers' TPACK through students' perspectives. These six items include (1) the use of animations (e.g., 2D or 3D) to teach the lesson, (2) the use of information and communication technologies (ICTs), e.g., WhatsApp, Zoom, Google Meet, and Skype that allow students to communicate and interact with the peers from a distance, (3) use of Cloud computing technologies (e.g., Google Docs) that allow students to work collaboratively with your peers, (4) use of appropriate technologies that meet the students' needs, (5) use of appropriate technologies allowing students to express opinions and interact with others, and (6) use of technologies allowing students to present learning outcomes. This study, therefore, used these items as these items mainly attempt to assess how teachers were able to operate technologies as teaching tools and facilitate

the teaching practice. Two themes emerged about teachers' TPACK knowledge as perceived by students. The following two subsections describe the two themes found in the present study: teachers' technological knowledge and teachers' knowledge of teaching with technology.

2.1. Finding

Teacher's Technological Knowledge

Teachers' technological knowledge becomes significant in the process of online teaching. Concerning teachers' technological knowledge, we found that all students gave positive responses. The teacher mainly used several applications and websites to support the teaching and learning activities. The use of digital technologies facilitated the students to interaction and collaboration with peers. Andi, for example, felt that he could easily collaborate with peers using the application that the teacher used in class. Although he did not know how to use the application, the teacher used to give tutorials that could assist him in using the application. He mentioned in the interview, "*Almost all apps that my teacher used allow us to collaborate with peers such as zoom, google drive, google jam board. I was new to using some of the apps, especially the Google Jamboard, but my teacher never forgot to give us tutorials on using the app/websites so it helped a lot"*. Andi's statement indicated that the teacher had sufficient knowledge of using appropriate technologies in the English online classroom. Besides, the teacher was also aware of the students' needs by providing tutorials for the students in case they had difficulties using the selected application. Similar to Andi, Ria also mentioned the same way. She said, *"I once remember that my teacher assigned us to analyze sentences, i.e., finding subject, verb, and conjunction, in Google Jamboard. We were made into three groups. The teacher had prepared three blank pages so that each group could do the assignment on their page. The instruction was given clearly, along with the tutorial on using the Jamboard. It was the first time I knew Jamboard, and I was happy that I could do the assignment in a group, although I was not in the same place as my friends."*

We also found that the teacher utilized the internet and communication technologies (e.g., WhatsApp) as the teaching media. The internet and communication technologies (ICT) were used as the main media to communicate with the students as if they interacted in an in-person classroom. The students confirmed that the use of WhatsApp was helpful because they could discuss with peers freely. For instance, Ana said that she was helpful with the selected application. As she mentioned in the interview, *"I always communicate with my teacher and friends through WhatsApp. I sometimes ask several questions in case I did not understand the lesson. My teacher also provided a WhatsApp group that ease me to have a discussion. I had never imagined studying via WhatsApp chats before. I thought that I can only use WhatsApp for chatting as I chat with my friends for random talks. But here, my teacher showed me that WhatsApp can also be the media for learning."* Ana's statement indicated that teachers should be able to re-purpose technology in education. WhatsApp, for example, as an everyday-use ICT, could be used as the teaching media instead of using applications that are difficult to use for either teacher or student. A similar statement was also mentioned by Rian. He said, *"I often discuss with peers in the WhatsApp group. We shared many things related to the materials being studied in class. It was helpful for me because I could ask my friends, and sometimes my teacher about the unit that I did not understand yet. I felt like I was studying while chatting. That was exciting."*

Teacher's Knowledge of Teaching with Technology

The result of this study revealed that teachers should have the ability to re-purpose technological use. Nearpod, for example, is commonly used in Mathematics and Science as the website and application allow teachers to invite students to have meaningful online classroom activities such as Phet Simulation and VR Field Trip. This study, however, found that English teachers used Nearpod as the teaching media in grammar and structure classrooms. The students surprisingly showed positive responses toward the use of Nearpod. Tia, for example, expressed her happiness in learning grammar

online through Nearpod. She said in the interview, "I expected to increase my TOEFL score by joining this class. The teacher used to give pre-study activities like online games or quizzes. The often ones were the online game and quiz through Nearpod. I feel that I could enjoy the quiz because of the animations and visuals that made me more excited to answer the questions. In the end, my TOEFL score increased. I was happy, and I now feel confident to take the official TOEFL test". We see from Tia's statement that she enjoyed learning while playing games in Nearpod. This indicated that the teachers have sufficient knowledge of technological use in teaching practices as the teacher could re-purpose the technological use. The students also confirmed that teachers often used Nearpod as the teaching media for several classroom activities such as exercises, pretests, and post-test. For instance, Rian and Ana repeatedly mentioned that some classroom activities were conducted using Nearpod. The following excerpts showed their confirmation of learning English grammar and structure through Nearpod:

> *The technologies used in class were varied. But we often used Nearpod. Almost all activities were conducted through Nearpod, including the pretest and posttest as well as the exercises. We also played games like vocabulary matches and synonyms. But I like climbing games because the avatars and animations were cute. I felt like I was there in the game climbing to win. For your information, the students should answer as many questions correctly to win to get there on the top of the mountain. That was a wonderful experience that I might not get in an offline class.*
>
> *(Ana, interview session)*

> *My teacher always starts the class by inviting the students to play online games in the Nearpod. In the game, there are lots of animations that stimulate me, especially to enjoy the activities. Besides, my teacher also inserted animations in the PowerPoint slides while presenting/teaching the lesson. The use of animations in the slides help me to lose boredom during class.*
>
> *(Rian, interview session)*

The excerpts above have indicated that the teacher could teach the subject matter using selected tools. It represented that the teacher had sufficient knowledge of technology-related components of the TPACK framework (i.e., TCK, TPK, and TPCK) in online English teaching as perceived by students.

