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# THE TEACHER'S TPACK ABILITY INTEGRATED LOCAL WISDOM TO SUPPORT THE ACHIEVEMENT OF PANCASILA STUDENT PROFILE

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**Abstract**

This study examines teachers" TPACK skills in integrating local wisdom into IPAS learning to develop the Pancasila student profile at SD Muhammadiyah Bangka Belitung. The research method is descriptive qualitative. Data collection techniques are questionnaires, observation sheets, documentation, and interviews. Data analysis techniques use descriptive, quantitative, and qualitative methods. The results showed that teachers had implemented TPACK even though they did not realise the practice was included in the TPACK framework. The highest aspects were PK and TPK, while the lowest were TK and TCK. Local wisdom-based learning successfully stimulates the dimensions of the Pancasila learner profile, such as faith, creativity, independence, and mutual cooperation. However, the achievement of Pancasila learner profile indicators is still in the range of 36-75% due to the lack of teacher training. The recommendation is to increase TPACK training, especially in the TK and TCK aspects, and understanding of the Merdeka curriculum.

**Keywords:** TPACK; local wisdom; Pancasila student's profile; merdeka curriculum; IPAS

***Abstrak***

*Penelitian ini mengeksplorasi dan menyelidiki keterampilan TPACK guru dalam pembelajaran IPAS untuk menumbuhkembangkan profil pelajar Pancasila di SD Muhammadiyah Bangka Belitung. Fokus penelitian pada kearifan lokal, pemahaman lingkungan, dan pemecahan masalah bagi masyarakat. Tujuannya, untuk mengeksplorasi kemampuan TPACK guru yang mengintegrasikan nilai-nilai kearifan lokal dalam IPAS dalam membentuk profil pelajar Pancasila. Penelitian ini termasuk deskriptif kualitatif. Pengumpulan data menggunakan kuesioner, lembar observasi, dokumentasi, dan wawancara. Teknik analisis data menggunakan deskriptif kualitatif. Hasil penelitian menunjukkan bahwa guru telah mengimplementasikan TPACK walaupun tidak menyadari praktik tersebut termasuk ke dalam kerangkanya. Aspek tertinggi terdapat pada PK dan TPK, sedangkan terendah pada aspek TK dan TCK. Pembelajaran berbasis kearifan local berhasil menstimulasi dimensi profil pelajar Pancasila seperti beriman, kreatif, mandiri, dan gotong royong. Namun dengan pencapaian indikator profil pelajar Pancasila berada pada kisaran 36-75%. Penyebabnya adalah kurangnya pelatihan guru. Rekomendasinya adalah meningkatkan pelatihan TPACK khususnya pada aspek TK dan TCK serta pemahaman kurikulum Merdeka.*

***Kata Kunci:*** *TPACK; kearifan lokal; profil pelajar Pancasila; kurikulum merdeka; IPAS*

## INTRODUCTION

The rapid development of technology in the digital era has led to a significant shift in the way education is approached. The advancements in science and technology during the Industrial Revolution 4.0, marked by the digital revolution through cyber-physical systems and the Internet of Things (IoT), underscore society's growing reliance on technology. The emergence of Industrial Revolution 5.0 signifies a synergy between human civilisation and digital technology that does not jeopardise true human identity. The field of education must adjust to global changes, presenting a challenge for the future to ensure that it effectively prepares teachers to manage learning through various technological resources.

Government Regulation No. 4 of 2022 on Graduate Competency Standards for Basic Education focuses on developing students into devout, noble-minded individuals with strong character, based on the Pancasila student profile. It emphasises improving competence, literacy, and numeracy to support further educational pursuits. Article 40 highlights that curriculum development considers regional and national needs, workforce demands, advancements in science and technology, and global dynamics.

The Merdeka Curriculum's IPAS (Science and Social Studies) learning helps shape the Pancasila student profile by encouraging students' curiosity about natural and social phenomena. This curiosity drives them to explore connections between nature, work, and human interactions, fostering problem-solving skills for sustainable development. Through scientific inquiry, students develop a scientific mindset. Local wisdom from Bangka Belitung, including natural phenomena and their socio-economic impacts, serves as learning material, allowing students to investigate and better understand their environment (BSKAP, 2022). The natural landscape of Bangka Belitung, rich in resources, directly and indirectly, affects the lives of individuals in every district. This phenomenon can be utilised as both a source and an object of learning. IPAS learning in the digital era requires teachers to master TPACK, as the integration of technology, pedagogy, and scientific content not only enhances learning effectiveness but also supports the development of 21st-century skills such as critical thinking and digital literacy among students.

