



JHS TEACHERS' PERCEPTIONS OF THEIR TPACK IN TAPUNG, KAMPAR DISTRICT

Freti Septri Yanti¹, Indah Tri Purwanti², Eliwarti³

^{1,2,3} Universitas Riau, Pekanbaru, Indonesia

Email: ¹freti.septri0909@student.unri.ac.id, ²indah.tri@lecturer.unri.ac.id, ³eliwarti@lecturer.unri.ac.id

ABSTRACT

This study explores junior high school teachers' perceptions of their Technological Pedagogical Content Knowledge (TPACK) in Tapung, Kampar District. As 21st-century education increasingly demands the integration of technology, understanding teachers' perspectives on their ability to combine content, pedagogy, and technology becomes crucial, especially in rural contexts. This research employed a descriptive quantitative method, utilizing a validated, closed-ended questionnaire adapted from Schmid et al. (2020) that covered all seven TPACK domains. A total of 34 teachers from three schools participated in the research. The findings revealed that teachers generally had positive perceptions across all TPACK domains, with the highest scores in Pedagogical Knowledge (PK) and Content Knowledge (CK), and slightly lower but still positive perceptions in Technological Knowledge (TK). The data suggest that while teachers feel confident in their pedagogical and content mastery, their technological integration still requires further development. This research contributes to the growing body of TPACK studies by offering insights into rural education settings, highlighting the need for ongoing professional development in technology integration. It also provides empirical evidence to support teacher training programs that focus on enhancing balanced competencies in pedagogy, content, and technology.

Keywords: teachers' perception, TPACK, technology integration

PERSEPSI GURU SMP TERHADAP TPACK DI TAPUNG, KABUPATEN KAMPAR

ABSTRAK

Penelitian ini bertujuan untuk mengetahui persepsi guru SMP terhadap Technological Pedagogical Content Knowledge (TPACK) mereka di daerah Tapung, Kabupaten Kampar. Seiring meningkatnya tuntutan pendidikan abad ke-21 terhadap integrasi teknologi dalam pembelajaran, memahami sudut pandang guru mengenai kemampuan mereka dalam menggabungkan konten, pedagogi, dan teknologi menjadi hal yang penting, khususnya di wilayah non-perkotaan. Penelitian ini menggunakan metode deskriptif kuantitatif dengan instrumen kuesioner tertutup yang telah divalidasi dan diadaptasi dari Schmid et al. (2020), mencakup tujuh domain TPACK. Sebanyak 34 guru dari tiga sekolah berpartisipasi dalam penelitian ini. Hasilnya menunjukkan bahwa secara umum guru memiliki persepsi yang positif terhadap semua domain TPACK, dengan skor tertinggi pada Pengetahuan Pedagogik (PK) dan Pengetahuan Konten (CK), serta persepsi yang sedikit lebih rendah pada Pengetahuan Teknologi (TK) meskipun tetap dalam kategori positif. Temuan ini memberikan gambaran bahwa guru merasa percaya diri dalam aspek pedagogik dan penguasaan materi, namun integrasi teknologi masih memerlukan penguatan. Penelitian ini berkontribusi pada pengembangan kajian TPACK di konteks pendidikan pedesaan dan memberikan dasar empiris bagi pengembangan program pelatihan guru yang lebih seimbang dalam penguasaan pedagogi, konten, dan teknologi.

Kata Kunci: persepsi guru, TPACK, integrasi teknologi

Submitted	Accepted	Published
June, 15 th 2025	June, 18 th 2025	January, 28 th 2026

Citation	:	Yanti, F. S., Purwanti, I. T., & Eliwarti. (2026). JHS teachers' perceptions of their TPACK in Tapung, Kampar district. <i>JOEEI (Journal of English Educational Issues)</i> . 2(1),
-----------------	---	--

INTRODUCTION

Acquiring a variety of competences is essential for success in the dynamic and interconnected landscape of the twenty-first century (Bernhardt, 2015). One critical component is digital literacy, which encompasses the ability to utilize digital resources efficiently and responsibly (Partnership for Twenty-First Century Learning, 2019; Pangrazio et al., 2020). In addition to conventional pedagogical skills, today's teachers need to incorporate technology into their instructional methodologies to enrich learning experiences. Information and Communication Technology transformed education by enhancing interactivity, accessibility, and creativity in



learning. It enables teachers to provide instruction via videos, perform assessments, and manage online learning settings (O’Flaherty and Philips, 2015).

