

EXPLORING EFL TEACHERS' TPACK IMPLEMENTATION IN RURAL INDONESIA: INSIGHTS FROM CENTRAL KALIMANTAN

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ABSTRACT

This study investigates Indonesian EFL teachers' perceptions and implementation of Technological Pedagogical Content Knowledge (TPACK) in rural Central Kalimantan. Using a qualitative design with semi-structured interviews, it explores how teachers integrate content, pedagogy, and technology in their classroom practices. The findings show that teachers demonstrate strong confidence in content and technological knowledge, adapting instruction to students' needs and displaying positive attitudes toward technology integration. However, challenges persist in pedagogical domains, particularly in fostering collaboration, and are compounded by infrastructural limitations, digital inequities, and restrictive institutional policies. This study highlights rural teachers' adaptive strategies under constrained conditions, expanding TPACK beyond urban settings. The implications call for teacher training that emphasizes pedagogically grounded and context-sensitive approaches, and for policies that strengthen rural digital infrastructure and promote equitable access. Future research should broaden the extent to a broader rural context, include learner perspectives, and examine teachers' sustainable TPACK development.

Keywords: EFL Teachers, Rural Education, Technology Integration, TPACK

INTRODUCTION

In the digital age, the role of teachers has evolved significantly, requiring not only subject matter expertise and pedagogical competence but also the ability to integrate technology meaningfully into instructional design and classroom practices. The Technological Pedagogical Content Knowledge (TPACK) framework by Koehler and Mishra (2009) offers a comprehensive model that encapsulates the essential skills required by 21st-century teachers. The framework emphasizes the intersection of technological knowledge

(TK), pedagogical knowledge (PK), and content knowledge (CK), highlighting the importance of their integration for effective teaching in modern classrooms.

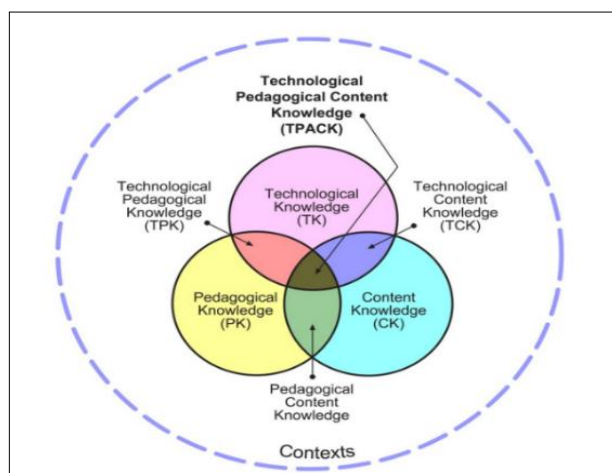


Figure 1. The TPACK framework by Koehler & Mishra (2009, p.63)

The Technological Pedagogical Content Knowledge (TPACK) framework consists of seven interconnected domains: Content Knowledge (CK), Pedagogical Knowledge (PK), Pedagogical Content Knowledge (PCK), Technological Knowledge (TK), Technological Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK), and Technological Pedagogical Content Knowledge (TPACK). It has been widely used to examine how teachers conceptualize integrating pedagogy, content, and technology in language instruction. Research in Vietnam found that high school English teachers rated themselves highly in Technological Knowledge and Pedagogical Content Knowledge but only slightly above average in Technological Pedagogical Knowledge, Technological Content Knowledge, Content Knowledge, and Technological Pedagogical Content Knowledge, with no significant gender differences, likely due to variations in teaching levels and technology needs (Loi, 2021). Supporting this, Tran, Pham, and Dinh (2023) reported that Vietnamese teachers generally expressed positive attitudes toward using technology in education, reinforcing the importance of technology as a core component of effective language teaching.

Research in Iran provides valuable insights into EFL teachers' TPACK development and its predictors. Fathi and Yousefifard (2019), surveying 148 intermediate students, found that teachers performed well in Technological Knowledge, Pedagogical Knowledge, Content Knowledge, and Pedagogical Content Knowledge but struggled with Technological Content Knowledge, Technological Pedagogical Knowledge, and Technological Pedagogical Content Knowledge. Similarly, Nazari, Nafissi, Estaji, and Marandi (2019) showed that experienced teachers scored higher in Pedagogical Knowledge and Pedagogical Content Knowledge, while novice teachers, as digital natives, outperformed in technology-related domains. However, their Pedagogical Content Knowledge was weaker due to limited teaching experience. Complementing these findings, Raygan and Moradkhani (2022) revealed that

teachers' positive attitudes toward technology strongly predicted successful integration, with school climate playing a role in shaping those attitudes, and concluded that technology literacy and teacher attitudes are key to strengthening TPACK and fostering effective classroom technology use.

