





IT synergy in the application of Technological Pedagogical Content Knowledge (TPACK) in the social studies learning process: A literature study

Anggit Wahyu Wijanarko^{1*}, Yuliani Hidayatul Amania¹, Sariyatun¹ , Syahri Ramadan² 

¹ Universitas Sebelas Maret, Indonesia.

² Universitas Negeri Yogyakarta, Indonesia.

* Corresponding Author. E-mail: anggitw96@student.uns.ac.id

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ABSTRACT

This research is motivated by the increasing need for Information and Technology (IT) in the field of education in the era of globalization. The advancement of IT in the era of globalization requires humans to have superior IT skills. One way to synergize IT to provide superior IT skills is through education. Education is the right field in synergizing IT, especially in the learning process with the Technological Pedagogical Content Knowledge (TPACK.) approach. The formulation and purpose of the research is to provide a descriptive analysis of the IT synergy with the TPACK approach in the social studies learning process at the Junior High School (SMP) level. This research uses descriptive analysis method with literature review from books, journal articles, and other sources related to the research topic. The benefits of this research are: (1) It can be used as a reference for similar research related to IT synergy with TPACK approach in other learning; (2) It can be used as an illustration of the application of IT synergy with TPACK approach in social studies learning process; and (3) It can be an inspiration for social studies teachers in conducting social studies learning by synergizing IT with TPACK approach in schools. This research not only fulfills an urgent need for a deeper understanding of how IT can collaborate with TPACK in social studies learning, but also aims to provide an important contribution to the development of effective learning practices in the future.



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INTRODUCTION

The world of education is one of the fields affected by advances in Information and Technology (IT) in the current era of globalization. The era of IT advancement requires education to change its course to race to utilize technology properly. In this case, based on Permendikbud Number 22 of 2016, concerning Process Standards for Primary and Secondary Education, teachers must be able to utilize information and communication technology to improve the efficiency and effectiveness of learning. This efficiency and effectiveness should be a concern for teachers in teaching using technology (Bagry, 2022; Mourya & Singh, 2022; Nilufar, 2022; Onyido & Nwaogu, 2022).

The 21st century is indeed marked by inevitable technological advances that have penetrated various sectors, including education and globalization, and are being marked as an era of openness

by promoting a borderless system (Mutiani, 2019). The education sector has witnessed significant transformation through the integration of technological tools and approaches, which has impacted teaching methods and student performance (Salawu, 2022). On the other hand, globalization, with its components of integration, world markets, and mobility, has brought both positive and negative consequences, such as the persistence of poverty despite technological advances (Pieterse, 2012). Furthermore, the shift towards inclusiveness in education, particularly in open and distance learning systems, reflects a global understanding that transcends geographical boundaries and traditional educational constraints (Onyido & Nwaogu, 2022). Therefore, while technological development drives openness and connectivity, it also underscores the importance of addressing societal challenges and disparities in a borderless world.

The demands of all aspects of novelty require breakthroughs in thinking, conceptualization, and action. New paradigms are needed to face new challenges, as suggested by (Kuhn, 2005). New challenges are faced by using the old paradigm so that all efforts will fail. New challenges demand a breakthrough in thinking if the desired quality is the quality of output that can compete with an open world. New challenges and breakthroughs are an important agenda for education to answer the demands of the 21st century (Anderson et al., 2013).

In an era where information technology has become an indispensable part of everyday life, the integration of technology in education has become increasingly important. However, although many studies have been conducted on the use of technology in learning, research investigating the synergy between Information Technology (IT) and the application of Technological Pedagogical Content Knowledge (TPACK) in the context of social science learning still needs to be completed. The Covid-19 pandemic has accelerated the integration of online learning technologies in educational settings around the world. Educators have been forced to rapidly shift to digital platforms to ensure continuity in learning (Karunanayaka, 2023; Lotulung & Purnawinadi, 2023; Tijow et al., 2023). This shift highlights the critical need for educators to be equipped with the necessary skills and resources to engage in digital and open practices effectively. Challenges such as limited access to gadgets and internet connectivity have hindered the effectiveness of online learning.

Although the concept of TPACK has been the focus of attention in educational literature, its implementation in the context of social science learning still faces a number of significant challenges. While it is idealized that the synergy between Information Technology (IT) and the application of TPACK will result in more interactive, student-centered learning and facilitate deeper understanding, the reality often needs to match such expectations. Limited access to technology, teacher proficiency in technology, and curriculum constraints are significant barriers to the effective integration of Information Technology (IT) and Technological Pedagogical Content Knowledge (TPACK) in social science learning (Amelia et al., 2023; Binjha et al., 2023; Ismail et al., 2023). Research shows that there is still a gap between the potential of technology to enhance learning and the reality of practice in the field, with little thorough and sustained implementation of TPACK concepts in social science learning (Koh & Divaharan, 2011; Voogt et al., 2013). Therefore, there is an urgent need to investigate further how the synergy between IT and TPACK can be strengthened in the context of social science learning, as well as identify effective strategies to overcome existing barriers and improve existing learning practices.

Several studies have explored the complex relationship between technology, education, and learning content. For example, Mishra and Koehler (2006) proposed the Technological Pedagogical Content Knowledge (TPACK) framework as a foundation for technology integration in educational contexts. Voogt et al. (2013) provided an in-depth review of TPACK, highlighting the importance of a holistic understanding of how technology can be effectively used in learning. Koh and Divaharan (2011) emphasized the importance of developing technology integration skills for prospective teachers using the TPACK development model. Archambault and Barnett (2010) reflected on the concept of TPACK, while Angeli and Valanides (2009) discussed epistemological and methodological issues in developing and assessing ICT-TPACK. While these studies provide valuable insights into TPACK and the use of technology in education, the specific focus on the synergy between Information Technology (IT) and the application of TPACK in social science learning is limited. Therefore, an in-depth literature study on this topic would significantly contribute to the

practical and theoretical understanding of how technology can strengthen the application of TPACK in the context of social science learning.

