International Journal of Business, Law, and Education
E-ISSN : 2747-134X
Publisher: IJBLE Scientific Publications Community Inc.
Volume 5, Number 1, 2024
https://ijble.com/index.php/journal/index

The utilization of Technological Pedagogical Content Knowledge (TPACK) in elementary school learning

Nurul Zikri Filina[1], Siti Mayang Sari[2], Zahraini[3]
Universitas Bina Bangsa Getsempena, Banda Aceh[1,2,3]
nrlzkrfln291000@gmail.com[1], mayang@bbg.ac.id[2], zahraini@bbg.ac.id[3]

ABSTRACT
This research aims to explore the use of Technological Pedagogical Content Knowledge (TPACK) in the learning context at the elementary school level. The research approach applied was qualitative with a focus on case studies at SD Negeri 16 Banda Aceh, class 4. Data collection was carried out through classroom observations, interviews and document analysis. The research results show that the integration of TPACK in learning in elementary schools has a positive impact. Teachers have succeeded in integrating information and communication technology (ICT) well in planning and implementing learning. They use various ICT tools and applications that are appropriate to the learning content as well as effective teaching strategies. In addition, teachers are also able to apply pedagogical and content knowledge effectively to facilitate interesting and meaningful learning for students. There are several challenges faced by teachers in implementing TPACK. Some obstacles include limited access to ICT devices and resources, lack of training capable of developing TPACK competencies, as well as obstacles in integrating TPACK into the existing elementary school curriculum. The findings of this research provide a deeper understanding of the use of TPACK in learning at the elementary school level. The implications of this research can be the basis for developing teaching materials and educational policies that support the integration of TPACK in the learning process in elementary schools.

Keywords:
Technological Pedagogical Content Knowledge;
Elementary School

INTRODUCTION

The implementation of Technological Pedagogical Content Knowledge (TPACK) in the learning process at Elementary Schools is a step to integrate three crucial dimensions of knowledge: technology, pedagogy, and subject matter. The goal is to create effective and relevant learning experiences. According to (Putra & Pratama, 2023), technology has played a significant role in the field of education. However, the use of technology in learning is not just about mastering tools and technology applications; it also involves integrating technology with pedagogical knowledge and a deep understanding of subject matter. Teachers can gain an understanding of how to use technology appropriately and meaningfully in the context of learning through the utilization of technology, as stated by (Rosyid, 2015). When integrating technology into the learning context, it involves understanding how technology can support effective teaching, the application of suitable teaching strategies, and how to incorporate technology into lesson materials (Mardhatillah et al., 2019).

The utilization of TPACK in the learning process has a significant positive impact, as expressed by (Tiwan & Tutuk Ningsih, 2022). In a world where digital life has a broad influence on various aspects of human life, teachers with TPACK knowledge can create more engaging and interactive learning experiences, leading to increased motivation and student engagement. They can leverage various relevant technological resources, such as multimedia, learning software, and online resources,

to enhance students' understanding of the subject matter. When teachers harness technology, it becomes a crucial contribution to supporting students' success, as highlighted by (Setiyowati & Arifianto, 2020). Additionally, the use of technology helps teachers overcome challenges and barriers related to technology use in the learning process. With a strong TPACK knowledge base, teachers can identify suitable solutions to integrate technology effectively, ensuring its alignment with learning objectives and student needs. The use of TPACK in learning also prepares students to face an increasingly technologically connected world. (Kamsina, 2020) asserts that teachers' confidence in integrating technology into education changes positively. The use of technology in learning will develop crucial digital skills and literacy essential for success in the future.

Internet usage in Indonesia has seen a significant increase in recent years. Infrastructure support and technological advancements have allowed more people in Indonesia to access the internet. Factors such as increased accessibility, affordable device prices, and the development of digital applications and content have driven internet adoption across various segments of society. The internet has become a source of information, communication, entertainment, and education for many people in Indonesia. Despite challenges such as access gaps and digital literacy, continuous efforts are being made to expand internet access, promote digital literacy, and ensure that the benefits of the internet are felt by the entire population of Indonesia. The number of internet users in Indonesia is illustrated in Figure 1 below.

Figure 1. *Quantity of Internet User in Indonesia*

Based on Figure 1 regarding the number of internet users in Indonesia, internet usage in Indonesia is increasing compared to the previous year. In January 2021, the number of internet users in Indonesia was recorded at 202.6 million, with a growth percentage of 1.03 percent. Furthermore, internet usage in Indonesia has increased over the past five years, with a growth percentage of 54.25 percent when compared to internet usage in 2018, which was 132.7 million users.

