ISSN : 2962-9195 E-ISSN : 2963-8992

Journal of Educational Management Research
Vol. 04 No. 02 (2025) : 487-498
Available online at https://serambi.org/index.php/jemr

Innovative Teaching in the Digital Age; Applying the TPACK Model to Foster Learning Motivation among Primary School Students

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DOI: https://doi.org/10.61987/jemr.v4i2.1107

Keywords:
TPACK, Innovative Learning, Digital Pedagogy, Primary Education

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ABSTRACT

This study aims to describe and critically analyze the implementation of innovative learning based on the Technological Pedagogical Content Knowledge (TPACK) framework in the digital era and to evaluate its influence on enhancing elementary students' learning interest. Conducted as a case study, the research focused on sixth-grade students at SDN Pekojan 03 and 05 in Jakarta. A qualitative approach was employed, with data collected through observation, interviews, and documentation. The findings reveal that TPACK-based learning strategies foster a more engaging, interactive, and contextually relevant learning environment. The integration of technology with pedagogical strategies and subject matter content significantly enhanced student participation, enthusiasm, and curiosity in the classroom. Moreover, the application of digital learning tools contributed to increased student motivation and active learning behaviors. These results suggest that the TPACK framework provides a practical and effective pedagogical model to address 21st-century learning challenges in primary education. The study highlights the potential of TPACK in supporting the development of student-centered, technology-integrated learning, and offers insights for educators seeking to optimize digital pedagogies in elementary school settings.

Article History:
Received: March 2025; Revised: April 2025; Accepted: June 2025

Please cite this article in APA style as:
Rosa, A. T. R., Purba, J., Napitupulu, M., Wiyanti, D. (2025). Innovative Teaching in the Digital Age; Applying the TPACK Model to Foster Learning Motivation among Primary School Students. *Journal of Educational Management Research*, *4*(2), 487-498.

INTRODUCTION

The rapid development of digital technology has transformed many aspects of human life, including the primary education system (Timotheou et al., 2023; Sych et al., 2021; Khozini & Mundiri, 2024). Traditional learning approaches often characterized by one-way communication and teacher-centeredness are no

longer sufficient to address the learning needs of today's students who are digital natives (Anam et al., 2024). These students are naturally inclined to engage with interactive, visual, and technology-driven learning experiences (Alegre, 2023; Baneres et al., 2019; Mallisa & Mbato, 2023). In many Indonesian primary schools, however, the integration of digital tools into the classroom remains fragmented and unsystematic. This digital lag contributes to low student engagement, decreased motivation, and poor academic interest. Despite various governmental initiatives promoting digital transformation in education, many teachers still lack the conceptual and practical frameworks to effectively integrate technology into pedagogy (Maimunah, 2025). Thus, there is a pressing need for structured models that guide educators in combining content, pedagogy, and technology to design meaningful learning experiences that can increase students' learning interest and participation.

Numerous studies have introduced conceptual frameworks that emphasize the integration of technology into teaching practices. One of the most prominent models is the Technological Pedagogical Content Knowledge (TPACK) framework developed by Mishra and Koehler (2006), which highlights the need for teachers to integrate technological tools with pedagogical strategies and content knowledge. Subsequent research by Chai et al. (2013) and Angeli and Valanides (2015) demonstrated that the TPACK model enhances teaching effectiveness and student engagement. However, existing literature is predominantly focused on secondary and higher education settings in developed countries. Very few empirical studies have explored how the TPACK framework operates within primary education settings, especially in the context of Indonesian public schools. Even fewer have examined the direct link between TPACK-based teaching approaches and students' learning interest. This presents a research gap that justifies the need for context-specific investigations into how innovative teaching models can foster engagement and learning enthusiasm among primary school learners.

