CHAPTER IV

FINDINGS AND DISCUSSION

The researchers present the findings of their study in this chapter. It is essential that the discussion of these findings contributes to shaping the overall conclusions. The main purpose of the discussion is to address the research questions and interpret the results comprehensively by relating them to relevant theories.

A. Findings

The data for this study were collected using two techniques: interviews and reflection journals. There were 10 pre-service teachers who were knowledgeable about TPACK and its application. The interviews were conducted to explore how the pre-service teachers described their experiences in using TPACK during their teaching practicum. The questions were asked face-to-face, and all 10 teachers were given the same set of questions. In addition, this study also identified the challenges they faced and the strategies they used in applying TPACK through the reflection journals they wrote after completing their teaching practicum.

There are two main research questions in this study. The first focuses on how pre-service teachers describe their experiences in using TPACK components such as CK, TK, PK, PCK, TPK, and TCK. The second explores the challenges and strategies pre-service teachers face in applying TPACK, such as limited facilities and access, as well as the lack of balanced integration between technology, pedagogy, and content.

The interview results are expected to show how they integrate technology, pedagogy, and content knowledge in their teaching activities. The interviews were conducted in Indonesian to make them easier for all participants to understand. The following are the interview results.

1.1 The Experiences of Pre-Service Teachers in Integrating TPACK During Teaching Practicum

Based on the interviews conducted with 10 pre-service English teachers at UIN Antasari, it was found that all participants applied TPACK as the main foundation in designing and implementing the teaching and learning process during their teaching practicum. They combined technological, pedagogical, and content knowledge to create engaging, interactive, and student-centered learning experiences. Their responses were informed by their personal teaching experiences.

a. Content Knowledge (CK)

Based on interviews with ten pre-service English teachers, it appears that their level of confidence in mastering learning content varies, but generally shows positive development along with teaching experience. Most participants felt quite confident because they had a strong knowledge base from the lectures, while some still experienced doubts at the beginning of practice, especially when facing new or complex material. As stated by P1 "I am quite confident with the material I teach because I have often discussed it in lectures. Before teaching, I usually reread the

material from the teacher's book and also look for example questions on the internet so that I can explain more clearly to students."

This shows that academic experience and the habit of reviewing material play an important role in increasing prospective teachers' confidence. Similarly, P2 initially felt nervous, but over time became more confident: "At first I was a bit nervous because I was afraid that my explanation was not right, but after a few times teaching, I became more confident. I prepared the concept by making my own summary and watching learning videos on YouTube to know how to deliver it."

Meanwhile, P3 emphasized the importance of preparation through practice and careful lesson planning:"I feel that I understand the content of the lessons, especially grammar and reading. For preparation, I usually make a detailed lesson plan and practice explaining the concept in front of the mirror so that it goes well in class." However, not all participants felt fully confident. P4 admits, Honestly, I am not always confident, especially if the material is rather complex. So I usually discuss with fellow prospective teachers and read additional references so that I can answer students' questions."

This statement suggests that collaborative work among peers is an important strategy to overcome limitations in content understanding. In contrast, P5 showed a high level of confidence due to a personal interest in English: "I feel confident because I really like English, so when I teach I can explain in a relaxed way. Before class, I always prepare a PowerPoint with key points and example sentences so that students can understand more easily."

Furthermore, P6 also expressed confidence in her mastery of the material, but still reviewed it before teaching: “I am quite confident with the material, but I still revise it before teaching. I usually read from the internet and YouTube material that is relevant to the topic. The helps me understand the concept more deeply." Meanwhile, P7 expressed hesitation when facing a new topic: "Sometimes I am not sure if the topic is new or I have never studied it before. I usually ask my supervisor for advice and look for other sources on the internet so that I can give the right explanation."

In terms of learning strategies, P8 relies on visual methods to clarify concept understanding: "I am quite confident because I am used to learn before practice. For preparation, I make a mind map of the main concepts so that it is easy to explain and not get off track when teaching." In addition, P9 emphasized the importance of anticipating students' questions: "I am confident but still careful, I am afraid that students will ask things that are outside the material. So I always read more than one source and prepare additional examples so that I can give relevant explanations."

Finally, P 10 indicated an increase in confidence after several practices: "I feel more confident after several practices. At first I learned from textbooks and online materials, then I turned it into interactive activities such as games or quizzes so that students are more interested and I also understand the concepts better."

Overall, these findings indicate that pre-service English teacherscontinue to develop their content knowledge skills through variousstrategies such as rereading materials, using digital media, discussingwith colleagues, and implementing

interactive learning. Repeated teaching practicealso plays a major role in building confidenceand deepening understanding of learning content.

b. Pedagogical Knowledge (PK)

Based on interviews with ten pre-service English teachers, it was found that the participants showed a good understanding in applying various pedagogical approaches during their teaching practice. They actively use various learning methods such as group discussion, role play, project-based learning, and blended learning to increase student participation and keep the classroom atmosphere conducive. The participants also adapted their strategies to the students' characteristics to make the learning process effective and interactive. As stated by P1 "I often use the group discussion method so that students can exchange opinions. To keep the class active, I call students' names randomly so that everyone is involved and not just silent."

This strategy shows participants' awareness of the importance of active involvement of all students in the learning process. The same thing was also expressed by P2 who used a game-based approach: "I usually use game-based learning like Kahoot so that students don't get bored. If the class starts to get noisy, I stop for a moment and give a short activity to get their focus back."

This approach shows the teacher's adaptive ability to maintain students' focus and motivation through fun activities. Meanwhile, P3 emphasizes the implementation of a student-centered approach to learning: "I teach with a student-centered approach, so students play more roles in class activities. To organize the class, I make small rules from the beginning, like ‘raise your hand before speaking’, and it is quite effective."

This illustrates that prospective teachers understand the importance of collaboratively built classroom discipline. P4 demonstrates the utilization of the role play method to develop students' speaking skills: "I like to use role play because it can make students dare to speak in English. If some are passive, I give them a small role first so that they will slowly become active."

