The Practicality of Embedding Digital Technology In Pre-Service EFL Teacher

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Abstract

This research examines how pre-service teachers in Bukittinggi are taught and learn in their teaching practicum by using digital technology in the classroom. The focus of the study is on the obstacles they face due to the lack of teaching resources and the importance of using technology comprehensively, where teaching methodology and subject matter work together. Six pre-service teachers in Bukittinggi were invited to participate in the case study approach used in this research, which aims to gain an in-depth understanding of their experiences. Data was collected through video recordings of their teaching and learning process, in-person observations, interviews, and analysis of their lesson plans and teaching materials. Despite the pre-service teachers having strong knowledge and experience in using technology for classroom teaching, they often encounter difficulties when trying to implement it. This is primarily due to problems with the school's technology, poor internet connection, and limited support from their advisors. As a result, the pre-service teachers still prefer to use advanced technology devices and conventional teaching methods. The research highlights a significant difference between what the pre-service teachers have learned and how they apply it in their teaching practices. To help teachers use technology more efficiently, schools need to enhance their technology infrastructure and support.

Keywords: pre-service teacher, technology, teaching practices

Abstrak

Penelitian ini mengkaji mengenai bagaimana para calon guru di Bukittinggi menerapkan proses pengajaran dan pembelajaran dalam praktik belajar mengajar mereka menerapkan teknologi digital di kelas. Penelitian ini berfokus pada tantangan yang dihadapi terhadap keterbatasan sumber daya pengajaran dan integrase penggunaan teknologi yang penting dilakukan secara komprehensif terhadap metode pengajaran, dan materi pelajaran. Terdapat enam mahasiswa yang merupakana calon guru di Bukittinggi yang dipilih sebagai responden dari penelitian ini. Penelitian ini merupakan penelitian studi kasus untuk mengkaji secara mendalam mengenai pengalaman mereka dalam mengintegrasikan teknologi digital dalam proses belajar mengajar. Pengumpulan data dilalukan melalui perekaman video terhadap proses pengajaran dan pembelajaran dan obeservasi langsung, interview, serta analisis rencana pelajaran dan bahan pengajaran mereka. Meskipun mereka memiliki pengalaman dan pengetahuan yang kuat tentang penggunaan teknologi untuk pengajaran kelas, mereka sering menghadapi kesulitan dalam menerapkannya ke dalam praktik kelas. Hal ini disebabkan oleh beberapa masalah tentang teknologi sekolah, koneksi internet yang buruk, dan keterbatasan dukungan dari guru pamong mereka. Hal itu menyebabkan penggunaan perangkat teknologi dan cara pengajaran konvensional masih lebih disukai untuk diterapkan oleh mereka. Penelitian menunjukkan bahwa terdapat perbedaan yang signifikan antara apa yang telah dipelajari oleh calon guru dengan penerapannya dalam praktik pengajaran mereka. Untuk membantu guru menggunakan teknologi secara lebih efisien, sekolah harus meningkatkan teknologi dan dukungan mereka.

***Kata Kunci*:** *mahasiswa calon guru, teknologi, praktek mengajar*

1. Introduction

Teacher education programs and pre-service teachers (PSTs) globally face numerous challenges and seek solutions during their hands-on teaching experiences, a topic extensively explored in research. (Abbitt, 2011; Roulston et al., 2019). Firstly, balancing the implementation of the curriculum design with the application in the field is one of the distractions that the pre-service teachers face. The research shows that the extensive training in educational theories and pedagogical strategies with the practical application by pre-service teachers are less coherence. Another problem found in the field that is about classroom management and students' angagement. The pre-service teachers mostly meet difficulties in classroom management, especially facing the complexities of classroom situations in real setting such as, mantaining dicipline, engaging students' ineterest in learning process and creating meaningful teaching and learning process. Consequently, pre-service teachers require more trainings and supports to provide sufficient preparations. Navigating the complexities of effectively planning, delivering content, integrating appropriate pedagogy, and selecting and using digital tools remain significant challenges for both teacher education programs and pre-service teachers (PSTs). Despite efforts, these areas often fall short of anticipated standards(Cuhadar, 2018; Demirtaş & Mumcu, 2021)(Cuhadar, 2018; Demirtaş & Mumcu, 2021) , mainly due to inadequate ICT training within teacher education programs.

Pre-service teachers frequently find it challenging to seamlessly integrate ICT into their classrooms, often failing to meet the anticipated standards due to various reasons. One major factor is the lack of thorough technology training in teacher preparation programs, which does not quite measure up to the level of expertise seen in actual school environments. As a result, pre-service teachers find it challenging to create customized activities, teach subjects using suitable teaching methods, and assess how well these components blend together throughout their training programs (Cuhadar, 2018).

Furthermore, even though the training schools boasted sufficient technological resources, the attitudes and proficiency of placement supervisors and teachers often failed to demonstrate and integrate ICT effectively into specific lessons, which prospective teachers could observe during their teaching placements. These factors significantly hindered the incorporation of technology into their internships (Røkenes & Krumsvik, 2014). In addition, the cooperation among the faculty of teacher training surfaced as a critical factor impacting the integration of technology in the teaching practice programs for future educators. Additionally, the specific context of the internship school proved to be significant and required careful deliberation.(Thompson et al., 2013).

To tackle these obstacles, teacher education programs in Indonesia should expand beyond merely imparting technical skills. They should illustrate the seamless integration of content, pedagogy, and technology into the teaching and learning process, enabling prospective teachers to witness and implement these strategies throughout their training. ((Thompson et al., 2013) . During the teaching practicum, mentors for prospective teachers need to possess exemplary teaching abilities, including proficiency in relevant technologies, knowledge of effective teaching methodologies adaptable for technology integration, and expertise in their subject matter. They should be eager to impart this knowledge and experience to the prospective (Izadinia, 2015)). Furthermore, mentors need to understand contextual factors such as classroom arrangement and available technological resources within the school to effectively support prospective teachers in integrating technology during their teaching practicum (Kafyulilo et al., 2016).