Further exploration of the use of TPACK in the context of learning continues to be conducted to enhance teachers' understanding and practices. The implementation of TPACK in education has been tested, one example being in the 4th-grade class at SD Negeri 16 Banda Aceh. With proper adoption, TPACK has the potential to serve as a strong foundation to enrich the learning experience and improve student

outcomes in the digital era. The opinion of (Sari et al., 2021), emphasizing that in the current digital era, the integration of knowledge about technology, pedagogy, and subject matter is inseparable, is also relevant in this context.

The aim of this research is to explore the use of Technological Pedagogical Content Knowledge (TPACK) in elementary school-level learning. The results of this research provide significant benefits for both teachers and students. Practically, this research can enhance the quality of teaching by combining knowledge of technology, pedagogy, and subject matter. Thus, teachers can design and deliver more effective and engaging lessons. Theoretically, this research contributes to knowledge about appropriate technology integration, making learning more interesting, interactive, and relevant.

METHOD

The research method employed is qualitative with a case study approach. The research is conducted at SD Negeri 16 Banda Aceh, specifically in the 4th-grade class. The choice of qualitative research is based on Sugiyono's assertion that qualitative research emphasizes meaning (Sugiyono, 2013). The research implementation took place from September 2023 to December 2023. Data collection was carried out through classroom observations, interviews, and document analysis. Data analysis was performed using techniques such as data reduction, data display, and data verification.

RESULTS AND DISCUSSION

Result

Based on the results of the conducted research, it was found that the implementation of TPACK in the learning process in the 4th-grade class at SD Negeri 16 Banda Aceh has yielded positive impacts. In the aspect of technological knowledge, teachers successfully integrated information and communication technology (ICT) into lesson planning and implementation. They utilized various ICT tools and applications that were appropriate for the learning content and effective teaching strategies. Additionally, teachers were able to effectively leverage pedagogical and subject matter knowledge to facilitate engaging and meaningful learning experiences for students. An illustration of the use of TPACK in the 4th-grade class at SD Negeri 16 Banda Aceh can be seen in Figure 2 below:

In the illustration in Figure 2, it is evident that the 4th-grade learning process at SD Negeri 16 Banda Aceh involves the utilization of technology. In the image, the learning process includes the use of technological devices such as laptops or tablets as supporting tools. Students are actively engaged in interacting with technology and are capable of integrating its use effectively in their learning. This is reflected in the demonstration of learning materials through multimedia presentations or the utilization of relevant educational software.

Figure 2. *Technological Use in Learning Activity*

Discussion

The development of Technological Pedagogical Content Knowledge (TPACK) has become an interesting trend in the evolution of learning (Zainuddin et al., 2022). However, this research highlights several challenges faced by teachers in implementing TPACK. These challenges include limited access to ICT devices and resources, inadequate training to develop TPACK competency, and difficulties integrating TPACK into the existing elementary school curriculum.

The use of technology in the 4th-grade learning process at SD Negeri 16 Banda Aceh provides a deeper understanding of TPACK implementation at the elementary school level. This aligns with the finding that integrating technology into lesson planning is an advantage for teachers (Utami & Bharati, 2020). The demonstration of technology use in the classroom reflects students' enthusiasm and engagement in technology-enhanced learning. Students pay full attention, follow the teacher's explanations, and use personal technological devices such as tablets or smartphones to interact with learning materials.

The use of technology by 4th-grade teachers at SD Negeri 16 Banda Aceh reflects an awareness of the urgency of leveraging technological advancements in the educational context. This can enhance interaction between students and teachers, make learning more engaging, and provide broader access to educational resources. Despite facing various challenges in implementing technology, the improved student-teacher interaction through technology usage reflects the school's commitment to adopting an innovative learning approach that aligns with the times.

By utilizing TPACK, teachers can design effective teaching strategies by integrating technology wisely into the learning context (Sari et al., 2021). The use of technology can increase student engagement and access to information. In the 4th-grade learning environment at SD Negeri 16 Banda Aceh, various teaching aids, images, audio, and physical manipulatives are used to facilitate learning, catering to diverse student learning styles and enhancing understanding of concepts.