Based on the background of the problem that the researcher has outlined, it is important to note that this study aims to significantly contribute to our understanding of technology integration in social science learning through the lens of Technological Pedagogical Content Knowledge (TPACK). This research aims to identify trends, challenges, and opportunities in the synergy between Information Technology (IT) and TPACK in social science learning through a comprehensive literature review. In addition, this study offers practical advice to educators, curriculum developers, and researchers on how to enhance technology integration in the context of social science learning in the hope of improving the quality of learning and student achievement. The findings from this study will provide valuable insights for educational practitioners and be a meaningful contribution to the educational literature in understanding how technology can be an effective partner in supporting student-oriented and relevant social science learning processes.

METHOD

This article is a review that uses the literature study method. Literature study in this context is interpreted as a theoretical analysis that refers to books, scientific journals, and other references that are recognized as relevant sources of information in the fields of technology, pedagogy, content knowledge, and social studies learning (Abdurahman, 2003; Nasution, 1988). This research specifically selected concepts related to IT integration in the context of TPACK in social studies learning. A descriptive method with a structured narrative description approach was chosen to elaborate and interpret findings from relevant literature (Arikunto, 2011). This approach allows us to present a comprehensive picture of the key concepts in TPACK and how IT integration can influence the social studies learning process in junior secondary schools. All literature used has been carefully selected to ensure a cohesive and in-depth construction of thoughts (Gunawan, 2016; Nasution, 1988).

The selection of articles or literature sources used in this study was carried out through a careful and systematic process. First, researchers conducted a search through databases of accredited and reputable indexed international scientific journals, such as Scopus, Web of Science, and Google Scholar. The keywords used included a combination of the terms "Technological Pedagogical Content Knowledge (TPACK)," "IT integration," "social studies education," and "middle school." We then screened the relevant articles based on the title, abstract, and keywords. The inclusion criteria included direct relevance to the TPACK concept, relevance to the context of social studies learning in middle school, and the accuracy and reliability of the research methodology used in the articles.

The data analysis technique was conducted using a descriptive approach and a structured narrative approach. Once the selected articles were identified, we conducted a thorough reading of each article to identify key findings relating to IT synergy in the application of TPACK in social studies learning. We then organized the findings into a structured and systematic narrative, paying attention to key aspects such as concept definitions, practical implications, and challenges. The analysis took into account the various perspectives that emerged from the retrieved literature, thus ensuring a comprehensive and in-depth overall understanding of the research topic.

RESULT AND DISCUSSION

Technological Pedagogical Content Knowledge, or TPACK, is a theoretical framework for developing Pedagogical Content Knowledge (PCK). Pedagogical Content Knowledge (PCK) was first initiated by Shulman in 1986. According to Shulman (1986), a teacher must master Pedagogical Knowledge (PK) and Content Knowledge (CK). Combining PK and CK means that a teacher must master the content/material and pedagogy to create learning. The ability to master a teacher's material and pedagogy is the same as the ability teachers in Indonesia must possess. This is stated in the Law of the Republic of Indonesia Number 14 of 2005 concerning teacher competence. Namely, teachers must have pedagogic, personality, social, and professional abilities.

According to **Shulman (1986)**, content knowledge includes knowledge of concepts, theories, ideas, frameworks, methods of proof, and evidence. Pedagogical knowledge is related to the way and process of teaching, which includes knowledge of classroom management, tasks, lesson planning, and student learning. Furthermore, **Hurrell (2013)** describes PCK as the relationship between the basic knowledge of content and pedagogy and the three necessary context areas. **Hurrell (2013)** describes the PCK relationship as a combination of content and pedagogical knowledge teachers apply in classroom learning by considering the existing context. **Figure 1** is a diagram of the PCK relationship.



Figure 1. PCK Relationship Diagram

Many studies on PCK have been conducted. From these various studies, it is concluded that PCK is important for developing the professional abilities of teachers and prospective teachers (**Anwar et al., 2014; Hill et al., 2008; Turnuklu & Yesildere, 2007**). However, along with the rapid development of technology and entering the industrial revolution 4.0 era, teachers and prospective teachers need to master technology in learning. The combination of PCK and technology is called by **Koehler and Mishra (2009)** Technological Pedagogical Content Knowledge (TPACK).

Koehler and Mishra (2009) developed Technological Pedagogical Content Knowledge (TPACK) based on Pedagogical Content Knowledge (PCK) developed by **Shulman (1986)** in 1986. Technological Pedagogical Content Knowledge (TPACK) is a theoretical framework for integrating technology in learning (**Koehler et al., 2013**). **Koehler et al. (2013)** further explained that Technological Pedagogical Content Knowledge (TPACK) has three main components: technological knowledge, content knowledge, and pedagogical knowledge. There is an interaction between every two components of the three components.

The three main components and the interaction between the two components form the intersection of TPACK, so there are seven components in TPACK, namely (1) Technological knowledge (TK); (2) Pedagogical knowledge (PK); (3) Content knowledge (CK); (4) Technological Content Knowledge (TCK); (5) Pedagogical content knowledge (PCK); (6) Technological Pedagogical Knowledge (TPK); and (7) Technological Pedagogical Content Knowledge (TPACK) (**Voogt et al., 2013**).

