ENHANCING EFL TEACHERS' TECHNOLOGICAL PEDAGOGICAL CONTENT KNOWLEDGE (TPACK) COMPETENCE THROUGH REFLECTIVE PRACTICE

Yunica Rhosiana Sari[a], Nur Arifah Drajati[b], Hyo-Jeong So[c], Sumardi[d]
([a]rhosianasari14@student.uns.ac.id, [b]nurarifah_drajati@staff.uns.ac.id,
[c]hyojeongso@ewha.ac.kr, [d]sumardi74@staff.uns.ac.id)

[a, b, d]Universitas Sebelas Maret Surakarta (UNS)
Jl. Ir. Sutami No. 36A, Kentingan, Kec. Jebres,
Surakarta, Central Java, Indonesia

[c]Department of Educational Technology,
Ewha Womans University, Seoul, Korea.
52 Ewhayeodae-gil, Daehyeon-dong, Seodaemun-gu, Seoul, South Korea

Abstract: This study examines how reflective practices can be an effective strategy in enhancing in-service teachers' Technological Pedagogical Content Knowledge (TPACK). The participants were two English teachers in high schools in Indonesia who designed and implemented technology-integrated lessons after participating in a professional development workshop. Data collected from their reflective journals and interviews were analyzed using thematic analysis. Findings from the interviews and teacher's reflective journal revealed three reflective practices: reflection in, on, and for action. Reflective practices helped the teachers to describe and articulate their own experiences in teaching, learn from enacted experiences in the classroom, and apply learned practices in subsequent teaching. This virtuous cycle indicates that reflective practice is an essential mechanism for EFL teachers to become proficient in integrating technology in their teaching practices.

Keywords: EFL teachers, professional development, reflective practice, TPACK

DOI: http://dx.doi.org/10.15639/teflinjournal.v32i1/117-133

During the past decades, reflective practice has been suggested as an essential component of teacher education to help teachers to improve their teaching from in-depth introspection of embodied experiences (Beauchamp, 2015; Chien,

2013; Cirocki & Widodo, 2019; Farrell, 2018) and to activate their metacognitive thinking to identify areas for improvement in teaching (Loughran, 2007). Further, reflective practice is also considered a powerful tool to investigate teachers' expected goals and epistemological beliefs and enhance teacher awareness during their teaching process (Demirbulak, 2012; Farrell, 2007; Nguyen, 2017).

Nowadays, teachers are increasingly more involved with designing and implementing technology-enhanced lessons in classrooms (Tai et al., 2015). However, bringing technology into the classroom is not a simple process since teachers need to consider the connection between technology usage and pedagogical goals to achieve (Drajati et al., 2018; Koh et al., 2015; Mouza, 2011). The type of teacher knowledge that helps this process of thinking is known as Technological Pedagogical Content Knowledge (TPACK), which refers to how teachers integrate their technological knowledge (TK), pedagogical knowledge (PK), and content knowledge (CK) to create technology-integrated lessons (Mishra & Koehler, 2006).

Researchers have investigated the potential of reflection on teaching to help teachers improve their critical thinking, knowledge, and action to integrate content, pedagogy, and technology (Loveless, 2011). The study by Kale (2017) showed that reflection helps pre-service teachers to improve TPACK for technology integration. Similarly, Gönen (2019) investigated how pre-service teachers in an English as a Foreign Language (EFL) context integrated technology during the 12-week teaching practicum and found that blending reflective practice and situated learning experiences (e.g., teaching practicum) is an effective way to equip pre-service teachers with TPACK. Krauskopf (2017) examined how the use of the Graphic Assessment of TPACK Instrument (GATI) helps develop teachers' meta-conceptual awareness of their teaching practices. GATI in Krauskopf's study refers to teachers' creating graphical representations of what they understand to be their current TPACK and aspired TPACK.

Despite the existing research on TPACK and reflective practice, little is known about whether reflective practices can help in-service teachers develop knowledge about teaching with technology in the EFL context. This research aims to address this issue by exploring the narrative story of EFL teachers. The two chosen teachers implemented a reflection cycle on their experiences designing and implementing technology-enhanced lessons. This study's

guiding research question was: What aspects of TPACK did teachers reflect on during the reflective practice cycle?

Teachers' Reflective Practice

Reflective practice has been extensively discussed among researchers and teachers who aim to develop teacher professionalism and to empower teachers in the practice of their teaching profession (Munalim & Gonong, 2019). Cirocki and Widodo (2019) define reflective practice as a process of thinking about the critical incidents in the classroom before, during, and after their occurrence to have an in-depth evaluation of the teaching and learning process. Contemplating the experience is to gain new understandings that can enhance a teacher's future practices. Reflective practice helps practitioners think on their feet and improvise to deal with uncertainty, chaos, and complexity in teaching (Finlay, 2008).