This strategy helps to gradually build students' confidence. In addition, P5 combines presentation and pair work to create an active learning dynamic: "I use presentation and pair work more often. To organize the class, I always start with ice breaking so that the atmosphere is relaxed and students are more ready to learn."

This approach demonstrates the importance of establishing a positive atmosphere at the start of learning. In terms of method creativity, P6 stands out with the use of project-based learning: "My method is more project-based learning, so students make mini projects such as dialogs or videos. For engagement, I give extra points for those who are active to keep them motivated."

This strategy not only increases participation, but also builds responsibility and cooperation among students. Meanwhile, Respondent P7 emphasized communication through the communicative approach: "I apply the communicative approach, the focus is for students to talk more than me lecturing. If the atmosphere gets crowded, I change the activity to a fun quiz to keep it productive."

This approach shows a balance between flexibility and clear learning objectives. P8 integrates technology in learning through blended learning: "I implemented blended learning by delivering material explanations directly in the

classroom, while the online activities were focused on completing and submitting assignments through a digital platform."

This approach reflects the ability to build positive relationships with students while utilizing digital media effectively. Furthermore, P9 applied question and answer techniques to maintain student engagement: "I usually use a question and answer session every time I finish explaining a concept. If there are students who seem less focused, I invite them to answer light questions to keep them engaged."

This strategy demonstrates the teacher's efforts to maintain students' attention and ensure their understanding of the material. Finally, P10 highlighted the importance of cooperation through cooperative learning methods: "I like to use cooperative learning, students work together in small groups , I rotate group members every week so they don't get bored and can learn to work together."

This approach fosters collaboration and positive social interaction among students. Overall, these findings indicate that pre-service English teachers have developed considerable pedagogical knowledge through the application of various innovative methods, effective classroom management, and the ability to adapt strategies to student needs. This demonstrates their readiness to create an active, inclusive, and student-centered learning environment.

c. Technological Knowledge (TK)

Based on interviews with ten pre-service English teachers, it is known that all participants have utilized various forms of technology to support the learning process during teaching practice. The use of technology not only serves as a presentation tool,

but also as a means to increase interactivity, collaboration, and student motivation. Most participants learned to use digital applications and platforms independently through online tutorials, lecture experiences, and recommendations from lecturers and peers. As P1 explained. "I most often use PowerPoint and Canva to help explain the material. I usually choose them because they are familiar from college and easy to use to make an attractive display."

This shows that ease of use and previous experience are the main reasons for choosing learning technology media. Meanwhile, P2 focuses more on using technology to increase student engagement through interactive evaluation. "I use Kahoot and Quizizz for evaluation, so that students are more eager to answer questions. When I tried it and it was really fun for the students."

In the aspect of providing authentic materials, P3 explained, "During my practice, I often use YouTube videos to give pronunciation and listening examples. I choose videos that are appropriate to the topic and short in duration so I don't get bored."

The use of video media helps students understand the language context in a more real and interesting way. In addition, P4 pointed out the utilization of learning management system to support learning administration: "I use Baamboozle for students to answer questions in groups, and it’s usually used for ice-breaking activities. I first learned about it from my lecturer during teaching, and then I explored it on my own.

This reflects the adaptive ability and high curiosity of prospective teachers towards new technologies. P5 integrated interactive digital media in learning: “I often create interactive quizzes using Wordwall and Educaplay. I found out about those applications from TikTok, so I tried using them in class, and it turned out the students really liked them.”

This strategy shows teachers' creativity in utilizing popular media to support learning activities. In terms of visual design, P6 revealed, "For presentations, I like to use Canva because it looks attractive and can be customized according to the theme. I learn it myself before the practice starts."

The use of Canva shows the efforts of prospective teachers in making learning more aesthetically appealing. P7 also displays initiative in the use of digital collaborative tools: “I sometimes use Mentimeter to collaborate on ideas with my students. I first learned about it from a lecturer who used it, then I explored its features through Google.”

Furthermore, P8 utilized technology to encourage the participation of more shy students: "I use Mentimeter for online discussion, so students can write their opinions there. I chose it because it is suitable for students who are shy to speak directly in class." This shows an understanding of the different characters of students and an effort to create an inclusive learning environment. P9 emphasizes the function of technology in communication and classroom management: "I use WhatsApp group to communicate and share assignments with students. It's simple, but very effective because all students are active there."

Simple applications such as WhatsApp proved to be relevant and efficient in supporting teacher-student interactions. Finally, P10 showed initiative in trying out more dynamic presentation technology: "I use Prezi once in a while for more interactive presentations. I learn from video tutorials and try it several times before using it in class so that I don't get confused when I perform."

This reflects the readiness of prospective teachers to master various platforms to enrich students' learning experience. Overall, these findings indicate that pre-service English teachers have a good level of technological literacy and are able to utilize various digital applications according to learning needs. They demonstrate independence, creativity, and adaptability in integrating technology to create learning that is engaging, efficient, and relevant to the digital age.

d. Technological Pedagogical Knowledge (TPK)

Based on the interviews with ten pre-service English teachers, it was found that the participants showed a good ability to integrate technology with pedagogical strategies during teaching practice. They understand that technology is not just a presentation tool, but an important means to create interactive, interesting and relevant learning with students' characteristics. Although some face technical obstacles such as internet connection, the majority feel that the use of technology makes teaching and learning activities more effective and efficient. As expressed by P1, "Technology really helps when I want to make learning more interactive. For example, using Kahoot for quizzes makes students more enthusiastic and less sleepy. So, in my opinion, technology makes teaching easier."

This statement shows that prospective teachers are able to utilize technology to increase student motivation and engagement. Similarly, Respondent P2 used YouTube as a medium to spark discussion: "I use YouTube videos to warm up before the discussion. Students have an idea before discussing the topic. At first it was a bit complicated to find the right video, but I got used to it and it really helped."

This strategy demonstrates the ability to combine technology with a student-centered learning approach. Meanwhile, P3 emphasizes how technology supports the clarity of material delivery: "Technology makes my strategies more lively. For example, I use Canva to show pictures and animations when explaining grammar. Students are more focused and understand more easily. I think technology makes teaching more effective."