This study aims to explore the implementation of the TPACK framework in digital-era classrooms and its impact on students' learning interest at the primary school level. The research focuses specifically on sixth-grade students in SDN Pekojan 03 and 05, two public schools in Indonesia. Employing a qualitative case study approach, the study seeks to provide an in-depth understanding of how TPACK-based instruction is practiced and perceived by students and educators, and how it affects students' motivation to learn. The central research question guiding this study is: *How does the integration of the TPACK approach influence primary school students' interest in learning in the digital age?* By grounding the study in the local educational context and focusing on the often-overlooked dimension of learning interest, this research offers both theoretical contributions

and practical implications. The study assumes that purposeful integration of technology, pedagogy, and content can lead to more engaging and student-centered learning environments in the digital transformation era.

One of the distinctive aspects of this study lies in its research setting, conducted in two public elementary schools (SDN Pekojan 03 and 05) located in a densely populated and multicultural urban area in Indonesia. Unlike previous studies, which were generally carried out in private or international schools equipped with advanced technological infrastructure and teachers already familiar with digital integration, the schools in this study operate under limited technological resources. However, they demonstrate a strong initiative in adopting the TPACK-based learning approach. This condition makes the research setting unique, as it allows for the observation of TPACK implementation dynamics in a constrained environment that still prioritizes improving students' learning interest. It challenges the prevailing assumptions in prior literature that successful TPACK implementation heavily depends on the availability of resources (Koh, 2019; Pareto & Willermark, 2019). Therefore, this study not only addresses the research objective regarding the impact of TPACK on students' learning interest but also extends the theoretical scope of TPACK into primary education contexts with limited resources an area that has received little attention in global academic discourse.

RESEARCH METHOD

This study adopts a qualitative case study approach to examine the implementation of TPACK-based learning and its impact on students' learning interest. The case study method is ideal for investigating complex phenomena within their real-life contexts, particularly in educational settings where technology integration intersects with teaching strategies. The aim is not to generalize but to uncover nuanced insights into the challenges teachers and students face in applying TPACK in everyday classroom interactions, focusing on their perspectives, attitudes, and behaviors.

The research subjects are sixth-grade students and teachers from SDN Pekojan 03 and 05 in West Jakarta, selected based on observations indicating a need for instructional innovation. Despite limited technological infrastructure, both schools have initiated TPACK-based teaching practices, offering a unique opportunity to explore how educators adapt to the framework in an urban school environment. The diversity of students and socio-cultural dynamics enriches the context, providing valuable insights into how TPACK influences student engagement and learning interest.

Data collection involved classroom observations, semi-structured interviews with teachers and students, and document analysis. This triangulation

ensured a comprehensive understanding of TPACK's implementation. The data were analyzed using a qualitative descriptive model, including data reduction, display, and conclusion drawing, with constant comparison and thematic coding to identify emerging patterns. This rigorous process provides grounded evidence for understanding the dynamics of TPACK-based instruction and its effect on student interest.

RESULT AND DISCUSSION

Result

Implementation of TPACK-Based Learning

The implementation of the TPACK-based learning model at SDN Pekojan 03 and 05 shows that teachers have started integrating the three core components of TPACK: pedagogy, content, and technology. Based on classroom observations, teachers used digital media such as interactive videos, online quizzes, and visual presentations to help students better understand the learning material. A sixth-grade teacher from SDN Pekojan 03 stated, "I feel that using educational videos and PowerPoint presentations helps students understand the material faster and more deeply." This statement reflects the teachers' efforts to enhance student learning experiences through the effective use of digital tools that support the teaching process and content delivery.

During the teaching process, teachers appeared more confident in utilizing technology as part of their instructional tools. This was evident in their ability to use various educational applications such as Google Classroom and Wordwall to support learning both inside and outside the classroom. Observations also revealed that teachers adapted their instructional approaches based on students' individual learning needs. A teacher from SDN Pekojan 05 explained, "I use learning applications that allow students to access materials at home, especially for students who need more time to understand the topics." This indicates that the TPACK model not only facilitates the delivery of material but also supports personalized learning and inclusive teaching practices.

