TEACHER'S TECHNOLOGICAL PEDAGOGICAL CONTENT KNOWLEDGE (TPACK) IN NEW NORMAL ERA

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Abstract: Recognizing that each teacher has unique strengths, preferences, and learning styles, they tailored their instructional approach accordingly. By aligning their teaching methods with their own characteristics, they were able to optimize TPACK development and create meaningful and engaging learning experiences for their students.

Key Words: TPACK, Online learning, New Normal

INTRODUCTION

The caliber of Indonesia's human resources continues to be of particular significance to all of us as we get closer to Golden Indonesia 2045. Indonesia still lags behind other ASEAN nations in terms of human resource quality, even falling short of Vietnam. According to PISA data, reading, science, and math proficiency levels are still behind those of the ASEAN nations. The standard of education nationally and the quality of human resources are closely correlated. As a result, the state budget for education receives a 20% allocation from the government. The quality f teachers is one of the cornerstones that determines the quality of education. As a result, when they are still potential teachers, professional and high-quality instructors should be prepared in a planned and systematic manner. A potential teacher must be knowledgeable about teaching methods, information technology and computers, scientific content expertise, and how pupils think and learn (Setiawan & Phillipson, 2020; Tyarakanita et al., 2021; Wright et al., 2018).

Teachers play an important role in education in the twenty-first century, often known as the digital era. Teachers' challenges in the digital era are becoming more difficult and complex as time passes. Every instructor must be able to respond to changing times by constantly updating material. To be more specific, in this all-digital world, every instructor must be able to adapt by adjusting learning techniques to meet the times and needs of students. The digital era has altered the world's perceptions of politics, economy, and social issues, including education. The digital era is heavily influencing the growth of the world of education, particularly in the field of education. As a result, teachers, as one of the education stakeholders, play a critical role in the learning process in the digital era.

To effectively integrate ICT, teachers must understand about technology, content, pedagogy, and the interrelationship of these areas (Nordin et al., 2013). As a result, the TPACK (Technological Pedagogical and Content Knowledge) model provides an important theoretical foundation for this research. TPACK refers to the incorporation of ICT into instruction. According to (Koehler et al., 2013), TPACK is a type of emergent knowledge that includes all three "core" components (content, pedagogy, and technology). These three components categoried into several and summarized such as Technological Knowledge (TK), Content Knowledge (CK), Pedagogical Knowledge (PK), Pedagogical Content Knowledge (PCK), Technological Pedagogical Knowledge (TPK), and Technological Pedagogical Content Knowledge (TPACK).

Technology that applied in online learning to help students increase in out-of-class language learning experiences (Lai and Gu, 2011). Learning outside the classroom using mobile phones is "the richest vein of language learning potential, in that students may engage in a variety of informal learning activities: incidental (e.g., gameplay), instrumental (e.g., use of a language learning service or app), or accidental (e.g., code-switching in a YouTube video)" (Godwin-Jones, 2017). Using this type of audiovisual technology, sources of original language input for either formal or informal learning can be easily found by learners of both English as a second language (ESL) and a foreign language (EFL).

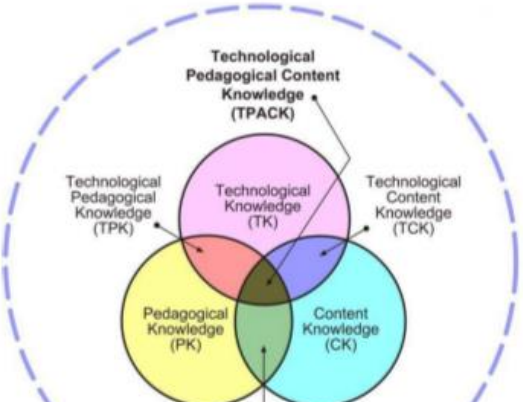
LITERATURE REVIEW

TPACK Framework

The TPACK framework expands on Shulman (1986,1987) PCK descriptions to describe how teachers' understanding of educational technologies and PCK interact with one another to produce effective technology-assisted teaching. Afterward, Mishra and Koehler created a framework that includes technology integration. The model created by Mishra and Koehler is a development of the model or framework introduced by Shulman in 1986 called PCK (pedagogical content knowledge). The reason behind the development of this new framework is the fact that "new technologies have changed the classroom situation or have the potential to change it". From Mishra and Koehler's point of view, technology provides space for explanations, representations, analogies, and demonstrations that make the subject matter easier to understand for students but at the same time, they argue that technology is different from content and content description. They identify and define each component and then analyze content, pedagogy, and