In Indonesia, educational policies demonstrate the government’s dedication to advancing quality and equitable education through technological support. Law Number 14 of 2005 regarding Teachers and Lecturers underscores the significance of pedagogical, professional, personal, and social competencies for educators. The Ministry of Education, Culture, Research, and Technology advocates for the utilization of infrastructure and technology to enhance national education (Kemendikbudristek, 2020). However, despite this support, the integration of technology in educational institutions frequently encounters obstacles due to its weak implementation (Doringin et al., 2022). This is particularly in rural regions where infrastructure and teacher preparedness may differ markedly.

The COVID-19 pandemic in 2020 highlighted the need for digital transformation in education. School closures encouraged teachers to implement distance learning strategies, thereby accelerating the integration of technology in classrooms (Zhao and Watterston, 2021). Despite the growing knowledge of digital tools, research indicates that teachers often encounter difficulties in properly utilizing technology due to inadequate training or infrastructure (Nicholas et al., 2024; Yuliani & Saputri, 2024). The incorporation of technology in education involves not just the utilization of tools but also comprehending the interplay among subject matter, pedagogy, and technology.

To address these issues, the framework of Technological Pedagogical Content Knowledge (TPACK) explains how teachers integrate content knowledge, pedagogy, and technology in their instruction. TPACK, introduced by Mishra and Koehler (2006), expands upon Shulman’s (1986) foundational work on Pedagogical Content Knowledge (PCK) by incorporating technology as a fundamental element. TPACK helps teachers select suitable digital tools, deliver practical education, and adapt to the diverse needs of students in various classroom settings.

Although numerous studies investigated TPACK in adequately equipped educational settings, there remains a need to comprehend how teachers in rural regions assess their own TPACK competencies. The present research examines the perspectives of junior high school teachers in Tapung, Kampar District, regarding their knowledge and confidence in integrating technology into their teaching and content delivery methods. Therefore, the researcher conducted the research entitled “JHS Teachers’ Perceptions of Their TPACK in Tapung, Kampar District”.

LITERATURE REVIEW

Perception is a valuable concept for understanding how individuals interpret and respond to information. A teacher’s perception can affect the implementation of innovative thinking, as well as their authority in the classroom and the use of information in teaching practices. Perceptions are influenced by prior experiences, external conditions, and intrinsic motivation (Saks & Johns, 2011; Pickens, 2005). These individual and contextual elements enable each teacher’s perception to be distinct.

The TPACK framework was developed by Mishra and Koehler (2006) as an extension of Shulman’s Pedagogical Content Knowledge (1986) to address the needs of education in the twenty-first century. TPACK incorporates three principal domains of knowledge: Content Knowledge (CK), Pedagogical Knowledge (PK), and Technological Knowledge (TK), as well as the interplay among them, as shown in Figure 1. Within this framework, teachers have the potential to create significant learning experiences by integrating their subject matter, pedagogical methods, and

technological tools.

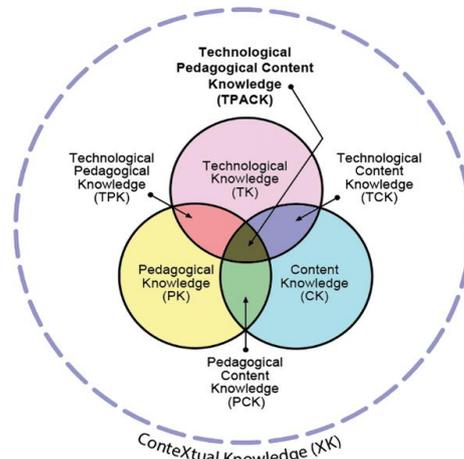


Figure 1. TPACK framework

Several studies have highlighted the significance of TPACK in enhancing teaching quality. Research by Ismail et al. (2023) on teachers' perceptions of TPACK in Pekanbaru reveals a high level of understanding among teachers, indicating that they possess the requisite skills to implement TPACK in their instruction. Similarly, the research conducted by Ghaffar et al. (2024) illustrates that teachers' TPACK across all subjects is often good. This research identifies Technological Content Knowledge as an area requiring further enhancement. As a result, the researcher recommends a focus on TPACK in teacher training programs to enhance technology integration in classrooms and address the shortage of technological resources in public schools, thereby facilitating successful instruction. Additionally, Bas and Senturk (2018) conducted research on teachers' TPACK in public schools in Turkey. The methodology employed was a survey, and overall, teachers exhibited moderate perceptions. The study indicated that novice teachers possess a more assured self-perception than their senior colleagues.