This shows the integration between visual media and conceptual explanation methods. In the evaluation aspect, P4 revealed the efficiency of using technology: "I use Quizzez for practice questions, so I can immediately see the results. It makes it easier for me and the students are also happy because they can know their scores quickly. So, obviously technology makes everything more practical."

This use shows an understanding of the function of technology as an effective formative assessment tool. In addition, P5 highlighted how technology can support more diverse student participation: "When I use Mentimeter, I can invite students to discuss without having to talk to everyone in the class. That's really helpful for students who are shy. Sometimes the internet connection is a challenge, but overall it makes it easier."

This reflects the future teachers' awareness of students' emotional and social needs.Respondent P6 also emphasized the collaborative value of technology: "Technology helps me vary my strategies, like using Mentimeter to brainstorm together. It's more fun than. So, even though it takes time to learn, it's worth it."

This approach demonstrates the teacher's ability to create interactive, collaborative learning activities. While P7 highlights the flexibility of technology in teaching: “In my opinion, technology makes teaching more flexible. For example, using Canva or Quizizz can be adjusted to the students' level. But sometimes if the signal is bad, it's a bit stressful too."

This shows that prospective teachers are able to adapt the use of technology to the needs of students, while recognizing its practical limitations. In the aspect of lesson planning, P8 stated, "Technology helps me prepare materials faster, such as Canva or Powerpoint design and finding images on the internet. Students are also more engaged if the display is interesting. So, it definitely makes teaching easier."

This shows that technology helps with efficiency as well as increasing the attractiveness of teaching materials. Furthermore, P9 shows the application of technology in game-based learning: "I use LearningApps for vocabulary practice, and it helps students learn while playing. So, my game-based learning strategy is easier to implement. I think technology makes the class more lively."

This integration emphasizes how technology reinforces a fun and meaningful pedagogical approach. Finally, P10 highlighted the dynamics of using technology in the field: "Sometimes technology makes teaching easier, sometimes it makes it more

difficult. If it goes well, everything is fun and interactive. But if there is an error or the internet is slow, we have to improvise manually again."

This shows the readiness of prospective teachers to face technical challenges with creative solutions. Overall, these findings indicate that pre-service English teachers have understood and are able to implement the close relationship between technology and pedagogy in their teaching practices. They use various digital platforms to enrich learning strategies, increase student engagement, and create an interactive learning environment. Despite facing technical obstacles, their adaptability and improvisation skills demonstrate their growing mastery of Technological Pedagogical Knowledge (TPK).

e. Technological Content Knowledge (TCK)

Based on the interviews with ten pre-service English teachers, it was found that the participants were able to utilize technology effectively to support the delivery of English learning materials or content. They integrate various digital media such as YouTube, Canva, Wordwall, and Quizzez to help students understand complex language concepts, such as grammar, vocabulary, pronunciation, and reading comprehension. Technology is considered to play an important role in making lesson content more visual, contextualized, and easily understood by students.

As expressed by P1 "I use YouTube to help explain pronunciation and listening. With videos, students can directly hear examples of native speakers, so they understand better and are more interested." This statement shows that technology can provide an authentic learning experience through direct exposure to native English speakers.

Similarly, P2 used visual media to explain grammar concepts: "I often use PowerPoint and Canva to display grammar concepts. With interesting visuals, students grasp the difference between tenses faster." This illustrates that visual displays can help students understand language structures more clearly. In addition, P3 also emphasizes the importance of context visualization: "I use Canva and add pictures or example sentences so that students can see the context directly. This technology really helps to explain grammar and vocabulary."

The integration of images and text supports the understanding of word meanings as well as the use of language in real contexts. In the realm of game-based learning, P4 states, "I use Wordwall for vocab practice and Quizizz for grammar practice. Students can learn content while playing, and it makes them memorize faster."

This shows that interactive technology can transform repetitive learning activities into fun and meaningful experiences. Meanwhile, P5 shows the use of collaborative technology: "I use Mentimeter to explain sentence structure. I write examples on the digital board and students can add their ideas too, so it's really interactive."

This strategy shows how technology can strengthen the interaction between teachers and students in understanding language structures. P6 also utilizes authentic video resources to teach oral skills: "I use videos from BBC Learning English to help explain pronunciation and speaking. This technology helps me give real examples, not just theories from books."

The use of original sources like this provides a more realistic experience of listening and imitating pronunciation. Furthermore, P7 integrates visual geographic technology to support descriptive text:“I used Canva to create interactive presentations about tourist destinations. The visuals helped students better understand how to write descriptive texts.”

The use of this application helps students understand descriptive content through visualization of real locations. In the context of writing skills, P8 explained, “I use Google Drive to display students’ work and example texts. It really helps during writing lessons because students can also learn from their classmates’ examples.”

This shows that technology can support collaborative and reflective learning in writing class. In addition, P9 utilizes interactive technology for reading learning: “I use Wordwall to make reading activities more interactive. Students can practice vocabulary and comprehension through matching or multiple-choice games.”

This strategy facilitates text comprehension by providing quick access to additional learning resources. Finally, P10 highlighted the importance of dynamic displays in learning abstract concepts: “I use Prezi to present tenses material, because the display is dynamic and makes students not bored. It really helps to make abstract concepts more visual."

This shows that interactive presentation design can improve understanding of complex grammar concepts. Overall, these findings indicate that pre-service English teachers have been able to functionally integrate technology with English content to strengthen student understanding. Through the use of various digital media, they can

present material that is more contextual, interesting, and easy to understand. This ability demonstrates a good command of Technological Content Knowledge (TCK), where technology not only serves as a tool, but also as an integral part of delivering and reinforcing learning content.

f. Pedagogical Content Knowledge (PCK)

Based on interviews with ten pre-service English teachers, it was found that all participants demonstrated the ability to integrate pedagogical and content knowledge (PCK) to adapt teaching strategies to the characteristics of the material and students' needs. They not only understood the content of the lesson, but were also able to choose appropriate approaches, methods and media so that students could understand the material more easily. In addition, the participants also showed flexibility in changing teaching strategies when facing difficulties in the classroom, making the learning process more effective and adaptive.