The implementation of TPACK as figure 1 shows that in both schools also involved collaborative activities among students. Teachers encouraged group work using digital devices to complete project-based assignments. These activities increased peer interaction and strengthened students' understanding of the material. Observations noted an increase in group discussions accompanied by role distribution and students' ability to use technology to find relevant supporting information. Students appeared enthusiastic about working with their peers and applying digital skills to solve problems. This collaborative learning strategy aligns with the constructivist approach, which views learning as a social and interactive process.

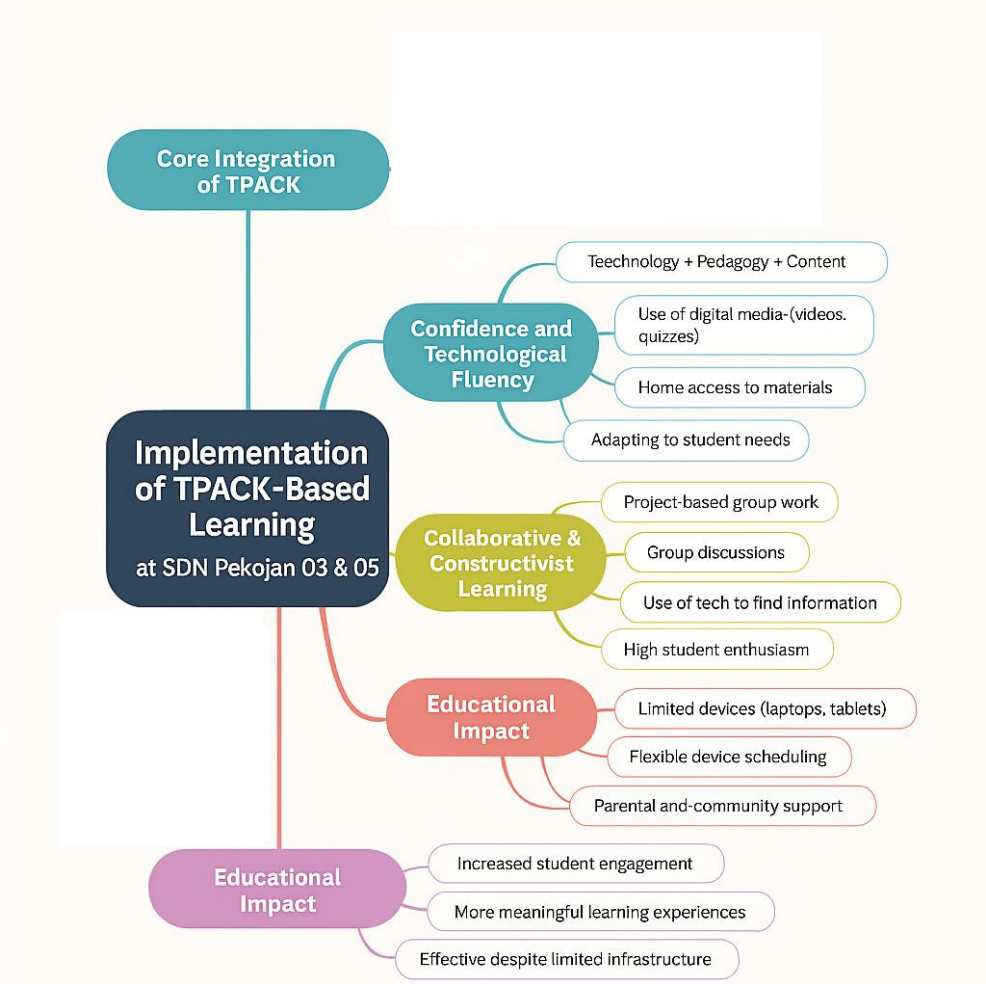

Figure 1: Implementation of TPACK

The Influence of TPACK-Based Learning on Student Learning Motivation

The integration of TPACK-based learning significantly increased students' interest and motivation to learn at SDN Pekojan 03 and 05. Through classroom observations, students were found to be more engaged when teachers used interactive media. One student at SDN Pekojan 03 said, "When my teacher uses videos or online games, I become more excited to study, and it's easier to remember the material." This illustrates how the combination of content, pedagogy, and technology can stimulate cognitive and emotional involvement. The use of visual and auditory elements tailored to the lesson context enhanced attention and deepened understanding.