The integrative approach at SD Negeri 16 Banda Aceh involves merging multiple subjects or concepts in teaching. With TPACK, teachers can use technology

to enrich students' learning experiences and enhance their understanding of subject matter (Ariani, 2015). Learning can become more effective, creative, and active through the integration of technology (Sari et al., 2020). Teachers at SD Negeri 16 Banda Aceh can accommodate individual learning needs by providing variations in instruction, content, or assessment.

The use of technology in teaching by 4th-grade teachers at SD Negeri 16 Banda Aceh helps them identify and address challenges in integrating technology into the learning process. By integrating technology, pedagogy, and subject matter, TPACK has the potential to create meaningful and relevant learning experiences for students (Hayani & Sutama, 2022). This can enhance students' in-depth understanding of the material and improve critical thinking and collaboration skills (Zubaidah, 2020). Learning with technology can also help students adapt to an increasingly technologically connected world (Alimuddin et al., 2023). Facilitating learning based on students' interests and desires can stimulate their engagement and choice of relevant topics.

CONCLUSION

Based on the conducted research, the researcher can conclude that the use of Technological Pedagogical Content Knowledge (TPACK) in elementary school learning has a positive impact. In the aspect of technological knowledge, teachers successfully integrated information and communication technology (ICT) into lesson planning and implementation. Teachers utilized various ICT tools and applications that were suitable for the learning content and effective teaching strategies. Additionally, teachers were able to effectively leverage pedagogical and subject matter knowledge to facilitate engaging and meaningful learning experiences for students. This research contributes to advancing knowledge regarding the use of Technological Pedagogical Content Knowledge (TPACK) in elementary school learning.

Reference

Alimuddin, A., Niaga Siman Juntak, J., Ayu Erni Jusnita, R., Murniawaty, I., & Yunita Wono, H. (2023). Teknologi Dalam Pendidikan: Membantu Siswa Beradaptasi Dengan Revolusi Industri 4.0. Journal on Education, 05(04), 36–38.

Ambarura, P. (2023). Analisis Penerapan Teknologi dalam Pembelajaran Bahasa Indonesia di Sekolah Menengah Atas. World Education, 1(1), 25–34.

Amrina, Z., Anwar, V. N., Alvino, J., & Sari, S. G. (2022). Analisis Technological Pedagogical Content Knowledge Terhadap Kemampuan Menyusun Perangkat Pembelajaran Matematika Daring Calon Guru SD. Jurnal Cendekia : Jurnal Pendidikan Matematika, 6(1), 1069–1079. https://doi.org/10.31004/cendekia.v6i1.1313

Ariani, D. N. (2015). Hubungan antara Technological Pedagogical Content Knowledge dengan Technology Integration Self Efficacy Guru Matematika di Sekolah Dasar. Muallimuna, 1(1), 79–91. https://doi.org/10.31602/muallimuna.v1i1.277

Darmawan, H. (2016). Pembelajaran Berbasis Konstruktivisme Menggunakan Media Animasi Dengan Kerangka. Jurnal Formatif, 6(1), 1–11.

Filina, N. Z., Muadi, F., Sari, S. M., & Karima, M. K. (2022). The Analysis of Problem Based Learning With Field Trip Method in Improving Students ' Learning Outcomes in Paya Dua. Proceedings Of International Conference On Education Teacher Training & Education Faculty Universitas Serambi Mekkah.

Hart, S. L., Steinheider, B., & Hoffmeister, V. E. (2019). Team-based learning and training transfer: a case study of training for the implementation of enterprise resources planning software. International Journal of Training and Development, 23(2), 135–152. https://doi.org/10.1111/ijtd.12150

Hayani, S. N., & Sutama, S. (2022). Pengembangan Perangkat dan Model Pembelajaran Berbasis TPACK Terhadap Kualitas Pembelajaran Daring. Jurnal Basicedu, 6(2), 2871–2882. https://doi.org/10.31004/basicedu.v6i2.2512

Istiqomah, N., Rusyd, I., & Grogot, T. (2023). Reinterpretasi Metode Pembelajaran Sejarah Kebudayaan Islam : Optimalisasi Implementasi dalam Kurikulum 2013 di Madrasah Aliyah Pendahuluan. IQRA Journal of Islamic Education, 6(1), 85–106.