As expressed by P1, "I usually adjust my teaching method to the type of material. For example, if I teach grammar, I start with example sentences first and then go to the formula, so that students can grasp it more easily. If they seem confused, I change it to use small games to make it lighter."

This statement reflects the teacher's ability to adapt the learning method to the characteristics of the content and students' responses in the classroom. The same thing was explained by P2 who linked the learning content with students' personal experiences: "I try to relate the content to students' daily activities. For example, when

teaching simple past tense, I ask them to tell me about their vacation experiences. If they are still confused, I give them personal examples to make it more relatable."

This approach shows how teachers are able to bridge abstract language concepts with students' concrete experiences to improve understanding. Meanwhile, P3 stated that the teaching strategy is adjusted to the type of material being taught: "My teaching method depends on the topic. If it's reading, I use group discussion; but if it's grammar, I use practice questions. If it turns out that students do not understand, I repeat the explanation using Indonesian." This response confirms the teacher's ability to choose pedagogical methods that suit the characteristics of language skills. P4 adds, "I always try to explain the material with examples that are close to the students' lives. If I see that they are struggling, I change the method from lecture to pair work so that they can learn together."

This shows the teacher's adaptability in changing the form of learning interaction to increase student engagement. In addition, P5 explained the use of visual media to strengthen vocabulary learning: "When teaching vocabulary, I use pictures or videos to make it easy to remember. But if I see that students have understood, I immediately move on to speaking activities so that they can practice."

This approach demonstrates the ability to integrate theory and practice in the learning process. P6 also emphasized the importance of the inductive approach: "I like to start the lesson with an example first, then discuss the theory. For example, give the text first and then analyze the grammar together. If they don't understand, I give them additional exercises that are simpler."

This strategy shows the application of constructivism-based pedagogy, where students learn through experience and analysis. Meanwhile, P7 adjusts the method to the dynamics of the class: "I adjust the method depending on the students' ability. If the class is active, I use discussion; but if it is passive, I change to the drill method so that they are more focused and participate."

This shows the teacher's ability to read the classroom situation and adjust teaching techniques to remain effective. Furthermore, P8 conveyed the importance of a systematic learning structure: "I try to make the learning sequential from easy to difficult. If students are still confused, I repeat it using visual examples. So, the way I teach always changes according to their reactions in class."

This shows the teacher's awareness of students' cognitive processes and the importance of scaffolding in learning. P9 also used familiar contexts to aid understanding: "I connect the content with a familiar context, for example the topic of hobbies, food, or music. If I see that students do not understand, I change the way I explain it with simpler language."

This reflects the teacher's ability to modify the language of instruction according to the students' ability level. Finally, P10 explains the application of narrative strategy in grammar learning: "I use storytelling to explain tenses, because students grasp it faster through stories. But if there are some who don't understand, I break it and give them additional practice with comparison tables."

This strategy shows how teachers can link content with a communicative approach to improve students' conceptual understanding. Overall, these findings

indicate that pre-service English teachers have developed good Pedagogical Content Knowledge (PCK) through their ability to link language content with relevant pedagogical strategies. They are able to adapt methods, examples, and activities according to students' level of understanding, and demonstrate flexibility in responding to learning challenges in the classroom. This combination of content understanding and pedagogical skills is an important foundation for creating effective and meaningful English language learning.

g. TPACK Integration

Based on the interviews with ten pre-service English teachers, it was found that all participants have demonstrated the ability to integrate all components of Technological Pedagogical and Content Knowledge (TPACK) in their teaching practice. The participants not only used technology as a tool, but also integrated it with appropriate pedagogical strategies and relevant learning content. This integration makes the teaching and learning process more interesting, meaningful and effective in helping students understand English materials.

As explained by P1"I feel that all aspects of TPACK come together the most when teaching descriptive text. I used a PowerPoint with pictures of tourist attractions (technology), then asked students to describe using their own sentences (pedagogy + content). From there I learned that the combination of visual media and interactive activities makes students understand more quickly and enthusiastically."

This statement shows how TPACK integration supports visual-based learning and interactive activities that combine technology, pedagogical approach and learning

content in a balanced way. Similarly, P2 linked the use of technology with the application of teaching content and strategies: "When teaching simple past tense, I use videos from YouTube about daily activities (technology), then invite students to rewrite the story with the correct tense (pedagogy)."

This statement shows how TPACK integration supports visual-based learning and interactive activities that combine technology, pedagogical approaches and learning content in a balanced way. Similarly, P2 links the use of technology with the application of teaching content and strategies: "When teaching simple past tense, I use videos from YouTube about daily activities (technology), then ask students to rewrite the story with the correct tense (pedagogy and content). I learned that students understand more easily if they are asked to relate the material to real things."

This response shows the effective application of TPACK in connecting the material with real-life contexts through the help of technology. Meanwhile, P3 illustrates the collaboration between technology and pedagogy in strengthening content understanding: "I have used Kahoot for grammar practice. While playing, I explained the reason for each right or wrong answer. It really shows how technology helps my pedagogy and strengthens students' content understanding. I learned that learning while playing can still be serious."

This confirms that pedagogical use of technology can increase motivation while deepening concept understanding. P4 added a form of TPACK integration through project-based activities: "When teaching procedure text, I asked students to watch a cooking tutorial video (technology), then they created their own text about the steps

(content) and presented it in front of the class (pedagogy). From there I realized that technology can make learning more real and fun."

This response highlights the role of technology in delivering contextualized and applied learning experiences. In addition, P5 shows a balance between the use of digital media and collaborative activities: "I once combined Canva for an interactive presentation, group discussion to discuss the meaning of the text, and reading comprehension materials. It went well, and I learned the importance of balance between digital media and collaborative activities."

