



Analysis Self-Reflection of Prospective Teacher-Students on TPACK Ability Through Case-Based Learning Model

Suci Nurpratiwi

Universitas Negeri Jakarta, Indonesia

sucinurpratiwi@unj.ac.id

ABSTRACT

Keywords:

Learning Model;
Case-Based;
Self-reflection;
TPACK

This study aims to analyze students' self-reflection on their Technological, Pedagogical, Content Knowledge (TPACK) abilities through a case-based learning model. The research was carried out at the State University of Jakarta, with the research subjects 41 students of the Islamic Religious Education study program who took the micro-teaching course. This type of research is qualitative, with data collection methods through observation, interviews, documentation, and distributing questionnaires. The results showed that the case-based learning model in the micro-teaching course could stimulate students' self-reflection ability. Self-reflection related to TPACK is students can find out their strengths and weaknesses in terms of TPACK. The results of student self-reflection show that technological, pedagogical, and content knowledge skills are very good, with a percentage above 80%. In comparison, the aspect that is still low is mastery related to technological content knowledge with an average percentage below 50%.



Article History:

Received: 05-11-2021
Revised : 17-11-2021
Accepted: 18-11-2021
Online : 06-12-2021



This is an open access article under the **CC-BY-SA** license



<https://doi.org/10.31764/ijecca.v4i3.5711>

----- ◆ -----

A. INTRODUCTION

Teachers as the main resource in improving the quality of education, are required to be professional. To be professional, teachers must have basic teaching abilities and skills. Future teachers are expected to effectively carry out their functions as people who professionally facilitate student learning activities according to their learning needs and work professionally with high professionalism in school and the school community. Besides, they can become agents of social change, both in the school environment and in the community (Fuada et al., 2020).

There are various components that a teacher must have to be considered a professional teacher, namely affection, mastery of knowledge, presentation of lesson materials, teacher-student relationships, and teacher-adult relationships (Anas, 2018). A professional teacher is armed with knowledge in managing learning and needs to learn a lot about teaching students. One way that teachers can do in improving their professional roles and responsibilities is always to do self-reflection.

Reflection is defined and interpreted by academics and researchers differently. However, they all accept that it is a desirable attitude and practice to improve practice and learning (Çimer et al., 2013). Reflective practice is a process that facilitates teaching, learning, and understanding, and it plays a central role in teachers' professional development (Mathew et al., 2017). Whereas reflection can be used as the main literature for teachers in developing new strategies in solving

problems in the learning and teaching process, teachers can continuously think, evaluate, and plan what they have done, are doing, and will be doing in the classroom.

There are still many teachers who lack self-reflection to improve their professional performance independently or with their peers. Self-reflection is an experience that aims to make a person ready to face new experiences and review what he has done in an activity, to plan or use his expertise in future activities. (Lestari, 2019). Of course, being a professional teacher who can reflect on himself is not a short process. Teacher education and micro teaching-learning are important as the starting point for the formation of qualified teacher candidates. There is a process that goes along with it to create good quality graduates (Nurpratiwi & Amaliyah, 2020). In teacher education, student-teacher candidates were taught how to go from 'student' to 'teacher' through lessons in higher education as a basis for self-development. Teacher education in higher education is required to improve the professional skills needed as a result of the development of science and technology. According to Keengwe, as quoted by Fuada, every teacher in all subjects must learn how to design and develop their abilities to achieve student success in learning in this modern era. (Fuada et al., 2020).

Prospective teacher-student candidates who have self-reflection skills will develop into a reflective-teacher. Reflective-teacher always learns from experience, is aware of what is known or unknown, and always applies lifelong learning in improving professionalism (Shafira, 2015), especially related to mastery of Technological, Pedagogical, Content, Knowledge (TPACK). TPACK is teacher knowledge about facilitating student learning of certain content through pedagogical and technological approaches (Hidayati et al., 2018).

TPACK in education is known as a theoretical framework for understanding the knowledge required by teachers to integrate three knowledge domains, namely technology, pedagogy, and content. Kohler & Mishra explain that quality learning requires a complex understanding of the interconnectedness between the three main sources of knowledge, namely technology, pedagogy, and content, and how these three sources are applied according to the context (Kohler & Mishra, 2009). These relationships are described in the seven TPACK domains as Figure 1 follows.