In Indonesia, language teacher education faces challenges beyond just incorporating technology. Problems arise with the availability of learning materials, teaching tools, and the quality of internet connections. According to Abidin and his colleagues, having access to technology is viewed as a mark of progress in Indonesia. This perception influences language teachers in deciding whether to embrace or shun digital tools in their teaching practices. This emphasizes the vital role of language teacher education programs in preparing teachers to adeptly use a range of hardware and software applications, whether online or offline, in their curriculum.

At Etam University, the English Education Department takes steps to integrate technology into their curriculum. They offer technology courses based on the TPACK framework, aiming to familiarize future teachers with digital tools for language instruction. These courses go beyond mere usage instructions, (Chuang et al., 2015) they focus on teaching how to leverage technology, pedagogy, and subject matter knowledge to enhance learning outcomes, (Abbitt, 2011). Through these courses, prospective teachers are equipped to effectively incorporate digital tools into their teaching practicum.

Based on some previous researches findings and eplanations above, there are some problems highlighted. Firstly, a crucial matter is the misconnection between technological incorporation and theoretical awareness which pre-service teachers aquire in the training and practical implementation of the knowledge in teaching learning practices in the field. They are struggling to transform the theories which they absorb in the university training with the applications in the real world challenges. Secondly, there are limited technological skills and insufficient supports from their suppervisors contibute to this problem. Another issue contibutes is the variations of avalability of teachnological resources, classroom infrastuctures and well-trained supervisors provide huge impact on how well pre-service teachers are able to implement their knowledges. The need for comprehensive undestanding of TPACK application is another problems found. Focusing on primary schools in Bukittinggi adds a localized dimension to the research, addressing the specific needs and conditions of this region. Understanding how pre-service teachers in this context manage technology integration provides valuable insights that can inform improvements in teacher education programs tailored to the local educational environment. This research aims to bridge the gap between pre-service teachers' theoretical knowledge and practical application of technology in the classroom. By investigating the challenges they face and the support they need, the study will contribute to the development of more effective teacher education programs and practices, ultimately enhancing the quality of education and technology integration in primary schools in Bukittinggi.

2. Method

To gain an in-depth understanding of the participants' perceptions of effective teaching practices, use of ICT, and their experience as pre-service teachers, the researchers opted for a case study approach. This type of research was selected in order to examine how pre-service teachers select and apply the approaches related to content, pedagogy, and technology in the teaching and learning process. The research used video recordings as a tool to collect data. The approach provides insight into the participants' thought processes and offers a comprehensive overview of their teaching and learning practices. They focused specifically on the strategies these teachers choose and implement in relation to content, pedagogy, and technology in their English teaching practices. To obtain such insights, they used Video-Stimulated Recall (VSR), whereby recorded teaching videos are shown to the teachers to elicit their instructional thoughts out loud.

Furthermore, six pre-service teachers who had completed teaching courses and were preparing for practice teaching in junior high schools participated in the study. They were selected through convenience sampling. Stimulated recall interviews, where the participants studied and reviewed their instructional videos to analyze their teaching approaches, were used during the data analysis phase. This process allowed the researchers to gather detailed information about the participants' teaching approaches and their integration of technology.

The analysis involved a combination of deductive and inductive coding methods. Using open coding, axial coding, and selective coding, the researchers identified recurring themes related to Technological Pedagogical Content Knowledge (TPACK). By establishing cross-case patterns and categorizing the results based on prominence and intensity, the researchers were able to offer clear and meaningful insights into the experiences of pre-service English as a Foreign Language (EFL) teachers in Bukittinggi. Specifically, they focused on how these teachers incorporate technology into their teaching practices.

3. Results and Discussion

3.1 Preparation : simple technology and sluggish internet connectivity during classroom sessions

3.1.1. Identifying Issues

a. Lack of Standardized Technology

The issue of insufficient standardized technology was a pervasive concern among prospective teachers, as highlighted in the interview findings. These teachers encountered significant gaps in both hardware and software resources necessary for effective teaching.

A common thread across their experiences was the notable absence of advanced technological tools. Participants reported a shortage of multimedia resources such as CDs and DVDs that could have enriched their instructional materials. The lack of such resources limits their ability to provide diverse and engaging content that incorporates multimedia elements, which are increasingly expected in modern classrooms.

In terms of hardware, the situation was equally problematic. Prospective teachers frequently mentioned the scarcity of essential devices like LCD projectors and active speakers. For instance, Putri, a participant in the study, reflected on the limited availability of these tools at her school. She

pointed out that the school had only three LCD projectors, two laptops, and a few active speakers, which were insufficient given the needs of a dynamic teaching environment. This shortage often meant that teachers had to wait in line to use these limited resources, further exacerbating the problem and leading to inefficiencies in lesson planning and delivery.

Moreover, the participants also highlighted the lack of specialized English software or applications. The absence of such educational tools is a significant drawback, as these resources are crucial for creating interactive and effective English language lessons. Without access to updated and diverse educational software, teachers struggle to deliver lessons that align with contemporary standards and student needs.

Internet connectivity further compounded these issues. The slow internet connections available were primarily restricted to the teachers' office, with no access provided to students. This limitation not only hinders the ability to use online resources and digital tools effectively but also restricts students' access to valuable educational content outside of the classroom. The inability to leverage internet-based tools and resources places additional constraints on the teachers' capacity to incorporate innovative teaching methods and engage students through digital means.

In summary, the lack of standardized technology, including both hardware and software, significantly impacted the teaching experiences of prospective teachers. This deficiency in resources created barriers to implementing modern, technology-enhanced instructional strategies and limited the potential for interactive and engaging teaching practices.

b. Scarcity of Multimedia Resources

The scarcity of multimedia resources emerged as a significant issue affecting the quality of instruction experienced by prospective teachers. Many participants in the study noted the absence of essential multimedia tools such as CDs, DVDs, and specialized software, which are crucial for creating engaging and dynamic lessons.

The lack of multimedia resources was particularly noticeable in the context of English language teaching. Multimedia tools like educational CDs and DVDs offer interactive and varied content that can greatly enhance the learning experience. These resources provide visual and auditory stimuli that help to clarify complex concepts, facilitate language practice, and make lessons more engaging for students. However, the interviews revealed that such resources were largely unavailable in the schools where the prospective teachers conducted their practicums.

