Mapping TPACK Competence Among Pre-Service English Teachers in EFL Classrooms

Novi Rahmania Aquariza

novirahmania@students.unnes.ac.id

Abstract

The integration of digital technology in education has transformed the way English as a Foreign Language (EFL) is taught and learned. In contemporary classrooms, teachers are expected not only to master subject content and pedagogy but also to integrate technology effectively into instructional practices. This expectation has become increasingly important for pre-service English teachers who are preparing to teach in technology-enhanced learning environments. Technological Pedagogical Content Knowledge (TPACK) provides a useful framework for understanding the knowledge and competencies teachers need to integrate technology into teaching meaningfully. This article discusses the concept of TPACK and maps the competence of pre-service English teachers in EFL classrooms. It explores the dimensions of TPACK, challenges faced by pre-service teachers, factors influencing their competence, and strategies for improving TPACK development in teacher education programs. The discussion highlights the importance of strengthening technological, pedagogical, and content knowledge simultaneously to prepare future English teachers for the demands of 21st-century education.

Keywords: TPACK, pre-service English teachers, EFL classrooms, technology integration, teacher education

Introduction

The rapid development of digital technology has significantly influenced educational practices across the world. In English as a Foreign Language (EFL) classrooms, technology has become an essential component in supporting language learning and teaching activities. Teachers now utilize various digital platforms, multimedia resources, learning management systems, and online communication tools to create more interactive and engaging learning experiences. The emergence of technology-integrated education has also changed the expectations placed on teachers, especially pre-service English teachers who are preparing to enter modern classrooms.

In the 21st century, teachers are required to possess not only strong pedagogical and content knowledge but also technological competence that supports effective instruction. The integration of technology in education aligns with the global movement toward improving the quality of education as promoted in the Sustainable Development Goals (SDGs), particularly SDG 4 on Quality Education. Digital literacy and technology integration are increasingly recognized as important aspects of equitable and inclusive education because they support innovative teaching practices and broaden students' access to learning opportunities.

The concept of Technological Pedagogical Content Knowledge (TPACK) has become one of the most influential frameworks for understanding teacher competence in technology integration. The framework was developed by Mishra and Koehler (2006) as an extension of Shulman's concept of Pedagogical Content Knowledge (PCK). TPACK emphasizes the interaction between technology, pedagogy, and content knowledge in teaching practices. According to Mishra and Koehler (2006), effective technology integration requires teachers to understand not only the subject matter and teaching methods but also how technology can support learning objectives.

For pre-service English teachers, mastering TPACK is particularly important because language teaching often requires creative and interactive learning environments. English teachers frequently use videos, online discussion forums,

digital storytelling, educational applications, and virtual communication tools to develop students' language skills. However, many pre-service teachers still face difficulties in integrating technology effectively due to limited experience, inadequate training, or lack of confidence in using educational technology (Chai et al., 2013).

Several studies have shown that pre-service teachers' TPACK competence varies depending on their technological exposure, teaching experiences, and teacher education programs (Schmidt et al., 2009; Tondeur et al., 2012). Some pre-service teachers demonstrate strong technological knowledge but struggle to combine it with pedagogical strategies and content delivery. Others may possess adequate pedagogical understanding but have limited ability to utilize digital tools meaningfully in EFL classrooms.

This article aims to discuss the mapping of TPACK competence among pre-service English teachers in EFL classrooms. Specifically, the article explores the dimensions of TPACK, factors influencing TPACK development, challenges experienced by pre-service teachers, and strategies to improve their competence in technology integration. Through this discussion, the article contributes to the understanding of how teacher education institutions can better prepare future English teachers for technology-enhanced learning environments.

The Concept of TPACK

Technological Pedagogical Content Knowledge (TPACK) is a theoretical framework that explains the types of knowledge teachers need to integrate technology effectively into teaching and learning processes. The framework was introduced by Mishra and Koehler (2006) based on Shulman's earlier concept of Pedagogical Content Knowledge (PCK). TPACK combines three primary forms of knowledge: Content Knowledge (CK), Pedagogical Knowledge (PK), and Technological Knowledge (TK).