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Teachers' Technology Pedagogy Content Knowledge (TPACK) ability must make the curriculum relevant to technological, social, and environmental global changes, as well as to 21st-century learning (Boisandi & Anita, 2017; Elvianasti et al., 2023). TPACK is an integration of Technology Knowledge (TK), Content Knowledge (CK), Pedagogy Knowledge (PK), Pedagogy Content Knowledge (PCK), Technology Pedagogy Knowledge (TPK), and Technology Content Knowledge (TCK) (Beri & Sharma, 2021; Sari & Mega, 2022, 2023; Schmidt et al., 2014). This framework encourages teachers to make informed decisions about selecting, adopting, and applying appropriate materials, pedagogy, and technology (Morales et al., 2022; Thappa & Baliya, 2022). The success of learning using TPACK is closely related to the qualifications of educators and their teaching experience, especially IT-based teaching (Akhwani, 2020; Antony et al., 2019; Demirtaş & Mumcu, 2021; Lyublinskaya & Kaplon-Schilis, 2022; Rahayu, 2020).

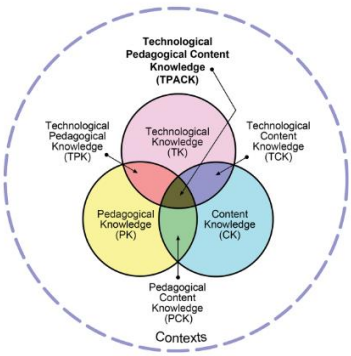


**Figure 1 TPACK framework in learning**

This research is a follow-up study on enhancing teacher competency through digital profile builder-based teacherpreneur training, which will be implemented in 2021. It aims to improve the competency for Muhammadiyah teachers through collaborative training activities between Muhammadiyah Elementary School and P4TK. Based on the results of problem identification, it is evident that Muhammadiyah Elementary School teachers have integrated TPACK competencies into their teaching. However, teachers are not yet aware that TPACK is a competency that supports learning in the era of the Industrial Revolution 5.0. The example provided remains conceptual, as it refers to the textbook that the school has prepared.

Science learning aims to help students understand environmental phenomena, fostering problem-solving skills. This study examines teachers' TPACK (Technological Pedagogical Content Knowledge) ability to integrate local wisdom into IPAS (Science-Social Studies) learning, reinforcing the Pancasila student profile at SD Muhammadiyah Bangka Belitung. Key issues include 1) Teachers' underutilisation of local wisdom in shaping the Pancasila profile, and 2) Challenges in implementing projects and assessing the profile due to insufficient training. The research explores how teachers' TPACK skills can effectively incorporate local wisdom into IPAS learning to strengthen students' Pancasila values. This study aims to explore the TPACK ability of teachers who integrate local wisdom values in IPAS to develop a Pancasila student profile, conducted at SD Muhammadiyah Bangka Belitung.

This research aims to provide a foundation for enhancing the quality of education through academic orientation and life skills, as well as educational pedagogical innovation, to support the development of edu-tourism in Bangka Belitung. In accordance with the target of achieving Indonesia Emas 2045, there is a need for qualified human resources who can face global challenges, especially in the professional field of employment (Fitriani et al., 2023; Guerra-Macías & Tobón, 2025; Iftikhar et al., 2023; Wu et al., 2022). This has become a global discourse that requires comprehensive instruction by integrating education policy, curriculum, and learning assessment (Roshid & Haider, 2024). Graduates are expected to possess 1) learning and innovation skills; 2) life and professional skills; and 3) media and technology skills (Joynes et al., 2019). The research examines teachers' TPACK abilities in integrating local wisdom values into IPAS to shape the profile of a Pancasila student. However, there remains a lack of knowledge, skills, and experience in using technology and integrating it into teaching (Halabieh et al., 2022; Klemer et al., 2023; Komarudin & Suherman, 2024; Valtonen et al., 2023). The results of this study are expected to enhance teachers' skills in implementing the Merdeka curriculum and encourage them to develop their expertise in this area further.

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## METHOD

This research method employs qualitative descriptive methods to explore the problem and develop a detailed understanding of the central phenomenon of teachers' TPACK skills at SD Muhammadiyah Bangka Belitung, which integrates local wisdom to support the achievement of the Pancasila profile (John W. Creswell, 2014). This research builds concepts, hypotheses, or abstract theories by asking questions such as "why," "how," and "in what way" (Cresswell JW, 1998; Mertens, 2005; Myers, 1997). Descriptive qualitative research is a method that utilises qualitative data and describes it descriptively. It involves collecting data in the form of words and language rather than using numbers (Seixas et al., 2018).