technology in pairs to understand the intersections between them. Thompson (2007) changed TPCK into TPACK. The new name, TPACK, doesn't just mean adding a vowel "A" to make it easier to pronounce. Its deeper implication is to emphasize the necessity of three kinds of knowledge, content knowledge, pedagogical knowledge and technology knowledge, to form a whole through interaction.

TPACK, Technological Pedagogical and Content Knowledge, is a framework to provide educators' views and knowledge in designing lesson plans so that a meaningful and meaningful change process occurs by teachers for students. Technology is the knowledge that educators need to have as a provision to teach students so that students can interpret the learning process more easily and better and of course in accordance with the times. TPACK or TPCK is a framework that describes teachers' understanding of the interrelated interactions between technology, content, and pedagogy (Koehler et al., 2004).



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According to the TPACK model that can be seen obviously in figure 2.1, there are three main components of teachers' knowledge: 1) Content, 2) Pedagogy, and 3) Technology. Equally important to the model are the interactions among these bodies of knowledge, represented as PCK (Pedagogical Content Knowledge, TCK (Technological Content Knowledge), TPK (Technological Pedagogical Knowledge), and TPACK (Technological Pedagogical Content Knowledge).

Content Knowledge (CK)

Content knowledge (CK) refers to their understanding of the subject matter to be learned or taught. In science, this would comprise scientific facts and ideas, as well as evidence-based reasoning. Such knowledge in art appreciation involves familiarity with well-known paintings, sculptures, artists, and their historical contexts (Koehler

et al., 2013). All knowledge associated with the use of ICT related tools, for example technical know-how about the use of Google Doc (Koh & Chai, 2016).

Pedagogical knowledge (PK)

Pedagogical knowledge (PK) refers to deep knowledge about methods of teaching and learning (Redmond & Peled, 2018) or a teacher's in-depth understanding of teaching and learning processes and activities. It entails an understanding of classroom procedures or approaches, the nature of the intended audience, and strategies for assessing student comprehension. As a result, it necessitates a grasp of learning theories such as cognitive, social, and developmental (Koehler et al., 2013).

Pedagogical Content Knowledge (PCK)

PCK is consistent with and similar to Shulman's idea of knowledge of pedagogy that applies to specific content. PCK covers the core business of teaching, learning, curriculum, assessment, and reporting. It includes the importance of forging connections among different content-based ideas, students' prior knowledge, and alternative teaching strategies (Koehler et al., 2013). In order to provide better educational processes, this knowledge integrate the content knowledge with the pedagogical knowledge (Eren & Alkan, n.d.).

Technological Knowledge (TK)

TK is the knowledge and skills of various traditional, current, and emerging technologies (Chen & Jang, 2014). Acquiring TK enables a person to accomplish a variety of different tasks using

information technology. This conceptualization of TK does not posit an "end state," but rather sees it developmentally as evolving over a lifetime. It requires a deeper understanding and mastery of information technology for information processing, communication, and problem-solving (Koehler et al., 2013).

Technological Content Knowledge (TCK)

TCK is, then, an understanding of how technology and content impact and constrain one another. Teachers must be able to master more than just the subject matter they teach; they must also have a thorough awareness of how the subject matter (or the types of representations that can be generated) can be altered by the use of specific technologies. Teachers must be aware of which technologies are best suited for addressing subject-matter learning in their domains, as well as how the content influences or even transform the technology—or vice versa (Koehler et al., 2013). Knowledge about how ICT tools can be used to represent/research and create subject matter knowledge (excluding all forms of pedagogical considerations) (Koh & Chai, 2016).