Kaliisa, R., Jivet, I., & Prinsloo, P. (2023). A checklist to guide the planning, designing, implementation, and evaluation of learning analytics dashboards. International Journal of Educational Technology in Higher Education, 20(1). https://doi.org/10.1186/s41239-023-00394-6

Kamsina, K. (2020). Integrasi Teknologi Dalam Pembelajaran Implementasi Pembelajaran Ilmu Teknologi Dan Masyarakat. Edueksos : Jurnal Pendidikan Sosial & Ekonomi, 9(2), 67–79. https://doi.org/10.24235/edueksos.v9i2.7103

Kweku, M., Amu, H., Awolu, A., Adjuik, M., Ayanore, M. A., Manu, E., Tarkang, E. E., Komesuor, J., Asalu, G. A., Aku, F. Y., Kugbey, N., Anumu, F., Boateng, L. A., Alornyo, J. S., Glover, R., Letsa, T., Bawah, A. A., Kanlisi, N. S., Awoonor-Williams, J. K., … Gyapong, J. O. (2020). Community-based health planning and services plus programme in Ghana: A qualitative study with stakeholders in two Systems Learning Districts on improving the implementation of primary health care. PLoS ONE, 15(1), 1–24. https://doi.org/10.1371/journal.pone.0226808

Lestari, S. (2018). Peran Teknologi dalam Pendidikan di Era Globalisasi. Edureligia; Jurnal Pendidikan Agama Islam, 2(2), 94–100. https://doi.org/10.33650/edureligia.v2i2.459

Mardhatillah, Sari, S. M., Surjono, H., & Muhtadi, A. (2019). Development of teacher and student thematic learning books based on gender and diversity for elementary school students in district of Aceh barat. International Journal of Scientific and Technology Research, 8(10), 896–898.

Putra, L. D., & Pratama, S. Z. A. (2023). Pemanfatan media dan teknologi digital dalam mengatasi masalah pembelajaran. Journal Transformation of Mandalika., 4(8), 323–329. https://ojs.cahayamandalika.com/index.php/jtm/article/view/2005/1586

Rosyid, A. (2015). Technological Pedagogical Content Knowledge: Sebuah Kerangka Pengetahuan Bagi Guru Indonesia Di Era Mea. Prosiding Seminar Nasional Inovasi Pendidikan, 446–454. https://ojs.cahayamandalika.com/index.php/jtm/article/view/2005/1586

Sari, S. M., Sinaga, B., & Suyanti, R. D. (2021). Personal Learning Environment Bersinergi dengan Teknology Pedagogic Conten Knowledge Terhadap Keterampilan Proses Sains. Educate: Jurnal …, 6(1), 72–81. https://doi.org/10.32832/educate.v6i1.4228

Sari, S. M., Surjono, H. D., & Muhtadi, A. (2020). The Effectiveness Of Thematic Learning Models Based On Diversity Integrated With Information And

Communication Technology (Ict) As Learning Support In The …. https://repository.bbg.ac.id/handle/1358%0Ahttps://repository.bbg.ac.id/bitstream/1358/1/SST_Q3-.pdf

Setiyowati, E. P., & Arifianto, Y. A. (2020). Hubungan Kompetensi Pedagogik Guru dan Prestasi Belajar Siswa pada Mata Pelajaran Pendidikan Agama Kristen. SIKIP: Jurnal Pendidikan Agama Kristen, 1(2), 78–95. https://doi.org/10.52220/sikip.v1i2.57

Sugiyono. (2013). Metode Penelitian Pendidikan (Pendekatan Kuantitatif, Kualitatif dan R&D). In Bandung: Alfabeta.

Tiwan, & Tutuk Ningsih. (2022). Inovasi Pembelajaran IPS Melalui Technological Pedagogical Content Knowledge (TPACK). Jurnal Cakrawala Pendas, 8(4), 1385–1395. https://doi.org/10.31949/jcp.v8i4.3233

Utami, C. P., & Bharati, D. A. L. (2020). Teachers' Perceptions, Planning, and Implementation of Game-Based Learning in English Extracurricular Program (A Case Of Smp 40 Semarang). English Education Journal, 10(3), 307–320. https://doi.org/10.15294/eej.v10i1.36574

Zainuddin, M., Saifudin, A., Lestariningsih, L., & Nahdiyah, U. (2022). Pengembangan Big Book dengan Model TPACK dalam meningkatkan Kemampuan Literasi Menulis Anak SD. Briliant: Jurnal Riset Dan Konseptual, 7(3), 770. https://doi.org/10.28926/briliant.v7i3.1045

Zubaidah, S. (2020). Keterampilan Abad Ke-21: Keterampilan yang Diajarkan Melalui Pembelajaran. Online. Seminar Nasional Pendidikan Dengan Tema "Isu-Isu Strategis Pembelajaran MIPA Abad 21, 2, 1–17.