Finally, research conducted by Prasojo et al. (2020) and Sy et al. (2023) shows that although many teachers possess confidence in their pedagogical and subject expertise, their technological competencies frequently fall short. This is particularly applicable to teachers in rural regions, where access to digital resources and training is severely limited. Despite the increasing number of policies that advocate for technology integration, actual obstacles persist.

RESEARCH METHOD

This research aims to find out the perspectives of teachers on their Technological Pedagogical Content Knowledge (TPACK) in instructional activities. The researcher employed a quantitative descriptive method to assess teachers' self-reported perceptions of the seven TPACK dimensions. The population of this research consisted of junior high school teachers in Tapung, specifically SMPN 11 Tapung (20 teachers), SMPN 8 Tapung (14 teachers), and MTs Nurul Jadid (20 teachers). The researcher conducted a trial instrument at SMPN 11 Tapung, collecting primary data from SMPN 8 Tapung and MTs Nurul Jadid. This research was carried out from May to June 2025. The closed-ended TPACK.xs questionnaire was employed, which the researcher adapted from Schmid et al. (2020). The researcher adjusted the sample, consisting of teachers from all subjects, to account for the transition from English to Indonesian. The questionnaire was distributed



via Google Forms. Following the trial questionnaire, the researcher conducted validity and reliability assessments using SPSS 30, which determined that the questionnaire was suitable for distribution to the sample teachers. The teachers' responses were analyzed according to perception levels by Suebwongsuwan and Nomnian (2020) through a 5-point Likert scale.

Table 1. The 5-point scale interpretation

Score Range	Mean Rating	Interpretation
1.00 – 1.80	Strongly Disagree	Very negative
1.81 – 2.60	Disagree	Negative
2.61 – 3.40	Neutral	Moderate
3.41 – 4.20	Agree	Positive
4.21 – 5.00	Strongly agree	Very positive

(Suebwongsuwan & Nomnian, 2020)

RESULTS AND DISCUSSION

This research examined how junior high school teachers in Tapung, Kampar District, perceive their Technological Pedagogical Content Knowledge (TPACK). The questionnaire responses from 34 teachers were analyzed across seven domains: PK, CK, TK, PCK, TCK, TPK, and TPACK. Overall, the results showed positive perceptions across all domains, although the strength of perception varied by category.

1. Pedagogical Knowledge (PK)

Pedagogical Knowledge (PK) refers to the knowledge that teachers possess about the teaching processes and strategies they utilize, including classroom management and assessment. This includes how to teach students effectively in any subject area. In this research, the PK domain consists of four question items, with the following results.

Table 2. The teachers' responses to PK items

Label	SD	D	N	A	SA	Mean	Category
PK1	0 (0.00%)	0 (0.00%)	4 (11.8%)	25 (73.5%)	5 (14.7%)	4.02	Positive
PK2	0 (0.00%)	0 (0.00%)	5 (14.7%)	23 (67.6%)	6 (17.6%)	4.02	Positive
PK3	0 (0.00%)	0 (0.00%)	7 (20.6%)	21 (61.8%)	6 (17.6%)	3.97	Positive
PK4	0 (0.00%)	0 (0.00%)	6 (17.6%)	20 (58.8%)	8 (23.5%)	4.05	Positive

The findings from the Pedagogical Knowledge (PK) domain indicate that teachers had a favorable self-assessment regarding their pedagogical competencies. They expressed confidence in adjusting their pedagogy to meet students' needs, employing a range of educational strategies, and evaluating students through many assessment techniques. The greatest score was tied to their



capacity to assess student learning (PK4), whereas the lowest score stayed within the positive range (PK3). The findings suggest that the respondents possess significant pedagogical fundamentals, which may be further strengthened by their professional expertise and regular exposure to diverse classroom environments.

2. Content Knowledge (CK)

Content Knowledge (CK) refers to knowledge about the subject being taught. This comprises the teacher’s understanding of the lesson’s topic, which allows the teacher to deliver the information correctly, clearly, and at a level that follows the students’ level of comprehension. In this research, the CK domain consists of four question items, with the following results.