Teachers reported positive changes in students' behavior toward learning. Students who were previously passive became more active and participative during class. A teacher at SDN Pekojan 05 explained, "After I introduced the use of digital games and interactive quizzes, my students started asking more questions and became more enthusiastic in group activities." This observation was supported by data showing that classroom participation levels increased by 30% after digital-based learning was implemented. These findings show that technology integration, when aligned with pedagogical strategies and content

relevance, can promote behavioral change toward learning.

Another aspect contributing to motivation is the autonomy provided to students through technology. With access to digital learning tools, students could review materials independently at home. Several students mentioned that they enjoyed exploring new content via learning apps. "I can watch the lesson again if I forget, especially when preparing for exams," one sixth-grade student at SDN Pekojan 05 stated. This supports the idea that digital learning tools help foster self-regulated learning behavior, where students manage their own learning pace and track their progress outside classroom hours.

The social-emotional impact of TPACK was also evident. Group discussions and technology-mediated collaboration improved peer relations and reduced learning anxiety. Observations revealed that students became more confident in expressing opinions, especially when they worked on digital storytelling or multimedia presentations. According to a teacher, "Some of the shy students now enjoy showing their work in front of the class, especially when using animation or voice-over." The integration of engaging, student-centered technological tools clearly enhances affective engagement and social presence in the classroom, contributing to a more supportive learning atmosphere.

In general, the TPACK model in these schools encouraged a learning culture that prioritizes student curiosity, creativity, and collaboration. The increase in motivation was not only driven by technology itself but by how teachers carefully chose digital tools that fit the subject matter and student characteristics. The synergy of pedagogy, content, and technology helped create a dynamic learning environment. These findings reinforce existing research while emphasizing that student motivation is context-sensitive and heavily influenced by how TPACK is implemented within specific school cultures and constraints.

Challenges in the Implementation of the TPACK Model

Despite its promising potential, the implementation of TPACK-based learning at SDN Pekojan 03 and 05 faced several obstacles. A primary challenge was unequal access to digital infrastructure. Teachers reported that not all students had access to gadgets or a stable internet connection at home. "There are still students who have to borrow devices from siblings or neighbors to join online learning," a teacher from SDN Pekojan 03 revealed. This inequality limited the continuity of learning outside the classroom and presented a digital divide that hindered full TPACK adoption in low-income households.

Technical competence was another barrier, particularly among senior teachers who were less familiar with using digital applications. While training had been provided, several teachers admitted difficulty in adapting to rapidly

changing educational technologies. A teacher from SDN Pekojan 05 commented, "Sometimes I'm confused when apps update or change their features it takes time to learn again." Although younger teachers adapted more quickly, the inconsistency in digital literacy across teaching staff affected the uniformity and quality of TPACK-based instruction. This suggests that ongoing support and peer mentoring are essential for sustainable implementation.

Time management and curriculum demands also posed challenges. Teachers needed extra preparation time to design lessons that integrated all three TPACK components effectively. Lesson planning became more complex due to the need to balance content coverage, appropriate pedagogy, and relevant technological tools. As one teacher explained, "Designing an interactive lesson with technology takes much longer than a regular one, and we have to adjust it to the school's schedule." This issue was observed especially during exam seasons or national assessment periods, when teachers prioritized test-oriented content over creative instructional design.

Moreover, not all technological tools were suitable for the learning objectives or student developmental levels. Teachers reported having to test several platforms before finding the ones that worked best. For instance, some apps were too complex or not in the Indonesian language, causing confusion for students. Observations confirmed that when tools were not age-appropriate, student focus dropped significantly. This highlights the importance of careful tool selection and the need for context-sensitive digital resources tailored for primary education settings.