Technological Pedagogical Knowledge (TPK)

TPK is a knowledge of how teaching and learning might change as a result of the usage of specific technologies in specific ways. This includes understanding the pedagogical benefits and drawbacks of a variety of technological instruments in relation to discipline- and developmentally appropriate educational designs and tactics. A greater grasp of the limits and affordances of technologies, as well as the disciplinary settings in which they operate, is required to construct TPK

(Koehler et al., 2013). Knowledge of technologies that may be used for learning and teaching and how teaching might change as the result of using technologies (Redmond & Peled, 2018).

Technological Pedagogical Content Knowledge (TPACK)

TPACK is a form of emergent knowledge that encompasses all three "core" components (content, pedagogy, and technology). Knowledge of technological pedagogical content develops from interactions between content, pedagogy, and technology knowledge. TPACK, which underpins really meaningful and deeply skilled teaching using technology, is distinct from the understanding of any of the three ideas separately. TPACK, on the other hand, is the foundation of effective teaching with technology, requiring 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 problems that students face; knowledge of students' prior knowledge and theories of epistemology; and knowledge of how technologies can be used to help redress some of the problems that students face (Koehler et al., 2013). The figure and explanation above are a representation of the elements of T (technology), (Pedagogy) and C (content) which together produce a knowledge construct of technology content. It is useful to provide a reference for how the three elements are related and mutually support each other. In other words, the above is a description and explanation of how a subject matter is transformed by the application of technology. T and P together describe the pedagogical knowledge of technology, or

knowledge of how technology can support pedagogical goals. the existence of knowledge and introduction of technology in a learning process creates new concepts and requires the development of dynamic transactional relationships between the three components suggested by the TPACK or TPCK framework.

Within this framework, many studies argue that teachers should be educated to integrate knowledge of technology, pedagogy, and content in teacher preparation programs (Association for Computers in Mathematics and Science Teaching (U.S.) et al., 2010; Niess, 2005). However, we are not aware of any research that particularly focuses on how to educate prospective teacher teachers to construct integrative knowledge for technology integration. More importantly, they (and practising teachers) need to be able to use this professional knowledge to design learning activities, or put into place relevant instructional practices, for the specific children they teach (Oakley, 2011).

2.2. TPACK in New Normal Era

The "new normal era" refers to a period characterized by significant and lasting changes in various aspects of society and daily life, often resulting from major disruptive events or circumstances. It signifies a shift from previous norms and practices to a new set of circumstances, behaviors, and expectations that become the accepted standard. The term gained prominence during the COVID-19 pandemic, as it describes the adjustments and adaptations made by individuals, organizations, and communities to mitigate the impact of the virus (Viner et al., 2020). This includes changes in social interactions, work arrangements, educational systems, travel, and health care practices.

Technological Pedagogical Content Knowledge (TPACK) in the new normal era refers to the integration of technology, pedagogy, and content knowledge by teachers to effectively navigate the challenges posed by remote learning (Koehler & Mishra, 2009). TPACK emphasizes the dynamic interplay between these three domains, recognizing that effective technology integration requires an understanding of how technology, pedagogy, and content knowledge intersect (Mishra & Koehler, 2006). In the new normal era, TPACK is crucial, as it enables teachers to adapt their instructional practices to virtual or hybrid classrooms and engage students in meaningful learning experiences. It involves the selection and utilization of appropriate digital tools and online platforms that align with the subject matter being taught (Mishra and Koehler 2006). For example, teachers may leverage video-conferencing platforms, learning management systems, or educational apps to deliver content, facilitate discussions, and provide interactive learning opportunities (Archambault et al., 2010).

TPACK in the new era encompasses the application of pedagogical strategies that promote active engagement and collaborative learning experiences among students. Teachers with strong TPACK skills design online activities and assignments that foster student interaction, critical thinking, and problem solving (Niess, 2005). They create opportunities for peer collaboration, group projects, and online discussions, thus ensuring that students are actively involved in the learning process (Archambault et al. 2010).