Table 3. The teachers’ responses to CK items

Label	SD	D	N	A	SA	Mean	Category
CK1	0 (0.00%)	0 (0.00%)	5 (14.7%)	19 (55.9%)	10 (29.4%)	4.14	Positive
CK2	0 (0.00%)	0 (0.00%)	5 (14.7%)	23 (67.6%)	6 (17.6%)	4.02	Positive
CK3	0 (0.00%)	0 (0.00%)	4 (11.8%)	23 (67.6%)	7 (20.6%)	4.08	Positive
CK4	0 (0.00%)	0 (0.00%)	9 (26.5%)	22 (64.7%)	3 (8.8%)	3.82	Positive

Regarding the Content Knowledge (CK) domain, teachers expressed a positive assessment of the learning circumstances. They had confidence in their knowledge of the subject, particularly in their ability to clarify basic concepts and apply content-specific thinking. The highest-rated item (CK1) demonstrated adequate certainty in content competence, consistent with the findings of Bas and Senturk (2018) and Lavidas et al. (2021), who revealed that teacher confidence in content knowledge is intricately linked to their educational background and pedagogical alignment with their area of expertise. Despite a lower score in theory development (CK4), the overall mean indicates adequate content mastery.

3. Technological Knowledge (TK)

Technological knowledge (TK) refers to the understanding of how to utilize various educational tools that are available. This involves teachers’ awareness of technology and how to use it to help the learning process. In this research, the TK domain consists of four items, with the following results.

Table 4. The teachers’ responses to TK items

Label	SD	D	N	A	SA	Mean	Category
TK1	0 (0.00%)	0 (0.00%)	3 (8.8%)	28 (82.4%)	3 (8.8%)	4.00	Positive
TK2	0 (0.00%)	0 (0.00%)	11 (32.4%)	19 (55.9%)	4 (11.8%)	3.79	Positive
TK3	0	0	9	19	6	3.91	Positive



Label	SD	D	N	A	SA	Mean	Category
TK4	(0.00%)	(0.00%)	(26.5%)	(55.9%)	(17.6%)	3.82	Positive
	0	0	11	18	5		
	(0.00%)	(0.00%)	(32.4%)	(52.9%)	(14.7%)		

Despite remaining classified as positive, TK attained the lowest mean score of 3.88 (Table 9). This suggests that certain teachers lack confidence in utilizing or exploring new technology in their instruction. The issue frequently occurs in rural contexts when training and infrastructure may be inadequate (Prasojo et al., 2020; Thy et al., 2023). Although teachers are typically knowledgeable about technological innovations, they may lack the appropriate support for their comprehensive implementation in everyday practices.

4. Pedagogical Content Knowledge (PCK)

Pedagogical Content Knowledge (PCK) refers to the knowledge a teacher possesses regarding effective instructional methods for teaching specific subject matter. In this case, teachers demonstrate a comprehensive understanding of the material's content and teaching methods, which enables them to present the material in a manner that aligns with the students' learning conditions. The PCK domain comprises 4 question items, yielding the following results.

Table 5. The teachers' responses to PCK items

Label	SD	D	N	A	SA	Mean	Category
PCK1	0	0	8	22	4	3.88	Positive
	(0.00%)	(0.00%)	(23.5%)	(64.7%)	(11.8%)		
PCK2	0	0	10	20	4	3.82	Positive
	(0.00%)	(0.00%)	(29.4%)	(58.8%)	(11.8%)		
PCK3	0	0	7	21	6	3.97	Positive
	(0.00%)	(0.00%)	(20.6%)	(61.8%)	(17.6%)		
PCK4	0	0	5	25	4	3.97	Positive
	(0.00%)	(0.00%)	(14.7%)	(73.5%)	(11.8%)		

Within the domain of Pedagogical Content Knowledge (PCK), teachers demonstrated confidence in selecting instructional methods and creating activities tailored to the subject matter being taught. The overall score was favorable (3.91 as shown in Table 9), although the item about encouraging complex thinking obtained the lowest score (PCK2). This suggests that although teachers perceive themselves as proficient in presenting and assessing knowledge, they may require additional support in designing activities that stimulate higher-order thinking. These findings align with the perspectives of Chai et al. (2013), who emphasize that adequate pedagogical content knowledge (PCK) develops continuously through experience and reflective practice.

5. Technological Pedagogical Knowledge (TPK)

Technological Pedagogical Knowledge (TPK) refers to the knowledge related to the use of educational technology in teaching methods that support effective learning in the classroom. This includes teachers' understanding of integrating appropriate technology to strengthen learning strategies. The TPK domain consists of four questions, yielding the following results.