Content Knowledge refers to teachers' understanding of the subject matter they teach. In EFL classrooms, this includes knowledge of grammar, vocabulary, pronunciation, reading, writing, speaking, and listening skills. Pedagogical Knowledge refers to teachers' understanding of teaching methods, classroom management, assessment, and instructional strategies. Meanwhile, Technological Knowledge involves teachers' ability to use digital tools, software, and technological resources effectively.

The TPACK framework also includes the intersections between these three domains. Pedagogical Content Knowledge (PCK) refers to the ability to teach specific subject matter effectively. Technological Content Knowledge (TCK) concerns understanding how technology can support content delivery, while Technological Pedagogical Knowledge (TPK) refers to understanding how teaching methods change when technology is integrated. At the center of the framework is TPACK itself, which represents the integration of technology, pedagogy, and content knowledge in meaningful teaching practices (Mishra & Koehler, 2006).

The TPACK framework is widely used in teacher education because it provides a comprehensive understanding of teacher competence in digital learning environments. It highlights that technology integration is not merely about using technological tools but about using them appropriately to support learning objectives and pedagogical practices.

TPACK in EFL Classrooms

Technology integration in EFL classrooms has become increasingly important in supporting language learning. English teachers use technology to provide authentic learning materials, facilitate communication, encourage collaboration, and increase student engagement. Digital

platforms such as Google Classroom, Zoom, Kahoot!, Quizizz, YouTube, and Duolingo are commonly used to support language instruction.

For pre-service English teachers, TPACK competence enables them to design effective technology-enhanced language learning activities. Teachers with strong TPACK can select appropriate technological tools that align with instructional goals and students' learning needs. For example, teachers may use online discussion forums to develop writing skills, video conferencing applications for speaking practice, or digital storytelling tools to enhance students' creativity.

In EFL classrooms, technology also supports exposure to authentic language use. Students can access native-speaker videos, podcasts, online articles, and interactive applications that provide meaningful language input. According to Gilakjani (2017), technology can improve students' motivation, participation, and language proficiency when integrated effectively into language learning activities.

However, effective technology integration requires more than technical ability. Pre-service English teachers need to understand how technological tools can support language learning objectives and pedagogical approaches. For instance, using videos in classrooms is not automatically effective unless teachers connect them to learning tasks, discussions, or language activities that support students' comprehension and communication skills.

Moreover, TPACK competence is important in helping teachers address diverse student needs. Technology allows teachers to create differentiated instruction, interactive assessments, and collaborative learning environments that accommodate different learning styles. In this sense, TPACK supports student-centered learning approaches in EFL classrooms.

Mapping TPACK Competence Among Pre-Service English Teachers

Mapping TPACK competence involves identifying the strengths and weaknesses of pre-service teachers across different dimensions of technological, pedagogical, and content knowledge. Studies on pre-service teachers' TPACK generally show that technological knowledge tends to develop more rapidly than integrated knowledge domains such as TPK, TCK, and TPACK itself.

Many pre-service English teachers are familiar with digital technologies because they belong to a generation exposed to smartphones, social media, and online platforms. They often demonstrate confidence in operating technological devices and applications. However, being familiar with technology does not necessarily mean they can integrate it effectively into teaching practices.

Research conducted by Schmidt et al. (2009) found that pre-service teachers often report high technological knowledge but moderate pedagogical and technological pedagogical knowledge. Similarly, Chai et al. (2013) revealed that pre-service teachers may struggle to connect technology with appropriate instructional strategies.

In EFL contexts, pre-service English teachers often demonstrate strong content knowledge related to language skills and teaching materials. Nevertheless, they may encounter challenges in selecting technological tools that support communicative language teaching approaches. Some teachers tend to use technology only for presentation purposes rather than for interactive and collaborative learningAnother important aspect of mapping TPACK competence is understanding pre-service teachers' confidence and attitudes toward technology integration. Teachers with positive attitudes toward educational technology are more likely to experiment with innovative teaching methods and digital tools. On the other hand, limited confidence or anxiety about technology may reduce their

willingness to integrate technology into classrooms.

Teaching practicum experiences also influence TPACK development. During teaching practice, pre-service teachers have opportunities to apply technological tools in real classroom settings. These experiences help them understand practical challenges such as internet connectivity, classroom management, student engagement, and technological limitations.