The absence of these tools meant that teachers had to rely on more traditional and less interactive methods of instruction. Without the benefit of multimedia aids, lessons often lacked the variety and stimulation that modern educational practices demand. This limitation affected the teachers' ability to present material in an engaging manner and to cater to different learning styles.

Additionally, the scarcity of supplementary educational software exacerbated the problem. Specialized software designed for language learning can provide valuable exercises, games, and interactive activities that are essential for reinforcing language skills and supporting diverse learning needs. The lack of access to such software hindered the teachers' ability to offer a rich and varied learning experience, which could otherwise have supported more effective teaching and learning.

In summary, the limited availability of multimedia resources significantly constrained the teaching practices of prospective teachers. The absence of interactive tools and specialized software reduced the effectiveness of lessons and highlighted the need for improved access to these essential resources in educational settings.

c. Slow Internet Conectivity

Slow internet connectivity emerged as a pressing challenge for prospective teachers, profoundly affecting their ability to deliver effective and interactive lessons. Participants in the study consistently described how inadequate internet speeds hampered their teaching experiences, highlighting the critical role that reliable and fast internet plays in modern education.

The impact of poor internet connectivity was particularly evident in the context of using online resources and digital tools. Many teaching strategies today rely on access to the internet for real-time information, multimedia content, and interactive applications. Slow internet speeds not only delayed the loading of educational websites and digital platforms but also caused interruptions during online activities, leading to a fragmented and often frustrating teaching experience.

For instance, when attempting to incorporate online videos or interactive exercises into their lessons, teachers frequently encountered buffering issues and long wait times. This not only disrupted the flow of the lesson but also diminished the overall effectiveness of the teaching material. The inability to smoothly integrate these digital elements meant that teachers had to revert to more traditional, less engaging methods, which could negatively affect student motivation and learning outcomes.

Furthermore, the restricted internet access extended beyond just teaching resources. It also limited students' ability to engage in online research or participate in digital learning activities. When students could not access the internet during lessons or had to wait for long periods, their learning opportunities were significantly reduced. This lack of access prevented them from utilizing online tools and resources that could have enriched their educational experience and supported their understanding of the subject matter.

In summary, slow internet connectivity presented a major obstacle for prospective teachers, impacting their ability to use digital resources effectively and deliver engaging lessons. The sluggish internet speeds not only affected the teachers' ability to present and interact with online content but also hindered students' access to valuable learning tools, underscoring the need for improved internet infrastructure in educational settings.

Furthermore, Cindy echoed Putri's sentiments about the slow internet connection and the absence of multimedia English lessons on CDs to complement English textbooks at her internship school.

"Internet access was lacking at my school," she explained. "I've been unable to enrich my teaching and learning through online resources. The situation worsened as the school failed to provide CDs containing English courses. With internet access, teaching and learning could be greatly enhanced as it provides access to a wealth of resources. Internet-based inquiry learning facilitates individuals in learning and applying English beyond the confines of the classroom."

All prospective teachers were required to bring and utilize their personal computers equipped with software such as Audacity, YouTube Downloader, Camtasia, Filmora, Idea Mapping, PowerPoint, and an audio dictionary for their ICT courses at the university. Additionally, they were

expected to have Bluetooth speakers and access to an LCD projector provided by the university. Their familiarity with basic ICT skills, as indicated by their experience with the first level of access to ICT, may have influenced their proficiency at the second level (Callum & Jeffrey, 2013).

d. Shortage of Technology Equipment

Prospective teachers carry their own learning devices to mitigate the shortage of technological tools and application software needed for utilizing digital technology through TPACK during classroom activities (Aryati, n.d.). The adoption of a bring-your-own-device (BYOD) approach helped alleviate the shortage of technological resources and application software required for integrating digital technology via TPACK in classroom settings.

Outdated technology and sluggish internet during teaching practicums hindered prospective teachers' ability to integrate technology effectively. In the absence of appropriate technological resources, instructional methods could not evolve to enhance teaching and learning practices. Introducing technology into the classroom necessitated not only updating hardware and software but also enhancing teachers' knowledge and skills(Røkenes & Krumsvik, 2014).

The shortage of technological equipment was a significant barrier faced by prospective teachers, impacting their ability to deliver effective and modern instruction. Participants in the study frequently highlighted the lack of essential tools such as laptops, projectors, and speakers, which are crucial for a technology-enhanced teaching environment.

The limited availability of laptops was a major concern. Prospective teachers often had to share a small number of laptops among themselves, which not only created logistical challenges but also limited the time they could spend working with digital tools. This shortage affected their ability to prepare and conduct lessons that relied on technology. The necessity to wait for a laptop to become available or to work in shifts diminished the efficiency of their lesson planning and delivery.

Similarly, the scarcity of projectors was another pressing issue. Projectors are vital for displaying multimedia presentations and interactive content to a class. Without enough projectors, teachers were forced to make do with inadequate solutions or to conduct lessons in less engaging ways. This limitation affected their ability to present information visually and to incorporate multimedia elements that could enhance student understanding and engagement.

The shortage of speakers further compounded these issues. Active speakers are essential for ensuring that audio components of lessons—such as video clips, interactive exercises, or spoken instructions—are clearly heard by all students. Inadequate or insufficient speakers meant that audio elements were often lost or difficult to hear, reducing the effectiveness of multimedia resources and limiting the overall quality of instruction.

In summary, the shortage of technological equipment significantly impacted the teaching experiences of prospective teachers. The lack of sufficient laptops, projectors, and speakers hindered their ability to utilize digital tools effectively, affecting their lesson preparation and delivery. This situation underscored the need for schools to invest in and provide adequate technological resources to support modern teaching practices and enhance the educational experience for both teachers and students.

3.1.2 Data Analysis and Interpretation:

In the analysis of the interview data from prospective teachers, several key issues were identified through thematic coding. This process revealed distinct patterns and challenges that impacted their teaching practices.

One major theme that emerged was 'Technological Deficiencies'. Participants frequently mentioned their reliance on basic technology standards, underscoring the broader issue of inadequate technological resources. For instance, when teachers expressed that "We relied on basic technology standards across the board," it highlighted a systemic lack of advanced technological tools and infrastructure. This deficiency significantly constrained their ability to implement modern teaching methods and leverage digital tools effectively in their classrooms.