Table 6. The teachers' responses to TPK items

Label	SD	D	N	A	SA	Mean	Category
TPK1	0 (0.00%)	0 (0.00%)	7 (20.6%)	21 (61.8%)	6 (17.6%)	3.97	Positive
TPK2	0 (0.00%)	0 (0.00%)	7 (20.6%)	21 (61.8%)	6 (17.6%)	3.97	Positive
TPK3	0 (0.00%)	0 (0.00%)	8 (23.5%)	22 (64.7%)	4 (11.8%)	3.88	Positive
TPK4	0 (0.00%)	0 (0.00%)	6 (17.6%)	21 (61.8%)	7 (20.6%)	4.02	Positive

Furthermore, the Technological Pedagogical Knowledge (TPK) domain revealed that teachers perceived themselves as capable of utilizing technology effectively to enhance their learning. The highest score was on the topic regarding the thoughtful incorporation of technology into instruction (TPK4). That said, their confidence slightly declined about the adaptation of technology across diverse activities (TPK3). This suggests that although teachers may select suitable technology, they often encounter challenges in its flexible implementation due to contextual limitations, such as school policies or inadequate technical support.

6. Technological Content Knowledge (TCK)

Technological Content Knowledge (TCK) refers to the understanding of integrating technology to create engaging teaching materials. In such cases, teachers must possess the knowledge to determine which technological tools are appropriate for particular materials. The TCK domain includes four items.

Table 7. The teachers' responses to TCK items

Label	SD	D	N	A	SA	Mean	Category
TCK1	0 (0.00%)	0 (0.00%)	4 (11.8%)	22 (64.7%)	8 (23.5%)	4.11	Positive
TCK2	0 (0.00%)	0 (0.00%)	10 (29.4%)	19 (55.9%)	5 (14.7%)	3.85	Positive
TCK3	0 (0.00%)	0 (0.00%)	11 (32.4%)	17 (50.0%)	6 (17.6%)	3.85	Positive
TCK4	0 (0.00%)	0 (0.00%)	13 (38.2%)	16 (47.1%)	5 (14.7%)	3.76	Positive

The findings from the Technological Content Knowledge (TCK) domain reveal a favorable assessment (3.89 as shown in Table 9). Teachers acknowledged the impact of technological advancements on their subject matter (TCK1), even though they showed diminished confidence in employing digital technologies for engaging in scientific discourse (TCK4). Although there is a general understanding of technology, a more profound engagement with subject-specific digital platforms is still evolving among teachers, particularly in rural or underprivileged areas.

7. Technological Pedagogical Content Knowledge (TPACK)



Technological Pedagogical Content Knowledge (TPACK) is the knowledge that enables teachers to effectively integrate technology into their pedagogy, encompassing both the content of instruction and the methods by which it is delivered. It is crucial to examine how teachers effectively integrate these three components to create engaging and effective instructional environments. TPACK is a complex knowledge that can assist teachers in effectively integrating technology support to enhance teaching quality. The TPACK indicator comprises four statements.

Table 8. The teachers' responses to TPACK items

Label	SD	D	N	A	SA	Mean	Category
TPACK1	0 (0.00%)	0 (0.00%)	10 (29.4%)	19 (55.9%)	5 (14.7%)	3.85	Positive
TPACK2	0 (0.00%)	0 (0.00%)	4 (11.8%)	26 (76.5%)	4 (11.8%)	4.00	Positive
TPACK3	0 (0.00%)	0 (0.00%)	4 (11.8%)	23 (67.6%)	7 (20.6%)	4.08	Positive
TPACK4	0 (0.00%)	0 (0.00%)	3 (8.8%)	26 (76.5%)	5 (14.7%)	4.05	Positive

Finally, teachers expressed a high degree of confidence in incorporating technology, pedagogy, and content into classroom practices in the Technological Pedagogical Content Knowledge (TPACK) category (4.00 as shown in Table 9). The capacity to choose and connect technology with lesson content and student requirements received the best score (TPACK3). This finding aligns with the results of Alharbi (2020), Ghaffar et al. (2024), and Ismail et al. (2023), who discovered that teachers hold remarkably favorable perceptions of their TPACK. The presence of the lowest-scoring item (TPACK1) within the positive category indicates a belief that teachers are effectively positioned to enhance educational quality through integrated digital pedagogy.