In the Indonesian context, Drajati Tan, Haryati, Rochsantiningsih, and Zainnuri (2018) reported that teachers with 7–10 years of experience mainly relied on simple tools like PowerPoint and videos, while novice teachers with 1–3 years of experience were more adventurous in using diverse technologies. Building on this, Aniq and Drajati (2019) found that 20 Indonesian EFL teachers rated their Content Knowledge, Pedagogical Knowledge, and Pedagogical Content Knowledge higher than other domains. Later, a large-scale survey of 573 in-service teachers across Jambi, Palembang, and Yogyakarta showed that Pedagogical Knowledge was perceived as their strongest domain and Technological Knowledge as the weakest, with significant gender-based differences in CK, PK, PCK, and TPACK, and age-related differences in TK, TPK, TCK, and TPACK (Prasojo, Habibi, Mukminin, & Yaakob, 2020).

Studies on Indonesian EFL teachers' use of the TPACK framework reveal both progress and challenges in integrating technology into language teaching. Darsih, Suherdi, and Safrina (2021) showed that Lesson Study cycles significantly improved lecturers' confidence, classroom management, and ability to integrate digital tools, leading to stronger overall TPACK. Similarly, Surayya, Asrobi, and Farizi (2021) found that while most teachers expressed moderate willingness to learn and apply TPACK in virtual learning environments, this willingness did not consistently translate into practice due to limited self-efficacy, resource constraints, and the abrupt shift to online teaching. Complementing this, Tyarakanita, Nurkamto, and Drajati (2021) reported that participation in a WhatsApp-based Online Community of Practice provided valuable training and peer support but resulted in only partial TPACK growth, with teachers reaching the adapting or accepting levels rather than more advanced integration. Bringing these findings together, Anwar, Yuliasri, Faridi, Pratama, and Hartono (2024) highlight that purposeful and systematic embedding of TPACK in TEFL can foster meaningful and effective English learning by promoting 21st-century skills, student-centered methods, and effective use of digital tools, making instruction more relevant and impactful in the Indonesian context.

Researchers in Indonesia have explored how EFL teachers' self-efficacy and perceptions of the TPACK framework influence teaching performance. Putry, Astuti, and Sakhiyya (2022) found that teachers with higher self-efficacy were more effective in applying TPACK by integrating tools like Zoom, WhatsApp, and Canva, though limited resources sometimes hindered success. Similarly, Lita, Puspitaloka, and Ambarwati (2023) showed that secondary teachers viewed TPACK, encompassing TK, PK, and CK, as essential for student-centered learning in the 4.0 era, despite challenges with adapting to new tools, infrastructure, and student limitations, which they addressed through collaboration and resource sharing. Extending this, Novita, Purwati, and Anam (2022) revealed that while many teachers demonstrated strong pedagogical and technological knowledge, sociocultural integration was minimal, with both teachers and students citing digital tools such as YouTube, quizzes, and project-based learning as effective but constrained by low proficiency,

limited cultural exposure, and weak institutional support. Supporting evidence also points to YouTube and Canva as the most frequently used applications in EFL teaching (Bannus & Emerald, 2025; Ilyas, Syarif, & Refnaldi, 2023).

While the studies mentioned above focus on urban teachers' TPACK, the studies highlighting the TPACK implementation in rural schools in Indonesia are lacking. Data from Central Java and Bengkulu show that rural teachers are stronger in content and pedagogy but weaker in technology use, facing barriers such as poor internet, limited facilities, minimal training, restrictive policies, and low confidence among older teachers (Aryati, 2021; Sumarwati, Suryanto, Ulya, and Hartati, 2024). In contrast, urban teachers demonstrate higher TPACK levels, effectively using diverse digital tools like Zoom, WhatsApp, Google Classroom, and YouTube during the COVID-19 pandemic (Aryati, 2021). These findings underscore persistent disparities and the need for targeted interventions to promote equitable technology integration, particularly in rural schools.