Technological Knowledge (TK) is an important component of Technological Pedagogical Content Knowledge (TPACK) for prospective teachers (**Witarsa & Siregar, 2023**). It includes understanding how technology can be utilized for effective learning, including software and applications, and the capacity to adapt and acquire new technologies (**Alaguraja & Ponselvakumar, 2023**). The ability to keep learning and finding out about the latest technology that can be used in learning is very important, considering that technology continues to develop very rapidly. For example, the development of learning software ranging from Microsoft PowerPoint, Lectora, Adobe Captivate, and Adobe Flash has now appeared as augmented reality technology. This software can be used for the learning process.

Pedagogical knowledge includes not only an understanding of teaching methods but also the ability to adapt and create learning strategies tailored to the needs of the classroom. Teachers with

strong pedagogical competence can effectively select appropriate learning methods that produce positive outcomes for students (Hidson & Leask, 2022). In addition, research emphasizes the importance of pedagogical knowledge in improving teaching quality, as teachers' ability to manage learning and apply effective methods significantly impacts student learning outcomes (Hutchinson, 2022; Shinvani et al., 2022). Furthermore, it is highlighted that pedagogical knowledge plays an important role in uncovering teachers' understanding of content and their pedagogical skills, demonstrating the interaction between content knowledge, pedagogical skills and pedagogical design capacity (Almonacid-Fierro et al., 2020).

Content knowledge (CK) is the mastery of prospective teachers of subject matter or material substance broadly and deeply (Nuraeni et al., 2022). This content knowledge is certainly different at each level of education; for example, geometry material in elementary school is certainly different from that in secondary school. Technological Content Knowledge (TCK) refers to the teacher's proficiency in delivering subject matter using technology. Research shows that teachers' mastery of Technological Pedagogical Content Knowledge (TPACK) is essential for effective teaching in the digital era (Alegre & Galado, 2023; Coşkun & Zeybek, 2023). TCK is the ability of teachers to accurately determine and use technology to create new representations in the process of transferring learning materials that have special characteristics so as to change the mindset of students.

Pedagogical Content Knowledge (PCK) includes more than just the ability to communicate material to students. It involves mastering the material, implementing the curriculum, creating engaging learning activities, and communicating effectively with students for assessment and evaluation (Idris et al., 2023). In delivering the material, the teacher does not just give the material but uses certain strategies in delivering the material, so PCK is also the accuracy of the teacher in choosing the right approach or strategy in certain materials and according to the character of the students because not all strategies are suitable for use in all materials.

Technological Pedagogical Knowledge (TPK) identifies the reciprocal relationship between technology and pedagogy (Zulaiha, 2023). TPK is also the ability of prospective teachers to select and utilize appropriate technology to support the implementation of various learning tools used. TPK is an important component of the broader Technology Pedagogical Content Knowledge (TPACK) framework, which integrates technology, pedagogy, and content knowledge for effective teaching (Lestari & Rahayu, 2023). Teachers need to develop TPACK to improve teaching quality by utilizing new approaches to content distribution, assessment, and documentation (Adipat et al., 2023). In addition, understanding GTC as transformative and homogeneous knowledge is essential for teacher preparation in the digital era, emphasizing continuous learning and individualized development (Bueno et al., 2023).

Technological Pedagogical Content Knowledge (TPACK) is the ability of teachers to organize learning by integrating learning strategies and technology. This is what distinguishes the depth of mastery of competencies for each subject teacher. TPACK is the optimization of TK used in learning to integrate CK, PK, and PCK into a unified whole that can produce an effective, efficient, and more interesting learning process (Rahman et al., 2018). Furthermore, Rahman et al. (2018) explained that the learning process in question prioritizes cognitive mastery and students' attitudes and character-building. The integrity of TPACK is a prerequisite for a teacher to implement PCK so that learning approaches, strategies, methods, and techniques can be adapted to the specifications of the content substance being taught.

Social science is an integration of various branches of social sciences, such as sociology, history, geography, economics, politics, law, and culture, which contains the study of humans and the world around them. Alizade and Nabiyeva (2022) suggest that social science is carried out by integrating various perspectives from the social sciences. The approach from various perspectives aims to address social problems by utilizing insights from various disciplines such as economics, politics, sociology, anthropology, culture, psychology, history, geography, human ecology, and so on (Hilmi, 2017).

Somantri (2001) states that social science is a simplified social science lesson for elementary school, junior high school, and senior high school education. The simplification means (1) Lowering the level of difficulty of social sciences that are usually studied at universities into lessons that are in accordance with the maturity of thinking of primary and secondary school students and (2) Linking

and integrating materials from various branches of social sciences and community life so that they become easy-to-digest lessons. Nasution (1988) defines social science as a lesson that is a fusion or blend of several social subjects. It is stated that social science is part of the school curriculum that deals with the role of humans in society, which consists of various subjects of history, economics, geography, sociology, anthropology, and social psychology.

Social science learning in junior high schools is implemented in an integrated manner. Integrated learning is a learning approach that allows students, both individually and in groups, to actively seek, explore, and discover concepts and principles holistically and authentically. Through integrated learning, students can gain direct experience, which can increase their power to receive, store, and produce impressions about the things they learn. Thus, students are trained to discover for themselves various concepts that are learned holistically, meaningfully, authentically, and actively.