Table 9. The average scores for each TPACK domain

No	Knowledge Domain	Mean	Category
1	PK	4.02	Positive
2	CK	4.02	Positive
3	TK	3.88	Positive
4	PCK	3.91	Positive
5	TPK	3.96	Positive
6	TCK	3.89	Positive
7	TPACK	4.00	Positive

Table 10. Teachers' demographic information

	Demographic	Number	Percentage
Gender	Male	14	41.18%
	Female	20	58.82%
Age Group	20–34 years old	12	35.29%
	35–49 years old	19	55.88%



	Demographic	Number	Percentage
Length of Teaching Experience	>50 years old	3	8.82%
	<5 years	7	20.59%
	6–15 years	15	44.12%
	>15 years	12	35.29%

Overall, the results indicate that teachers had positive perceptions across all TPACK domains. Pedagogical Knowledge (PK) and Content Knowledge (CK) recorded the highest mean scores, at 4.02, whereas Technological Knowledge (TK) attained the lowest score, 3.88. However, it remained classified as positive. The teachers' demographic backgrounds might explain these discrepancies. Over 80% of respondents possessed over five years of teaching experience, with the majority aged between 35 and 49 years, a demographic regarded as productive and receptive to innovation and improvement. Moreover, 26 of the 34 teachers participated in training focused on technology integration in education, which presumably enhanced their confidence in the TPK and TPACK frameworks. Teachers demonstrated significant confidence in integrating technology into their instruction, despite teaching in distant institutions such as MTs Nurul Jadid and SMPN 8 Tapung. The findings indicate that teachers' perceptions of TPACK are influenced by variables such as age, teaching experience, training exposure, and the evolving requirements of post-pandemic education, as supported by prior studies (Chai et al., 2013; Kumala et al., 2022; Hapsari et al., 2022).

CONCLUSION AND RECOMMENDATIONS

The present research explored the perspectives of junior high school teachers in Tapung regarding their Technological Pedagogical Content Knowledge (TPACK). The findings indicate that teachers generally possess favorable perceptions of their TPACK competencies, displaying a strong belief in pedagogical and content knowledge. In contrast, Technological Knowledge is a domain that requires additional development. Although within a rural environment, teachers regarded technology integration as a beneficial and enhancing component of the educational process. The findings indicate that the teachers perceived themselves as proficient and assured in managing and integrating pedagogy, content, and technology within their teaching environments. To enhance these favorable attitudes and minimize uncertainties, schools must offer continuous and adaptive technology-related training. These initiatives will enhance teachers' familiarity and comfort with integrating technology into their instruction. Future studies should explore actual instructional practices to gain a more thorough understanding of TPACK use.

REFERENCES

- Alharbi, A. A. M. (2020). The degree of teaching knowledge for Saudi EFL teachers: An investigation for Madinah EFL teachers' perceptions regarding TPACK framework. *English Language Teaching*, 13(10), 99–112. <https://doi.org/10.5539/elt.v13n10p99>
- Bas, G., & Senturk, C. (2018). An evaluation of technological pedagogical content knowledge (TPACK) of in-service teachers: A study in Turkish public schools. *International Journal of Educational Technology*, 5(2), 46–58.
- Bernhardt, P. E. (2015). 21st century learning: Professional development in practice. *Qualitative Report*, 20(1), 1–19. <https://doi.org/10.46743/2160-3715/2015.1419>
- Bunga, A. C., Susilawati, T., Septa, R., & Farradiba, K. (2020). Profil Kementerian Pendidikan dan