This illustrates participants' understanding of the importance of harmony between the three aspects of TPACK to support comprehensive learning. Furthermore, P6 explained: "When teaching vocabulary, I use Wordwall to practice words, then ask students to use the words in dialog. I feel that my TPACK is really working in that technology helps students learn while practicing. I learned that digital tools can strengthen language acquisition when combined with hands-on activities."

This response confirms that TPACK integration enables practice-based learning through interactive technology support. P7 also pointed out the application of digital collaborative integration: “I once used Mentimeter for brainstorming ideas before writing a narrative text. With this tool, students actively shared their ideas (pedagogical aspect), and it helped them organize their stories more easily (content aspect). I learned that digital collaboration makes the classroom atmosphere more engaging.”

This emphasizes the role of technology in strengthening students' interaction and direct involvement in learning activities. Meanwhile, P8 illustrates visual and pedagogical integration to reinforce grammatical concepts: "I combined Prezi to explain tenses (technology), pair work for practice (pedagogy), and real sentence examples (content). I learned that an attractive visual display can help students focus and understand grammatical concepts faster."

This reflects that technology-based visual displays can support the effectiveness of pedagogy and content understanding. In addition, P9 explained how technology also plays a role in student self-evaluation: “When teaching speaking, I use a voice recording tool to record students’ conversations. Afterwards, they listen to their recordings and reflect on their pronunciation and fluency. I learned that simple technology like this can help students evaluate themselves and improve their speaking skills.”

This statement expands the function of TPACK not only for teaching, but also for learning reflection. Finally, P10 described the full integration of all three TPACK components in evaluative activities: "I remember using Kahoot to review the material before the exam. I invited students to play while discussing the answers. All the elements of TPACK were very visible there, technology helped interaction, pedagogy helped collaboration, and content remained the focus. I learned that fun teaching can still be meaningful." This response emphasizes that TPACK-based learning can create a balance between fun and academic meaning.

Overall, these findings show that pre-service English teachers have successfully integrated the three main elements of TPACK technology, pedagogy, and content effectively into their teaching practices. They are able to design learning that combines digital media, collaborative activities, and a focus on material in a harmonious manner. This integration of TPACK not only increases student motivation to learn, but also strengthens conceptual understanding, making the learning process more creative, contextual, and meaningful.

h. TPACK in Professional Development

Based on interviews with ten pre-service English teachers, it was found that the application of the Technological Pedagogical and Content Knowledge (TPACK) concept during teaching practice contributed significantly to their professional development as prospective teachers. Through real classroom experiences, they learned to balance content, pedagogy and technology aspects in the learning process. This integration not only improves their teaching ability, but also fosters reflection, creativity and flexibility in dealing with various situations in the classroom.

As expressed by P1, "During my practice, I feel that my teaching is much more focused. I used to focus only on the material, but now I can also think about how to deliver it and the technology that can help. TPACK made me realize the importance of balancing content, methods, and tools."

This statement shows that TPACK plays an important role in helping prospective teachers understand the balance between content knowledge, pedagogical strategies and the integrated use of technology. Similarly, P2 highlighted significant

changes in confidence and teaching skills: "I feel that I have really improved from the beginning of my PPL. At first I was still confused about organizing the class and preparing media, but because I often used technology and discussed with my mentor teacher, I became more confident. TPACK helped me see that teaching is not just about transferring knowledge, but also building interesting learning experiences."

This response shows that the application of TPACK helps prospective teachers develop professionalism by placing students at the center of learning. P3 emphasized how TPACK encourages creativity in lesson planning: "I became more creative in developing learning strategies. With the TPACK concept, I learned to integrate technology, methods, and content so that students don't get bored. Now I know that technology is not just an addition, but an important part of learning."

This shows that prospective teachers increasingly understand the role of technology as an integral component in creating effective and engaging learning experiences. Furthermore, P4 explained the link between theory and practice through the application of TPACK: "Teaching practice makes me understand how the theory I learned on campus can be applied in the real world. TPACK helps me manage all these aspects in a balanced way, so I don't just use technology, but it is adjusted to the lesson objectives."

This response shows that TPACK helps prospective teachers translate pedagogical theories into purposeful practice. Meanwhile, P5 highlighted the increased adaptability in attracting students' interest: "I used to be confused about how to make students interested in the lesson. Now I know how to incorporate videos, interactive

quizzes and discussion methods. TPACK helps me be more flexible and adaptive as a future teacher."

This statement confirms that TPACK encourages teachers' ability to combine various approaches according to students' needs. In addition, P6 demonstrated the reflective side of professional development through TPACK: "I feel more reflective. Every time I teach, I think: does the technology I choose really support the content and methods? From that I learn a lot about effective lesson planning."

This indicates that the application of TPACK encourages prospective teachers to think critically and self-evaluate their teaching practices. P7 added that TPACK also fosters the courage to innovate: "I learned not to be afraid to explore new things. When I practiced, I tried various digital platforms and the results were good. TPACK makes me more open to changes and technological developments in education."

This response highlights aspects of professional development that are oriented towards innovation and adaptation to technological advances. On the other hand, P8 reflects changes in the understanding of the role of the teacher: "I used to think that the important thing is just being able to explain the material clearly. But after practicing, I realized the importance of interaction and interesting learning experiences. TPACK helps me think more broadly as a future professional teacher."

This statement illustrates the shift from traditional views towards a more holistic and interactive approach to learning. P9 emphasizes the importance of balance between theory and practice: "I became more aware of the importance of balance

between theory and practice. With TPACK, I learned that teachers must continue to learn as well in terms of technology, pedagogy and material mastery."

This suggests that TPACK encourages continuous learning and dynamic professional development. Finally, P10 emphasized increased confidence and flexibility in teaching: "I feel that I have grown as a more prepared future teacher. TPACK taught me not to be rigid if one method doesn't work, I can change to another strategy or media. Now I am more confident in dealing with situations in the classroom." This statement shows how understanding TPACK plays a role in shaping teachers who are adaptive and responsive to classroom challenges.

