Profile of Technological, Pedagogical, and Content Knowledge (TPACK) Middle School Teachers in Sekarbela District, Mataram City

Ismail*, Muhammad, & Bahtiar
Tadris Physics Study Program, Universitas Islam Negeri Mataram
*Email: ismail_thoib@uinmataram.ac.id

Received: 18 May 2022; **Accepted**: 31 May 2022; **Published**: 06 June 2022
DOI: http://dx.doi.org/10.29303/jpft.v8i1.3594

Abstract *- Teachers with TPACK perspective are teachers who understand the correct pedagogy and conceptual understanding by using technology in teaching subject matter. By having the right TPACK, teachers will be able to engage and motivate students in exploring learning content to a greater extent. This study examines the TPACK profile of junior high school teachers in the Sekarbela sub-district of Mataram city using the TPACK framework. This research is ex-post-facto research and causal associative research with a quantitative approach. The population in this study were junior high school teachers in Sekarbela District, Mataram City, totaling 120 teachers, with a sample of 60 teachers who were taken using a proportional random sampling technique. The data collection technique used questionnaires and documentation, while the data analysis technique used multiple regression using SPSS for windows 21. The results showed that the component of Technological Content Knowledge scored 36.50, which fell into the low category. Pedagogical Knowledge (PK) got a score of 54.80, Technological Knowledge (TK) got a score of 40.83, Content Knowledge (CK) got a score of 47.97, and Technological Pedagogical Knowledge fell into the medium category. Meanwhile, Pedagogical Content Knowledge (PCK) scored 60.93, and Technological, Pedagogical, and Content Knowledge (TPACK) scored 63.53, which fell into the high category. Hence, it can be concluded that the research results show the average overall ability of teachers in the seven TPACK frameworks has a score of 50.07 within high criteria.*

Keywords*: TPACK; Teacher*

INTRODUCTION

The success of student learning is influenced by many factors and the teacher plays an important role for the success of the learning process (Saribas et al., 2013; Studies, 2016). (Barsalou, 2008; Widodo & Wahyudin, 2018) revealed that the structure of the teacher's knowledge and skills in carrying out learning in the classroom is related to how well and how much students learn. Students will learn a lot when teachers can use time effectively, apply methods or strategies that involve students actively in learning, clearly communicate rules and learning objectives, and prevent problems by proposing learning contracts when starting the learning activities and continuing to apply them effectively and consistently throughout the year (Chua & Jamil, 2012; Rizqiya et al., nd). Based on this, teacher is a profession that requires expertise. Professional teachers should master education and teaching. Teaching skills are absolutely needed by teachers. To understand the processes that occur in a learning activity and understand how the influence of teacher knowledge in a learning activity is, a framework is needed as an instrument to measure teacher skills, namely TPACK.

Technological, Pedagogical, and Content Knowledge (TPACK) is a conceptual framework which serves as the basis for the needs of teachers in teaching. According to (Voogt et al., 2011), TPACK is the framework used for the knowledge base that teachers need to teach effectively with technology. This framework stems from the

idea that the integration of technology in a given educational context benefits from a careful alignment of the content, pedagogy and technology potential, and therefore teachers wishing to integrate technology in their teaching practice must be competent in all three domains (Chai et al., 2011; Tanak, 2020). In understanding and improving teacher's knowledge for efficient technology integration, in having the value of uncovering new types of knowledge and departing from a technocentric approach, an integrated concept called TPACK is needed (Porras-Hernández, et al, 2013). Therefore, in the current development of the fourth industrial revolution era, teachers must have the ability to implement technology-integrated learning, pedagogical abilities, and mastery of material that can be measured using the TPACK framework.(Dong et al., 2020). This is one solution for providing a phenomenological approach for teachers that reflects learning practices.