In terms of technology integration in the teaching and learning process, teachers can articulate their past experiences and learn to understand technology integration by doing reflective practices. To become a reflective practitioner, a teacher needs to do not only *reflection-on-action* (a reflection of the previous activities) but also *reflection-in-action* and *reflection-for-action* (reflection for future actions to improve or change) (Schön, 1983).

Wilson (2008) states that in the reflection-in-action, teachers have deep thinking of the present situation. Similarly, Murphy (2013) points out that reflection-in-action is teachers' awareness of the class conditions. Broader research studies found that learners' responses or feedback during the class condition have an essential role in improving teaching and lesson planning (Crichton & Gil, 2015).

Further, the next cycle on teachers' reflective practice experience concerns reflection after teaching or *reflection-on-action*. In this cycle, the practitioners recall their memory and evaluate the obstacles, weaknesses, strengths of the teaching aspects. One example of reflection on action is teachers watching their videos or doing a peer-reflection right after the teaching process (Farrell, 2018).

Reflection-for-action impacts how a lesson plan is designed and deals with planning before teaching. It deals with the preparation before the teaching and learning process. The teachers usually think of some steps as anticipation of classroom situations (Farrell, 2018). Minott's (2010) study revealed some

aspects of the reflection-for-action teachers are supposed to consider, which involve students' reactions (in reflection during the class) and resources, including school facilities and supplies for the lesson. Moreover, reflection for action refers to finding out problems and possible solutions for the future lesson, anticipating the challenges of preparing the lesson.

TPACK in Language Teaching

Technological Pedagogical Content Knowledge (TPACK) is a useful conceptual framework for conceptualizing, scrutinizing, and evaluating what teachers need to know to integrate technology into teaching practices (Mishra & Koehler, 2006). Teachers need to construct a solid knowledge repertoire of technology, pedagogy, and content to plan effective teaching with technology (Hofer et al., 2011; Hughes, 2005; Koehler & Mishra, 2005). The TPACK framework does not merely focus on one pedagogical orientation but involves various knowledge orientations (Harris & Hofer, 2011). The TPACK elements of profound elaboration are technological knowledge (TK), pedagogical knowledge (PK), content knowledge (CK), pedagogical content knowledge (PCK), technological content knowledge (TCK), and technological pedagogical knowledge (TPK).

Effective integration of technology into teaching practices requires mutual relationship between content and pedagogical knowledge. Therefore, the TPACK development strategy used in the workshop provided to the participants of the present study was structured around learning activities that match a particular content area (Harris & Hofer, 2011). Each activity integrates digital and non-digital technologies. The study therefore emphasizes largely multimodal learning and reflective practice to help EFL teachers reconstruct the aspects of TPACK during the class and when planning the lessons.

Research Context

This research was conducted in a teacher professional development (TPD) program organized by university faculty members through an international collaborative research project. The TPD program involved two workshops for EFL teachers in secondary schools in Indonesia, which aimed to equip them with TPACK to design and implement multimodal language learning with technological components, and to help them to reflect on their teaching

practices. The first workshop was about the theoretical aspects of multimodality in language learning and the nature of reflective teaching practices and how teachers can reflect on their teaching practices. Further, the second workshop focused on the practical aspects of creating a lesson plan by using TED-Ed as media to support multimodal language learning. Each workshop lasted for 90 minutes.

To gain an in-depth understanding of the impacts of the workshop on teaching practices, pre-observations and final observations were carried out to portray realistically teaching practices by teachers. Pre-observations were done before the procedural intervention or before the workshop was implemented, whereas the final observations were conducted after the workshop. Teachers were also interviewed before and after the observed lessons to identify their skills to plan the lessons and to integrate technology into their teaching practices. Further, reflective journals, the journal to document teachers' stories and reflections after their teaching practices, were analyzed to explore whether teachers got a better understanding of the integration of technology into teaching practices which in turn improved the student learning process.

METHOD

The researchers used a qualitative research method in the narrative inquiry to examine teachers' stories describing the reflective practice of integrating technology, content, and pedagogy. A narrative inquiry focuses on teachers' embodied stories, which offer an in-depth understanding of the event being investigated. Using narrative inquiry to explore every aspect of pedagogy (Clandinin, 2013), the researchers collected the data from multiple sources for four months, including interviews, observations and reflective journals.