Overall, these findings indicate that the application of TPACK plays a major role in supporting the professional development of pre-service English teachers. Through practical experience, they not only learn to master technology and content, but also understand how to balance it with effective pedagogical strategies. TPACK becomes a framework that helps them grow as reflective, innovative educators who are ready to face the dynamics of 21st century education.

1.2 Challenges and Strategies of Pre-Service Teachers when Integrating TPACK

Based on the reflection journals made by 10 pre-service English teachers at some school in Banjarmasin, the researcher analyzed their experiences during teaching practice using Gibbs' Reflective Cycle (1988) approach. This reflection aims to explore the challenges faced and strategies applied when integrating TPACK (Technological Pedagogical and Content Knowledge) in the learning process.

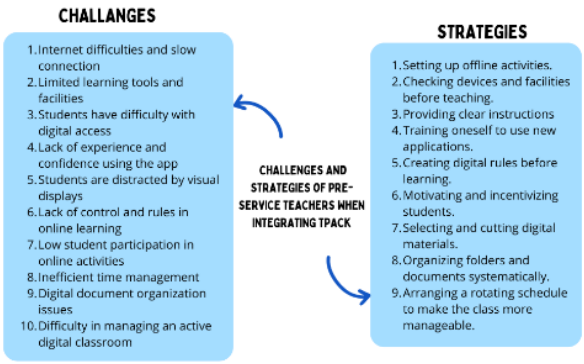


Figure 4.1. The Challange and Strategies Pre-Service Teachers when Integrating TPACK

Through the analysis of the reflection, it was found that the prospective teachers faced various obstacles, ranging from technical constraints to learning management, but also showed adaptive and reflective abilities in formulating concrete solutions.

1) Challanges

Based on the analysis of the reflection journals, the researcher found that the main challenges faced by pre-service teachers relate to the technical, pedagogical, and managerial aspects of integrating technology into learning. Knowing the various forms

of these challenges is important so that pre-service teachers can develop more prepared and reflective professional strategies to deal with technology-based classroom dynamics.

The findings of the emerging challenges include:

a. Internet difficulties and slow connection

P1 reported that “the main challenge arises from slow internet connection constraints when using PowerPoint and Kahoot”. This made the learning process inefficient and caused her to panic. This is an important challenge because it shows that technical readiness affects the effectiveness of pedagogy.

b. Limited learning tools and facilities

P2 revealed that “the small speaker sound when using YouTube videos for listening” made students unable to hear clearly. Barriers like this illustrate the importance of equipment readiness before learning takes place.

c. Students struggle with digital access

P4 noted that “some students fail to log in due to connection or device,” reflecting the digital divide in the classroom. This issue challenges teachers to create inclusive learning.

d. Lack of experience and confidence

P5 stated that she was initially “awkward because she was not used to using Prezi,” indicating that technological self-efficacy still needs to be improved for effective TPACK integration

e. Students are distracted by visual displays

P3 explained that when using Canva, students focus more on the images than the content. This poses a pedagogical challenge as technology can distract students from the main content.

f. Lack of digital control and rules

P6 experienced confusion when using Mentimeter because student comments were not controlled. This challenge shows the importance of setting rules before digital activities begin

g. Low student participation

P7 wrote that "student participation is low even though the assignments are neatly organized in WhatsApp Group." This confirms that technology does not automatically increase student engagement without proper motivation.

h. Inefficient time management

P8 found that "long YouTube videos leave insufficient time," signaling the importance of digital media selection according to duration and learning objectives.

i. Digital document organization issues

P9 faced the problem of "some files were lost while using Google Docs." This confirms the need for digital organization skills in collaborative learning.

j. Difficulty managing an active digital classroom

P10 noted that "the class gets too crowded when playing Wordwall," suggesting that technology integration requires careful planning and time management.

2) Strategies

In addition to the challenges, the reflection also shows the adaptive strategies used by prospective teachers to overcome problems in the field. These strategies illustrate their ability to plan, evaluate and improve TPACK-based learning approaches. Some of the key strategies found include:

a. Preparing Offline Activities

The strategy of preparing offline activities is used by prospective teachers to anticipate technical obstacles such as internet disruptions or malfunctioning devices. By preparing alternative activities such as grammar card games, paper-based exercises, or group discussions, the learning process can continue even when technology cannot be used. This strategy reflects the professional readiness and flexibility of teachers in ensuring learning continuity without relying solely on digital networks. P1 and P4 demonstrated the application of this strategy when facing internet connection barriers and difficulties accessing digital platforms.

b. Checking Devices and Facilities Before Teaching

Technical readiness is an important part of effective TPACK integration. Prospective teachers check the condition of devices such as laptops, projectors, speakers, and internet connections before learning activities begin. With this step, they can avoid disruptions during learning and ensure that digital media function optimally. This preventive action also demonstrates professional awareness of the importance of equipment management in the context of technology-based learning. This strategy is

seen in the reflection of P2, who emphasizes the importance of checking devices to avoid sound problems in learning videos.

c. Providing Clear Instructions

Clear instructions help students understand the steps for using digital media and reduce confusion when interacting with new technology. Teachers provide concrete directions on how to log in, answer quizzes, or access learning materials. This not only facilitates the implementation of activities, but also keeps students focused on the learning objectives, rather than on the technological aspects. P3 identified this strategy after finding that Canva's attractive visuals could distract students from the main material.

d. Training Yourself to Use New Applications

Prospective teachers strive to improve their technological skills by training themselves to use new learning applications. This training aims to build confidence and technical skills before applying them in the classroom. Mastery of various platforms such as Wordwall, Quizizz, or Mentimeter supports the Technological Knowledge aspect of the TPACK framework, which emphasizes that theoretical understanding must be balanced with practical application. P5 demonstrated the application of this strategy by practicing creating templates and exploring application features before using them in learning activities.