Koehler et al., (2011) stated that TPACK (Technological, Pedagogical, and Content Knowledge) is a framework in designing new learning models by combining three main aspects, namely technology, pedagogy, and content knowledge (ontological). There are 7 (seven) components in the TPACK framework, namely TK, CK, PK, PCK, TCK, TPK, and TPACK (Koehler et al., 2012). Technological Knowledge (TK) is the knowledge about how to operate computers and relevant software. 2) Pedagogical Knowledge (PK) is the ability to manage student learning. 3) Content Knowledge (CK) is the knowledge about the subject matter, such as knowledge on language, Mathematics, Natural Sciences etc. 4) Technological Content Knowledge (TCK) is knowledge about how content can be researched or represented by technology such as using computer simulations to represent and study the movement of the earth's crust. 5) Pedagogical Content Knowledge (PCK) is knowledge about how to represent and formulate subjects to make them understood by others. 6) Technological Pedagogical Knowledge (TPK) is knowledge about how technology can facilitate pedagogical approaches such as using asynchronous discussion forums to support the social construction of knowledge. 7) Technological, Pedagogical and Content Knowledge (TPACK) is knowledge about how to facilitate student learning of certain content through pedagogic and technological approaches.

From the explanation above, it can be concluded that TPACK (Technological, Pedagogical, Content Knowledge) is a framework in designing new learning models by integrating three main aspects, namely technology, pedagogy and content/ material knowledge as well as the interaction between two or all of the knowledges. This in-classroom-learning knowledge aims to develop basic knowledge when a teacher learns the subject matter and understands how technology can increase learning opportunities and experiences for students while knowing the right pedagogy to improve the content of learning.

In education, a teacher with a TPACK perspective is a teacher who understands the correct pedagogy and conceptual understanding by using technology in teaching subject matter. By having the right TPACK, teachers will be able to engage and motivate students in exploring learning content to a greater extent (Hofer & Harris, 2016). The rapid development of technology in the 21st century makes it challenging for the world of education to develop and to find tools that add efficiency and value to the learning process (Bahtiar & Ibrahim, 2022). Technology has a strong influence in schools as a tool that can

change the way subjects are taught in the learning process, and good teaching requires both teachers and students to use technology to collect, organize, and evaluate information to solve problems (Sointu et al., 2016).

From the literature study, there are still few studies that discuss the TPACK profile of junior high school teachers. Thus, this study will fill this gap by exploring the technological understanding profile of junior high school teachers using the TPACK framework. The benefit of this research is that the discovery of the TPACK profile for junior high school teachers, which consists of six components, can be used to adjust learning development to make learning more effective and dynamic. Given how important the TPACK ability is, it encourages researchers to conduct profiling for teachers' TPACK. The evaluation method used can use the Technological, Pedagogical, Content, Knowledge (TPACK) framework.

RESEARCH METHODS

This research is a type of ex-post facto research and causal associative research with quantitative research approach. The population in this study were state junior high school teachers in Sekarbela District, Mataram City, totaling 120 teachers with a sample of 60 teachers who were taken using proportional random sampling technique. Data collection techniques used questionnaires and documentation, while data analysis techniques used multiple regression using SPSS for windows 21. In this study, teacher's TPACK indicators were used, which include Pedagogical Knowledge (PK), Technological Knowledge (TK), Content Knowledge (CK), Technological Content Knowledge (TCK), Pedagogical Content Knowledge (PCK), Technological Pedagogical Knowledge (TPK), Technological Pedagogical and Content Knowledge (TPACK) by using the TPACK questionnaire.

RESULTS AND DISCUSSION

Results

The results of descriptive statistical data analysis of the TPACK variable are presented as follows.

Table 1. Analysis of TPACK variable

No	Indicator	Min	Max	Sum	Mean	Category
1	PK: Pedagogical Knowledge	10	150	1644	**54.80**	**Medium**
2	TK: Technological Knowledge	8	150	1225	**40.83**	**Medium**
3	CK: Content Knowledge	10	150	1439	**47.97**	**Medium**
4	TCK: Technological Content Knowledge	10	150	1095	**36.50**	**Low**
5	PCK: Pedagogical Content Knowledge	10	150	1828	**60.93**	**High**
6	TPK: Technological Pedagogical Knowledge	10	150	1378	**45.93**	**Medium**
7	TPACK: Technological Pedagogical and Content Knowledge	10	150	1906	**63.53**	**High**
	Mean	**9.71**	**150.00**	**1502.14**	**50.07**	**High**

Source. SPSS TPACK Analysis Results.