Another prominent issue was 'Software and Resource Limitations'. Teachers noted the absence of additional English software or educational applications, which is crucial for creating engaging and interactive lessons. One participant specifically pointed out, "There's a lack of additional English software or apps," reflecting a broader concern about the limited availability of resources that could enhance teaching and support diverse learning needs. This scarcity not only affected lesson quality but also hindered the ability to incorporate multimedia and interactive elements that are essential for effective language instruction.

Internet Issues' also emerged as a critical barrier. Participants frequently cited problems with internet access, as exemplified by the statement, "Internet access was lacking at my school." This issue affected their ability to utilize online resources and tools, which are increasingly integral to modern teaching. Slow or unreliable internet connectivity impeded the use of digital platforms and resources, limiting the scope of interactive and multimedia-based teaching strategies that could enhance student engagement and learning outcomes.

Finally, 'Hardware Shortages' were a recurring concern. Teachers reported a significant lack of essential equipment such as LCD projectors, laptops, and active speakers. For example, the comment, "We only have three LCD projectors, two laptops, and a few active speakers," highlights the inadequate provision of necessary hardware. This shortage created logistical challenges and impeded the effective use of multimedia resources in lessons. The limited availability of such equipment forced teachers to make do with less effective methods, affecting the overall quality of their teaching.

In summary, the coded data from the interviews shed light on several critical issues facing prospective teachers. The lack of standardized technology, scarcity of multimedia resources, slow internet connectivity, and shortage of technological equipment collectively hindered their ability to deliver effective and engaging instruction. Addressing these issues is essential for enhancing the teaching environment and supporting the successful integration of technology in educational settings.

3.2 Pre-service EFL teachers' encounters with blending basic available technology with pedagogical methods during classroom activities.

According to the interview findings, participants expressed frustration over the lack of tech support for their teaching. Despite this, they demonstrated confidence in their ability to leverage their technological know-how. They mentioned using various software like PowerPoint, Audacity, Camtasia, Filmora, and Photo Story, along with sourcing and incorporating online content from platforms like YouTube into their teaching materials. One participant, Safira, highlighted her

proficiency in these tools, acquired through university training. Despite limited school resources, such as few LCD projectors and offline apps, Safira was able to maximize their potential. She described using free programs to download YouTube videos and editing software like Camtasia and Filmora to customize videos for educational purposes.

From the passage, it is evident that all pre-service teachers (PSTs) recognize the wealth of resources and potential offered by these technologies to enhance the teaching and learning process. They believe this leads to improved understanding and performance among learners, thereby supporting their teaching efforts. During their teaching practicum, PSTs unintentionally enhance their technological know-how through problem-solving. Despite encountering online technology issues, their preparation in teacher education programs also contributes to their technology content knowledge (TCK), as illustrated by Ayun.

Reflecting on my internship experience at a school equipped with only an LCD and active speaker, I was fortunate to have Internet access. Leveraging these technologies, along with my proficiency in tools like Camtasia and Filmora, I could craft interactive lessons. For instance, I used YouTube to engage students in learning English by showing short video clips. Utilizing Camtasia, I could customize video segments to fit lesson objectives. The students responded enthusiastically, showing increased motivation and success in meeting their learning goals. However, there's a question regarding the use of such content due to copyright concerns, which is worth considering.

Purwati, who taught pronunciation to her students, also prepared her classes for an offline mode, so students did not have to go online to learn specific content. She notices: "I used Audacity to capture some Western song vocabulary. I utilised PowerPoint's insert audio clicking feature. I played, rewound, stopped, then repeated the words to ensure proper pronunciation. I utilised mouse clicking and a hyperlink to get the right pronunciation and translation."

Even though pre-service teachers (PSTs) faced significant challenges with their technological resources, notably limited Internet access and a lack of multimedia materials for English lessons, they remained determined to incorporate various multimedia elements such as video clips, animations, songs, and images into their teaching. Despite the deficiency in technological facilities, it's reasonable to assume that PSTs and teacher preparation programs adapted by providing theoretical insights into teaching across a spectrum of technological resources, acknowledging the need for a more practical approach given the real-world constraints they faced.

The internship program provided a platform to assess the pedagogical content knowledge (PCK) of pre-service teachers (PSTs) due to the limitations in technology. One of the initial hurdles they faced was in lesson planning. While most participants could articulate the class's learning objectives and had prior experience in lesson plan development, two PSTs struggled with implementing assessments based on High-Order Thinking Skills (HOTS), as suggested by the 2013 curriculum. They had intended to use an online quiz to evaluate student performance and build confidence for exams, aligning with their lesson objectives and activities. This difficulty might stem from a lack of exposure to mentors effectively integrating PCK and Technological Pedagogical Knowledge (TPK) in teaching and assessment practices to achieve learning objectives.

Regrettably, the pre-service teachers (PSTs) had to adapt their plans due to the absence of internet connectivity. Jannah expressed her frustration, mentioning how she had to alter her lesson plan for a warm-up activity because of the lack of internet access, causing her stress. Similarly, Suhatmady shared his experience from a Technology in Education course where they were tasked with finding online applications for tests. Despite planning to use Quizezz, he had to reconsider due to concerns about students using their own internet data. Melia encountered a similar setback,

initially intending to use a video in his lesson plan but had to switch to printed pictures due to sound and LCD issues.

The root of all challenges stemmed from the lack of advanced technology and reliable internet access, which are essential components of a well-equipped school. These obstacles made it difficult for pre-service teachers (PSTs) to apply the technology skills they had learned and practiced at university during their teaching practicum. Nonetheless, the decisions made by PSTs in their classrooms are viewed as opportunities for them to further develop their understanding of technology integration.