In this qualitative narrative study, the researchers investigate the reflective practice of two teachers. Pseudonyms are used for the confidentiality of the participants. The first teacher, Ani (female), is an experienced teacher with 15 years of teaching experience. She has been awarded the top national teacher, which indicates her excellence in teaching. The second teacher, Budi (male), is a technology-savvy teacher with five years of teaching experience and has been enthusiastic about applying technology from the early years when he entered the teaching profession. Both teachers have a master's degree in English education.

Another consideration for recruiting the teachers was that the two teachers had implemented the lessons they designed during the workshops in their classrooms. Based on the observations conducted before the workshop, the teachers were also found to have integrated technology in the classroom regularly, which reflected TPACK requirements.

Data Collection

The teachers were asked to implement in their classrooms the lesson plans they had designed during the workshop. The researchers observed and recorded the teachers' activity during the teaching and learning process. The teachers were interviewed for 15 minutes before and after each observed lesson in Indonesian. The pre-lesson interviews were to gain an overall understanding of the teacher's lesson plan as well as to identify their thoughts and expectations on the lesson outcomes. The post-lesson interviews focused on the lesson outcomes to gain a more profound sense of what had happened during the lesson implementation and why. After the final observation, a 30-minute interview was conducted to examine teachers' overall experiences and beliefs about teaching English with technology.

The teachers were also asked to keep a journal to document their stories and reflections after the implementation. The teacher wrote a reflection of their teaching at the end of each lesson that served as a journal entry. There were three journal entries for each teacher as the data. The teachers wrote their thoughts on their practice in response to some guiding questions. The questions were: (1) What happened in class while you were applying multimodality as the type of TPACK?; (2) How were the students' responses while you were applying TPACK?; and (3) Why did the response emerge? In particular, the teachers were directed by the questions to write their thoughts related to the implementation of the TPACK framework in their classrooms, thinking deeply in every aspect of TPACK, both content (English), pedagogy (multimodal learning), and technology (TED-Ed).

Data Analysis

For data analysis, the researchers conducted a thematic analysis of the reflective journals and interviews that dealt with teachers' reflective practice. The pre-observation was also analyzed by using the process of thematic analysis includes three activities. The first activity was repeatedly reading data

on the narrative. This activity has an interactive relationship with the second activity, which is coding and categorizing data extracts. The researchers must move back and forth to improve thematic headings based on the data's theoretical relationship (Barkhuizen et al., 2014). Themes were categorized around three types of reflections: *reflection-in-action*, *reflection-on-action*, and *reflection-for-action*, proposed by Schön (1983) and Killion and Todnem (1991).

FINDINGS AND DISCUSSION

Findings

This section focuses on presenting the teachers' experience in utilizing reflective practice in their teaching, particularly to reflect on their use of technology and TPACK. The findings are organized around the three stages of reflection: reflection in-, on-, and for-action.

Reflection-in-Action: Students' Responses during the Implementation of Technology

Reflection-in-action occurs during an action, which engages teachers to look at what they observe when teaching and give judgments about what happened in the classroom (Burhan-Horasanlı & Ortaçtepe, 2016). The aspects observed are usually related to the multiple aspects of teaching and learning, such as students' motivation, teaching and learning materials, and the effectiveness of teaching-learning activities. Ani was also involved in the reflection-in-action during her teaching process, as seen in the interview excerpt:

> *From the beginning until the end of the lesson, I monitored the class situation, including the students' attention. In this lesson, I used an article and asked them to make a mind map about the article by using an application. Some minutes later, some students turned to be noisy without noticing me giving the next instructions. I hypothesized many factors about their behavior, 'Is there something wrong with the application and the music?', 'Did I teach them too fast to apply their understanding of the materials into the application?' It is an essential part of my teaching process to decide the next action, whether I should repeat the instructions or simplify the assignment.* ***(Ani / Interview.03)***

In this excerpt, Ani considered the students' response to indicate their attention levels and whether the materials were delivered well. Changing or repeating instructions based on the students' responses through monitoring is an aspect of pedagogical knowledge (PK), whereas her speculation on 'something wrong with the application' reflects technological knowledge (TK). Ani shared that monitoring students' understanding happens naturally even though it is not described in the lesson plan. Further, Ani mentioned her concern about task-centered learning rather than understanding-focused learning, when students focused too much on completing tasks without deep understanding:

> *I found out that something went missing when the students focused only on finishing the assignment (in this case, making a mind map using an application) but did not understand the material I was supposed to teach. They could not answer my questions related to the text even after the assignment was accomplished.* ***(Ani/ Reflective Journal.02)***