e. Creating Digital Rules Before Learning

Creating digital rules helps maintain discipline and effectiveness in technology-based learning. Teachers set guidelines for media use, such as how to comment, speaking time, or digital etiquette during online discussions. These rules make learning activities

more focused and orderly, and reduce potential disruptions caused by uncontrolled use of technology. P6 implemented this strategy after experiencing confusion in using the comment feature on Mentimeter.

f. Providing Motivation and Incentives to Students

Motivation is key to maintaining student engagement in digital learning activities. Teachers give praise, rewards, or extra credit to students who actively participate. This strategy helps increase student engagement and creates a more lively learning atmosphere. Through this approach, prospective teachers demonstrate a pedagogical understanding of the importance of the affective aspect in technology-based learning. P7 used this strategy when they found low student participation in WhatsApp activities.

g. Selecting and Cutting Digital Material

Teachers need to adapt digital materials to the time, needs, and abilities of students. In practice, they select or cut videos so that their duration fits the time allocation and remains focused on the core of the lesson. This strategy emphasizes the importance of efficiency and relevance in the use of digital content so that learning objectives can be achieved optimally. P8 implemented this strategy after realizing that long YouTube videos made learning inefficient.

h. Organizing Folders and Documents Systematically

File and document management is an important skill for teachers in the digital age. By organizing folders based on groups, weeks, or types of assignments, teachers can monitor students' work more easily and avoid data loss. This strategy demonstrates digital literacy and organizational skills that support learning administration efficiency.

P9 identified the importance of this strategy after losing several student assignment files in Google Docs.

i. Creating a Rotating Schedule to Keep Classes More Controlled

This strategy is implemented to maintain order during interactive digital activities, especially when many students want to participate at the same time. Teachers set up a schedule or rotation system so that discussions run smoothly and all students have equal opportunities. This approach demonstrates the teacher's ability in classroom management and creates a conducive and focused learning environment. P10 implemented this strategy after facing difficulties in controlling the class when using Wordwall simultaneously.

B. Discussion

This section discusses the research findings obtained from interviews and reflection journals of 10 pre-service English teachers during their teaching practicum. This study focuses on two main questions, namely: 1. How do pre-service English teachers describe their experiences of integrating TPACK during their teaching practicum? And 2. What challenges and strategies do pre-service English teachers reflect upon when integrating TPACK during their teaching practicum?

Based on the results of data analysis, it was found that all participants integrated various aspects of TPACK into their learning activities. The eight main components of TPACK identified include: Content Knowledge (CK), Pedagogical Knowledge (PK), Technological Knowledge (TK), Technological Pedagogical Knowledge (TPK),

Technological Content Knowledge (TCK), Pedagogical Content Knowledge (PCK), Full TPACK Integration, and Professional Development Reflection. In addition, the study also revealed various challenges, such as limited internet connection, time management, and the digital divide, as well as strategies, such as preparing offline activities, giving clear instructions, and establishing digital rules.

All of these elements are important because they reflect the extent to which prospective teachers not only understand TPACK theory conceptually, but are also able to apply it contextually in real learning practices. This demonstrates their transition from pre-service teachers to reflective practitioners who are able to adapt technology, pedagogy, and content according to classroom needs.

1. **The Experiences of Pre-Service Teachers in Integrating TPACK During Teaching Practicum**

    a. Content Knowledge (CK)

In terms of Content Knowledge, prospective teachers demonstrated a good understanding of the subject matter they teach, especially in the context of mastering linguistic concepts and English language skills. They were able to explain the content accurately and adapt it to the students' ability levels. Mastery of CK is the main foundation for TPACK integration, because without a strong understanding of content, the use of technology becomes only a meaningless additional tool. These findings are in line with Shulman's (1986) opinion that CK is the core of a teacher's competence in teaching a particular subject.

b. Pedagogical Knowledge (PK)

In terms of Pedagogical Knowledge, participants demonstrated their ability to organize learning strategies, manage classrooms, and select approaches that suit students' needs. They applied interactive methods such as group work, peer discussion, and game-based learning to maintain student engagement. Their reflections showed an awareness that the successful use of technology depends not only on the tools, but also on pedagogical approaches that support active learning. This supports Mishra & Koehler's (2006) theory that PK is the main foundation in facilitating meaningful learning experiences through TPACK integration.

c. Technological Knowledge (TK)

The Technological Knowledge aspect covers prospective teachers' ability to use various applications such as PowerPoint, Mentimeter, Canva, Quizzez and Wordwall. They showed a willingness to experiment with new media and practice independently before using them in class. Although some experienced technical difficulties, their reflections showed an increase in technological self-efficacy over time. This is in line with Koehler & Mishra's (2009) theory, which emphasizes that TK is dynamic and develops through direct experience in the learning context.

d. Technological Pedagogical Knowledge (TPK)

In terms of TPK, prospective teachers are able to adapt the use of technology to relevant pedagogical approaches. For example, they use Kahoot and Quizizz to reinforce grammar understanding through interactive quizzes, or mentimeter to

facilitate collaboration in writing. Reflections show that they are beginning to understand how technology can support specific teaching strategies, rather than merely being a supplement. This indicates an integrative understanding between pedagogy and technology, as explained in the TPACK model, which states that the interaction between the two can improve the quality of learning.

e. Technological Content Knowledge (TCK)

In terms of TCK, prospective teachers demonstrated the ability to select technological media that was appropriate for the characteristics of the subject matter. For example, the use of YouTube videos to teach pronunciation or Canva for descriptive texts demonstrated their ability to connect technology with the content being taught. Although there were still challenges in selecting the duration or focus of the material, these findings confirm that prospective teachers are beginning to understand the relationship between the nature of the content and the digital media used to deliver it.

f. Pedagogical Content Knowledge (PCK)

The PCK aspect reflects prospective teachers' understanding of developing effective teaching strategies based on content and student characteristics. They are able to adapt methods such as discussion, project-based learning, and drilling according to the type of material being taught. Several reflections show an awareness that each material requires a different pedagogical approach in order to be well understood by

students. This finding is in line with Shulman's (1987) idea that effective teachers not only master content, but also the best ways to teach it.

g. Full TPACK Integration

At the Full TPACK Integration level, prospective teachers are able to holistically combine the three main domains technology, pedagogy, and content. They do not only use technology as a tool, but make it an integral part of their learning design. For example, combining Mentimeter for brainstorming ideas, Googledrive for collaborative writing, and Wordwall for grammar evaluation. Their reflections show an awareness that modern learning requires flexibility and creativity from teachers in utilizing technology to achieve both pedagogical and content goals.

h. Professional Development Reflection

The findings reveal that the *Technological Pedagogical and Content Knowledge (TPACK)* framework effectively supports the professional development of pre-service English teachers. Through continuous reflection and technology-based practice, they learned to balance technological, pedagogical, and content knowledge (Mishra & Koehler, 2006). This integration enabled them to think critically, adapt to challenges, and create more meaningful learning experiences.