The research was conducted at SD STKIP Muhammadiyah Bangka Belitung (Bangka Tengah), SD Muhammadiyah Pangkalpinang (Kota), and SD Muhammadiyah Sungailiat (Bangka). The three schools were selected based on their geographical location, as they are central areas and borders between districts in Bangka Belitung, involving nine teachers, with three teachers assigned to each school. Data collection involves questionnaires, interviews, documentation, and observational techniques.

The study utilises both descriptive quantitative and qualitative methods for data analysis, integrating multiple sources to deepen understanding of observed phenomena. A larger dataset enhances result accuracy. Quantitative analysis applies descriptive statistics, calculating mean values for each measured aspect. Qualitative analysis involves data collection, transcription, organisation, coding, categorisation, and descriptive interpretation. Additionally, construct validity tests, assessed through expert judgment, refine test items for empirical evaluation. Validity test decision-making is as follows: if $r_{count} > r_{table}$, the item is declared valid. The questionnaire instrument was validated through Pearson correlation and reliability testing using Cronbach's alpha. According to the results of the Pearson correlation test, the validation decision-making indicates that if the significance value is <0.05, the item is declared valid; if > 0.05, it is declared invalid. Based on the validation test results, 22 out of 25 items are valid, with a reliability level of 0.928, categorising

it as very reliable. Table 1 presents some aspects used for the questionnaire and observation sheets in this study.

**Table 1 Grid of Questionnaire, Interview, and Observation**

| Aspect | Item |
|---|---|
| Technological Knowledge (TK) | 3 |
| Pedagogical Knowledge (PK) | 3 |
| Content Knowledge (CK) | 2 |
| Technological Content Knowledge (TCK) | 3 |
| Pedagogical Content Knowledge (PCK) | 4 |
| Technical Pedagogical Knowledge (TPK) | 3 |
| Technological Pedagogical Content Knowledge (TPACK) | 4 |
| ***Indicatiors of Interview and Questionnaire*** | |
| Proficiency in using technology in learning | 5 |
| Classroom management skills | 5 |
| Integrating interdisciplinary/transdisciplinary learning (e.g. STEM or STEAM) | 7 |
| Integrates several disciplinary studies | 5 |
| Stimulate students to construct in-depth and meaningful knowledge through multidisciplinarity | 8 |
| Stimulate students to apply the principles of realising the Pancasila learner profile | 8 |

## RESULT AND DISCUSSION

Based on the results of observations and analyses conducted on fourth-grade science learning at SD STKIP Muhammadiyah Bangka Belitung (Bangka Tengah), SD Muhammadiyah Pangkalpinang (Kota), and SD Muhammadiyah Sungailiat (Bangka), it is clear that all three schools have implemented the Merdeka Curriculum, which is primarily required for fourth-grade students. The fourth grade falls under phase B, where the focus is on students' ability to make craft products based on environmental potential and to explain the materials, tools, and steps involved. Achieving these learning objectives requires the teacher's pedagogical

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role to be integrated with technology use, content mastery, and the optimisation of the environment as an object or phenomenon in learning through the teacher's TPACK abilities. The analysis results regarding the implementation of teacher TPACK competencies, which integrate local wisdom to develop a Pancasila profile for fourth-grade elementary students, are illustrated in Figure 2.

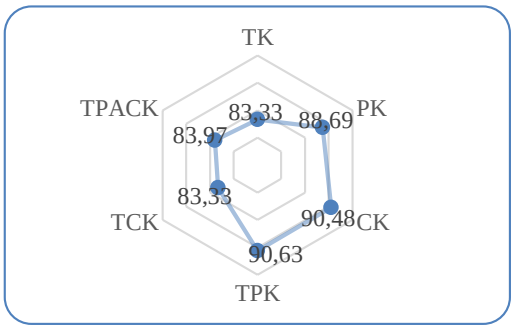


**Figure 2 TPACK competencies integrated local wisdom**

Figure 2 shows that teachers have tried to apply TPACK in the learning process. This learning process, following the learning needs of the 21st century, utilises technology to support a learning system that is open and creative, free access to information sources, freedom of choice, an independent approach, and the creation of conditions for mastering creative fields in forming a learning culture (Tolochko et al., 2023). Educators act as guides or facilitators for learning, emphasising a student-centred learning approach (Khairatunnisa, 2022; Smith et al., 2022; Talan, 2018). Based on Figure 2 obtained from the questionnaire results, it is known that the lowest aspects are in the TK and TCK aspects. This statement is strengthened by interviews with teachers, who stated that teachers consider technology to be digital only in the TK aspect. Teachers have used various interactive and up-to-date media to support learning, primarily to support the formation of the Pancasila profile of critical and creative reasoning dimensions. However, technology-based media is sometimes not effective for fourth-grade elementary school students. Students are more involved in direct learning in the field by observing the school and home environment. Overall, learning media is expected to help students in learning, but it does not guarantee its maximum achievement. This is due to the lack of relevance between the media and the needs

of students in creating learning conditions (Fitriana et al., 2021; Ghufron et al., 2024).