- Kebudayaan. Retrieved from <https://kemdikbud.go.id>
- 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.
- Doringin, F., Wenehen, S., & Doringin, T. (2022). The analysis of government strategy in integrating technology in education. *Advances in Social Science, Education and Humanities Research*, 655. <https://doi.org/10.2991/assehr.k.220404.171>
- Ghaffar, R., Khoso, F. J., & Sahito, Z. H. (2024). Assessing secondary school teachers' perceptions of their Technological Pedagogical and Content Knowledge in Karachi Pakistan. *Spry Contemporary Educational Practices (SCEP)*, 3(1), 119–137. <https://doi.org/10.62681/sprypublishers.scep/3/1/7>
- Hapsari, N., Abidin, Z., & Arip, A. G. (2022). Analisis faktor jenis kelamin, usia dan lama bekerja terhadap kemampuan TPACK guru IPA SMP di Kota Cirebon. *Quagga: Jurnal Pendidikan Dan Biologi*, 14(2), 113–123. <https://doi.org/10.25134/quagga.v14i2.4942>
- Ismail, S., Masari, D., Kasriyati, D., Herdi, H., & Andriani, R. (2023). Teachers' perception of Technological Pedagogical Content Knowledge (TPACK) in teaching at senior high school in Pekanbaru. *ELT-Lectura*, 10(2), 75–82. <https://doi.org/10.31849/elt-lectura.v10i2.14695>
- Kumala, F. N., Ghufron, A., & Pujiastuti, P. (2022). Elementary school teachers' TPACK profile in science teaching based on demographic factors. *International Journal of Instruction*, 15(4), 77–100. <https://doi.org/10.29333/iji.2022.1545a>
- Lavidas, K., Komis, V., & Gialamas, V. (2021). Exploring preschool teachers' TPACK: Perceptions of their integration of ICT in practice. *International Journal of Instruction*, 14(1), 55–72.
- Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for integrating technology in teacher knowledge. *Teachers College Record*, 108(6), 1017–1054.
- Nicholas, A., Yeboah, S. K., Emelia, O. A., Otobil, E. K., Atieku, J. N., & Sefenu, J. C. (2024). Exploring senior high school teachers' Technological Pedagogical Content Knowledge in the Greater Accra Region of Ghana. *International Journal of Research and Scientific Innovation*, 11(5), 111–138. <https://doi.org/10.51244/ijrsi.2024.1105006>
- O'Flaherty, J., & Phillips, C. (2015). The use of flipped classrooms in higher education: A scoping review. *Internet and Higher Education*, 25, 85–95. <https://doi.org/10.1016/j.iheduc.2015.02.002>
- Pangrazio, L., Godhe, A. L., & Ledesma, A. G. L. (2020). What is digital literacy? A comparative review of publications across three language contexts. *E-Learning and Digital Media*, 17(6), 442–459. <https://doi.org/10.1177/2042753020946291>
- Partnership for 21st Century Skills. (2019). Framework for 21st Century Learning. Retrieved from https://p21.org/storage/documents/P21_Framework_Brief.pdf
- Pickens, J. (2005). Attitudes and perceptions. Miami Gardens, FL: Saint Thomas University.
- Prasojo, L. D., Habibi, A., Mukminin, A., & Yaakob, M. F. M. (2020). Domains of Technological Pedagogical and Content Knowledge: Factor analysis of Indonesian in-service EFL teachers. *International Journal of Instruction*, 13(4), 593–608. <https://doi.org/10.29333/iji.2020.13437a>
- Saks, A. M., & Johns, G. (2011). Perception, attribution, and judgment of others. In *Organizational behaviour: Understanding and managing life at work* (7th ed., p. 120).
- Schmid, M., Brianza, E., & Petko, D. (2020). Developing a short assessment instrument for Technological Pedagogical Content Knowledge (TPACK.xs) and comparing the factor



- structure of an integrative and transformative model. *Computers & Education*, 157, 103967.
- Shulman, L. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher*, 15(2), 4–14. <https://doi.org/10.3102/0013189X015002004>
- Suebwongsuwan, W., & Nomnian, S. (2020). Thai hotel undergraduate interns' awareness and attitudes towards English as a lingua franca. *Indonesian Journal of Applied Linguistics*, 9(3), 704–714. <https://doi.org/10.17509/ijal.v9i3.23221>
- Sy, Y., Raja, P., & Sinaga, T. (2023). Investigating English teachers' perception about the use of TPACK in EFL learning. *English Education: Jurnal Tadris Bahasa Inggris*, 16(2), 130–142. <https://doi.org/10.24042/ee-jtbi.v16i2.19208>
- Thy, S., Im, R., & Iwayama, T. (2023). Examining Cambodian high school science teachers' perception of Technological Pedagogical Content Knowledge (TPACK). *Journal of Science and Education (JSE)*, 4(1), 1–13. <https://doi.org/10.56003/jse.v4i1.232>
- Yuliani, S., & Saputri, K. (2024). The effectiveness of the TPACK-based problem based learning model on the learning outcomes. *English Franca: Academic Journal of English Language and Education*, 8(2), 461–474.
- Zhao, Y., & Watterston, J. (2021). The changes we need: Education post COVID-19. *Journal of Educational Change*, 22(1), 3–12. <https://doi.org/10.1007/s10833-021-09417-3>