Comparative research shows a clear gap between Indonesian EFL teachers' TPACK development and that of teachers in countries like Vietnam and Iran, where technological knowledge and positive attitudes toward technology are stronger, with novice Iranian teachers even outperforming experienced ones in tech-related domains (Loi, 2021; Nazari et al., 2019; Raygan & Moradkhani, 2022). In contrast, Indonesian teachers generally excel in pedagogy and content but lag in technology use, often relying on basic tools like PowerPoint (Drajati et al., 2018; Prasojo et al., 2020). Although initiatives such as Lesson Study and online communities have improved confidence and integration, progress is uneven, with many teachers remaining at lower TPACK levels (Darsih et al., 2021; Tyarakanita et al., 2021). Moreover, most studies focus on urban areas, leaving rural teachers' challenges and lived experiences underexplored, highlighting the need for more context-sensitive research.

This study, guided by the TPACK framework proposed by Koehler and Mishra (2009), aims to investigate how English teachers in rural areas of Central Kalimantan perceive and implement TPACK in their teaching practice. By assessing the application of TPACK, the study seeks to provide new insights and a more comprehensive understanding of the real challenges faced by teachers in these rural contexts. In particular, it explores the strategies teachers employ to integrate technological, pedagogical, and content knowledge into the classroom, while also examining the factors that influence both their perceptions and actual use of TPACK in real teaching scenarios. Accordingly, the research is designed to address two key questions: how Indonesian EFL teachers in rural areas of Central Kalimantan perceive their TPACK, and how they implement it in their teaching practice.

METHODS

Design

This study employed a qualitative research design to explore how EFL teachers perceive and implement TPACK in their teaching practice. Focusing on a purposefully selected group of English teachers, the study aims to capture detailed and contextualized insights into how TPACK is applied in real classroom settings, especially in rural areas.

Participants

The technique used in this study is purposive sampling, in which researchers intentionally select participants who can provide the most relevant and in-depth information for the study's objectives (Creswell & Guetterman, 2018; Lodico, Spaulding, & Voegtle, 2010). This study's purposive sampling will target four English teachers in Katingan Regency, Central Kalimantan, who possess the specific experience and insights needed to address the research questions. This approach ensures that the data collected are rich, contextually relevant, and aligned with the study's goals, rather than aiming for broad statistical generalization.

Instrumentation

This study collected the data using a semi-structured interview guide designed based on the TPACK framework by Koehler and Mishra (2009). Two English language education experts reviewed the interview guide to ensure its validity. Furthermore, an interview protocol was used to maintain consistency across all participants while allowing flexibility for follow-up questions to gain deeper insights. Each teacher was given 45 minutes for the interview.

The interview questions were developed using the TPACK framework of Koehler and Mishra (2009) and adapted from Nazari et al. (2019) to ensure coverage of TPACK domains. For example, questions included: "What kinds of technology tools do you typically use in your teaching?" (Technological Knowledge), "How do you ensure the English content you deliver is accurate and appropriate?" (Pedagogical Knowledge), and "Can you give an example of how you use your knowledge of English, teaching, and technology together when planning lessons?" (TPACK).

Data Collection and Analysis

The interview data were analyzed using thematic analysis (Braun & Clarke, 2006; Maguire & Delahunt, 2017). A six-phase thematic analysis approach was employed to analyze the interview data. All interview recordings were transcribed verbatim, reviewed for familiarization, and coded using the TPACK domains to capture key perceptions and practices. The codes were then grouped into broader themes, which were refined to ensure consistency with the research objectives. These themes were clearly defined and named, and the findings were presented with detailed descriptions and illustrative quotes. To enhance the trustworthiness of the analysis, peer debriefing was conducted with a fellow researcher, and member checking was applied by sharing summaries of the interpretations with participants for confirmation and feedback. To ensure reliability, intercoder agreement was used. Two independent coders reviewed and categorized the interview transcripts, and discrepancies were discussed until consensus was reached.

RESULTS

Indonesian EFL Teachers' Perceptions of Their TPACK

This section presents the findings on Indonesian EFL teachers' perceptions of their TPACK and interprets these results in relation to existing literature. The data reveal how teachers integrate technology with pedagogy and content knowledge in the EFL context, highlighting both strengths and areas for development. Through examining teachers' self-reported confidence in applying TPACK, this discussion provides insights into the current state of technology integration in Indonesian EFL classrooms.