This activity also influences TCK results to be lower than other aspects. TCK integrates technology and material substances that stimulate several dimensions of the Pancasila profile, such as global diversity, faith, holiness, noble character, critical reasoning, creativity, independence, and cooperation. The dimensions of religion, purity, noble character, and global diversity are stimulated by video presentations by elementary school teachers at Muhammadiyah Pangkalpinang. At the same time, SD Muhammadiyah Sungailiat and SD STKIP Muhammadiyah Bangka Belitung have not yet optimised digital technology to form these dimensions. The dimensions of independence, critical reasoning, creativity, and cooperation are formed by involving students in implementing inorganic waste processing practices converted into products of economic value or other innovative products. For example, students learn using science process skills per the elements presented in the *Merdeka* curriculum.

The importance of the science process for students in facing complex challenges in solving environmental problems is Science Process Skills (SPS) (Biswal & Behera, 2023; Bray et al., 2023; Putri et al., 2023; Sakdiah et al., 2022; Sumardi, 2023). SPS is a strategic skill that equips students with a foundation of constructivism by applying concepts and developing logical thinking skills to solve environmental problems through practical activities and applying concepts. These skills can be obtained from the results of implementing SPS activities, classified as Basic Science Process Skills (BSPS) and Integrated Science Process Skills (ISPS). BSPS consists of 1) observation, 2) inferring, 3) measurement, 4) communication, 5) classification, and 6) prediction. ISPS consists of 1) controlling variables, 2) defining operationally, 3) formulating hypotheses, 4) interpreting data, 5) experimenting, and 6) formulation of a model (Biswal & Behera, 2023; Idris et al., 2022; Raj & Devi, 2014; Yildiz & Guler Yildiz, 2021). Aspects and activities of SPS facilitate students to learn science meaningfully by exploring experiential or constructivist processes, observing objects, identifying objects, and experiences that start with simple ideas to develop new and complex ideas (Gizaw & Sota, 2023;

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Suryanti et al., 2020). Figure 3 is an effort to form a Pancasila profile by SD Muhammadiyah Pangkalpinang. Every activity is published on social media as a form of the school's existence in supporting education in the 21st century. Figure 4 is the work of Muhammadiyah Sungailiat Elementary School students who use inorganic waste in the form of cardboard and local Bangka Belitung wisdom using shells and snails, which are often found on beaches.

**Figure 3 Efforts to form a Pancasila profile at Muhammadiyah Pangkalpinang elementary school students**


**Figure 4 Processing inorganic waste and utilizing local potential as photo by Muhammadiyah Sungailiat Elementary School students**

Several products produced by these students show that teachers at Muhammadiyah Elementary School have tried to shape the profile of Pancasila through the latest learning and integrating it with local potential. The ideal science learning course places the environment as an object to be studied regarding disturbances, impacts, and how to overcome these problems (Gubasheva et al., 2023). Efforts to ensure a sustainable environment through education are

integrating environmental issues as learning objects to facilitate students in developing knowledge skills supporting innovative, relevant, and responsive learning opportunities to needs as a new approach in pedagogy (Hewindati et al., 2023). Based on Figure 2, it is known that the highest percentage is in the TPK aspect. The percentages show that the teacher can pedagogical design with technology and pedagogical range for technological tools. Teachers can create a learning environment to build students' new knowledge and skills through technology, supported by didactic steps to support optimal learning. Figure 5 is the result of an analysis of the teacher's assessment of himself regarding the effectiveness of using TPACK in learning by integrating local wisdom to form a Pancasila profile.