According to Juwandani et al. (2022) research titled "Blended Learning Strategy in the New Normal Era using the TPACK

Competency Study," it has been emphasized that in the context of the new normal era, it is crucial for teachers to integrate technology effectively or implement the Technological Pedagogical Content Knowledge (TPACK) framework into the teaching and learning process. The new normal era, characterized by the COVID-19 pandemic and its subsequent impact on education, has necessitated a shift in instructional practices and the adoption of innovative approaches to ensure continued learning. In this era, where traditional face-to-face teaching has been disrupted, the integration of technology has become essential for facilitating remote or blended learning environments.

The TPACK framework guides teachers in making informed decisions regarding the selection, utilization, and integration of digital tools, pedagogical strategies, and subject-specific content knowledge. It enables teachers to leverage technology effectively to enhance their learning experience, promote student engagement, and facilitate meaningful knowledge construction. By integrating technology and TPACK into the teaching process, teachers can employ various instructional methods that cater to different learning styles and preferences. Blended learning, which combines online and offline elements, has gained prominence as an effective strategy in the new normal era (Juwandani et al., 2022). It allows for flexibility, personalized learning experiences, and the integration of various digital resources such as multimedia materials, online collaboration tools, and interactive assessments. Furthermore, the selection of appropriate teaching methods in the new normal era significantly affects students' understanding and engagement in the learning process. Teachers must employ pedagogical approaches that align with the unique challenges and opportunities of remote or blended learning environments.

They should design activities that foster active participation, critical thinking, and collaborative problem solving among students. Additionally, formative assessment techniques should be utilized to gauge students' progress and provide timely feedback, thereby enhancing their learning experiences (Juwandani et al., 2022). Alfarouqy's (2022) research study titled "Technological, Pedagogical, and Content Knowledge (TPACK) Profile of Class IV Teachers of SDN Batok Bali in Thematic Learning in The New Normal Era" sheds light on the significance of technology integration in education during the new normal era. The study highlights that in this era, where traditional face-to-face instruction has been disrupted, utilizing technology has become crucial for effective and engaging learning experiences. By incorporating technology tools and resources into thematic learning, teachers can not only increase students' enthusiasm for learning, but also enhance the efficiency of the learning process.

One of the key advantages of integrating technology in the new normal era is the ability to streamline and simplify various aspects of learning. Technology enables teachers to go beyond traditional instructional methods by incorporating multimedia elements such as video playback or PowerPoint presentations, which can effectively replace extensive reliance on textbooks. This allows students to visualize concepts, engage with interactive content, and grasp complex ideas more easily. Moreover, the use of technology in thematic learning can provide a dynamic and interactive learning environment. Using digital tools, teachers can create virtual simulations, interactive quizzes, and collaborative online activities that foster student engagement and active participation. This interactive approach encourages students to play an

active role in their learning processes, promoting critical thinking, problem-solving, and creativity.

Finally, Maru et al. (2021) research study titled "The Integration of ICT in ELT Practices: The Study on Teachers' Perspective in the New Normal Era" reveals that the results of the study suggest that teachers possess a high level of knowledge and perception regarding the integration of ICT in the learning process during the pandemic. However, there are still some obstacles that need to be addressed, particularly concerning the familiarity and readiness of relevant learning components. The findings of this study indicate that not all schools are adequately equipped with the necessary technological facilities for conducting online learning. Furthermore, teachers also expressed the need for continuous updates of knowledge related to the application and integration of ICT to ensure a more effective learning process. The analysis also highlights that Internet connectivity issues and their financial implications can pose additional challenges. In light of these circumstances, it is recommended to implement efforts, such as providing essential ICT components in schools, equipping teachers with enhanced digital literacy skills, and allocating more time for learners' feedback and interaction to address these challenges.

In the new normal era, TPACK (Technological Pedagogical Content Knowledge) plays a crucial role in integrating technology into the learning process. Teachers with a strong TPACK can wisely select and use technology to enhance student engagement, facilitate deep understanding, and promote skills relevant to the digital age. However, challenges such as technological infrastructure readiness and the need for teacher knowledge updates must be addressed. Efforts such as providing adequate technology facilities, enhancing

teachers' digital literacy, and allocating sufficient time for feedback and student interaction can support the effective implementation of TPACK in the new normal era.