Content Knowledge

The findings reveal that teachers demonstrate strong confidence in their content knowledge (CK), particularly in understanding students' needs and linking lessons to relevant, everyday contexts. It is evident in practices where teachers assess learners' prior knowledge and connect new material to familiar activities, ensuring lessons are accessible and meaningful. Such strategies reflect a learner-centered approach that values engagement and relevance. At the same time, teachers show adaptability by adjusting instruction according to context, as illustrated by differences in teaching practices between urban and rural settings where skill levels, resources, and conditions vary significantly. In urban schools, lessons are closely aligned with the syllabus and higher student competencies, whereas in rural areas, teachers modify approaches to accommodate learners' abilities and local realities. These insights underscore that effective teaching requires strong CK and pedagogical sensitivity, contextual awareness, and flexibility to ensure equitable and impactful learning experiences across diverse environments. For instance, one teacher described their strategy:

Excerpt 1:

"I understand their basics first, so I ask the children, 'Have you ever learned this?' Like that, so I give appreciation first. I ask, 'Have you ever heard of this before?' Later, we will automatically relate it to the material, so we relate the material to things that are more like their daily activities. From there, I can capture, 'Oh, it feels easier for children if it's like this,' or 'Oh, it feels like children like this material more,' but it must be because the teacher's demands must cover all the material."

Contextual adaptation also plays a critical role, as one teacher explained how they adjust materials depending on the students' abilities and location.

Excerpt 2:

"When I teach in the city, maybe the skills are good, I will adjust the material, focusing on the syllabus, so that's what I teach, and I adjust it to my students' abilities. Different when I teach here in the village of Katingan Regency, of course, the skills are a little less than those in Palangka Raya, so I adjust to the situation and conditions with the school itself."

Technological Knowledge

Regarding Technological Knowledge, the findings indicate that teachers possess strong technological knowledge, which is reflected in their confidence and positive attitudes toward integrating digital tools into EFL instruction. Their frequent use of applications such as YouTube, TikTok, Canva, KineMaster, CapCut, Wordwall, and Quizizz demonstrates creativity and readiness to embed technology into classroom practices. Teachers use these tools to deliver content and engage students in producing digital outputs, such as videos, fostering interactive and participatory learning. This technology integration aligns with current EFL teaching trends, underscoring teachers' adaptability and commitment to enhancing instruction through diverse digital resources.

Excerpt 3:

Participant 1 shared various teaching tools: *"Yes, YouTube is the most favorite, besides YouTube, usually TikTok, but sometimes TikTok is just for refreshing with the children because sometimes they can open up something else."*

"Canva and KineMaster."

"I used to ask the students to make a video using CapCut. Yes. From the CapCut, then they presented it."

Excerpt 4:

Participant 4 mentioned three tools: *"I usually use Canva for making posters and Wordwall, Quizizz for media."*

On another note, teachers expressed positive attitudes toward technology integration, recognizing its benefits for teaching and student learning. They see technology as a valuable tool that enhances classroom engagement and supports more dynamic instructional approaches. Participant 1 stated,

Excerpt 5:

"It's very useful and also makes it easier for the students. It's very, very easy for them. That's why we should not be left behind in technological developments. I initially didn't know about it, but I even learned about it because of my students. So, I learned from the students."

Pedagogical Knowledge

Regarding Pedagogical Knowledge, the findings reveal challenges and strengths in teachers' pedagogical approaches. While group work is intended to promote collaboration, one teacher noted difficulties with unequal participation, as dominant students often overshadow their peers, limiting the effectiveness of cooperative learning. At the same time, teachers emphasized the benefits of Project-based Learning (PjBL) and blended learning, highlighting how these methods engage students through hands-on projects and the integration of digital resources. Such approaches make learning more interactive and

meaningful and align with contemporary educational practices prioritizing active student involvement and practical application of knowledge.

Excerpt 6:

"... because the projects are in groups, they are rarely independent, well, it's a group. Well, there are more who don't work than work because the ones who stand out dominate."

Excerpt 7:

"I think the most effective method is using Project-based learning, meaning that they practice directly and are given a project that they can dive into directly, and of course, it is more interesting for students."

The Implementation of TPACK by Indonesian EFL Teachers in Rural Areas

The findings from this study reveal a complex and multi-dimensional understanding of Indonesian EFL teachers' implementation of TPACK. The responses indicate that teachers have varying degrees of confidence and competence across the multiple facets of TPACK, shaped by their pedagogical content knowledge, technological skills, and contextual factors.