Discussion

This study revealed that Indonesian EFL teachers' technological knowledge was sufficient to enact online English teaching as perceived by the students. The results of this study were in line with the previous study regarding teachers' technological competence as perceived by students (Fathi & Yousefifard, 2019). Through distributing questionnaires to Iranian students, the study found that Iranian EFL teachers were proficient in four dimensions of TPACK, i.e., TK, PK, CK, and PCK. The teachers, however, did not have sufficient understanding of TCK, TPK, and TPCK. The present study further added more evidence regarding teachers' proficiency in selecting appropriate technology in teaching, particularly in terms of TCK, TPK, and TPCK. This study has shown that Indonesian EFL teachers could select and use content-appropriate technologies. The ability to utilize technology in teaching helped teachers to accelerate the teaching and learning process (Ertmer, 2019). Recognizing the students' needs and determining appropriate ways of delivering the knowledge are also influential to the successful enactment of technology in teaching (Tsai & Tsai, 2018). As Koehler and Mishra (2006) maintained that the ability to integrate technology, pedagogy and content knowledge determined successful technology-enhanced teaching.

This study also indicated that teachers should not select up-to-date or new applications to teach to impress the class's attention but fail to operate the tool and create problems in the teaching practice. Selecting everyday used applications like WhatsApp might be helpful for executing online teaching as long as teachers and students have full access to it (Keane & Keane 2019). Having easy access to the

media used during teaching creates meaningful learning for students (Kabilan et al., 2010; Prasojo et al., 2019). Golonka et al. (2014) also maintained that allowing students to freely interact with friends in the class led students to improve their language skills. This study found that teachers mainly used everyday used tools for interaction in their teaching practice. The use of this media received positive responses from students as they could communicate with teachers and friends to have further discussions about the subject matter. In other words, the findings of this study have shown evidence regarding teachers' implementation of technology-enhanced language teaching.

The findings of this study contributed to additional evidence about teachers' competence in teaching with technology in the online classroom, particularly using the TPACK framework. Supporting the previous study, this study found that Indonesian English teachers could re-purpose technological use, particularly in an online classroom environment. Jaipal-Jamani and Figg (2015) have argued in their study that teachers should have the ability to re-purpose technologies so that the technology-integrated teaching practice could be successful. The results of this study were also in line with Fathi & Yousefifard's (2019) study implying that teachers' sufficient knowledge of technology was influential in improving students' language skills as teachers could teach effectively utilizing the technological tools. Moreover, the present study also indicated that Indonesian English teachers were aware of the students' needs. Such awareness helped teachers to create a positive and joyful classroom atmosphere and stimulate students' active engagement in classroom activities (Gonen, 2019).

Overall, this study suggested that teachers consider students' feedback to evaluate technology-enhanced teaching practice. Barkhuizen (1998) has maintained that students' perceptions were impactful on teachers' decision-making as teachers could understand the students' viewpoint regarding the learning activities. The results of this study implied that Indonesian English teachers' knowledge of technology integration was sufficient. However, the results of this study should not be over-generalized as this study did not deny any limitations during the investigation. This study suggests that English teachers in Indonesia should regularly participate in teachers' professional development programs, particularly those related to technology-enhanced teaching. Besides, practitioners and/or educational policy-makers should stimulate teachers' willingness to consider reflective practice as it could possibly enhance teachers' teaching performance and competence (Farrell, 2019; Sari et al., 2020).

4. CONCLUSION

This study explored students' perceptions of English teachers' technological knowledge in Indonesia. Using six items to assess teachers' technological knowledge as perceived by students, this study overall revealed that teachers' knowledge of technology integration was sufficient to conduct technology-enhanced teaching in an online classroom setting. Specifically, Indonesian English teachers have the ability to select and use appropriate technology to teach the subject matter. The teachers also could re-purpose the technological use and be aware of the students' needs. The results of this study implied that teachers should realize the affordances of everyday used technology to be utilized in the educational context. Besides, practitioners should provide forums for teachers to share and discuss applicable and easy-access technology to teach English. The selection and use of technology in teaching practices consider to what extent the technology could mediate the teaching and learning activities and also consider students' ability to access the tools so that the activities would be run more effectively.

Although the results of this study have shown positive evidence regarding teachers' technological competence, this study does not mean without limitations. This study has focused on students' perception of teachers' technological knowledge without considering factors that support teachers' knowledge improvement. A future study might take this opportunity to investigate factors influencing teachers' technological knowledge development and the ability to practice knowledge. Then, this study was conducted in an online English learning context which focused on grammar teaching and learning. Conducting a similar investigation in different learning contexts would result in a different way, such

as speaking learning context. Finally, a more focused survey study might be taken into account to measure Indonesian English teachers' technological knowledge as perceived by students.

Conflicts of Interest: The authors declare no conflict of interest

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