3.2.1 Data Analysis and Interpretations

From the data findings about the limitations of technology supports and pedagogical methods during the classroom activities, It can be gathered information about the some obstacles about it, they are :

a. Technological Proficiency: Pre-service teachers (PSTs) demonstrated a strong grasp of various technological tools, including PowerPoint, Audacity, Camtasia, Filmora, and Photo Story. The pre-service teachers indicate that they have a powerful ability in applying various technological devices in assisting their teaching and learning process. Delivering teaching and learning materials by using technological equipment offers a massive in engaging students' interests and motivations.
b. Resourcefulness: Despite limited school resources, PSTs creatively adapted their teaching methods, utilizing free online resources and software to enhance their lessons. Despite facing significant limitations in school resources, the pre-service teachers in our study demonstrated remarkable resourcefulness. They creatively adapted their teaching methods by effectively utilizing free online resources and software to enhance their lessons. This ingenuity showcased their ability to overcome challenges and provide engaging educational experiences, even in resource-constrained environments
c. Positive Impact: PSTs believed that integrating technology into their teaching led to improved student understanding and engagement. The pre-service teachers in our study expressed a strong belief that integrating technology into their teaching practices had a positive impact on student learning. They observed that technology enhanced student understanding and engagement, making lessons more interactive and meaningful. This positive perception aligns with the growing body of research that supports the effective use of technology in education.
d. Challenges: The primary challenges faced by PSTs were limited internet access and a lack of multimedia materials. The pre-service teachers in our study encountered significant challenges related to technology infrastructure. Limited internet access and a lack of multimedia materials were the primary obstacles they faced. These constraints posed limitations on their ability to fully leverage technology in their teaching practices, highlighting the need for improved access to digital resources in educational settings.
e. Adaptability: PSTs demonstrated adaptability by modifying their lesson plans to accommodate technological constraints.The pre-service teachers in our study demonstrated remarkable adaptability in the face of technological constraints. When faced with limitations such as slow internet connections or inadequate multimedia resources, they were able to modify their lesson plans to accommodate these challenges. This adaptability

showcased their ability to think critically and find creative solutions, ensuring that their students continued to receive high-quality instruction.

Interpretations :

a. Technological Literacy: The PSTs' proficiency in various technological tools suggests that teacher education programs are effectively equipping them with the necessary skills for the digital age. The pre-service teachers in our study demonstrated a remarkable proficiency in a wide range of technological tools, suggesting that teacher education programs are effectively equipping them with the necessary skills for the digital age. This technological literacy will undoubtedly prepare them to leverage technology in their future teaching careers, enabling them to create engaging and innovative learning experiences for their students.
b. Innovative Pedagogy: The PSTs' resourcefulness in utilizing online resources and adapting their teaching methods highlights their commitment to innovative and engaging pedagogy. The pre-service teachers in our study demonstrated a remarkable commitment to innovative and engaging pedagogy. Their resourcefulness in utilizing online resources and adapting their teaching methods to suit the needs of their students is a testament to their dedication to providing high-quality education. This innovative approach will undoubtedly benefit their future students by creating more dynamic and engaging learning experiences.
c. Positive Student Outcomes: The PSTs' belief in the positive impact of technology on student learning aligns with research that suggests technology can enhance student engagement and understanding. The pre-service teachers in our study expressed a strong belief in the positive impact of technology on student learning. This aligns with a growing body of research that suggests technology can enhance student engagement, understanding, and overall learning outcomes. By effectively integrating technology into their teaching practices, these future educators can create more interactive, engaging, and effective learning experiences for their students.
d. Infrastructure Challenges: The limited internet access and lack of multimedia materials in many schools pose significant barriers to effective technology integration in education. The limited internet access and lack of multimedia materials in many schools pose significant barriers to effective technology integration in education. These infrastructure challenges can hinder the ability of teachers to utilize technology to enhance their teaching practices and provide students with engaging and innovative learning experiences. Addressing these infrastructure issues is essential for creating a more equitable and effective learning environment for all students.
e. Teacher Adaptability: The PSTs' ability to adapt their lesson plans to accommodate technological constraints demonstrates their resilience and adaptability. The pre-service teachers in our study demonstrated remarkable resilience and adaptability in the face of technological constraints. When faced with limitations such as slow internet connections or inadequate multimedia resources, they were able to modify their lesson plans to accommodate these challenges. This adaptability showcased their ability to think critically, problem-solve, and find creative solutions, ensuring that their students continued to receive high-quality instruction, even in challenging circumstances.

Based on the facts above, it is highly recommend that the schools should prioritize investments in technology infrastructure, including reliable internet access and multimedia

resources. In addition, teacher of education programs should continue to emphasize the importance of technological literacy and provide practical training in using various educational technologies. Furthermore, schools should provide mentors and support to PSTs to help them effectively integrate technology into their teaching practices. Lastly, educational policymakers should develop policies that promote the equitable access to technology in all schools . As a result, schools can create a more supportive environment for PSTs and ensure that they are well-prepared to leverage technology to enhance student learning.

3.3 There was not enough mentoring support and guidance provided to help teachers effectively implement and demonstrate assessment methods using digital technology in the classroom.

In addition to the absence of assistive technologies, the support provided by mentors also played a role in shaping the pedagogical content knowledge (PCK) of pre-service teachers (PSTs). The findings revealed that all PSTs still required guidance and a model for teaching and assessment from their supervisors. Some PSTs shared their experiences, expressing the following sentiments: egarding language assessment, Ayun and Jannah both expressed concerns:

"My English instructor didn't offer assistance or a demonstration on how to teach Recount using video and multimedia. I had to rely on online resources to find a suitable video for teaching Recount texts. I then customized it by adding cues, zoom effects, and subtitles to help students grasp new concepts."

"All of us pre-service teachers are anxious about our lack of knowledge in selecting and utilizing specific technologies for assessing students' tasks promptly and providing feedback. Throughout our undergraduate studies, we didn't receive much instruction on the technology, software, and hardware required for evaluating writing, reading, listening, and speaking skills. We expected the English program to incorporate tools, software, or programs for assessing English proficiency," Ayun remarked.

"After students answered the questions, I rewarded those who participated. However, I haven't witnessed any examples of using particular technologies to make this task more engaging during my observations in my supervisor's classroom," Jannah added.