The teachers in this study varied in age and teaching experience. Their backgrounds ranged from early-career educators to those with over a decade of teaching experience, reflecting a diverse group regarding professional tenure and life stages. The teachers' responses reveal a range of ages and teaching experiences, which may influence their perspectives and practices in the classroom. This diversity reflects a mix of seasoned educators and relatively newer teachers within the sample.

TPACK Integration

The findings highlight that teachers benefit from institutional support, with resources such as WiFi, projectors, and laptops facilitating technology integration and ensuring smooth instructional delivery. Beyond infrastructure, teachers deliberately review and select teaching materials to ensure relevance, appropriateness, and alignment with the syllabus, demonstrating a strong commitment to curriculum-based instruction. They also adapt strategies to match specific content and objectives, such as employing Project-based Learning for procedure texts, enhancing engagement and effectiveness. Furthermore, teachers recognize students' strengths as digital natives, leveraging their technological proficiency to enrich learning with interactive multimedia tools. These insights illustrate how resource access, careful material selection, and responsive instructional strategies converge to create supportive and engaging learning environments.

Teachers acknowledged the availability of various institutional resources that facilitate technology integration in their teaching. Access to WiFi, projectors, laptops, and computers plays a significant role in supporting instructional activities.

Excerpt 8:

"The school has several WiFi points, so we can use them. The school WiFi has been very helpful. There are projectors, sometimes laptops. There are three school laptops here that

can be used. If we need it, for example, when the teacher forgets to bring a laptop or the student needs it, we can borrow it. So, the school is very supportive."

Teachers emphasized the importance of assessing teaching materials before implementation to ensure their relevance and appropriateness for the students. This process involves reviewing content and considering suitable instructional strategies.

Excerpt 9:

"For example, folklore, in the second semester, there are Fractured Stories, folktales that are modified again from other viewpoints. Well, I see them first on YouTube, what the videos of the folktale look like." She added, "For expository text, (I) look for material first and strategies that can be used."

Teachers emphasized the importance of adhering to the syllabus when planning and delivering lessons to ensure alignment with curriculum objectives. This approach guides their selection of materials and instructional strategies.

Excerpt 10:

"When making a lesson plan, I usually choose first, for example, the material that is in accordance with the lesson plan, which is seen first."

Teachers emphasized the importance of selecting teaching strategies aligned with the specific content and learning objectives. Tailoring instructional methods to the material enhances student engagement and learning effectiveness.

Excerpt 11:

"I'll just adjust it, for example, this material suits this. Like I said earlier, the procedure text material was suitable for the Project-based learning method."

Teachers highlighted the importance of selecting and utilizing engaging and appropriate technology for their students' learning needs. They acknowledged students' capabilities as digital natives and the value of interactive multimedia tools in language instruction.

Excerpt 12:

"As for technology, there is almost none because today's students are technology literate, so sometimes they are smarter than us. If I make something on Canva, it can take a long time; half an hour is not necessarily finished. If it's the students, I give them half an hour, and they can finish it in 10 minutes."

Challenges

The findings reveal that while technology integration is supported, disparities in access remain challenging, particularly in rural contexts where some students lack devices or digital familiarity. Teachers recognize the need to provide additional support for these learners, acknowledging that not all students are equally up to date with technology. Moreover, schools impose restrictions on cell phone use due to past misuse, allowing limited exceptions

such as for students living far away or during web-based exams, where secure applications prevent cheating. These practices illustrate the balance teachers and schools must maintain between leveraging technology for learning and managing equitable access and responsible use among students.

Excerpt 13:

"Okay, back again, I teach in a rural district, so maybe one or two students are a bit clueless about technology. So, we have to pay more attention to them. Because we can't judge whether students are able, students are up to date. Because of our condition in the village, some students may be less updated on technology. Some don't have cell phones."

Teachers described restrictions on cell phone use in schools due to previous violations, with limited exceptions to support students who live far from school.

Excerpt 14:

"Actually, it used to be allowed, but over time, there were violations and others, so now they are not allowed to bring cellphones except for those whose homes are far away, more than an hour from school. They can bring cellphones collected from the homeroom teacher's desk. So, if, for example, they use cellphones for end-of-semester exam assignments, we use a web-based exam browser that they can't cheat on, so when they take the exam, they are allowed to bring cell phones, no longer manually using paper. Alhamdulillah, they are familiar with various applications on cell phones."