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The Strategies on Developing TPACK

The strategies employed in the development of Technological Pedagogical Content Knowledge (TPACK) among prospective teachers in the field of English as a Foreign Language (EFL) play a crucial role in equipping them with the skills and competencies necessary to effectively integrate technology into language instruction. These strategies encompass a range of approaches aimed at enhancing EFL learners' abilities to leverage technology to promote meaningful and engaging learning experiences.

The examination of previous research on the development of Technological Pedagogical Content Knowledge (TPACK) reveals a

multitude of strategies and approaches employed to enhance the integration of technology in language instruction among EFL prospective teachers. Although studies exhibit variations in terms of subject selection, geographical locations, research objectives, and specific research foci, these diverse investigations provide valuable insights that can guide the development of TPACK, specifically targeting EFL prospective teachers as the primary focus of recent scholarly endeavors.

Several studies have investigated strategies aimed at promoting the integration of technology in language instruction among EFL prospective teachers. Notably, the research conducted by Sari et al. (2021) emphasized that reflective practices can serve as an effective strategy for enhancing in-service teachers' Technological Pedagogical Content Knowledge (TPACK). The study involved English language teachers who employed several strategies to develop their TPACK. These strategies include developing familiarity with digital learning platforms, participating in technology-focused training sessions, and aligning instructional methods with contextual needs. In this study, the respondents highlighted the importance of becoming familiar with various digital learning platforms. This involved exploring and using technological tools and resources specifically designed for language instruction. By developing proficiency in utilizing digital learning platforms, teachers were able to enhance their TPACK by effectively integrating technology into their teaching practices (Sari et al., 2021).

Furthermore, the research emphasizes the significance of participating in training programs focused on technology integration. By attending workshops, seminars, or professional development sessions dedicated to technology in education, teachers gain valuable

knowledge and skills to integrate technology effectively. These training opportunities provided them with insights into innovative pedagogical strategies, the effective use of digital resources, and best practices for incorporating technology in language instruction (Sari et al., 2021).

Additionally, the study highlights the importance of aligning instructional methods with the specific needs and circumstances of the learning environment. Teachers recognized the significance of adapting their teaching approaches to accommodate the different learning styles, preferences, and resources available. By considering the context, they were able to select appropriate technological tools, instructional strategies, and learning activities that aligned with students' needs and goals (Sari et al., 2021).

Moreover, Pradita et al. (2023) shed light on the experiences of prospective EFL teachers in integrating TPACK into their teaching practice programs. This study shares similarities with previous research, as the prospective teachers in this study revealed their strategies for developing TPACK. These strategies include familiarizing themselves with digital learning platforms and utilizing learning methods that align with their personal characteristics.

The findings of the study by Pradita et al. (2023) highlight the importance of becoming familiar with digital learning platforms. The prospective teachers recognized the value of exploring and becoming proficient in using various technological tools and resources designed for language instruction. By developing competence in utilizing digital

learning platforms, students were able to enhance their TPACK and effectively integrate technology into their teaching practices.

The study emphasized the significance of selecting learning methods that align with the individual characteristics of the prospective teachers. Recognizing that each teacher has unique strengths, preferences, and learning styles, they tailored their instructional approach accordingly. By aligning their teaching methods with their own characteristics, they were able to optimize TPACK development and create meaningful and engaging learning experiences for their students.

In a study conducted by Syamdianita & Cahyono (2021), similar findings were reported regarding the importance of developing the habit of using digital learning platforms and selecting appropriate learning methods. The research emphasized that prospective teachers need to familiarize themselves with digital learning platforms to enhance their Technological Pedagogical Content Knowledge (TPACK). By immersing themselves in the use of technology tools and resources designed for language instruction, prospective teachers can effectively integrate technology into their teaching practices. Additionally, the study highlighted the significance of selecting appropriate learning methods that align with the characteristics and preferences of students. By considering the needs and preferences of learners, prospective teachers can optimize their TPACK development and create engaging and effective learning experiences.