The results showed that the averages for each TPACK framework were 54.80, 40.83, 47.97, 36.50, 60.93, 45.93, and 63.53 for Pedagogical Knowledge (PK), Technological Knowledge (TK), Content Knowledge (CK), Technological and Content Knowledge (TCK), Pedagogical Content Knowledge (PCK), Technological Pedagogical Knowledge (TPK), and Technological Pedagogical and Content Knowledge (TPACK) respectively. This means that the component of TCK, which got a score of 36.50, fell into the low category. PK, which got a score of 54.80, TK, which got a score of 40.83, CK, which got a score of 47.97, and TPK, would fall into the category of medium. Meanwhile, PCK, which got a score of 60.93 and TPACK, which got a score of 63.53, fell within the high category. Hence, it can be concluded that the research results show that the average of the overall ability of the teachers in the seven TPACK frameworks has a score of 50.07, which fell within the high criteria.

Discussion

The results of the research above are supported by several previous studies. (Restiana, 2018) state that The TPACK framework provides a basis for improving the ability of mathematics teachers in Banten. There, it is shown that teachers get the highest average score for the CK component. The factors of age, length of teaching and gender have no significant effect or only have a small effect on the TPACK component. Therefore, learning is required in order to adapt to technological developments so that learning is more effective and dynamic.

Another opinion comes from (Feladi, 2020), who states that teachers must be able to integrate technology, pedagogy and materials quite well. In the learning process, the teacher always thinks about effective learning by using facilities such as computers, projectors, and the internet, which are integrated using various learning models that are adapted to the material. Subsequently, (Ambaryati, 2019) also stated that the results of his research showed the average of the overall ability of teachers in the seven TPACK frameworks had a score of 31.68 within quite high criteria. (Septiandari, 2019) also said that there was an increase in students' creative thinking skills in both classes, whereby the highest improvement was in the fluency thinking skill aspect and the lowest was in the originality aspect. The products made by students contain aspects of novelty, effectiveness, and wholeness. The wholeness aspect got the highest percentage of 87.5%.

CONCLUSION

The results showed that the component of Technological Content Knowledge scored 36.50, and fell into the low category. Pedagogical Knowledge (PK) got a score of 54.80, Technological Knowledge (TK) got a score of 40.83, Content Knowledge (CK) got a score of 47.97, and Technological Pedagogical Knowledge fell within the medium category. Meanwhile, Pedagogical Content Knowledge (PCK) scored 60.93, and Technological, Pedagogical, and Content Knowledge (TPACK) scored 63.53 within the high category. So, it can be concluded that the research results show the average overall ability of teachers in the seven TPACK frameworks has a score of 50.07, with high criteria.

ACKNOWLEDGMENT

The writers express sincere gratitude to the Chancellor of UIN Mataram, who had supported and, at the same time, funded this activity of study program-based independent

research. Additionally, we would like to express gratitude to the lecturer team of UIN Mataram, who had assisted in this research. We hope that this research will help improve the education department of UIN Mataram.

REFERENCES

Ambaryati, A. (2019). Profil TPACK Guru SD Negeri Kecamatan Tengaran Kabupaten Semarang Tahun 2018. *Seminar Nasional Sains & Entrepreneurship*. http://conference.upgris.ac.id/index.php/snse/article/view/154

Bahtiar, B., & Ibrahim, I. (2022). The Science Literacy Profile Based on Students' Creative Thinking Skill in the Time of Covid-19 Pandemic Using Blended Learning. *Proceedings of the International Conference on Madrasah Reform 2021 (ICMR 2021)*, *633*(Icmr 2021), 102–110. https://doi.org/10.2991/assehr.k.220104.016

Barsalou, L. W. (2008). Grounded Cognition. *Annual Review of Psychology*, *59*(1), 617–645. https://doi.org/10.1146/annurev.psych.59.103006.093639

Chai, C. S., Koh, J. H. L., Tsai, C. C., & Tan, L. L. W. (2011). Modeling primary school pre-service teachers' Technological Pedagogical Content Knowledge (TPACK) for meaningful learning with information and communication …. *Computers & Education*. https://www.sciencedirect.com/science/article/pii/S0360131511000157

