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Exploring the Use of Technology Pedagogical Content Knowledge (TPCK) Strategies in Elementary Schools: Mixed Methods Design with IRAMUTEQ

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Abstract

This study aims to explore the use of TPCK (Technological Pedagogical Content Knowledge) in Javanese language learning in elementary schools, with a focus on the use of technology and pedagogical strategies used by teachers. The research design used is Mixed-Method with IRAMUTEQ as a data analysis tool. Data was collected through observation, interviews with teachers, and document analysis. The results of the study show that teachers use various technologies in Javanese language learning, but the application of TPCK is still limited. In addition, the pedagogical strategies used tend to vary depending on the context and characteristics of the students. The implications of this study are the importance of improving the understanding and application of TPCK in the context of Javanese language learning, as well as the importance of developing pedagogical strategies that suit the needs of students. This research contributes to the understanding of the integration of technology in regional language learning and provides guidance for teachers in improving the quality of Javanese language learning in East Java, Indonesia.

Keywords: TPCK, Javanese Language, Technology, Pedagogical Strategy, Mixed-Method, IRAMUTEQ

INTRODUCTION

In the introduction section, the article must begin by presenting the background of the study and emphasizing the critical role of technology in language education (Angeli, & Valanides, 2009). This is especially relevant in the regional context of Javanese language learning, where modern educational technologies have the potential to transform traditional teaching methods. The integration of technology in language education is essential to enhance the learning experience, making it more interactive and engaging for students. Javanese, as a regional language taught in elementary schools, presents unique challenges in terms of both pedagogy and technological application, underscoring the need for a closer examination of these issues.

The introduction should also review the relevant literature on TPCK (Technological Pedagogical Content Knowledge) and its growing importance in educational settings. TPCK serves as a framework that helps teachers effectively integrate technology into their subject-specific teaching. By understanding how content knowledge, pedagogy, and technology intersect, teachers can improve their instructional methods and student outcomes (Ching, & Hursh, 2014). Previous studies have examined the role of TPCK in various language education contexts, but there is limited research on its application in regional language teaching, such as Javanese. This gap in the literature highlights the need for further investigation into how TPCK can be applied effectively in this area.

One of the main challenges in implementing technology in Javanese language classes is the limited access to resources and the lack of familiarity among teachers with the TPCK framework. Many

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teachers may have some level of content knowledge and pedagogical expertise, but integrating technology into their lessons remains a challenge. Furthermore, the diverse cultural and linguistic backgrounds of students in different regions make it difficult to develop a one-size-fits-all approach to teaching Javanese using technology. These challenges underline the necessity of conducting research to explore how TPCK can be adapted and applied in the context of Javanese language instruction.

The research gap lies in the limited application of TPCK in Javanese language teaching. While there has been significant progress in the use of TPCK in general education and mainstream language instruction, little attention has been paid to its potential in regional languages. Javanese language teachers, particularly in elementary schools, have yet to fully embrace the TPCK framework, partly due to the lack of professional development opportunities and adequate training. This study seeks to address this gap by investigating the current state of TPCK application in Javanese language education and identifying areas for improvement.

In response to these challenges, the primary objective of this study is to explore the extent to which TPCK is being applied by teachers in Javanese language classes. The research will focus on two main areas: the use of technology in language instruction and the pedagogical strategies employed by teachers to enhance student learning. By examining how teachers integrate technology into their teaching, this study aims to provide insights into the effectiveness of current practices and offer recommendations for future improvements.

In conclusion, the study aims to contribute to the body of knowledge on TPCK by examining its application in the regional context of Javanese language education. It will provide valuable insights into how technology can be leveraged to improve teaching and learning outcomes in this unique educational setting. Through this research, it is hoped that teachers will gain a deeper understanding of how to incorporate technology into their lessons in a way that is both pedagogically sound and culturally appropriate.

METHODS

This section should provide a detailed description of the research methodology, outlining the data collection techniques and the analytical tools utilized throughout the (study Koehler, & Mishra, 2005). The research adopted a Mixed-Method approach, combining both qualitative and quantitative data analysis to ensure a comprehensive understanding of the subject matter. By integrating these two methods, the study captures the complexity of the educational processes involved, providing both numerical insights and rich, descriptive data that reflect the experiences of the participants.

The participants in this study were Javanese language teachers from various elementary schools in East Java. The selection of teachers was based on their teaching experience and their geographical location, ensuring a diverse representation of educational contexts within the region. Data collection was carried out using three primary methods: observation, interviews, and document analysis. Classroom observations were conducted to capture the real-time application of technological and pedagogical strategies by teachers, providing direct insight into their teaching practices. The interviews, structured around key themes such as the use of technology and pedagogical approaches, allowed the researchers to delve deeper into the teachers' perspectives and experiences. Additionally, document analysis was employed, focusing on reviewing lesson plans, teaching materials, and other relevant instructional documents to further understand the alignment between

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theory and practice. The qualitative data obtained from interviews and document analysis were then analyzed using IRAMUTEQ, a software tool specifically designed to assist in processing textual data, enabling the researchers to identify patterns and themes within the data systematically.

RESULTS

The findings of this study are presented based on the data analysis, focusing on the key results and their alignment with the research objectives. The data reveals important insights into the use of technology, the pedagogical strategies employed by teachers, and the challenges faced in the implementation of TPCK within Javanese language classes. These findings provide a deeper understanding of how technology is currently utilized in this educational context and the extent to which TPCK is integrated into teaching practices.