Furthermore, institutional support plays an important role in shaping TPACK competence. Teacher education programs that provide technology-rich learning environments, digital literacy training, and opportunities for reflective teaching practices contribute significantly to the development of pre-service teachers' TPACK.

Factors Influencing TPACK Competence

Several factors influence the development of TPACK competence among pre-service English teachers. One major factor is technological exposure and experience. Students who frequently use digital tools in academic and personal contexts tend to demonstrate higher technological knowledge.

Another important factor is teacher education curriculum. Teacher preparation programs that integrate technology-related courses and practical teaching experiences help pre-service teachers develop stronger TPACK competence. According to Tondeur et al. (2012), teacher education institutions play a critical role in preparing future teachers for technology integration by modeling effective instructional practices.

Teaching experience is also closely related to TPACK development. Through microteaching sessions and teaching practicum programs, pre-service teachers gain opportunities to experiment with technological tools and reflect on their instructional practices. Practical experiences help them connect theoretical understanding with classroom implementation.

Self-efficacy and attitudes toward technology are additional factors influencing TPACK competence. Teachers who believe in their ability to use technology effectively are more likely to integrate it into instruction. Bandura (1997) explained that self-efficacy affects individuals' motivation, confidence, and persistence in performing specific tasks.

Access to technological resources also contributes to TPACK development. Limited access to internet connections, digital devices, or educational software may hinder pre-service teachers from developing technological competence. In some educational contexts, insufficient infrastructure remains a significant challenge.

Peer collaboration and mentoring can further support TPACK development. Collaborative learning environments encourage pre-service teachers to share experiences, discuss technological tools, and learn from peers and teacher educators. Such interactions promote reflective teaching practices and professional growth.

Challenges in Developing TPACK

Although technology integration is increasingly emphasized in education, pre-service English teachers still encounter various challenges in developing TPACK competence. One common challenge is limited pedagogical understanding of technology integration. Some pre-service teachers know how to operate technological tools but struggle to align them with instructional goals and language learning activities.

Another challenge is inadequate training in teacher education programs. In some institutions, technology courses focus mainly on technical skills without emphasizing pedagogical applications. As a result, pre-service teachers may not fully understand how to integrate technology meaningfully into EFL instruction.

Technological anxiety is also a challenge for some pre-service teachers. Fear of making mistakes, technical problems, or lack of confidence may discourage teachers from using digital tools in classrooms. Aydin (2016) noted that teaching anxiety can negatively influence teachers' instructional performance and classroom practices.

Infrastructure limitations remain another important issue. In some schools, internet access, technological devices, and multimedia facilities are insufficient to support effective technology integration. These limitations may reduce opportunities for pre-service teachers to practice technology-enhanced teaching.

Time management is another challenge during teaching practicum. Preparing digital learning materials and integrating technology into lesson plans often require additional time and effort. Pre-service teachers may feel overwhelmed when balancing instructional preparation, classroom teaching, and technological adaptation.

Moreover, differences in students' technological literacy can influence classroom implementation. Some students may quickly adapt to digital learning environments, while others require additional support and guidance. Teachers need to consider students' readiness and accessibility when integrating technology into EFL instruction.

Strategies to Improve TPACK Competence

Improving TPACK competence among pre-service English teachers requires collaborative efforts from teacher education institutions, teacher educators, and policymakers. One important strategy is integrating technology across the teacher education curriculum rather than limiting it to a single course. Technology integration should become part of pedagogical training, lesson planning, assessment, and teaching practice.

Teacher educators should also model effective technology integration during classroom instruction. When pre-service teachers observe how digital tools can support meaningful learning activities, they gain practical examples of technology-enhanced teaching practices.

Microteaching activities can further support TPACK development. Through simulated teaching sessions, pre-service teachers can experiment with technological tools, receive feedback, and reflect on their teaching performance. Reflective practices help them identify strengths and areas for improvement.

Professional development workshops and digital literacy training programs are also important in strengthening technological competence. These programs can introduce pre-service teachers to various educational technologies and instructional applications relevant to EFL teaching.

