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TPACK COMPETENCE AND TECHNOLOGY USE AMONG IN-SERVICE EFL TEACHERS

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Abstract

In the context of teacher professionalism, the ability to effectively integrate technology into teaching practices is now part of the basic competencies that must be possessed. One of the conceptual frameworks that are widely used to measure and assess this competency is Technological Pedagogical and Content Knowledge (TPACK). Therefore, this study aims to (1) describe how in-service English teachers integrate technology into their EFL teaching, and (2) explain the perceptions of these teachers regarding their TPACK competency. The research is a mixed-method study that combines quantitative and qualitative data collection using observation and questionnaires. Thirty teachers consisting 11 male and 19 female involved in this study. The quantitative data were analyzed using descriptive analyses, while the qualitative data were analyzed using thematic analysis by presenting themes and codes. The finding of the study shows that in-service English teachers have "good" competence of TPACK as shown in the mean of the questionnaire result is 3.94 which belongs to the good category. Among 7 TPACK categories, TPK is the highest with the mean 4.14, on the other hand, PCK is the lowest with a mean 2.94. There are 16 types of ICT integrated in their lesson. PPT, blog, Pinterest, and YouTube are mostly used their English lesson with 100% on the other hand, Link Tree and Elsa Speak is the lowest used. Overall, these findings underscore the importance of further training that focuses not only on the use of technology, but also on how it can be effectively linked to content and pedagogical approaches in the context of English language learning.

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INTRODUCTION

In-service training is essential for English teachers to improve their skills and stay updated with the latest teaching methods. Teachers who are employed and actively teaching in schools or other educational institutions are known as in-service teachers. The term "in-service" refers to the fact that these teachers are already in the field, providing instruction to students. They are contrasted with pre-service teachers who are individuals undergoing teacher training and education to become certified teachers but have not yet started their teaching careers(Yang et al., 2022)

In-service teachers participate in ongoing professional development, which includes training, workshops, seminars, and other activities aimed at enhancing their teaching skills, staying updated on educational trends, and improving their knowledge in specific subject

areas. Professional development is crucial for in-service teachers to adapt to changes in education policies, curriculum updates, and advancements in teaching methodologies. Continuous learning helps them stay effective and informed in their roles as educators.

Becoming a competent in-service English teacher involves developing a range of skills and acquiring knowledge that enables effective teaching and communication in the English language. Here are key competencies for in-service English teachers explain Lázaro-Cantabrana et al. (2019) which include Subject Knowledge (grammar, vocabulary, and syntax and skills in listening, speaking, reading, and writing), Teaching Strategies (using various teaching methods, including interactive and student-centered approaches), Classroom Management, Assessment and Evaluation, Communication Skills, Adaptability (Flexibility to adapt teaching strategies to the needs of diverse learners), Professional Development, Collaboration (teacher's ability to work collaboratively with colleagues and contribute to a positive school culture), and Reflective Practice (Regular self-reflection on teaching practices and effectiveness).

As a framework, Technological Pedagogical Content Knowledge (TPACK) can be described as the knowledge base teachers need to effectively integrate technology into their teaching practices. Developed by Punya Mishra and Matthew Koehler in Yang et al. (2022), TPACK recognizes the complex interplay of three primary forms of knowledge: Technological Knowledge (TK), Pedagogical Knowledge (PK), and Content Knowledge (CK). The integration of these knowledge domains is seen as essential for successful and meaningful technology integration in education (Matthew et al., 2017).

The Technological Pedagogical and Content Knowledge (TPACK) of teachers has been the subject of numerous studies, including exploratory study to measure TPACK, teacher perspective of TPACK, TPACK implementation, and teacher development of TPACK. To assess the research gap—a topic that has not been previously studied by researchers—the researcher would like to offer the findings of those earlier studies in this section.

The previous study related to teacher knowledge of TPACK which had been done by (Alharbi, 2019; Rasheed et al., 2020; Sarıçoban et al., 2019). The first research was done with 115 Saudi EFL educators who answered the questionnaire's online form; while the second investigated 77 pre-service EFL teachers in Turkey. The result shows that the TPACK model positively improves students' vocabulary learning and pre-service EFL teachers have a very good level of competence although they still need to develop in some areas.