In essence, integrated social science learning in junior high school aims to make this subject more meaningful to students so that the organization of material/subject matter is adjusted to the environment, characteristics, and needs of students (Sapriya, 2009). That way, students can master the dimensions of learning at school, namely mastering knowledge, skills, attitudes and values, and actions (Sapriya, 2009).

The integrated learning approach in social science, often called interdisciplinary, emphasizes holistic and authentic exploration of concepts and principles through individual and group education (Novriadi et al., 2023; Scholkmann et al., 2023). This model facilitates meaningful learning experiences by connecting ideas across different subjects, meeting children's needs, and enhancing their understanding of interconnected concepts (Horbatiuk et al., 2023). In addition, integrated learning is essential in modern education, promoting the perception of the world as a whole and increasing the effectiveness of the educational process through the integration of basic disciplines (Singh et al., 2023). Through integrated learning, learners can gain direct experience to increase the power to receive, store, and produce impressions about the things they learn. Thus, students are trained to discover the concepts they learn holistically, meaningfully, authentically, and actively for themselves.

The integrated learning approach prepares the learning program from various branches of science in the social science family. In this case, the development of integrated learning can take a topic from a particular branch of science and then complement, discuss, expand, and deepen with other branches of science. Topics or themes can be developed from issues, events, and problems that develop. It can form problems that can be seen and solved from various disciplines or perspectives, for example, floods, slums, tourism potential, science and technology, social mobility, modernization, and revolution, which are discussed by various social science disciplines.

In addition, the integrated social science learning model can facilitate and motivate students to recognize, accept, absorb, and understand the relationship or relationship between concepts, knowledge, values, or actions contained in several indicators and Basic Competencies. By using an integrated social science learning model, psychologically, students are led to think broadly and deeply to capture and understand the conceptual relationships presented by the teacher. Furthermore, students will get used to thinking directed, organized, whole, comprehensive, systematic, and analytic. Thus, this learning model leads to better learning abilities for students, both in terms of intelligence and creativity.

Technological Pedagogical Content Knowledge (TPACK) officially emerged in the early 2000s. TPACK is based on the development of Pedagogical Content Knowledge (PCK) (Guerrero-Quiñonez et al., 2023; Koehler & Mishra, 2009). TPACK is a framework for integrating technology in teaching (Koehler et al., 2013). Quality learning requires an intricate understanding of the interconnectedness of the three main sources of knowledge, namely technology, pedagogy, and content, and how they are applied in context. There are seven knowledge domains in TPACK, namely: (1) pedagogical knowledge, (2) content knowledge, (3) technology knowledge, (4) pedagogical content knowledge, (5) technological content knowledge, (6) technological pedagogical knowledge, and (7) technological pedagogical content knowledge (Kereluik et al., 2011; Loughran et al., 2012).

First, Pedagogical Knowledge (PK) is understood as knowledge about the nature of teaching and learning, including teaching methods, classroom management, lesson planning, and student

learning assessment (Anderson et al., 2013). This is certainly related to the process, strategies, procedures, steps, and methods of teaching and learning. In the first aspect, PK is expected to improve the ability of social studies teachers, especially in formulating learning according to student needs. Social studies learning that prioritizes integrated essential principles. Thus, social studies learning becomes strong.

Second, Content Knowledge (CK) is knowledge related to the subject matter being taught (e.g., math, language, social, art, and so on) (Baran & Uygun, 2016). In this aspect, social science teachers can understand the lessons to be taught, including knowledge of facts, concepts, theories, and procedures in a particular field, knowledge of frameworks that can organize and connect ideas and knowledge of rules, and evidence of content. In practice, social science teachers can connect the interrelations of social science in certain materials such as people, places, and the environment in class VII, semester 1. Social science teachers can use more than one discipline to deliver material comprehensively to students (Abbas, 2022; Mutiani, 2019).

Third, Technology Knowledge (TK) is knowledge based on sustainability and development, including knowledge of technology (Harris & Hofer, 2011; Kereluik et al., 2011). This knowledge is used to process information, communicate, solve problems, and focus on productive applications that are integrated into social science learning. Social science teachers can utilize several technologies that support social science learning, namely, laptops and projectors (LCDs) to display videos in learning. In addition, teachers can use web quiz tools to create questions related to students' social science subjects.

Fourth, Pedagogical Content Knowledge (PCK) is knowledge of pedagogy, teaching practices, and planning processes that can be applied and appropriate to teach the given subject matter (Loughran et al., 2012). PCK knowledge includes choosing the learning approach or method to teach a particular content. The choice of approach or method in learning mathematics is different from the approach or method of teaching other fields, such as the Indonesian language, natural science, or social science. PCK is concerned with concept representation and formulation, pedagogical techniques, knowledge of what makes a concept difficult or easy to learn, and also knowledge of learners' prior epistemological theories (Koehler & Mishra, 2009).

Correct conceptual representation is necessary to overcome learning difficulties and misconceptions and create more meaningful learning. PCK includes knowledge about creating a conducive learning atmosphere in the learning process, including providing facilities that can support the optimal learning process (Anderson et al., 2013). The fourth point of PCK for social studies teachers can strengthen one unit's academic ability and technological literacy. This is reinforced by the challenges of changing times that require students to understand technology as a whole.

Fifth, Technology Content Knowledge (TCK) is knowledge about the relationship between the subject and technology. This includes knowledge about influential technologies that can be used to explore specific content disciplines (Baran & Uygun, 2016). An example is linking material with currently developing technology, such as a social science teacher elaborating on a social science lesson related to social change with the technological needs of society. In TCK, teachers must be fluent in choosing teaching materials and connecting them with technological developments. Of course, this must be supported by an established concept of science development.