DISCUSSION

Indonesian EFL Teachers' Perceptions of Their TPACK

This discussion examines Indonesian EFL teachers' perceptions of TPACK, focusing on their knowledge and skills in content (CK), technology (TK), and pedagogy (PK). It explores how teachers understand subject matter, integrate digital tools, and apply teaching strategies to support student learning. These insights provide a clearer picture of how teachers conceptualize and apply TPACK in classroom practices.

Teachers' Content Knowledge (CK) Perception

The interview results suggest that Indonesian EFL teachers in Katingan Regency are strongly confident in their CK, particularly in three main areas: the four language skills, need analysis, and vocabulary and grammar. Teachers reported being able to assess students' prior knowledge and conduct a needs analysis to adapt lessons according to learners' goals and proficiency levels. Furthermore, teachers integrate the four language skills, such as listening, speaking, reading, and writing, into their lessons to create more meaningful and relevant learning experiences. This result aligns with previous studies showing that Indonesian teachers often rated their CK higher than other domains of TPACK (Drajati et al., 2018; Aniq & Drajati, 2019). These practices indicate a learner-centered approach and

highlight the critical role of CK within the TPACK framework in supporting students' diverse learning needs.

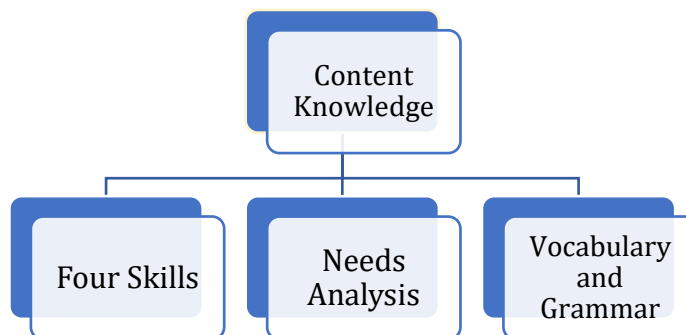


Figure 2. Teachers' content knowledge perception

Teachers' Technological Knowledge (TK) Perception

Teachers show a strong and diverse use of digital tools, reflecting their confidence and engagement with educational technology across three key aspects: frequency of technological use, attitudes toward technological development, and technological tools and apps used. Teachers frequently integrate platforms such as Quizizz and Wordwall to create interactive games and exercises, fostering student participation and enabling formative assessment. Confirming findings from previous studies (Bannus & Emeral, 2025; Norahmi et al., 2024; Ilyas et al., 2023), Canva is widely used for creative tasks like poster-making, while YouTube serves as a primary resource for instructional videos and motivational materials. Moreover, tools like CapCut and KineMaster are employed for student-created videos, promoting multimedia production and enhancing students' digital literacy alongside language learning. Interestingly, TikTok is occasionally mentioned to refresh students and create a relaxed classroom atmosphere, demonstrating teachers' sensitivity to student engagement and well-being. Teachers also view technology as a means for professional development, showing openness and adaptability by learning from students and exploring innovative teaching strategies. This positive attitude toward technological development supports successful TPACK integration and encourages teachers to improve their practices continuously.

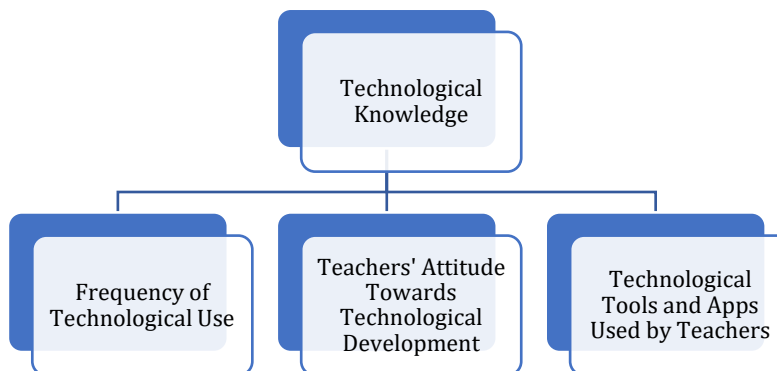


Figure 3. Teachers' technological knowledge perception

Teachers' Pedagogical Knowledge (PK) Perception

Teachers reveal key aspects of their Pedagogical Knowledge (PK), particularly concerning teaching methods, student motivation, time management, individual and collaborative learning, and attitudes toward teaching. Teachers reported challenges in ensuring active and equitable participation during pair and group work, suggesting the need for clearer roles and structured strategies to promote genuine collaboration among students. These findings are consistent with previous studies highlighting variations in pedagogical competence among teachers with different levels of experience (Fathi & Yousefifard, 2019; Nazari et al., 2019). Additionally, teachers prioritize interactive and varied activities to capture students' interest and build motivation before progressing to more complex content, emphasize effective time management, and provide less homework to avoid overwhelming students. These practices reflect a student-centered pedagogy that integrates diverse teaching strategies and supports active participation.