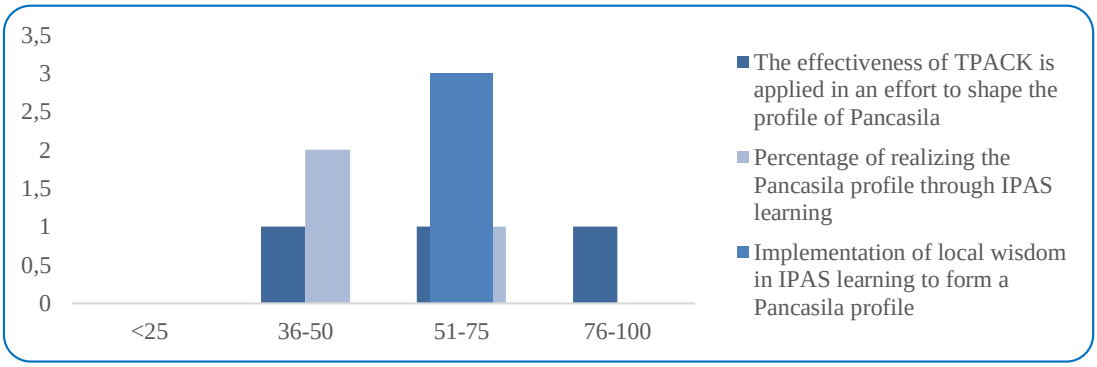


**Figure 5 Analysis results from teacher self-evaluation to form a Pancasila student's profile**

Based on Figure 5, it is known that the effectiveness of TPACK applied in learning to support the Pancasila student's profile is at a percentage of 36%-50%, 51%-75%, and 76%-100%. This assessment is based on self-reports form the teacher in SD Muhammadiyah Bangka Belitung through google form. Aspects reported by teachers include the Pancasila student's profile strengthening project, obstacles to forming a Pancasila student's profile, and the output of the implementation of the Pancasila student's profile strengthening project. However, based on the results of observations of learning and interviews with students, we see that teachers have implemented TPACK in learning but with varying achievements. The implementation of TPACK is adjusted to the needs of the school. The application of TPACK is a follow-up to previous research, which shows that TPACK is relevant for current learning. Judging from the aspect of implementing

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local wisdom in science and science teaching to form a Pancasila student's profile, it is known that the three schools are at a percentage of 51% -75%. This percentage is adjusted to learning needs and the characteristics of the material being studied. However, all three schools have implemented it.

Meanwhile, regarding the percentage of schools achieving the Pancasila student's profile through IPAS learning, it is known that 67% of schools are at a rate of 36% to 50%, and 33% have a rate of 51% to 75%. This percentage is because not all sub-dimensions are easily assessed with existing instruments. The curriculum has many dimensions and sub-dimensions, so teachers need more time and performance to achieve this. The results of the data analysis indicated that teachers have effectively optimised the formation of a Pancasila student profile for Muhammadiyah Elementary School students, primarily through various innovations. The implementation of TPACK at Muhammadiyah Elementary School began in 2020, particularly during the COVID-19 pandemic. However, sometimes teachers do not realise that the learning they conduct is part of implementing TPACK. IPAS learning, utilising TPACK competencies integrated with local wisdom, has been in practice for a long time.

This integration provides an effective method for Muhammadiyah Elementary School to shape a Pancasila student profile. Nevertheless, it has not been fully optimised due to the relatively broad scope of dimensions and sub-dimensions. Consequently, it takes teachers longer to grasp the concepts outlined in the curriculum. Therefore, the hope for further research is to develop a comprehensive and representative instrument for assessing the achievement of indicators related to the Pancasila student profile. Additionally, there is a need for training programs to strengthen Muhammadiyah elementary school teachers' understanding of the indicators presented in the curriculum. Another study also supported the results that elementary school teachers in Bangka Belitung successfully integrated TPACK with local wisdom by utilising sea shell waste to stimulate the dimensions of the Pancasila learner profile through creativity and gotong royong (Sari & Mega, 2023). The learning fosters students' environmental awareness and independence.

## CONCLUSION

The implementation of TPACK has not been optimal, especially in the TK and TCK aspects. The results show that teachers have implemented TPACK in IPAS learning, especially during the Covid-19 period, but not all of them realise that the practice is included in the TPACK framework. PK and TPK aspects have the highest presentation, while TK and TCK are still low. Local wisdom-based learning effectively stimulates the dimensions of the Pancasila learner profile, including faith, creativity, independence, and mutual cooperation. However, the achievement of Pancasila learner profile indicators remains in the range of 36-75% due to the complexity of the curriculum and a lack of teacher training. The obstacles experienced by teachers are limited information and understanding related to the implementation and assessment of the Merdeka curriculum. The recommendation is to increase TPACK training, especially in the TK and TCK aspects, as well as the understanding of the Merdeka curriculum. Optimising technology to support learning, for example, with interactive media or locally based projects. Further research is expected to conduct a more in-depth study of the effectiveness of TPACK in different contexts or with other integrated disciplinary approaches such as STEM or STEAM.

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