Sixth, Technological Pedagogical Knowledge (TPK) is knowledge about the influence of technology in teaching and learning and the advantages and constraints related to pedagogical design technologies and strategies (Niess, 2011). TPK for social science teachers is the ability to apply several tools and software that support learning. The existence of TPK for social science teachers can support social science learning that reflects the needs of technological development. In addition, students also get new learning experiences.

The seventh Technological Pedagogical Content Knowledge (TPCK-TPACK) is knowledge of the complex interactions between the domains of knowledge principles (content, pedagogy, technology) (Anderson et al., 2013). Learning in modern times requires teachers to understand technology to collaborate with it. So, it is not only the pedagogy aspect; content and technology aspects are also considered when implementing modern and innovative classroom learning (Brantley-Dias & Ertmer, 2013). TPACK integrates complex technology in learning by paying

attention to three aspects, namely pedagogy, content, and technology itself, in learning that teachers develop effectively.

The seven components above are related to each other. Social science learning can be given room for innovation so that social science learning becomes fun. The nature of integrated social science learning is intended to enable students to develop knowledge, values, attitudes, and skills in society, nation, and state (Abbas, 2022). The construct of the social science learning paradigm must shift teacher-centered, textbook-centered, and monomedia-centered learning to the student center (Samiha, 2017). Social science learning must prioritize social science, namely the study of social science and humanitarian science integrated into developing citizenship competencies (Wahidmurni, 2017).

Elaboration of TPACK and social science is learning to provide flexibility for students to determine the pace of learning and choose the sequence of learning activities according to the needs of heterogeneous students (Wahidmurni, 2017). Social science teachers can enhance learning by utilizing technology-assisted strategies such as Augmented Reality (AR) to display concrete examples, facilitating content understanding (Mustaffa & Rashid, 2023). In addition, project-based learning in social science can increase student independence and discipline, leading to improved communication and learning outcomes (Bernal Jr et al., 2023). Implementing educational strategies, including technology-assisted methods, is essential to engage students and improve the teaching and learning process (Nora et al., 2023). By integrating project-based tasks aligned with students' interests and needs, teachers can increase participation and effectiveness in social science learning (Martínez & García, 2023). Therefore, combining concrete examples through technology and project-based tasks tailored to student usability can significantly improve social science learning outcomes and student engagement.

Such integration between technology and learning certainly requires time and training for social science teachers. However, the existence of TPACK in social studies learning is believed to be a learning model that is oriented to the changes and demands of the 21st century in addressing the era of science. The organization of the material will be contextual. Teachers can develop actual material. Various phenomena of daily life can be raised as the theme of the subject matter. The subject matter is more verbal learning. Students can develop Various intellectual skills, ranging from fact-finding skills to knowing facts to evaluating or assessing facts.

While this article provides a comprehensive insight into the synergy of IT in the application of TPACK in social science learning in junior secondary schools, there are some limitations that need to be acknowledged. First, this research is limited to analyzing literature studies and does not involve empirical research or field research. In addition, the focus of this study is only on social science learning in junior high school and may not cover all related aspects or disciplines. Therefore, the findings and conclusions in this article need to be considered in light of the context and limitations of the research.

CONCLUSION

This article highlights the importance of synergy between Information Technology (IT) and the application of Technological Pedagogical Content Knowledge (TPACK) in the learning process of social science in junior high school. A comprehensive literature study revealed that effective integration between IT and TPACK can improve the quality of social science learning by strengthening the interaction between technology, pedagogy, and learning content. However, this study also highlights that implementing such synergy still faces several challenges, including limited access to technology, teachers' skills in using technology, and the need for more institutional support. Therefore, corrective measures and updates in learning approaches need to be considered to optimize the synergy of IT and TPACK in social science learning in junior secondary schools.

Several suggestions can be made based on this literature study's findings. First, educators need more intensive training and professional development to improve their understanding and skills in integrating technology into social science learning. In addition, strong institutional support and supportive policies are also needed to create a conducive learning environment for the implementation of TPACK in learning practices. Furthermore, further research can be conducted to

explore effective strategies and methods to overcome the barriers and identify best practices in optimizing the synergy between IT and TPACK in the context of social science learning in junior secondary schools.