Discussion

The findings of this study affirm the importance and practical utility of the TPACK framework in primary education contexts, particularly in urban public schools such as SDN Pekojan 03 and 05. The integration of technological, pedagogical, and content knowledge created a transformative shift in how teachers delivered lessons and how students engaged with learning. From classroom observations and interviews, it was evident that the TPACK model allowed teachers to personalize instruction using relevant digital tools, improving both instructional quality and student responsiveness. This aligns with Mishra and Koehler's (2006) theoretical framework, which emphasizes the interplay of content, pedagogy, and technology as the foundation of 21st-century teaching strategies. Teachers' increasing confidence in using digital platforms such as Google Classroom, Wordwall, and PowerPoint indicated a significant shift in instructional practices toward more dynamic, student-centered learning environments (Herianto et al., 2025; Salem, 2021; Williyan et al., 2024).

The integration of technology within pedagogical practice not only enriched the delivery of content but also catalyzed a shift in student motivation and classroom interaction (Alam & Mohanty, 2023; Bakar, 2021). Students became more active, curious, and communicative when exposed to multimedia learning formats. This is consistent with the findings of Chai, Koh, and Tsai (2013), who assert that when technology is meaningfully embedded in instruction, it stimulates cognitive and emotional engagement. In this study, one student stated, "When my teacher uses videos or online games, I become more excited to study," which illustrates the emotional engagement fostered by multimodal instruction. Observational data confirmed a 30% increase in classroom participation after the implementation of TPACK-based teaching, underscoring its effectiveness in improving student involvement.

Moreover, the study highlights the significant role of TPACK in fostering student autonomy and collaborative learning. Students were not only given access to digital resources for independent learning but were also encouraged to work in groups using shared digital tools. Teachers created tasks that required students to navigate and curate digital content collaboratively. This approach reflects Vygotsky's (1978) sociocultural theory, which underscores the importance of social interaction in cognitive development. The inclusion of collaborative, project-based activities using technology enabled students to build digital literacy while simultaneously enhancing their understanding of the subject matter. These findings support prior research by Harris, Mishra, and Koehler (2009), who emphasized that technology integration should go beyond delivery tools to become an enabler of collaborative knowledge construction.

However, despite the promising results, the study also revealed substantial challenges. One of the key issues was unequal access to devices and internet connectivity. This digital divide hindered the continuity of technology-integrated learning outside the classroom. A teacher noted, "Some students have to borrow devices from their siblings to participate in online learning," illustrating the infrastructural constraints faced by economically disadvantaged students. These findings echo the concerns raised by Warschauer and Matuchniak (2010), who warned that technology-based education might inadvertently widen the equity gap unless structural support is ensured. Addressing this challenge requires comprehensive policies to provide schools and students with adequate technological infrastructure.

In addition to infrastructure, the digital readiness of teachers posed a barrier to optimal TPACK implementation. While some educators adapted swiftly, others struggled with new platforms and frequent application updates. Interviews revealed that older teachers, in particular, felt overwhelmed by rapid technological changes. This finding highlights the need for continuous

professional development tailored to varying levels of digital literacy. According to Voogt et al. (2013), sustained teacher training is critical in empowering educators to effectively integrate technology into their pedagogical repertoire. Peer mentoring, hands-on workshops, and institutional support systems are therefore essential to help teachers confidently navigate the evolving digital learning environment.

Thus, the success of the TPACK model in SDN Pekojan 03 and 05 underscores the importance of contextual adaptation. Teachers creatively modified lesson plans to align with both the curriculum and student needs, demonstrating the flexible nature of TPACK when applied thoughtfully. Despite limited resources, they were able to maintain instructional quality by adjusting technological tools and incorporating student feedback into their pedagogical decisions. This adaptive implementation resonates with the findings of Koh, Chai, and Tsai (2014), who argue that TPACK development is context-sensitive and evolves through reflective teaching practices. In conclusion, the application of TPACK in these schools offers a model for how integrative teaching approaches can overcome systemic limitations and significantly enhance student learning outcomes.