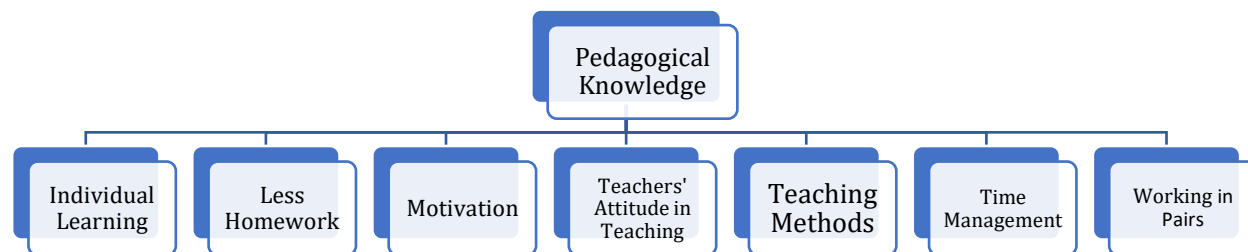


Figure 4. Teachers' pedagogical knowledge perception

The Implementation of TPACK by Indonesian EFL Teachers in Rural Areas

This section explores the implementation of TPACK by Indonesian EFL teachers in rural areas, particularly in Katingan Regency, Central Kalimantan, focusing on how they integrate technology, pedagogy, and content in English teaching. While teachers strive to enhance learning through TPACK-based practices, they face challenges such as limited digital

infrastructure, insufficient training, and varying student proficiency levels. These insights highlight the need for greater support to strengthen TPACK integration in rural classrooms.

TPACK Integration

The integration of TPACK in teaching is reflected through several key practices. Teachers emphasize the importance of adhering to the syllabus and carefully assessing teaching materials before use to maintain consistency and quality. Institutional support in providing adequate facilities and internet access is crucial for effective technology integration (Bannus & Emeral, 2025). In the classroom, teachers employ relevant teaching strategies, such as project-based and blended learning, to foster student engagement and meaningful learning. At the same time, they utilize appropriate technologies that align with students' needs and digital proficiency, ensuring that instruction remains student-centered and pedagogically sound.

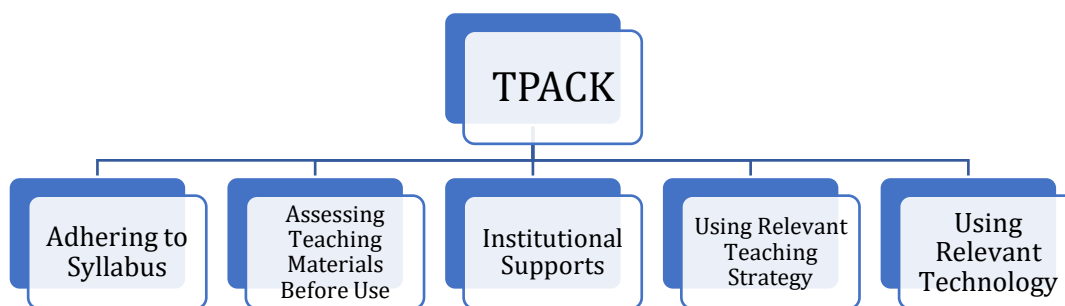


Figure 5. TPACK integration

Challenges

The findings highlight that Indonesian EFL teachers in rural areas face persistent challenges related to the digital divide and restrictive school policies. Limited access to devices, unstable internet connections, and unequal resource distribution hinder students' opportunities for effective digital learning, requiring teachers to provide additional support to ensure equity. It aligns with Putry et al. (2022), who found that insufficient technological tools constrained effective TPACK implementation despite teachers' high confidence levels. At the same time, strict phone use policies, though intended to prevent misuse and maintain academic integrity, often restrict students' engagement with mobile-based learning tools. As Lita et al. (2023) similarly note, while teachers value the role of TPACK in the digital era, infrastructural constraints, resource gaps, and institutional regulations remain significant barriers to its optimal integration.