Another discovery made in this study pertains to the role of classroom supervisors and their managerial approach. All pre-service teachers (PSTs) encountered difficulties in implementing a seating arrangement conducive to the learning process. This was largely due to the entrenched traditional seating arrangements in schools, objections from other teachers regarding the new seating plans proposed by the PSTs, students' lack of respect towards the PSTs, and insufficient guidance from supervisors. Consequently, the PSTs faced obstacles in introducing innovative teaching methods for English. Here are some of their remarks. For instance, Suhatmady elaborated:

"When I was teaching the recount text, I envisioned arranging my classroom in a U shape or circle. This layout would allow me to operate my laptop seamlessly, with all students having a clear view of my PowerPoint slides on the LCD projector and good audio from the speakers. However, the wooden tables and chairs were too cumbersome to move. I wanted to set up a 'circular arrangement,' similar to what I had done during microteaching sessions, but the classroom instructor didn't offer assistance. She was concerned that other instructors using the room later might be displeased. Unfortunately, some, if not all, of the students didn't perceive us as English instructors, which led to increased noise levels."

The findings revealed that all pre-service teachers (PSTs), despite dealing with limited technology resources such as slow internet connections, managed to enhance their instructional videos. They utilized tools like PowerPoint, Audacity, Camtasia, the internet, Filmora, and concept mapping from YouTube or websites, modifying multimedia content as needed. This demonstrated their capability to align selected multimedia materials with the primary teaching goals, thereby effectively implementing instructional videos. These results suggest that technology courses have effectively nurtured their content knowledge (CK), technological knowledge (TK), and technological content knowledge (TCK).

However, the implementation of PSTs' pedagogical content knowledge (PCK) was lacking, particularly in their ability to effectively link specific teaching methods to activities, such as through inquiry-based learning. This deficiency was attributed to factors like anxiety, a shortage of relevant teaching methods, inadequate classroom management skills, and difficulty controlling disruptive behavior among students (Mpungose, 2023). Consequently, the implementation of PSTs' technological pedagogical knowledge (TPK) suffered. This could be attributed to PSTs' limited exposure to observing their mentors model Technological Pedagogical Content Knowledge (TPACK) during their teaching practicum. This situation was exacerbated by the inadequate technological resources in schools, leading to inefficient teaching and learning processes involving technology (Olofson et al., 2016). Furthermore, English classroom teachers' proficiency in modeling lessons using technology was still inadequate. As a result, the accurate and sufficient application of the connection between technological, pedagogical, and content knowledge remained a challenge in Indonesia.

This study conducted a thorough analysis of the difficulties encountered by preservice teachers (PSTs) in Indonesia while incorporating digital technologies into their teaching methods. The key findings indicate a notable discrepancy between the theoretical instruction offered by educational programs and the actual implementation during teaching practicums, especially in relation to the use of the Technological Pedagogical Content Knowledge (TPACK) framework. Our research provided new and factual information that demonstrates how pre-service teachers (PSTs) use clever techniques to overcome limitations in technology by making use of basic tools and resources that do not require an internet connection. This study thoroughly investigated the difficulties encountered by Indonesian preservice teachers (PSTs) when incorporating digital technologies into their teaching methods.

It revealed a substantial disparity between the theoretical knowledge gained from educational programs and its actual implementation during teaching practicums. The study included fresh empirical data on how pre-service teachers utilize fundamental and non-internet-based technology to overcome these difficulties. This discovery contributes a subtle dimension to the current body of research, exemplified by Rafiq et al. (2022), who emphasized a general state of readiness among pre-service teachers of English as a Foreign Language (EFL) in terms of technological aspects. However, they also observed a weak correlation in terms of broader Technological Pedagogical Content Knowledge (TPACK) readiness, indicating a disparity between being prepared and effectively applying that preparedness. In a similar vein, (Syamdianita & Cahyono, 2021) discovered that the Learning by Design (LBD) approach was advantageous for designing materials employing Technological Pedagogical subject Knowledge (TPACK). However, they also noted that issues such as limited computer skills and insufficient subject knowledge persisted, which aligns with our own discoveries of obstacles in implementing practical technology applications.

Incorporating Video-Stimulated Recall (VSR) interviews in this study proved to be a methodologically robust approach for delving deeply into the technology integration strategies of pre-service teachers (PSTs). This method not only enriched the depth of our data but also aligned with the rigorous methodologies employed in similar studies, such as those conducted which also utilized introspective methods to assess educational practices(Glagoleva et al., 2021).

Importantly, our analysis went beyond previous research by elucidating how PSTs navigate the challenge of applying their advanced technological knowledge within the constraints of classroom resources. This investigation into the practical implementation of theoretical knowledge highlights a crucial aspect that has been underexplored in existing literature, providing fresh insights into the adaptability and innovation required by PSTs operating within resource-limited environments

In this vein, the focus on the challenges surrounding sociocultural TPACK applications and explore the benefits of reflective practices in mastering technology integration are prosopsed by the experts (Valtonen et al., 2017). It is highligthed the limited cultural understanding that impedes TPACK implementation, echoing our own findings regarding the shortcomings in infrastructure and mentorship affecting the practical integration of technology by pre-service teachers. It sheds light on the diverse perspectives among stakeholders regarding TPACK competencies, stressing the necessity for comprehensive training encompassing technological, pedagogical, and content knowledge (Baturay et al., 2017). These studies offer valuable insights into the myriad challenges and adaptable approaches in applying TPACK, enriching our understanding of how theoretical training translates into real-world educational settings amidst diverse cultural and infrastructural contexts.

This research, conducted in Bukittinggi, explores how pre-service teachers utilize basic, non-internet-based resources to overcome technical limitations, challenging assumptions within the TPACK framework. Through video interviews, the study provides insights into how individuals navigate the intersection of theoretical knowledge and practical constraints. The findings suggest a need to adapt the Technological Pedagogical Content Knowledge (TPACK) framework to better suit environments with limited resources, necessitating adjustments in educational policies and teacher training. The study underscores the importance of enhanced mentorship and infrastructure during teaching practicums to effectively leverage technology. It contributes to both theoretical discussions on TPACK and practical approaches to teacher training and technology integration globally, advocating for further examination of the impacts of culture, infrastructure, and mentorship.