These findings underscore the importance of cultivating the habit of utilizing digital learning platforms and selecting suitable learning methods to enhance TPACK among prospective teachers in the field of English as a Foreign Language (EFL). In addition to the

aforementioned studies, several other studies have found that strategies in developing TPACK include familiarizing oneself with digital learning platforms (Farhadi & Öztürk, 2023; Harris & Harris, n.d.; Taopan, 2020), and participating in training programs (Harris & Harris, n.d.). ; Ismaeel & Al Mulhim, 2022) and selecting appropriate learning methods (Ertmer et al., 2012). Farhadi and Öztürk (2023), Harris and Harris (n.d.), and Taopan (2020) have highlighted the importance of becoming familiar with digital learning platforms. This involves exploring and utilizing various technological tools and resources specifically designed for language instruction.

Educators can enhance their TPACK and effectively integrate technology into their teaching practices by developing proficiency in using digital learning platforms. Furthermore, Harris and Harris (n.d.) and Ismaeel and Al Mulhim (2022) emphasized the significance of participating in training programs. These programs focus on providing educators with the necessary knowledge and skills to integrate technology effectively into their pedagogy. Through training, teachers can learn innovative pedagogical strategies, best practices for incorporating technology, and how to leverage digital resources to enhance student learning.

Ertmer et al. (2012) highlighted the importance of selecting appropriate learning methods. onsidering the diverse needs and preferences of learners, educators need to choose instructional approaches that align with specific contexts and student characteristics. By selecting suitable learning methods, teachers can optimize their

TPACK development and create engaging and effective learning experiences.

Another strategy discussed is the utilization of alternative technologies, as highlighted by Stkip et al. (2018). In their study titled "Gadget: An Alternative Learning Media in Developing the TPACK," gadgets were identified as highly supportive tools in the development of TPACK as alternative media. The research emphasized the significant role of gadgets as technological tools that can enhance the integration of technology, pedagogy, and content knowledge. Gadgets such as smartphones and tablets are widely accessible and commonly used in daily life, making them suitable platforms for supporting TPACK development in educational settings. By incorporating gadgets as alternative learning media, educators can tap into the functionalities and features of these devices to enrich instructional practices. Gadgets provide access to various multimedia resources, interactive applications, and communication platforms that facilitate engaging and interactive learning. The utilization of gadgets as an alternative technology aligns with the principles of TPACK by leveraging technology to address content-specific instructional challenges and promote student-centered learning. The findings from the study conducted by Stkip et al. (2018) highlight the potential of utilizing gadgets as alternative learning media to enhance TPACK development. By recognizing the value of gadgets as supportive tools, educators can harness their capabilities to create meaningful and effective learning experiences that integrate technology, pedagogy, and content knowledge. In conclusion, the strategies used to develop TPACK (Technological Pedagogical Content Knowledge) can significantly contribute to preparing teachers in the new normal era. Integrating relevant training on technology use, effective pedagogical strategies, deep content knowledge can help teachers

acquire strong TPACK competency, and etc. Additionally, collaboration between educational institutions, the government, and higher education institutions can support the development of professional development programs focused on TPACK. With appropriate strategies in place, teachers will be better prepared and capable of facing challenges and harnessing the potential of technology to enhance the quality of learning in the new normal era.

The Challenges in Developing TPACK

Believing that everything we undertake or engage in will not proceed seamlessly and without any obstacles is an important mindset to foster. It is a fundamental recognition that challenges are an inherent part of any endeavor or journey upon which we embark. This belief holds true not only in our personal lives but also in the professional realm, including the development of TPACK (Technological Pedagogical Content Knowledge). When we acknowledge and embrace the notion that challenges inevitably arise, we position ourselves to approach them with a resilient and proactive mindset. By expecting and preparing for the challenges, we are better equipped to navigate the complexities and uncertainties that lie ahead.