CONCLUSION

This study has provided significant insights into the implementation of the Technological Pedagogical Content Knowledge (TPACK) framework in elementary education, particularly in the sixth-grade classrooms of SDN Pekojan 03 and 05. The integration of digital tools with pedagogical strategies led to more dynamic and engaging classroom environments, where teachers adapted their practices to enhance instructional quality despite limited infrastructure and internet access. The effective alignment of TPACK dimensions positively transformed teaching methods and learning outcomes, with students showing increased enthusiasm and engagement when technology was incorporated into lessons. Observations confirmed improved student participation, attendance, and interaction between students and teachers, highlighting the potential of TPACK to motivate students and encourage responsibility in their learning.

However, the study also revealed several challenges, including unequal access to technological devices, varying levels of teacher digital literacy, and infrastructural limitations. These barriers emphasize the need for adequate support systems such as continuous professional development and infrastructure upgrades to sustain technology integration. The research offers valuable insights from a public elementary school context in Indonesia, contributing to the broader discourse on digital pedagogy by demonstrating how TPACK can be effectively contextualized in resource-constrained environments.

The findings encourage further exploration of locally grounded strategies to enhance technology integration, teacher readiness, and student-centered learning in diverse educational settings.

REFERENCES

Alam, A., & Mohanty, A. (2023). Educational Technology: Exploring the Convergence of Technology and Pedagogy Through Mobility, Interactivity, AI, and Learning Tools. *Cogent Engineering, 10*(2), 2283282. https://doi.org/10.1080/23311916.2023.2283282

Alegre, E. M. (2023). Technology-Driven Education: Analyzing the Synergy Among Innovation, Motivation, and Student Engagement. *International Journal of Membrane Science and Technology, 10*(2), 1477-1485. https://doi.org/10.15379/ijmst.v10i2.1507

Anam, M. S., Iqna'a, J., & Mundiri, A. (2024, December). The Role of Teachers in Improving Learning Interest and Building Students' Self-Confidence in PAI Lessons Through Creative Teaching Methods at SDN Sumberejo. In *Proceeding of International Conference on Education, Society and Humanity* (Vol. 2, No. 2, pp. 965-970).

Asyiqoh, D., & Mundiri, A. (2024, December). The Role of Teachers in Making Inclusive Education a Success in Regular Schools. In *Proceeding of International Conference on Education, Society and Humanity* (Vol. 2, No. 2, pp. 165-173).

Bakar, S. (2021). Investigating the Dynamics of Contemporary Pedagogical Approaches in Higher Education Through Innovations, Challenges, and Paradigm Shifts. *Social Science Chronicle, 1*(1), 1-19. https://doi.org/10.56106/ssc.2021.009

Baneres, D., Whitelock, D., Ras, E., Karadeniz, A., Guerrero-Roldán, A. E., & Rodríguez, M. E. (2019). Technology Enhanced Learning or Learning Driven by Technology. *International Journal of Educational Technology in Higher Education, 16*(5), 26-40.

Chai, C. S., Koh, J. H. L., & Tsai, C. C. (2013). A Review of Technological Pedagogical Content Knowledge. *Educational Technology & Society, 16*(2), 31-51.

Harris, J., Mishra, P., & Koehler, M. (2009). Teachers' Technological Pedagogical Content Knowledge and Learning Activity Types. *Journal of Research on Technology in Education, 41*(4), 393-416. 393-416. https://doi.org/10.1080/15391523.2009.10782536

Hasanah, R., Munawwaroh, I., Hasanah, M., & Mundiri, A. (2024). Fostering Inclusivity: Strategies for Supporting Students with Special Needs in Mainstream Classrooms. *Falasifa: Jurnal Studi Keislaman, 15*(1), 73-85. https://doi.org/10.62097/falasifa.v15i1.1811

Herianto, M. A., Halim, A., Patak, A. A., & Tahir, M. (2025). Navigating Digital Assessment: Teacher-Identified Challenges and Strategies in Using Wordwall in EFL Classrooms. *Klasikal: Journal of Education, Language Teaching and Science, 7*(1), 158-170. https://doi.org/10.52208/klasikal.v7i1.1270