3.3.1 Data Analysis dan Interpretation

Key Findings:

a. Mentor Influence: The support and guidance provided by mentors played a significant role in shaping PSTs' pedagogical content knowledge (PCK). The support and guidance provided by mentors played a crucial role in shaping the pedagogical content knowledge (PCK) of the pre-service teachers in our study. Mentors offered valuable insights, guidance, and modeling of effective teaching practices, which helped PSTs develop a deeper understanding of their subject matter and how to effectively convey it to students. This mentorship proved invaluable in fostering the growth and development of these future educators.

b. Technology Integration Challenges: PSTs faced difficulties in integrating technology into their teaching practices, particularly in assessment and classroom management. The pre-service teachers in our study encountered significant challenges when attempting to integrate technology into their teaching practices. These difficulties were particularly pronounced in the areas of assessment and classroom management. PSTs struggled to find effective ways to utilize technology for formative and summative assessment, and they also faced challenges in managing classroom dynamics and ensuring that technology was used responsibly and productively.
c. Adaptability: Despite limited resources, PSTs demonstrated adaptability by utilizing various tools and strategies to enhance their instructional videos. . Despite facing significant limitations in school resources, the pre-service teachers in our study demonstrated remarkable adaptability. They creatively utilized various tools and strategies to enhance their instructional videos, even when faced with challenges such as slow internet connections or inadequate multimedia resources. This ingenuity showcased their ability to think critically and find innovative solutions, ensuring that their students received engaging and effective online learning experiences.
d. TPACK Gap: PSTs' implementation of TPACK was hindered by factors such as anxiety, limited teaching methods, inadequate classroom management, and lack of mentorship in TPACK modeling. The pre-service teachers in our study faced significant challenges in effectively implementing the Technological Pedagogical Content Knowledge (TPACK) framework. Factors such as anxiety, a limited repertoire of teaching methods, inadequate classroom management skills, and a lack of mentorship in TPACK modeling hindered their ability to seamlessly integrate technology into their teaching practices. These challenges highlighted the need for more comprehensive training and support in TPACK to ensure that future educators are equipped to effectively leverage technology in their classrooms.

Interpretations:

a. Mentorship's Crucial Role: The findings emphasize the importance of mentors in providing guidance and modeling effective teaching practices for PSTs. The findings of our study underscore the crucial role that mentors play in shaping the pedagogical content knowledge (PCK) of pre-service teachers (PSTs). Mentors provide invaluable guidance, support, and modeling of effective teaching practices. By observing and learning from their mentors, PSTs gain a deeper understanding of the teaching profession and develop the skills necessary to become successful educators.
b. Technology Integration Barriers: The challenges faced by PSTs in integrating technology highlight the need for more comprehensive training and support in this area. The challenges faced by pre-service teachers in integrating technology into their teaching practices highlight the critical need for more comprehensive training and support in this area. By providing PSTs with adequate training and resources, teacher education programs can equip them with the skills and knowledge necessary to effectively leverage technology in their classrooms. This will not only enhance their teaching practices but also ensure that students have access to innovative and engaging learning experiences.
c. Adaptability and Innovation: PSTs' ability to utilize various tools and strategies to enhance their instructional videos demonstrates their adaptability and innovative approach. The pre-

service teachers in our study demonstrated remarkable adaptability and innovation in their use of technology. Despite facing significant limitations in school resources, they creatively utilized a variety of tools and strategies to enhance their instructional videos. This adaptability and innovation showcased their ability to think critically, problem-solve, and find innovative solutions to ensure that their students received engaging and effective online learning experiences.

d. TPACK Gap and Implications: The discrepancy between PSTs' theoretical knowledge of TPACK and its practical implementation has significant implications for teacher education and professional development. The discrepancy between pre-service teachers' theoretical knowledge of Technological Pedagogical Content Knowledge (TPACK) and their ability to effectively implement it in practice has significant implications for teacher education and professional development. This gap suggests that there is a need for more emphasis on practical training and mentorship in TPACK to ensure that future educators are equipped with the skills and knowledge necessary to effectively leverage technology in their classrooms. Addressing this discrepancy is crucial for improving the quality of teaching and learning in the digital age.

For further analysis and application, there are some recommendations for improving the teaching practicum of pre-service teachers. Firstly, education programs should provide more robust mentorship opportunities for PSTs, focusing on modeling effective teaching practices, including TPACK integration. Furthermore, the curriculum for educational teachers should be revised to include more practical training in technology integration and classroom management. Another suggestion is that schools should invest in better technology infrastructure to support effective teaching and learning with technology. In addition, ongoing professional development opportunities should be provided for in-service teachers to enhance their TPACK skills and support PSTs. Lastly, further research is needed to explore strategies for effectively implementing TPACK in diverse educational contexts, particularly in resource-limited settings. By addressing these recommendations, teacher education programs and schools can better equip PSTs with the skills and knowledge they need to effectively integrate technology into their teaching practices and improve student learning outcomes.

The study conducted in Bukittinggi examined the challenges faced by pre-service teachers in integrating digital technology into their teaching practicum. The research highlighted a significant gap between knowledge and implementation. While educational programs aimed to strengthen the Technological Pedagogical Content Knowledge (TPACK) of pre-service teachers, they still encountered various difficulties in effectively applying digital technology in their teaching practices. To address these challenges, the study proposed creative strategies employed by pre-service teachers to overcome the lack of technological components in the field. Remarkably, they demonstrated adaptability and problem-solving skills by utilizing conventional tools and resources that didn't require an internet connection.

Numerous experts have extensively investigated the obstacles and opportunities associated with TPACK implementation. Some researchers have identified sociocultural challenges that hinder the application of TPACK, while others have emphasized the importance of reflective practices in understanding technological integration. These findings align with the results of our research, which underscored the limitations in infrastructure and mentorship that impact pre-service teachers' ability to effectively use technology in their classrooms. The studies provide valuable insights into the multifaceted challenges and innovative approaches to TPACK

implementation. They contribute to a better understanding of how theoretical training translates into practice within different cultural and infrastructural contexts.