REFERENCES

- Abbas, E. W. (2022). *Menulis artikel konferensi internasional*. Universitas Lambung Mangkurat. <https://repo-dosen.ulm.ac.id/handle/123456789/17949>
- Abdurahman, D. (2003). *Pengantar metode penelitian*. Kurnia Kalam Semesta.
- Adipat, S., Chotikapanich, R., Laksana, K., Busayanon, K., Piatanom, P., Ausawasowan, A., & Elbasouni, I. (2023). Technological pedagogical content knowledge for professional teacher development. *Academic Journal of Interdisciplinary Studies*, 12(1), 173. <https://doi.org/10.36941/ajis-2023-0015>
- Alaguraja, S., & Ponselvakumar, G. (2023). Technological Pedagogical and Content Knowledge (TPACK) among prospective teachers. *Thiagarajar College of Preceptors Edu Spectra*, 5(S1), 74–80. <https://doi.org/10.34293/eduspectra.v5is1-may23.013>
- Alegre, E. M., & Galado, J. (2023). Technological competence and pedagogical content knowledge practices of junior high school science teachers. *International Journal of Membrane Science and Technology*, 10(2), 566–579. <https://doi.org/10.15379/ijmst.v10i2.1266>
- Alizade, S., & Nabiyeveva, E. (2022). Multidisciplinary Issues in Social Sciences. *Grani*, 25(1), 84–87. <https://doi.org/10.15421/172212>
- Almonacid-Fierro, A., Merellano-Navarro, E., Sepúlveda-Vallejos, S., & Rios-Chandia, M. (2020). Pedagogical knowledge: A reflection on the pedagogical praxis of teachers during the initial phase of their profession. *Universal Journal of Educational Research*, 8(12B), 8075–8084. <https://doi.org/10.13189/ujer.2020.082609>
- Amelia, D. P., Oktafianti, M., Genika, P. R., & Luthfia, R. A. (2023). Implementasi Technological Pedagogical Content Knowledge (TPACK) terhadap keterampilan mengajar di sekolah dasar. *Journal on Education*, 5(2), 3001–3009. <https://doi.org/10.31004/joe.v5i2.952>
- Anderson, A., Barham, N., & Northcote, M. (2013). Using the TPACK framework to unite disciplines in online learning. *Australasian Journal of Educational Technology*, 29(4). <https://doi.org/10.14742/ajet.24>
- Angeli, C., & Valanides, N. (2009). Epistemological and methodological issues for the conceptualization, development, and assessment of ICT–TPCK: Advances in technological pedagogical content knowledge (TPCK). *Computers & Education*, 52(1), 154–168. <https://doi.org/10.1016/j.compedu.2008.07.006>
- Anwar, Y., Rustaman, N. Y., & Widodo, A. (2014). Hypothetical model to developing pedagogical content knowledge (PCK) prospective biology teachers in consecutive approach. *International Journal of Science and Research*, 3(12), 138–143. <https://repository.unsri.ac.id/45539/1/U1VCMTQyNTU%3D.pdf>
- Archambault, L. M., & Barnett, J. H. (2010). Revisiting technological pedagogical content knowledge: Exploring the TPACK framework. *Computers & Education*, 55(4), 1656–1662. <https://doi.org/10.1016/j.compedu.2010.07.009>
- Arikunto, S. (2011). *Prosedur penelitian : Suatu pendekatan praktik*. Rineka Cipta.
- Bagry, A. (2022). Criteria for the effective use of educational technology. *Scientific Bulletin of Flight Academy. Section: Pedagogical Sciences*, 11, 20–25. <https://doi.org/10.33251/2522-1477-2022-11-20-25>

- Baran, E., & Uygun, E. (2016). Putting Technological, Pedagogical, and Content Knowledge (TPACK) in action: An integrated TPACK-design-based learning (DBL) approach. *Australasian Journal of Educational Technology*, 32(2). <https://doi.org/10.14742/ajet.2551>
- Bernal Jr, H. L., Cao, H. D., De Sierra, A. A., Diamaton, C. A., Dolor, C. D., Hidalgo, A. I., & Pati, M. V. (2023). Utilization of technology-aided strategies in teaching social science: Basis for outcomes-based instruction. *Randwick International of Education and Linguistics Science Journal*, 4(1), 13–19. <https://doi.org/10.47175/rielsj.v4i1.605>
- Binjha, P. B., Das, B. C., Dansana, A., & Das, B. K. (2023). Pedagogical innovation of TPACK based K-4 learning transaction model in science and social sciences. *Asian Journal of Education and Social Studies*, 39(1), 42–52. <https://doi.org/10.9734/ajess/2023/v39i1838>
- Brantley-Dias, L., & Ertmer, P. A. (2013). Goldilocks and TPACK. *Journal of Research on Technology in Education*, 46(2), 103–128. <https://doi.org/10.1080/15391523.2013.10782615>
- Bueno, R., Niess, M. L., Aldemir Engin, R., Ballejo, C. C., & Lieban, D. (2023). Technological pedagogical content knowledge: Exploring new perspectives. *Australasian Journal of Educational Technology*, 39(1), 88–105. <https://doi.org/10.14742/ajet.7970>
- Coşkun, N., & Zeybek, G. (2023). High school teachers' technological pedagogical content knowledge and self-efficacy perceptions. *Research on Education and Psychology*, 7(1), 164–181. <https://doi.org/10.54535/rep.1277313>
- Guerrero-Quiñonez, A. J., Bedoya-Flores, M. C., Mosquera-Quiñonez, E. F., Ango-Ramos, E. D., & Lara-Tambaco, R. M. (2023). Hybrid education: Current challenges. *Ibero-American Journal of Education & Society Research*, 3(1), 276–279. <https://doi.org/10.56183/iberoeds.v3i1.629>
- Gunawan, I. (2016). *Metode penelitian kualitatif: Teori & praktik*. Bumi Aksara. <http://ap.fip.um.ac.id/wp-content/uploads/2019/11/metod-kualitatif.pdf>
- Harris, J. B., & Hofer, M. J. (2011). Technological Pedagogical Content Knowledge (TPACK) in Action. *Journal of Research on Technology in Education*, 43(3), 211–229. <https://doi.org/10.1080/15391523.2011.10782570>
- Hidson, E., & Leask, M. (2022). Pedagogy. In *Learning to Teach in the Secondary School* (pp. 405–417). Routledge. <https://doi.org/10.4324/9781003201267-33>
- Hill, H. C., Ball, D. L., & Schilling, S. G. (2008). Unpacking pedagogical content knowledge: Conceptualizing and measuring teachers' topic-specific knowledge of students. *Journal for Research in Mathematics Education*, 39(4), 372–400. <https://doi.org/10.5951/jresmetheduc.39.4.0372>
- Hilmi, M. Z. (2017). Implementasi pendidikan IPS dalam pembelajaran IPS di sekolah. *Jurnal Ilmiah Mandala Education*, 3(2), 164–172. <https://doi.org/http://dx.doi.org/10.58258/jime.v3i2.198>
- Horbatiuk, O., Polishchuk, S., Kuchynska, I., & Blashkova, O. (2023). Integrated learning in a modern school in the context of distance education. *SOCIETY. INTEGRATION. EDUCATION. Proceedings of the International Scientific Conference*, 1, 601–612. <https://doi.org/10.17770/sie2023vol1.7095>
- Hurrell, D. P. (2013). What teachers need to know to teach mathematics: An argument for a reconceptualised model. *Australian Journal of Teacher Education*, 38(11), 54–64. <https://doi.org/10.14221/ajte.2013v38n11.3>
- Hutchinson, J. B. (2022). *Gut*. University of Arkansas Press. <https://doi.org/10.2307/j.ctv262qrrf>
- Idris, I., Mardalina, M., Muliawati, L., & Chandri, C. (2023). Pedagogical Content Knowledge (PCK) integrated Islamic for students of FTK UIN Sulthan Thaha Saifuddin Jambi. *INNOVATIO*:

- Journal for Religious Innovations Studies*, 23(1), 16–26. <https://doi.org/10.30631/innovatio.v23i1.160>
- Ismail, M., Zubair, M., Alqadri, B., & Basariah, B. (2023). Integration of technological pedagogical and content knowledge in 21st Century learning. *Jurnal Penelitian Pendidikan IPA*, 9(5), 2363–2367. <https://doi.org/10.29303/jppipa.v9i5.3732>
- Karunanayaka, S. P. (2023). Blending innovative pedagogy and technology for capacity development of educators during the pandemic. *Journal of Learning for Development*, 10(1), 24–37. <https://doi.org/10.56059/jl4d.v10i1.783>
- Kereluik, K., Mishra, P., & Koehler, M. J. (2011). On learning to subvert signs: Literacy, technology and the TPACK framework. *California Reader*, 44(2), 12–18. <https://punyamishra.com/wp-content/uploads/2010/12/californiareader2010.pdf>
- Koehler, M. J., & Mishra, P. (2009). What is technological pedagogical content knowledge (TPACK)? *CITE Journal*, 9(1), 60–70. <https://www.learntechlib.org/p/29544/>
- Koehler, M. J., Mishra, P., Akcaoglu, M., & Rosenberg, J. M. (2013). The technological pedagogical content knowledge framework for teachers and teacher educators. In *ICT integrated teacher education: A resource book* (pp. 2–7). Commonwealth Educational Media Centre for Asia. [https://www.cemca.org/ckfinder/userfiles/files/ICT teacher education Module 1 Final_May 20.pdf](https://www.cemca.org/ckfinder/userfiles/files/ICT%20teacher%20education%20Module%201%20Final%20May%2020.pdf)
- Koh, J. H. L., & Divaharan, H. (2011). Developing pre-service teachers' technology integration expertise through the TPACK-developing instructional model. *Journal of Educational Computing Research*, 44(1), 35–58. <https://doi.org/10.2190/EC.44.1.c>
- Kuhn, T. S. (2005). *The structure of scientific revolutions : Peran paradigma dalam revolusi sains* (L. Rasjidi (ed.); T. Surjaman (trans.)). Remaja Rosdakarya.
- Lestari, A., & Rahayu, D. S. (2023). Technological Pedagogical Content Knowledge (TPACK): Survey persepsi pada mahasiswa calon guru IPA. *PENDIPA Journal of Science Education*, 7(1), 33–42. <https://doi.org/10.33369/pendipa.7.1.33-42>
- Lotulung, C. V., & Purnawinadi, I. G. (2023). Persepsi tentang pembelajaran daring dan hasil belajar mahasiswa keperawatan. *Nutrix Journal*, 7(1), 97. <https://doi.org/10.37771/nj.v7i1.935>
- Loughran, J., Berry, A., & Mulhall, P. (2012). *Understanding and Developing Science Teachers' Pedagogical Content Knowledge*. SensePublishers. <https://doi.org/10.1007/978-94-6091-821-6>
- Martínez, A. A., & García, I. N. (2023). Enhancing social science learning with augmented reality for primary students in a CLIL context. *Europub Journal of Education Research*, 4(1), 11–33. <https://doi.org/10.54745/ejerv4n1-002>
- Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record: The Voice of Scholarship in Education*, 108(6), 1017–1054. <https://doi.org/10.1111/j.1467-9620.2006.00684.x>
- Mourya, S. K., & Singh, T. (2022). Effective ways of using technology in teaching. *Gyan Management Journal*, 16(2), 20–25. <https://doi.org/10.48165/gmj.2022.16.2.3>
- Mustaffa, R. B., & Rashid, S. B. A. (2023). Competence of teachers in teaching and learning of social science teachers in school towards the improvement of teacher professionalism. *Russian Law Journal*, 11(4s), 74–85. <https://doi.org/10.52783/rlj.v11i4s.805>
- Mutiani, M. (2019). Social capital dan tantangan abad 21: Kontribusi Pendidikan IPS dan eksplorasi nilai sosial melalui biografi KH Zainal Ilmi. *SOSIO-DIDAKTIKA: Social Science Education Journal*, 6(1), 1–10. <https://journal.uinjkt.ac.id/index.php/SOSIO-FITK/article/view/12386>
- Nasution, S. (1988). *Metode penelitian naturalistik kualitatif*. Tarsito.