Budi also mentioned close monitoring of students' understanding and the use of technological application:

> *During the teaching process, I made a personal approach to the students, where I went around the classes to make sure they understand the materials and technological applications. There were usually two or three students who do not understand the technological applications. For example, I used TED-Ed to teach about poems. There were some obstacles, such as sign-up problems and the distraction of social media. These simple things made my class become less conducive to teaching and caused a lack of student understanding about the materials I taught. Due to the large class size, I could only make this personal approach to specific students.* ***(Budi/Interview.03)***

Overall, Budi appeared to focus on tackling some obstacles with technology usage in the classroom, and his pedagogical knowledge (PK) was less revealed during the interview. The use of technology often caused the class to become noisy, which may indicate issues with students' ability to use the technology. Budi tried to solve the issue by spending more time with the students who still did not understand the materials or instructions. In other words, he used his technological knowledge to resolve the students' problems.

Reflection-on-Action: Technology and Method as a Puzzle

The two teachers did reflection-on-action through individual analysis and discussion with colleagues, as seen in this excerpt from Ani:

> *At the end of each lesson, where I integrated short stories and TED-Ed as the media, I felt something missing, such as the time-division. The time provided in the school for English lessons was limited. Then I discussed this issue with my colleague and decided that it would be better if some materials are done as homework to relieve class time. Besides, I also asked my students to inform me of the parts that they do not understand. These are input for my analysis.* ***(Ani/Interview.10)***

This excerpt indicates Ani's technological pedagogical knowledge (TPK) on time allocation management. The use of technology seemed to require longer time allocation for a lesson. At this point, Ani realized that integrating content, pedagogy, and technology should be considered in an integrated way. To find a specific solution, she engaged in discussions with fellow teachers to find the balance between learning in class and learning out of class (e.g., homework).

A similar situation happened to Budi. Initially, he was not entirely sure about integrating technology in his lessons and thought that a technology-enhanced lesson is not a simple process, and he could continue with a traditional teaching approach. From the second trial, he was able to see the appropriateness and benefits of integrating technology, which changed his initial experience of integrating technology in the lessons:

> *The first time I used TED-Ed application, a short story facilitated by the video available in the TED-Ed, it was very beneficial for me to explain the material in the class. At first, I only thought, "I just download the video, then show it and finish the lesson," and I continued to teach conventionally, so the video had no connection with the material and the approach.* ***(Budi/Reflective Journal.03)***

Budi's mentioning that he thought the teaching method and the technology media did not relate to each other implies that he did not consider the close integration of pedagogical and technological aspects in the lessons, which affected the materials he wanted to deliver to his students. In the attempts to address teacher learning within PD, Kazemi and Hubbard (2008) made a distinction between knowledge that is possessed and knowing that is deployed

in action. Learning to improve teaching (e.g., teaching with technology) entails developing both knowledge and knowing. The teachers' narratives imply that they had acquired TPACK—a form of knowledge required for teaching with technology—to some degree, but they had difficulty applying it in action in innovative ways.

Reflection-for-Action: Integrating TPACK Means Leaving Comfort Zone

With regard to reflection-for action, Budi's narratives show improvement in how he used the TPACK framework for the lesson redesigning process. He elaborated on the consideration in choosing technological tools for the next lesson in his reflective journal.:

> *Today I had some problems with students' understanding of grammatical rules that used the short story and video as the learning platform. For the next material about the different genres, I need to fix my lesson plan to help students understand the lesson's goals, whether it is a receptive skill or productive skill, to make sure the strategy I'm going to blend with technology and how much I should teach conventionally.* ***(Budi/Reflective Journal.03)***

Budi discussed his consideration in choosing the teaching strategy based on reflecting on the action he did previously. The reflection for action relates to the action for future changes and improvement. This is clearly shown in his thinking about what is needed for the next implementation, related to the content or skill as the goals and technology as the media (TPACK). He also reflected through the discussion with colleagues, which improved his ideas on designing the teaching materials.