Other research on pre-service teachers' perception of TPACK were Demirtaş & Mumcu, (2021); Irwanto et al. (2022); Luik et al. (2018)and teachers' perception of TPACK has also been done by (Aniq & Drajati, 2019; Loi, 2021; Oktalia & Drajati, 2018; Prasojo et al., 2020; Rasheed et al., 2020; Shi & Jiang, 2022). The survey was done with 120 English teachers, 64 EFL teachers in China, 573 in-service EFL teachers in Indonesia. The result shows the teachers ranked their ability to integrate technology with pedagogical subject knowledge barely above average while having a high level of proficiency with fundamental office and computer technologies and pedagogical content knowledge; teachers had positive beliefs about technological applications in EFL instruction.

Research on the implementation of TPACK was conducted by Drajati et al., 2018; Lestari & Asari, 2022; Rahmi, 2020; Turgut, 2017. Drajati et al. (2018) using qualitative research, obtained information from 100 pre-service and in-service teachers' surveys, which demonstrates that the teacher demographic uses technology, pedagogy, and content knowledge literacy (TPACK). Although they may have used and understood technology in the classroom, they may not yet be familiar with the TPACK framework or how multimodal literacy fits into it. Therefore, this current research would like to focus on the following questions:

(1) What forms of technology integration are implemented by in-service English instructors in EFL learning?
(2) What are the perceptions of these English teachers regarding their TPACK competencies?

The novelty of this study lies in the theme and data collection methods used. Unlike previous studies that tend to only discuss one aspect of TPACK or only highlight teacher perceptions, this study simultaneously examines two important aspects, namely the practice of technology integration by teachers and their perceptions of TPACK competencies. In addition, the subjects of this study are also different because they involve in-service English teachers, not prospective teachers or novice teachers. The combination of these two studies focuses with specific subjects provides a new perspective in understanding teacher professional competencies in the digital era.

RESEARCH METHOD

Research Design

The study uses a mixed-methods approach. It is defined as a process for gathering, evaluating, and combining quantitative and qualitative methods in one study or a number of studies in order to comprehend a research issue by Creswell & Plato Clark, 2011 as referenced in Creswell, 2012. In this study, a mixed approach to collecting data such as using a questionnaire and class observation was used. Quantitative data were obtained through distributing questionnaires to measure teachers' perceptions of their TPACK competencies statistically. The results of this questionnaire provide an overview of the level of competency possessed by teachers based on indicators in the TPACK framework. Meanwhile, qualitative data were collected through classroom observations to see directly how teachers integrate technology into their English learning practices. The integration of both data was done by comparing and connecting the results of the questionnaire with the findings of the observations. Thus, this mixed approach allows for a more holistic and comprehensive analysis of teachers' TPACK competencies.

Research Participants or Population and Sample

This research was held in the Professional Teacher Education Program (PPG) of English subject Batch 3 Universitas Muhammadiyah Purworejo. These 30 students 11 males and 19 females come from Purworejo and neighboring regencies such as Kebumen, Wonosobo, Banjarnegara, Banyumas and Cilacap. The research was conducted from the end of January to early February 2024 for data collection.

Instruments

Sugiyono (2015:193) outlines several methods for gathering data, including observation, questionnaires, documentation, and triangulation. Given that this study uses a hybrid methodology, triangulation was used. In order to gather data for this study, the researchers employed interviews and questionnaires. The researchers take multiple steps in the data collection process.

First, creating questionnaires with twenty closed-ended questions centered on how competent teachers felt they were in terms of their technological pedagogical content knowledge (TPACK). The questionnaire is developed in English to make it easier for the participants to complete. The researchers created an online survey using a Google Form, which they then shared with the WhatsApp group. Because the questionnaire is closed-ended, participants don't have to consider their own responses; they can select only the options that are provided.

The second step is to set up a field and checklist for the teaching practice observation so that in-service English teachers can be seen using TPACK in their lessons. An instrument used to quantify observed natural or social phenomena is called a research instrument. In

order to gather data for this study, the researcher employed interviews and questionnaires (Sugiyono, 2013).