The results also show that TPACK fosters reflective and adaptive thinking, aligning with Schön's (1983) concept of the *reflective practitioner* and Zeichner and Liston's (1996) view of reflection as a means for professional growth. Furthermore, consistent with Chai, Koh, and Tsai (2013) and Harris and Hofer (2009), the

participants demonstrated flexibility and creativity in using technology to enhance student engagement and learning outcomes. In conclusion, TPACK not only strengthens teachers' techno-pedagogical competence but also cultivates reflective, innovative, and future-ready educators equipped to face the dynamic challenges of 21st-century education.

2. Challenges and Strategies in Integrating TPACK during Teaching Practice

Based on the reflections of prospective teachers, four main challenges and four related strategies were identified in integrating TPACK during teaching practice. These findings are consistent with previous studies emphasizing that technology integration requires not only technical expertise but also adaptive pedagogical strategies (Koehler & Mishra, 2009; Chai et al., 2013).

a. Internet Connection Issues

One of the most frequently mentioned challenges is unstable internet connection, which often disrupts synchronous classes and hinders digital learning activities. Several participants explained that connection issues disrupted the use of online platforms such as Mentimeter or Quizizz, forcing them to stop the lesson or switch to alternative activities.

This challenge reflects a common obstacle found in previous studies, particularly in developing countries where digital infrastructure remains uneven (Rahimi, 2020; Setiawan, 2023).

To overcome this problem, participants implemented strategies to prepare backup or offline activities. They designed lesson plans that included alternative exercises, such as printed worksheets or offline discussions, to ensure the continuity of learning. This adaptive approach is in line with Chai et al. (2013), who emphasized the importance of pedagogical flexibility in maintaining the instructional flow when technological disruptions occur.

b. Unequal Access to Technology Among Students

Another major challenge identified is the digital divide among students. Some students do not have reliable devices or stable internet connections, making it difficult for them to participate in technology-based learning. This inequality creates barriers to inclusive learning and limits teachers' ability to effectively implement technology-based strategies. These findings are in line with research by Ghomi and Redecker (2019), which highlights that unequal access remains a significant problem that affects fair learning opportunities.

To overcome this, prospective teachers adopt paper-based or offline alternatives and combine online and offline methods. This strategy ensures that all students, regardless of their level of access, can participate in learning activities. These findings are in line with Setiawan (2023), who found that hybrid learning integrating digital and traditional approaches helps reduce the impact of technological inequality while maintaining pedagogical coherence.

b. Lack of Confidence in Technology

Many participants stated that they lacked confidence in using new digital tools or overcoming technical problems during lessons. This lack of confidence in technology often causes anxiety, especially when teaching in front of students. This finding is in line with the research by Chai et al. (2013), which states that teachers' confidence in technology significantly affects their willingness to integrate technology into their teaching practices.

c. To build their confidence

Participants implemented a strategy of practicing using new applications before class. They explored the features of learning tools such as Canva, or Mentimeter to anticipate potential challenges. This practical approach not only improved their technological proficiency but also strengthened their pedagogical readiness, as supported by Koehler and Mishra (2009), who argued that experience and reflection are key components in developing TPACK competence.

d. Classroom Management and Digital Challenges

The integration of digital tools also poses challenges in managing student behavior in the classroom and online engagement. Several participants mentioned difficulties in maintaining student focus, overcoming distractions from social media, and ensuring discipline during digital tasks. This is in line with previous studies showing that managing technology-supported classrooms requires specific pedagogical and managerial skills (Rahimi, 2020; Ghomi & Redecker, 2019).

To overcome this, participants implemented digital rules and guidelines. They set clear expectations regarding online behavior, such as turning off microphones

during online lessons, submitting assignments on time, and maintaining polite interactions in chat rooms. These strategies effectively reduced digital distractions and improved classroom discipline. These findings support the recommendations of Chai et al. (2013), who emphasize that explicit digital behavior norms are essential for maintaining a productive online learning environment.

The challenges and strategies reflected by pre-service teachers during the implementation of TPACK provide valuable insights into their professional development process. Facing various difficulties such as limited technological skills, time constraints, and classroom management issues encouraged them to develop adaptive strategies, including seeking peer support, exploring alternative tools, and engaging in reflective practices.

These experiences demonstrate that overcoming challenges is not only a technical adjustment but also a part of their professional growth. By continuously reflecting on their teaching experiences and adapting to emerging demands, the pre-service teachers show progress in their self-efficacy, flexibility, and pedagogical decision-making all of which are essential components of professional development in teacher education.

Overall, the findings indicate that prospective teachers face complex but surmountable challenges in integrating TPACK during their teaching practice. Their reflective strategies such as preparing offline backups, practicing the use of digital tools, and establishing clear digital rules demonstrate a growing capacity for pedagogical adaptation. These strategies not only overcome technical barriers but also

demonstrate a growing awareness of how pedagogy, content, and technology intersect in real teaching contexts. This study supports Koehler and Mishra's (2009) TPACK framework, affirming that effective technology integration requires balanced knowledge of content, pedagogy, and technology, supported by reflection and practical problem-solving. In conclusion, while technological challenges remain common, reflective strategies based on pedagogical adaptability can enhance the effectiveness of TPACK implementation among prospective English teacher.