In terms of technology use in Javanese language classes, the study shows that teachers employ a variety of technological tools to support their instruction. These include digital presentations, online learning platforms, and multimedia resources aimed at enhancing student engagement and comprehension. However, the integration of TPCK remains limited. While teachers are making efforts to incorporate technology, the depth of TPCK application is often inconsistent, with many educators lacking the necessary knowledge to effectively blend technology, pedagogy, and content. This suggests that, although technology is present in the classroom, it is not always used in a way that fully leverages its potential to enhance learning outcomes through a structured TPCK framework.

Regarding pedagogical strategies, there is notable variation in how teachers approach Javanese language instruction. The study found that these strategies often depend on the characteristics of the students and the specific classroom context. For instance, teachers in rural areas tend to rely more on traditional methods due to limited access to technology, while those in urban settings are more likely to incorporate digital tools. Moreover, the pedagogical approaches varied depending on the age and learning needs of the students, with some teachers using interactive methods to engage younger learners, while others applied more structured techniques for older students. This variation indicates a flexible approach to pedagogy, but also highlights the need for more systematic application of TPCK to ensure that both technology and teaching strategies are effectively aligned with student needs.

One of the most significant challenges identified in the study is the limited implementation of TPCK. Teachers face several obstacles when attempting to apply the TPCK framework, with many struggling to balance the integration of technology with effective pedagogical approaches. The lack of adequate training and resources further exacerbates this issue, leaving teachers uncertain about how to adapt their teaching to include both technological tools and sound pedagogical methods. Additionally, there are concerns about the relevance of available technological resources to the specific content of Javanese language teaching. This highlights the need for targeted professional development and resource allocation to support teachers in overcoming these barriers and improving the implementation of TPCK in their classrooms.

DISCUSSION

In the discussion section, the results of the study are interpreted in light of the research objectives and the literature reviewed in the introduction (Schmid, Brianza, & Petko, 2021). The findings suggest important implications for the application of TPCK in the context of Javanese language

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learning and provide a foundation for further exploration of technology integration in regional language education. The study highlights both the potential and challenges of applying TPCK in elementary school settings, particularly in regional languages like Javanese, where the cultural and linguistic context adds complexity to the teaching process.

In interpreting the results, it is clear that the application of TPCK in Javanese language learning is limited, as reflected in the inconsistent use of technology by teachers. This aligns with broader trends in language education, where the integration of technology often faces obstacles, including limited teacher training and inadequate resources. The findings reveal that while teachers are willing to incorporate technology into their lessons, their understanding of how to align it with pedagogical strategies and content knowledge remains superficial. This challenge is not unique to Javanese language education; it is a common issue in regional language instruction where both content-specific and context-specific factors complicate the application of TPCK.

The implications for teaching are significant. To enhance the quality of Javanese language education, it is crucial to improve teachers' understanding and application of the TPCK framework. Professional development programs focused on TPCK should be introduced, providing teachers with the tools and knowledge to integrate technology effectively into their teaching practices. Pedagogical strategies that are specifically tailored to Javanese language learning must also be developed. These strategies should take into account the unique linguistic and cultural aspects of Javanese, as well as the varying needs of students across different regions of East Java. By equipping teachers with the necessary skills and resources, the overall learning experience for students can be significantly improved.

This study contributes to the broader field of language education by deepening the understanding of technology integration in regional language teaching. It sheds light on the specific challenges and opportunities involved in using technology to teach Javanese, a language that carries deep cultural significance in East Java. The study not only provides theoretical insights but also offers practical guidance for teachers who are seeking to enhance their pedagogical practices. By identifying the areas where TPCK is underutilized and suggesting ways to overcome these barriers, the research contributes to the development of more effective teaching methods for regional languages.

However, there are certain limitations in this study that should be acknowledged. The sample size was relatively small, and the geographic scope was limited to certain regions of East Java, which may affect the generalizability of the findings. Additionally, the study focused primarily on the perspectives of teachers, without fully exploring the student experience or other stakeholders, such as school administrators. Future research could address these limitations by expanding the scope of the study to include a broader range of participants and regions, as well as by exploring the impact of TPCK on student learning outcomes in more detail.

In conclusion, while the application of TPCK in Javanese language education is still in its early stages, this study provides valuable insights into the potential for technology to transform language teaching in regional contexts. By addressing the gaps in teacher training and providing practical strategies for integrating technology, there is an opportunity to improve both the quality of instruction and the learning experience for students. Future research should continue to explore these themes, with a focus on developing and implementing solutions that can support teachers in overcoming the challenges of TPCK integration in regional language education.

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CONCLUSION

The main findings of this study emphasize the critical need for better integration of Technological Pedagogical Content Knowledge (TPCK) in Javanese language education. Although teachers are increasingly utilizing various technologies in their classrooms, the application of TPCK remains limited, indicating that there is significant room for improvement. The study reveals that while educators are willing to adopt technological tools, their understanding of how to effectively combine these tools with pedagogical strategies and content knowledge is insufficient. As a result, there is an urgent need for comprehensive professional development programs that focus on enhancing teachers' TPCK, ensuring they are equipped to deliver engaging and contextually relevant Javanese language instruction that meets the diverse needs of their students.

In light of these findings, it is essential to offer several recommendations for policy-makers, educators, and future researchers. Policy-makers should prioritize the development and implementation of targeted professional development initiatives that focus specifically on TPCK for teachers of regional languages like Javanese. Educators, in turn, should actively seek opportunities to expand their understanding of technology integration in their teaching practices, exploring pedagogical strategies that are culturally and linguistically appropriate for their students. Furthermore, future researchers are encouraged to conduct studies that encompass a broader range of geographic locations and include the perspectives of students and administrators to gain a more comprehensive understanding of TPCK implementation. By addressing these recommendations, stakeholders can work towards enhancing the quality of Javanese language education and ultimately improving student learning outcomes.

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