Any written form that asks respondents a series of questions or makes statements and requests that they either type out their answers or select from pre-prepared ones. Brown mentioned in (Donyei, 2003) is referred to as a questionnaire. According to Dornyei (2003), questionnaires have the advantage of being economical with regard to the time, energy, and money spent by researchers. However, they are not without restrictions; other researchers frequently assert that the data is not as valid or dependable. To complete the data, therefore, another required instrument.

Likert scales are a common type of rating scale that comprise multiple assertions relating to a certain objective, in this example, a group of people: English teachers and pupils. The respondents are asked to select a response option, ranging from "strongly agree" to "strongly disagree," to indicate how much they agree or disagree with each topic. This is done by clicking on a Google form-style button. For the close questions in this study, a Likert scale was used. There are two sets of closed-ended surveys with 31 items apiece, each for two different kinds of study sub-themes.

The instruments used have gone through a validation process to ensure their validity and suitability for use. Validation was carried out through expert judgment, namely by asking for input from experts in the field of TPACK and English language learning to assess the suitability of the instrument content with the research objectives. Several aspects examined in the validation include the clarity of the statement, relevance to the TPACK indicators, and the suitability of the context to the EFL learning situation. After going through a revision process based on expert advice, the instrument was declared valid for use in data collection.

In addition to validation, this study also implemented a data triangulation process as an effort to increase the credibility of the findings. Triangulation was carried out by comparing and confirming data from two different sources, namely quantitative data from questionnaires and qualitative data from classroom observations. The questionnaire's structure is shown below.

Table1
Construct of TPACK questionnaire

No	Pedagogical Competence	Total item
1	Technological Knowledge (TK).	5
2	Content Knowledge (CK)	3
3	Pedagogical Knowledge (PK)	6
4	Pedagogical content knowledge (PCK)	2
5	Technological pedagogical knowledge (TPK)	4
6	Technological pedagogical content knowledge (TPACK)	6
7	Web content knowledge (WCK)	5
	TOTAL	**31**

Adopted from Bugheri (2020)

Observation is the method of collecting unstructured, first-hand data at a study location by watching participants and surroundings. To conduct observation the researchers must prepare with form of checklist and fieldnote sheet to record the data. Accumulate field notes by observing as a participant; making an observation in the role of an observer putting in more time as an observer than a participant observing more than engaging in the activity; initially, as a "outsider," then taking part in the environment and watching as a "insider"(Creswell, 2012).

Data Analysis

After completing the data collection process, the researchers employed both quantitative and qualitative analytical methods to ensure a comprehensive understanding of the findings. For the quantitative analysis, descriptive statistical techniques were used to analyze the questionnaire data, which had been collected using a Likert scale format. The researchers calculated the frequency, percentage, and mean for each response category—ranging from "strongly agree" to "strongly disagree"—to identify general patterns and trends in the participants' perceptions. This approach allowed the researchers to assess the level of agreement or disagreement among respondents regarding key aspects of the study, offering measurable insights into the effectiveness and challenges of English language teaching practices. In parallel, qualitative content analysis was conducted to interpret the observational data gathered during classroom visits. This analysis focused on identifying how in-service English teachers integrated technology into their instructional practices. By coding and categorizing the observed behaviors and strategies, the researchers were able to draw meaningful conclusions about the types and frequency of digital tools used, the purpose behind their application, and their impact on student engagement. The combination of quantitative and qualitative analysis provided a well-rounded interpretation of the data, ensuring that both numerical trends and contextual insights were captured to support the study's objectives.

RESEARCH FINDINGS AND DISCUSSION

Research Findings

The first data was obtained from a questionnaire on teachers' perception of TPACK was done through descriptive analysis, while the second data about technology integration was done through content analysis. The analysis was done to answer two research questions which are shown below.

(1) How do the in-service English teachers perceive their Technological Pedagogical Content Knowledge (TPACK) competence?

To answer the research question, researchers use the data from a questionnaire obtained from the participants. There are 30 in-service English teachers participated in this study. Using Silaen & Widiyono's mean interpretation (2013:128), the authors interpreted the results the TPACK competence from the questionnaire as follows: Very High (4.20 – 5.00), High (3.40 – 4.19), Medium (2.60 – 3.39), Low 1.80 – 2.59, and Very low (1.00 – 1.79).