Collaborative learning environments should also be encouraged. Group projects, peer discussions, and mentoring programs allow pre-service teachers to share ideas and learn from each other's experiences. Collaboration promotes creativity and confidence in technology integration.

In addition, teacher education institutions need to provide adequate technological infrastructure and access to digital resources. Access to internet connections, multimedia facilities, and educational software enables pre-service teachers to practice and explore innovative teaching methods. Reflective teaching practices should become an essential component of TPACK development. Reflection helps pre-service teachers evaluate the effectiveness of technology integration and consider how digital tools can better support students' language learning experiences.

Methodology

This research was conducted with three pre-service teachers from one Islamic

university in Surabaya. The participants were selected because they were actively involved in the *Surabaya Mengajar* program, where they gained teaching experience in elementary schools. Through this program, the pre-service teachers had the opportunity to interact directly with young learners and apply their pedagogical knowledge in real classroom settings.

The study aimed to explore their experiences, perspectives, and challenges during the teaching process. To obtain detailed and in-depth data, the researcher used interviews as the main instrument of data collection. The interviews allowed the participants to share their thoughts, feelings, and reflections regarding their teaching practices and learning experiences in elementary school classrooms

Findings

The findings of this study show that pre-service English teachers generally have a positive understanding of the TPACK concept and recognize the importance of integrating technology, pedagogy, and content knowledge in English teaching. The participants commonly used digital tools such as Canva, YouTube, Wordwall, Quizizz, and other interactive media to create engaging and enjoyable learning experiences for elementary school students. The results also reveal that technology-integrated lessons received positive responses from students, as they became more enthusiastic, active, and motivated during the learning process.

However, several challenges were still found, particularly unstable internet connections, limited facilities, technical problems, and students' different levels of technological literacy. In addition, while some participants felt confident in their technological knowledge, others still struggled with pedagogical or technological integration skills. The study further indicates that teacher education programs play an important role in developing pre-service teachers' TPACK competence through teaching practice, technology training, and exposure to digital learning media. Therefore, it can be concluded that continuous training, more opportunities for classroom practice, and stronger support in integrating technology into English teaching are needed to enhance pre-service teachers' TPACK competence effectively.

Conclusion

The integration of technology in education has transformed the roles and competencies required of English teachers in EFL classrooms. Pre-service English teachers are expected to develop not only pedagogical and content knowledge but also technological competence that supports meaningful learning experiences. The TPACK framework provides a comprehensive understanding of how technology, pedagogy, and content knowledge interact in effective teaching practices.

Mapping TPACK competence among pre-service English teachers reveals that many teachers possess basic technological knowledge but still encounter challenges in integrating technology with pedagogy and content effectively. Factors such as technological exposure, teacher education programs, teaching experience, self-efficacy, and institutional support significantly influence TPACK development. Despite various challenges, there are many opportunities to strengthen TPACK competence through technology-integrated curricula, reflective teaching practices, collaborative learning environments, and professional development programs. Teacher education institutions play a crucial role in preparing future English teachers who are capable of teaching in digital learning environments.

References

Aydin, S. (2016). A qualitative research on foreign language teaching anxiety. *The Qualitative Report, 21*(4), 629–642.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. W. H. Freeman.

Chai, C. S., Koh, J. H. L., & Tsai, C. C. (2013). A review of technological pedagogical content knowledge.

Educational Technology & Society, 16(2), 31–51.

Gilakjani, A. P. (2017). A review of the literature on the integration of technology into the learning and teaching of English language skills. *International Journal of English Linguistics, 7*(5), 95–106.

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record, 108*(6), 1017–1054.

Schmidt, D. A., Baran, E., Thompson, A. D., Mishra, P., Koehler, M. J., & Shin, T. S. (2009). Technological pedagogical content knowledge (TPACK): The development and validation of an assessment instrument for preservice teachers. *Journal of Research on Technology in Education, 42*(2), 123–149.

Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher, 15*(2), 4–14.

Tondeur, J., van Braak, J., Sang, G., Voogt, J., Fisser, P., & Ottenbreit-Leftwich, A. (2012). Preparing pre-service teachers to integrate technology in education: A synthesis of qualitative evidence. *Computers & Education, 59*(1), 134–144.