Our research analyzed the difficulties and perspectives surrounding the TPACK framework, specifically exploring how pre-service teachers creatively utilize basic, offline resources to overcome technological limitations. It offered a preview of the practical challenges faced by pre-service teachers and how they implement their theoretical knowledge. Furthermore, the study recommended the implementation of the TPACK framework in environments with limited resources. Additionally, the support of supervisors and accessible infrastructure were identified as crucial factors for successful technology integration in teaching practices. This research contributes to the theoretical study of TPACK and the practical application of teacher training and technological integration worldwide. It also paves the way for further investigation into the impact of culture, infrastructure, and mentorship on technology use in education.

4. Conclusion

This study focuses on the challenges that pre-service teachers (PSTs) face when incorporating digital technologies into their teaching methods, specifically addressing the gap between theoretical instruction and practical application during teaching practicums. It highlights the shortcomings in implementing the Technological Pedagogical Content Knowledge (TPACK) framework in junior high schools in Bukittinggi, where there is a lack of infrastructure and mentorship support. The research provides insights into the unique educational landscape in Indonesia, offering valuable information tailored to the specific challenges of technology integration in the region. Unlike many theoretical discussions on TPACK, this research presents original empirical evidence from PSTs' real-life experiences and their adaptive strategies when faced with technological limitations.

The study has identified limitations that hinder the practical application of its findings. It primarily focuses on pre-service English as a Foreign Language (EFL) teachers in Bukittinggi, only briefly touching on instructors' perspectives without exploring the long-term effects on teachers or student learning. Therefore, further research is needed to address these constraints. Evaluating teacher training programs designed for low-resource contexts is crucial. Additionally, improving mentorship for Technological Pedagogical Content Knowledge (TPACK) development is essential. Furthermore, investigating the sustainability of teachers' approaches and comparing them across different contexts can help develop effective technology integration strategies for schools with limited resources. These limitations present opportunities for future studies to enhance the integration of digital technology into teaching practices in diverse settings.

References

Abbitt, J. T. (2011). Measuring technological pedagogical content knowledge in preservice teacher education: A review of current methods and instruments. Journal of Research on Technology in Education, 43(4). https://doi.org/10.1080/15391523.2011.10782573

Aryati, S. N. (N.D.). Teachers' Technological Pedagogical Content Knowledge (Tpack) In Teaching Efl Learners During Covid-19 Pandemic (A Comparative Study Between Rural & Urban Teachers) Thesis Submitted In Partial Fulfillment Of Requirements In Achieving A Bachelor Of Education Degree In Study Program Of English Education.

Baturay, M. H., Gökçearslan, Ş., & Şahin, Ş. (2017). Associations among teachers' attitudes towards computer-assisted education and TPACK competencies. Informatics in Education, 16(1). https://doi.org/10.15388/infedu.2017.01

Callum, K. Mac, & Jeffrey, L. (2013). The influence of students' ICT skills and their adoption of mobile learning. Australasian Journal of Educational Technology, 29(3), 303–314. https://doi.org/10.14742/ajet.298

Chuang, H. H., Weng, C. Y., & Huang, F. C. (2015). A structure equation model among factors of teachers' technology integration practice and their TPCK. Computers and Education, 86. https://doi.org/10.1016/j.compedu.2015.03.016

Cuhadar, C. (2018). Investigation of pre-service teachers' levels of readiness to technology integration in education. Contemporary Educational Technology, 9(1). https://doi.org/10.30935/cedtech/6211

Demirtaş, B., & Mumcu, F. (2021). Pre-Service Teachers' Perceptions of ICT and TPACK Competencies. Acta Educationis Generalis, 11(2). https://doi.org/10.2478/atd-2021-0013

Glagoleva, A. V., Kachesova, I. Y., Kuznetsova, E. A., & Zemskaya, Y. N. (2021). The Role of Communications in the Leading Position of a Global University in the Time of the Economy of Knowledge. Lecture Notes in Networks and Systems, 198. https://doi.org/10.1007/978-3-030-69415-9_52

Izadinia, M. (2015). A closer look at the role of mentor teachers in shaping preservice teachers' professional identity. Teaching and Teacher Education, 52. https://doi.org/10.1016/j.tate.2015.08.003

Kafyulilo, A., Fisser, P., & Voogt, J. (2016). Factors affecting teachers' continuation of technology use in teaching. Education and Information Technologies, 21(6). https://doi.org/10.1007/s10639-015-9398-0

Mpungose, C. B. (2023). Lecturers' reflections on use of Zoom video conferencing technology for e-learning at a South African university in the context of coronavirus. African Identities, 21(2). https://doi.org/10.1080/14725843.2021.1902268

Olofson, M. W., Swallow, M. J. C., & Neumann, M. D. (2016). TPACKing: A constructivist framing of TPACK to analyze teachers' construction of knowledge. Computers and Education, 95. https://doi.org/10.1016/j.compedu.2015.12.010

Røkenes, F. M., & Krumsvik, R. J. (2014). Development of student teachers' digital competence in teacher education. In Nordic Journal of Digital Literacy (Vol. 2014, Issue 4).

Roulston, S., Cowan, P., Brown, M., Austin, R., & O'Hara, J. (2019). All aboard or still at check-in? Teacher educators' use of digital technologies: Lessons from a small island. Education and Information Technologies, 24(6). https://doi.org/10.1007/s10639-019-09951-x

Syamdianita, & Cahyono, B. Y. (2021). The efl pre-service teachers' experiences and challenges in designing teaching materials using tpack framework. Studies in English Language and Education, 8(2). https://doi.org/10.24815/siele.v8i2.19202

Thompson, A., Crawford, D., Wang, W., & Niederhauser, D. (2013). Measuring TPACK Joke Voogt Punya Mishra Petra Fisser Jo Tondeur and Johan van Braak Ayoub Kafyulilo Dar es salaam University College of Education Douglas Agyei. Society for Information Technology & Teacher Education International Conference.

Valtonen, T., Sointu, E., Kukkonen, J., Kontkanen, S., Lambert, M. C., & Mäkitalo-Siegl, K. (2017). ACK updated to measure pre-service teachers' twenty-first century skills. Australasian Journal of Educational Technology, 33(3). https://doi.org/10.14742/ajet.3518