Most teachers have "Good" TPACK competence with a total number of 28 teachers (93%) and only two teachers (7%) have "Fair" competence. Based on the data analysis it can be stated that the in-service English teachers' TPACK competence is "good" as the mean score of the questionnaire is 3.94. To make it clearer, a table is provided below.

Table 2
In-service English Teachers' Perception on their TPACK competence

No	Class Interval	Frequency	Percentage (%)	Level
1	1.00 - 1.79	0	0	very low
2	1.80 – 2.59	0	0	low
3	2.60 – 3.39	2	6.6	average
4	3.40 – 4.19	28	93.3	high
5	4.20 – 5.00	0	0	very high

Table 3 highlights the overall perception of in-service teachers regarding their TPACK (Technological Pedagogical Content Knowledge) competence. A significant majority—93%—of teachers rated themselves as having good competence, suggesting strong confidence

in their ability to integrate technology, pedagogy, and content in their teaching practices. Only a small portion, 7%, perceived their competence as "fair," indicating minimal need for improvement among most participants. To provide a more nuanced understanding, the data were further broken down into seven specific knowledge domains: Technological Knowledge (TK), Content Knowledge (CK), Pedagogical Knowledge (PK), Pedagogical Content Knowledge (PCK), Technological Pedagogical Knowledge (TPK), Technological Pedagogical Content Knowledge (TPACK), and Web Knowledge (WK). This detailed categorization allows for a clearer analysis of teachers' strengths and weaknesses across different aspects of TPACK. For instance, while many teachers may feel confident in using digital tools (TK) or applying teaching strategies (PK), the integration of these skills in a content-specific context (PCK and TPACK) could reveal areas needing further support or training.

Table 3
Teacher Competence Based on Knowledge Category

No	Knowledge Category	Mean	Competence
1	TK	3,91	Good
2	CK	3,82	Good
3	PK	3,96	Good
4	PCK	2,94	Fair
5	TPK	4,14	Good
6	TPACK	4,04	Good
7	WCK	4,02	Good

In table 3, there are 7 categories of TPACK, and nearly all categories have "Good" competence. Only one category has "Fair" competence. To present a clearer finding, a figure is made below.

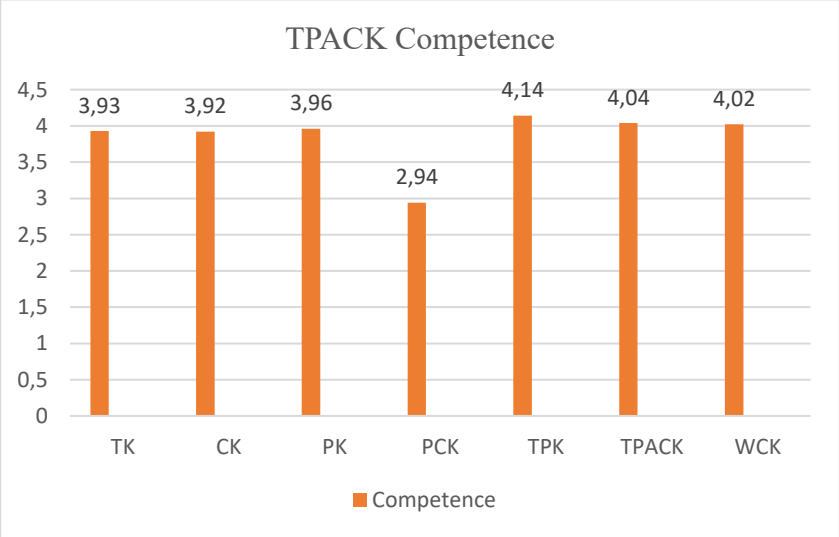

Figure 1 In-service English teachers' TPACK competence

Figure 1 reveals that Technological Pedagogical Knowledge (TPK) holds the highest mean score among the different knowledge domains assessed, indicating that in-service English teachers perceive themselves as most competent in integrating technology into their teaching methods. This suggests that they are confident in using digital tools to enhance pedagogical strategies and engage students in the learning process. The high score in TPK reflects the growing emphasis on technology-enhanced instruction and possibly indicates that teachers have received adequate training or exposure to technology use in education. In contrast, Pedagogical Content Knowledge (PCK) received the lowest mean score, with an average of 2.94, signifying a moderate or average level of perceived competence. This result

implies that while teachers may understand their subject matter and general teaching methods, they may struggle to effectively combine both elements to deliver content in a way that is pedagogically sound. This highlights a potential area for professional development.