- Niess, M. L. (2011). Investigating TPACK: Knowledge growth in teaching with technology. *Journal of Educational Computing Research*, 44(3), 299–317. <https://doi.org/10.2190/EC.44.3.c>
- Nilufar, O. (2022). The use of effective technology in teaching English language. *Asian Journal of Multidimensional Research*, 11(3), 70–75. <https://doi.org/10.5958/2278-4853.2022.00044.1>
- Nora, Y., Ambiyar, A., & Aziz, I. (2023). Evaluation of project-based learning in social sciences learning subjects in elementary schools. *JURNAL PAJAR (Pendidikan Dan Pengajaran)*, 7(1), 75–82. <https://doi.org/10.33578/pjr.v7i1.9060>
- Novriadi, F., Fitria, Y., & Erita, Y. (2023). Kajian dampak pembelajaran model fragmented dan motivasi belajar terhadap siswa sekolah dasar. *Pendas : Jurnal Ilmiah Pendidikan Dasar*, 8(1), 2034–2049. <https://doi.org/10.23969/jp.v8i1.8204>
- Nuraeni, A., Nana, N., & Surahman, E. (2022). Pedagogical Content Knowledge (PCK) mahasiswa jurusan pendidikan fisika dalam mereduksi miskonsepsi peserta didik pada materi gerak lurus. *ORBITA: Jurnal Pendidikan Dan Ilmu Fisika*, 8(1), 1–9. <https://doi.org/10.31764/orbita.v8i1.4909>
- Onyido, J. A., & Nwaogu, O. A. (2022). Technology in secondary education: Sociological implications for the 21st Century Nigeria adolescents. *British Journal of Education*, 10(4), 35–42. <https://doi.org/10.37745/bje.2013/vol10no4pp.35-42>
- Pieterse, J. N. (2012). Twenty-first century globalization: A new development era. *Forum for Development Studies*, 39(3), 367–385. <https://doi.org/10.1080/08039410.2012.688859>
- Rahman, F. ur, Hussain, M. A., & Khalid, S. (2018). Technological Pedagogical Content Knowledge (TPACK) and preparedness of tutors in Open and Distance Learning (ODL) for new teacher education programs. *Journal of Educational Research*, 21(2), 147–161. <https://jer.iub.edu.pk/journals/JER-Vol-21.No-2/13.pdf>
- Salawu, I. (2022, September). Inclusive ODL: Implications for the adoption of blended instructional learning strategy in the 21st Century technological era. *Tenth Pan-Commonwealth Forum on Open Learning*. <https://doi.org/10.56059/pcf10.3322>
- Samiha, Y. T. (2017). Interaktif dalam pembelajaran IPS. *JIP Jurnal Ilmiah PGMI*, 3(1), 89–97. <https://doi.org/10.19109/jip.v3i1.1383>
- Sapriya, S. (2009). *Pendidikan IPS: Konsep dan pembelajaran* (D. Effendi (ed.)). Remaja Rosdakarya.
- Scholkmann, A., Stegeager, N., & Miller, R. K. (2023). Integrating the integration. *Journal of Problem Based Learning in Higher Education*, 11(1), 98–123. <https://doi.org/10.54337/ojs.jpblhe.v11i1.7371>
- Shinvani, R. D., Amalia, D. K., Evitaloka, R., Putra, F. A., & Sari, I. N. (2022). Variations of learning methods as implementation of teacher's pedagogical knowledge. *EduLine: Journal of Education and Learning Innovation*, 2(2), 80–87. <https://doi.org/10.35877/454RI.eduline727>
- Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher*, 15(2), 4–14. <https://doi.org/10.2307/1175860>
- Singh, A. R., Bhardwaj, D., Dixit, M., & Kumar, L. (2023). An integrated model for text to text, image to text and audio to text linguistic conversion using machine learning approach. *2023 6th International Conference on Information Systems and Computer Networks (ISCON)*, 1–7. <https://doi.org/10.1109/ISCON57294.2023.10112123>
- Somantri, M. N. (2001). *Menggagas pembaharuan pendidikan IPS*. Remaja Rosdakarya.

- Tijow, M. A., Sembiring, D. A. K., Risamasu, P. E. G., & Aryesam, A. (2023). Problematika pembelajaran daring di masa pandemi Covid-19. *NOKEN : Jurnal Pengelolaan Pendidikan*, 4(1), 43–58. <https://doi.org/10.31957/noken.v4i1.2992>
- Turnuklu, E. B., & Yesildere, S. (2007). The pedagogical content knowledge in mathematics: Pre-service primary mathematics teachers' perspectives in Turkey. *Issues in the Undergraduate Mathematics Preparation of School Teachers*, 1. <https://files.eric.ed.gov/fulltext/EJ835499.pdf>
- Voogt, J., Fisser, P., Pareja Roblin, N., 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>
- Wahidmurni, W. (2017). *Metodologi pembelajaran IPS: pengembangan standar proses pembelajaran IPS di sekolah/madrasah*. Ar-Ruzz Media. <http://repository.uin-malang.ac.id/4634/>
- Witarsa, R., & Siregar, P. (2023). Pengaruh model pembelajaran Technological Pedagogic and Content Knowledge (TPACK) terhadap kognisi siswa sekolah dasar. *SITTAH: Journal of Primary Education*, 4(1), 95–106. <https://doi.org/10.30762/sittah.v4i1.971>
- Zulaiha, F. (2023). Analisis technological pedagogical content knowledge calon guru fisika pada mata kuliah pendidikan teknologi dasar. *Jurnal Pendidikan Dan Ilmu Fisika*, 3(1), 202–214. <https://doi.org/10.52434/jpif.v3i1.2825>