Chua, J. H., & Jamil, H. (2012). Factors influencing the technological pedagogical content knowledge (TPACK) among TVET instructors in Malaysian TVET institution. *Procedia-Social and Behavioral Sciences*. https://www.sciencedirect.com/science/article/pii/S1877042812055565

Dong, Y., Xu, C., Chai, C. S., & Zhai, X. (2020). Exploring the structural relationship among teachers' technostress, technological pedagogical content knowledge (TPACK), computer self-efficacy and school support. *The Asia-Pacific Education Researcher*. https://doi.org/10.1007/s40299-019-00461-5

Feladi, V. (2020). Profil Technological Pedagogical and Content Knowledge (TPACK) Guru Mata Pelajaran Teknologi Informasi dan Komunikasi di SMA dan SMK Pontianak …. In *Proceedings of the 1st ICOLED–IKIP-PGRI Pontianak*. pbing.org. https://pbing.org/wp-content/uploads/2020/04/20192-16vindo.pdf

Hofer, M., & Harris, J. (2016). Open educational resources (OERs) for TPACK development. *Society for Information Technology & Teacher …*. https://www.learntechlib.org/p/172102/

Koehler, M. J., Mishra, P., Bouck, E. C., & ... (2011). Deep-play: Developing TPACK for 21st century teachers. *International …*. https://doi.org/10.1504/IJLT.2011.042646

Koehler, M. J., Shin, T. S., & Mishra, P. (2012). How do we measure TPACK? Let me count the ways. *Educational Technology, Teacher …*.https://www.igi-global.com/chapter/measure-tpack-let-count-ways/55357

Porras-Hernández, L. H., & ... (2013). Strengthening TPACK: A broader notion of context and the use of teacher's narratives to reveal knowledge construction. *Journal of Educational …*. https://doi.org/10.2190/ec.48.2.f

Restiana, N. (2018). Evaluasi profil TPACK untuk guru matematika sekolah

menengah pertama di Banten. *Jurnal Penelitian Pendidikan*. https://journal.unnes.ac.id/nju/index.php/JPP/article/view/14438

Rizqiya, R., Mayasari, L., & Yunianti, S. (n.d.). Teaching Writing on Narrative Text Using Group Investigation on Whatsapp Group Feature. in *board committee structure …*. researchgate.net.

Saribas, D., Mugaloglu, E. Z., & Bayram, H. (2013). Creating metacognitive awareness in the lab: Outcomes for preservice science teachers. *Eurasia Journal of Mathematics, Science and Technology Education*, *9*(1), 83–88. https://doi.org/10.12973/eurasia.2013.918a

Septiandari, W. (2019). *Profil Keterampilan Berpikir Kreatif Dan Kreativitas Siswa Pada Materi Bunyi Dan Pendengaran Berdasarkan Desain Technological …*. repository.upi.edu. http://repository.upi.edu/id/eprint/39689

Sointu, E., Valtonen, T., Kukkonen, J., & ... (2016). Quasi-experimental study for enhancing pre-service teachers' TPACK. *... & Teacher Education …*. https://www.learntechlib.org/p/172127/

Studies, E. (2016). *Working in the Mathematics Frame : Maximizing the Potential to Learn from Students ' Mathematics Classroom Discussions Author (s): Rodney E . McNair Source : Educational Studies in Mathematics , Vol . 42 , No . 2 (2000), pp . 197-209 Published by : Sp*. *42*(2), 197–209.

Tanak, A. (2020). Designing TPACK-based course for preparing student teachers to teach science with technological pedagogical content knowledge. *Kasetsart Journal of Social Sciences*. https://so04.tci-thaijo.org/index.php/kjss/article/view/234891

Voogt, J., Shin, T., Mishra, P., Koehler, M., & ... (2011). Teachers' assessment of TPACK: Where are we and what is needed? *... & Teacher Education …*. https://www.learntechlib.org/p/37028/

Widodo, S. A., & Wahyudin. (2018). Selection of Learning Media Mathematics for Junior School Students. *Turkish Online Journal of Educational Technology - TOJET*, *17*(1), 154–160. http://www.tojet.net/