How do in-service English teachers use ICT to teach English?

To answer this research question, the writers analyzed the teachers' teaching modules as their teaching plan and made observations on the documentation of teaching videos of 30 in-service English teachers. The result of the analysis is presented below.

Table 4
Thematic Analysis Results of Technology Use by English Teachers

Theme	Description	Initial Code / Application	Number of Teachers Using
Theme1: Preference for Traditional and Familiar Platforms	Teachers tend to use familiar and easily accessible media to deliver teaching materials	PPT, Blog, Pinterest, YouTube	PPT (30), Blog (30), Pinterest (30), YouTube (30)
Theme 2: Limited Exploration of Interactive and Innovative Applications	The use of interactive digital applications such as quizzes or online exercises is still limited.	Kahoot, Padlet, Liveworksheet, Pictory, Quizzes, Link Tree	Kahoot (10), Padlet (5), Liveworksheet (2), Pictory (2), Quizzes (5), Link Tree (1)
Theme 3: Integration of Technology for Vocabulary Reinforcement and Language Comprehension	Teachers use supporting applications such as digital dictionaries and translators to help understand vocabulary and context	Google Translate, Application Dictionary, Bing App, Elsa Speak	Speak Google Translate (5), Application Dictionary (12), Bing App (2), Elsa Speak (1)

The results of the thematic analysis show that technology integration by in-service English teachers still tends to focus on traditional and familiar media, with limited exploration of innovative and interactive digital platforms.

The first theme, namely Preference for Traditional and Familiar Platforms, shows that teachers make more use of tools such as PPT, Blogs, Pinterest, and YouTube, which are commonly used and considered practical in supporting material presentations. This indicates that most teachers feel comfortable using media that they have mastered and prioritize ease of access and effectiveness of content delivery.

The second theme, Limited Exploration of Interactive and Innovative Applications, shows that although there are many interactive-based educational applications such as Kahoot, Padlet, Pictory, and Live worksheet, their use is still very limited. The number of teachers who use these applications is relatively small. This can be caused by lack of training, time constraints, or teachers' unfamiliarity with integrating interactive technology into their teaching and learning activities.

The third theme, Technology Integration for Vocabulary Strengthening and Language Comprehension, shows that teachers are aware of helping students understand English content using digital dictionaries, translation applications, and pronunciation support applications. Although used by some teachers, this indicates an effort to support independent learning and improve students' language skills, although it has not been widely adopted. Overall, the interpretation of the results of this analysis shows that although teachers have integrated technology into the learning process, the approach used is still conventional. Further training and mentoring are needed so that teachers are more prepared and confident in exploring more

innovative digital technology, so that the integration of TPACK in English learning can run more optimally.

Discussion

The main purpose of the study firstly was to describe the perception of the in-service English teachers on their TPACK competence and, secondly to describe the ICT integration in their EFL classes. The result of the study shows that the majority of in-service English teachers have a good perception of their TPACK competence. Among seven knowledge domains of TPACK only one domain is at a fair level, namely Content Knowledge (CK), Pedagogical Knowledge (PK), Technological Pedagogical Knowledge (TPK), Technological Pedagogical Content Knowledge (TPACK), and Web Knowledge (WK) are the other six areas that make up Pedagogical Content Knowledge (PCK) are in "Good" level. The second purpose of the study was to describe the ICT integration in EFL classes. The result shows there are 16 types of ICT integrated into their lesson. Based on descriptive statistics 100 % of teachers.