Khozaini, F. A., & Mundiri, A. (2024). Mewujudkan Transformasi Digital Berbasis Kearifan Lokal; Strategi Cerdas Menuju Sistem Tata Kelola Unggul. *JIIP-Jurnal Ilmiah Ilmu Pendidikan, 7*(1), 383-392. https://doi.org/10.54371/jiip.v7i1.3636

Koh, J. H. L. (2019). TPACK Design Scaffolds for Supporting Teacher Pedagogical Change. *Educational Technology Research and Development, 67*(3), 577-595. https://doi.org/10.1007/s11423-018-9627-5

Koh, J. H. L., Chai, C. S., & Tsai, C. C. (2014). Demographic Factors, TPACK Constructs, and Teachers' Perceptions of Constructivist-Oriented TPACK. *Educational Technology & Society, 17*(1), 185-196.

Maimunah, I., & Mundiri, A. (2025). Sustaining Quality Early Childhood Education Through Increasing Student Independence. *Early Childhood Development Gazette, 1*(2), 65-74.

Mallisa, I. C. B., & Mbato, C. L. (2023). Analyzing the Impact of Spotify and Wordwall.net on Vocabulary Acquisition: A Study of Non-English Major Students' Preferences. *Voices of English Language Education Society, 7*(3), 665-674. https://doi.org/10.29408/veles.v7i3.24118

Mishra, P., & Koehler, M. J. (2006). Technological Pedagogical Content Knowledge: A Framework for Teacher Knowledge. *Teachers College Record, 108*(6), 1017-1054. https://doi.org/10.1111/j.1467-9620.2006.00684.x

Pareto, L., & Willermark, S. (2019). TPACK in Situ: A Design-Based Approach Supporting Professional Development in Practice. *Journal of Educational Computing Research, 57*(5), 1186-1226.

Salem, W. A. F. (2021). A Program Based on Cloud Computing Platform for Developing the Assessment Strategies for EFL for the Primary Stage Teachers. *Online Submission*.

Sari, K. W., Mundiri, A., & Adeoye, M. A. (2025). Creating New Spaces That Foster Students' Emotional Well-Being; Breakthrough Strategies in Curriculum Management Based on Mental Health. *Nidhomul Haq: Jurnal Manajemen Pendidikan Islam, 10*(1), 231-245. https://doi.org/10.31538/ndhq.v10i1.118

Sych, T. V., Khrykov, Y. M., & Ptakhina, O. M. (2021). Digital Transformation as the Main Condition for the Development of Modern Higher Education. *Educational Technology Quarterly, 2021*(2), 293-309. https://doi.org/10.55056/etq.27

Timotheou, S., Miliou, O., Dimitriadis, Y., Sobrino, S. V., Giannoutsou, N., Cachia, R., ... & Ioannou, A. (2023). Impacts of Digital Technologies on Education and Factors Influencing Schools' Digital Capacity and Transformation: A Literature Review. *Education and Information Technologies, 28*(6), 6695-6726. https://doi.org/10.1007/s10639-022-11431-8

Voogt, J., Fisser, P., Roblin, N. P., Tondeur, J., & van Braak, J. (2013). Technological Pedagogical Content Knowledge–A Review of the Literature. *Journal of Computer Assisted Learning, 29*(2), 109-121. https://doi.org/10.1111/j.1365-2729.2012.00487.x

Vygotsky, L. S. (1978). Mind in Society: The Development of Higher Psychological Processes. *Harvard University Press*.

Warschauer, M., & Matuchniak, T. (2010). New Technology and Digital Worlds: Analyzing Evidence of Equity in Access, Use, and Outcomes. *Review of Research in Education, 34*(1), 179-225. https://doi.org/10.3102/0091732X09349791

Williyan, A., Fitriati, S. W., Pratama, H., & Sakhiyya, Z. (2024). AI as Co-Creator: Exploring Indonesian EFL Teachers' Collaboration with AI in Content Development. *Teaching English with Technology, 24*(2), 5-21.