Meanwhile, Ani started with fundamental points to teach and considered new knowledge on designing the materials by considering the coherence between content and technology. In one interview, she explained how she delivered materials in the first lesson in a traditional way and used technology as the primary media (e.g., mobile learning) in the next session:

> *I have a consideration that I have to apply technology, but I still need to stress more on the content. So in this way, I try to combine both of them. It means that in my lesson design, I delivered the material in a typical way in the first session. In the next session, when I applied the TPACK using TED-Ed, I thought it is helpful, and I applied that when I knew that the students already got the point of the material to be easier for them to apply what we had done or discussed.* ***(Ani/Interview.30).***

Ani examined her lesson design several times to ensure that the design worked for her students and concluded that it is better to apply technology after the materials have been thoroughly discussed and understood. Both teachers' reflection-for-action was related to finding an optimal balance between traditional approaches and new approaches (the use of TED-Ed), moving beyond their comfort zone. Overall, the two teachers appreciated the opportunity to design, implement, and reflect on their classroom experiences with technology. When asked to share the most valuable aspect of teaching with technology, both of them commented on the importance of implementing technology into their classrooms and how this experience forced them to "get out of their comfort zone," "think outside the box," "utilize new resources in their instruction," and "reflect on the outcomes of their lesson." For instance, Ani shared that:

> *Technology integration is a way of exploring outside my comfort zone. I need to force myself to improve my technological knowledge for my students. This allowed me to reflect more on the outcomes of my lesson plan as opposed to just implementing the lesson and moving on.* **(Ani/Interview.32)**

Discussion

This study examined two EFL teachers' stories about how the cycle of reflective practice helped them consider technology, content, and pedagogy as an integrated knowledge base that can guide effective teaching with technology. From the narrative inquiry analysis, we identified three patterns of reflective practices:

1. The teachers were engaged in reflection-in-action, where they sensed what happened during their teaching practice and then took actions based on the informal hypothesis.
2. Reflection-on-action resulted in the teachers' understanding of constructing a new lesson plan for the classroom's TPACK perspective.
3. The significant knowledge in reflection-for-action is the connection between content knowledge (CK) and technological knowledge (TK), which resulted in the emergence of reflection on technological content knowledge (TCK) that the teachers started to think deeply about how technology usage is related to the students' needs of understanding the content.

While both teachers had a similar tendency in how they engaged in reflective practices, there was a slight difference in terms of the focus of their reflection. This finding is in line with Cahyani and Cahyono's (2012) research, which indicates that some teachers have a strong interest in various technology usage, and some do not. It is stated that a teacher who is not skillful in using technology will join some workshops and training in recognizing new technology (Cahyani & Cahyono, 2012). It may cause the teacher to have more time to see and observe the technology supporting the learning process. Meanwhile, novice preoccupation in technology tends to become risk-taking in technology usage. (Meskill et al., 2002). From the background, Ani is a more experienced teacher in teaching English, whereas Budi is a technology-savvy teacher. In most of Ani's narratives, the focus was on content knowledge and her trial and error to find the appropriate balance between technology, content, and pedagogy. On the contrary, Budi's narrative focused more on finding the newest technological applications.

Concerning teacher learning within professional development, Kazemi and Hubbard (2008) distinguish between knowledge that is possessed and knowing that is deployed in action. Learning to improve teaching (e.g., teaching with technology) entails developing both knowledge and knowing (Farrell, 2018), involving the action of sorting the accessible aspects of technology for the classroom application. This study suggests that while teachers had attended TPACK workshop and training, they still had some difficulties applying TPACK in designing lessons in innovative ways. Similar difficulties were discussed in Drajati et al. (2018). In their research, teachers encountered challenges in terms of limited time allocation and supporting facilities for English subject.

The understanding of TPACK complexity indicates teachers' awareness of integrating technology, content, and pedagogy (Schmidt et al., 2009), which makes them more aware of how to design lesson plans for future teaching. This study suggests that reflection enabled teachers to build connections among the different components of TPACK. As one of the tools of reflection on action, group discussion brings confidence to the teacher in developing TPACK in their lesson plans. Narrative inquiry reveals the embedded elements of reflection (Barkhuizen et al., 2014), including issues related to pedagogy, such as learners, instruction, and assessment, as well as content and technology. Initially, teachers were reluctant to implement technology in student-centered

ways, despite their ability to design technology-integrated lessons. With reflective teaching, they looked back on their learning to look forward to their teaching (Farrell, 2007; Ghaye, 2011). As suggested by Farrell (2018) and Freeman (2016), reflection is a form of improvement concerning the teacher's mind about their consideration of choosing teaching strategy, technology, and many other components related to the lesson.

CONCLUSIONS

Reflection is a powerful mechanism to help teachers in making adaptive inferences on their teaching. The EFL teachers did their reflection by telling stories on their technology usage, which increased their awareness of their teaching practices and led them to make decisions towards improvement. With the importance of reflective practice on TPACK, teacher education institutions and professional development programs may consider sessions to gain the necessary knowledge and skills for reflective practices. In terms of future research, there is a need for long-term research that includes teacher groups with different educational and professional experiences. Future research can also elaborate more on the types of challenges teachers face in developing TPACK in a longer timeframe.

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