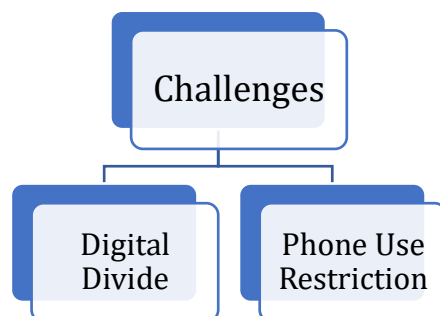


Figure 6. Challenges in TPACK integration

Implications for Teacher Training, Rural Education Policy, and Digital Equity

Teacher Training

Teacher training should go beyond content knowledge (CK) to strengthen pedagogical (PK) and technological knowledge (TK) within the TPACK framework. While teachers show confidence in digital tools, challenges in collaboration, time management, and equitable participation highlight the need for professional development that emphasizes structured group work, project-based and blended learning, and the pedagogical use of technology, in line with the Effective Teacher Professional Development framework which stresses that lasting improvement requires clear goals, strategies, and sustained practice (Sims, Fletcher-Wood, O'mara-Eves, Cottingham, Stansfield, Goodrich, Herwegen, and Anders, 2022). Training must also be context-sensitive, as highlighted by Brianza, Schmid, Tondeur, and Petko (2022), equipping rural teachers to adapt strategies to infrastructural constraints, diverse learners, and local policies. Continuous, practice-oriented programs that integrate these elements can foster more equitable and meaningful TPACK implementation.

Rural Education Policy

The rural education policies should address contextual disparities in digital access and instructional conditions. Teachers in rural districts often adapt materials and methods to accommodate students with lower proficiency levels and limited exposure to technology. However, they remain constrained by infrastructural gaps and restrictive school policies. This call is reinforced by recent research in rural Indonesian settings of English teachers in rural junior high schools in Tanjung Jabung Timur, which revealed that scarce technological resources and reliance on self-directed learning inhibit teachers' capacity to deliver digital-rich instruction (Saputri & Sukarno, 2024). Policies should prioritize expanding digital infrastructure, such as stable internet connectivity, adequate devices, and reliable electricity, while supporting localized curriculum adaptation that respects rural learners' contexts. Furthermore, policy frameworks should encourage flexibility in classroom technology use, enabling rural schools to benefit from digital learning without overly restrictive practices that hinder innovation and equitable participation.

Digital Equity

Persistent digital inequity is clearly seen as students in rural areas often face barriers such as limited device ownership, unstable internet access, and restrictions on mobile phone use. While teachers creatively integrate digital tools, these inequities limit students' opportunities to engage in technology-enhanced learning fully. To address this, digital equity initiatives must ensure fair distribution of resources and provide accessible technological solutions tailored to rural communities. Schools should balance the need for responsible technology policies with enabling access for learning, for example, by offering supervised digital platforms and loaner devices. Promoting digital literacy for teachers and students is equally critical, ensuring all learners can benefit from TPACK-based instruction and participate meaningfully in the digital learning landscape. Empirical backing for this approach appears in a recent study of remote and underserved areas, where Muslimin and Indrawati (2024) found that integrating flexible hybrid learning models, strategic infrastructure support, and capacity building for teachers and students can significantly reduce digital exclusion and advance educational equity in remote regions.

CONCLUSION

This study offers an original contribution by foregrounding rural EFL teachers' TPACK practices in Central Kalimantan, a context that remains underrepresented in the literature. The findings show that while teachers display strong content knowledge and technological confidence, their pedagogical practices are constrained by infrastructural limitations, digital inequities, and restrictive policies. These insights underline the need for teacher training programs that move beyond tool familiarization to emphasize the design of structured collaborative tasks, strategies for managing diverse proficiency levels, and adaptive use of digital resources under rural constraints. Continuous, practice-oriented professional development should also embed contextual knowledge, enabling teachers to balance innovation with local realities. For policymakers, priority should be given to expanding rural internet access, ensuring reliable electricity, providing affordable or shared devices, and revising restrictive mobile phone policies to allow supervised, purposeful technology use in classrooms. Incentives for schools to develop localized digital literacy programs could further strengthen equitable participation. Future research should extend to broader rural contexts, include student perspectives to capture the impact on learning outcomes, and examine how sustained training and systemic support shape teachers' evolving TPACK integration.

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