This mind-set allows us to view challenges as opportunities for growth, learning, and self-improvement. In the realm of TPACK (Technological Pedagogical Content Knowledge) development, challenges are widely acknowledged as an inherent part of the process. Numerous studies have explored the various challenges faced by educators and institutions when integrating technology effectively into

teaching and learning practices. One such study conducted by Farhadi and Öztürk (2023) titled "Technological Pedagogical Content Knowledge (TPACK) Level and Needs of Pre-Service English as a Foreign Language (EFL) Teachers: Evidence from Turkey" shed light on the challenges encountered by pre-service teachers in developing their TPACK competencies. The research findings revealed that technical issues such as difficulties with technology infrastructure and software were among the prominent challenges faced by the respondents. Additionally, they encountered pedagogy problems, such as adapting instructional strategies to seamlessly incorporate technology and a lack of facilities or resources to support their TPACK development.

Similarly, Gayyur (2021) conducted a study focusing on the exploration of PTs' TPACK skills of prospective teachers and the challenges they encountered in digital technology integration in Pakistan. This research highlighted the opportunities and difficulties faced by a private higher education institution group in Malaysia that implemented the TPACK model in their teaching and learning processes (Lye, 2013). The study revealed challenges such as resistance to change, inadequate training and support, and limited access to technological resources. Another study conducted by Sari et al. (2021) examined how reflective practices can be an effective strategy for enhancing in-service teachers' TPACK. The study emphasized the challenges faced by educators in developing their TPACK competencies, such as limited time for reflection, the need for ongoing professional development, and the integration of technology in diverse instructional contexts.

Additionally, Syamdianita and Cahyono (2021) investigated the experiences of EFL pre-service teachers in designing and implementing teaching materials using the TPACK framework through the learning-

by-design (LBD) approach. The study revealed challenges related to balancing content, pedagogical, and technological knowledge while designing effective and technology-enhanced instructional materials. Juwandani et al. (2022) conducted a study on blended learning strategies in the new normal era, focusing on TPACK competency. This research explored the challenges and opportunities associated with implementing blended learning approaches that effectively integrate technology and pedagogy. The challenges identified in the study included resistance from educators and students, infrastructure limitations, and the need for comprehensive training and support.

Collectively, these studies highlight the multifaceted challenges faced by educators and institutions in developing TPACK. These challenges encompass technical issues, pedagogical problems, resistance to change, limited resources, and the need for ongoing professional development. By recognizing and addressing these challenges, educators can foster an environment conducive to the effective integration of technology, pedagogy, and content knowledge, leading to enhanced teaching and learning experiences for students.

In another study conducted by Taopan (2020), an inquiry was conducted to explore and retell the story of an English teacher using the TPACK framework for teaching English, and additional challenges in TPACK development were unveiled. This research revealed that mastery of the digital learning platform being employed and a lack of technological knowledge were among the other challenges encountered. This study sheds light on the importance of teachers acquiring proficiency in specific digital learning platforms utilized in

their instructional practices. Familiarity with these platforms is essential for effectively integrating technology into teaching, and maximizing the potential of the TPACK framework. However, the research indicated that teachers faced challenges in mastering these platforms, which hindered their ability to leverage technology fully in their teaching.

Furthermore, this study highlights the significance of technological knowledge in TPACK development. Teachers need to possess a solid understanding of various technological tools, applications, and resources that can enhance their teaching and learning experiences. However, the research findings indicated that a lack of technological knowledge was a challenge faced by teachers in their efforts to effectively implement TPACK.

In conclusion, the challenges faced in developing TPACK (Technological Pedagogical Content Knowledge) highlight the need for comprehensive strategies and support systems. The integration of technology in education requires addressing obstacles such as limited access to technology and Internet connectivity issues, as well as ensuring that teachers have the necessary training and support to effectively use technology in the classroom. Additionally, keeping up with the rapid advancements in technology and its integration into pedagogical practices requires continuous professional development and opportunities for collaboration among educators, and there are still many challenges that can arise from any aspect of the development of TPACK.

CONCLUSION

Recognizing that each teacher has unique strengths, preferences, and learning styles, they tailored their instructional approach accordingly. By aligning their teaching methods with their own characteristics, they were able to optimize TPACK development and create meaningful and engaging learning experiences for their students.

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