The main purpose of the study firstly was to describe the perception of the in-service English teachers on their TPACK competence and, secondly to describe the ICT integration in their EFL classes. The result of the study shows that many in-service English teachers have a good perception of their TPACK competence. Among seven knowledge domains of TPACK only one domain is at a fair level, namely Content Knowledge (CK), Pedagogical Knowledge (PK), Technological Pedagogical Knowledge (TPK), Technological Pedagogical Content Knowledge (TPACK), and Web Knowledge (WK) are the other six areas that make up Pedagogical Content Knowledge (PCK) are in "Good" level. The second purpose of the study was to describe the ICT integration in EFL classes. The result shows there are 16 types of ICT integrated into their lesson. Based on descriptive statistics 100 % of teachers use PPT, Pinterest, blogs, and YouTube. Canva and Google form the second, the third is the application dictionary and the fourth is Kahoot.

The result of the study in the first finding supports the result of the previous study done by Mitha et al (2020) that the perception of all domains is good. It is a bit different from the earlier research, which was done by Luik P, Taimalu M, Suviste R (2018) which shows that the participants of the study had lack of pedagogical knowledge, however, they were good at integrating technology in their teaching. Meanwhile, the second finding is relatively similar to Lestari and Asari (2022) which shows that video and PPT are most frequently used. The findings of this study indicate that in-service English teachers have integrated technology into their learning, but with a dominant tendency towards traditional and familiar platforms. Media such as PowerPoint, Blogs, Pinterest, and YouTube are the main choices in supporting the learning process. This shows that teachers still rely on tools that are commonly used, easily accessible, and considered practical in delivering teaching materials. This finding is in line with a previous study by Chai et al. (2013) which stated that teachers tend to integrate technology that they have mastered technically and pedagogically.

However, the data also shows that the use of interactive learning technologies such as Kahoot, Padlet, and other quiz-based applications is still very limited. This shows that teachers' exploration of innovative technology in English learning is not optimal. The contributing factors may include limited knowledge of new technologies, lack of practical TPACK training, and lack of confidence in using unfamiliar technology. As stated, by Akram et al. (2022), the success of technology integration in learning is greatly influenced by the teacher's ability to combine aspects of technology, pedagogy, and content proportionally.

In addition, some teachers have begun to utilize technology to help students understand vocabulary and text context through applications such as digital dictionaries, Google Translate, and Elsa Speak. Although not yet widely used, these findings indicate that there is teacher awareness in supporting students' linguistic understanding through technology.

However, these applications have not been fully integrated into learning strategies systematically. Overall, the results of this study indicate that although teachers have shown progress in using technology, there is still a need to increase professional capacity in integrating interactive and innovative technologies that are in accordance with TPACK principles. Continuous and real-world practice-based training is needed so that teachers can optimize technology in designing more meaningful and contextual English learning experiences.

CONCLUSION

Based on the findings and discussion, here are conclusions that can be drawn the in-service English teachers have "good" competence of TPACK as shown in the finding as the mean of the questionnaire result is 3.94. and this belongs to the high or good category which lies in the range 3.40 – 4.19. with 93.3 % of teachers belonging to the good category and only 6.6 % of teachers belonging to the "Fair" category. Among 7 TPACK categories, Technology-Pedagogical Knowledge (TPK) is the highest with a mean score is 4.14, on the other hand, Pedagogical Content Knowledge (PCK) is the lowest with a mean score of 2.94.

This study shows that in-service English teachers have integrated technology into their learning, but predominantly use conventional platforms such as PowerPoint, Blogs, Pinterest, and YouTube. Although effective and familiar, the use of interactive and innovative technology such as Kahoot, Padlet, and other digital learning applications is still very limited. In addition, the use of technology to assist language comprehension such as digital dictionaries and translator applications shows an awareness of the use of technology to support more independent language learning.

This finding reflects that technology integration is not fully aligned with the principles of Technological Pedagogical and Content Knowledge (TPACK), especially in the dimensions of innovative technology exploration and its pedagogical use. Therefore, there is an urgent need to strengthen teachers' TPACK competencies. The implication of this study is that ongoing training is needed that does not only focus on mastering technology, but also on how to integrate it effectively in the pedagogical context and content of English learning. Hands-on practice-based training will help teachers build confidence in exploring new platforms. Teachers need to plan to improve their TPACK competence through teacher learning community, reflective teaching and lesson study. Further research is recommended to explore more deeply the relationship between teachers' TPACK competencies and student learning outcomes directly. In addition, further studies can also examine the effectiveness of real practice-based training models (hands-on training) in improving teachers' ability to integrate technology.

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