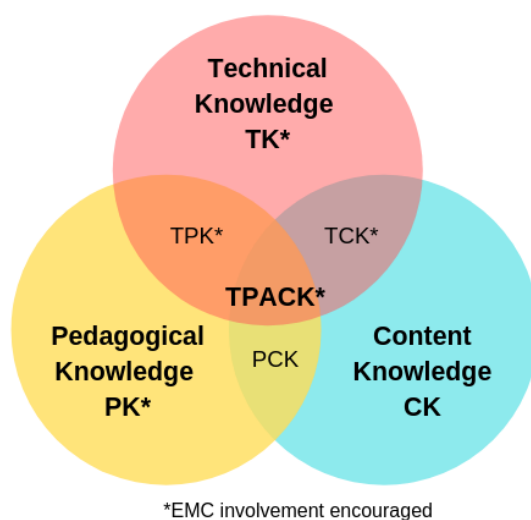


Figure 1. The relationship between each aspect of TPACK

The case-based learning model is a learning activity carried out on a case-based basis. The case-based learning model is a part or form of implementation of the student center learning

(SCL) approach, and students face a case containing concrete problems. Case-based learning is expected to improve students' self-reflection skills, making them aware of their ability to master TPACK. So the purpose of this study is to display and analyze the development of self-reflection of prospective teacher students through mastery of TPACK with case-based learning.

B. METHODS

The research method used is qualitative research. The research was carried out at the State University of Jakarta, with the research subjects being 41 students who took micro-teaching courses. Data collection techniques in this study were observation, interviews, distributing questionnaires, and documentation. The questionnaires were distributed to students after implementing the micro-teaching course to determine the development of student self-reflection. Researchers conducted self-reflection research through aspects of student mastery of TPACK.

Data collection techniques were also carried out by distributing self-reflection questionnaires to students after implementing the micro-teaching course to determine the level of student self-reflection. Researchers involved selected participants in interviews (related to learning and projects that have been produced and their effects on students' understanding and self-reflection). This approach was chosen because it provides a space for open discussion, allowing the researcher to gain insight into the selected student's point of view on the subject under investigation (Kustandi et al., 2019).

Data analysis was carried out descriptively to get an idea of how high the level of self-reflection of prospective teacher students was with implementing the case-based learning model in the micro-teaching course. The data analysis techniques based on Miles and Huberman, as cited by Sugiyono, include data reduction, display data, and conclusions/verification (Sugiyono, 2014).

In data reduction, researchers collect data on the results of student self-reflection through observation, questionnaires, and interviews. Then the researcher transcribed the data. The irrelevant data which were not related to research questions were discarded. The reduced data is then displayed. At this stage, the steps taken are to present a structured set of information, and the possibility of concluding, the narrative used in explaining the data analysis regarding TPACK mastery is further simplified to make it easier to understand. After collecting, reducing, and displaying data, a conclusion is then drawn. Conclusions are drawn by analyzing the data continuously and verifying its validity to get a perfect conclusion about self-reflection regarding mastery of TPACK in prospective teacher students. The formula used to convert the score obtained into a percentage is as follows:

$$\text{Score} = \frac{\text{obtained score}}{\text{maximum score}} \times 100 \quad (1)$$

The data obtained will then be converted into qualitative criteria. Researchers set standards for the high and low self-reflection results, as shown in Table 1 below.

Table 1. Percentage Range and Qualitative Criteria

Range	Criteria
0 - 20	Very less
21 - 40	Not enough
41 - 60	Enough
61 - 80	Well
81 - 100	Very good

C. RESULT AND DISCUSSION

Case-based learning is implemented by designing learning with an emphasis on analysis and problem solving related to the case of teacher competence and professionalism in teaching. The issue is then observed or solved by students in groups. Furthermore, issues and problem-solving are presented in the form of group presentations, followed by discussions. At the time of the presentation, students are required to solve problems and reflect on themselves if they are the subject being studied.

Case-based learning allows students to reflect on the results of their achievements, including their TPACK abilities. The score of students' self-reflection levels in each aspect of TPACK are converted into percentages as shown in the Table 2.

Table 2. TPACK mastery based on self-reflection

No	TPACK Aspects	Average (%)
1	Technology Knowledge	87,8
2	Pedagogical Knowledge	82,9
3	Content Knowledge	85,4
4	Technological Content Knowledge	48,8
5	Pedagogical Content Knowledge	63,4
6	Technological Pedagogical Knowledge	70,7

TPACK is a framework that tries to understand the relationship between pedagogical knowledge and technology knowledge. In TPACK, teacher knowledge to integrate technology in learning makes learning effective and efficient. Technology integration is considered a component of teaching closely related and included in pedagogical content knowledge (Oyanagi & Satake, 2016).

Self-reflection is the ability to understand and evaluate one's own cognitive, emotional, and behavioral processes. The results of student self-reflection showed that students were good in their knowledge of technology, pedagogics, and content in general. However, it is still at a good and sufficient level in the integration aspect of these three aspects in its implementation in learning.

Case-based learning requires students to explore, collaborate, analyze, synthesize, assess, and problem solve a particular event or issue in a relatively short time. This process of analysis, synthesis, interpretation, and assessment can develop self-reflection abilities. Through this self-reflection, it can be seen the level of student mastery of the aspects of TPACK. The case-based learning model stimulates students' self-reflection skills related to their mastery of TPACK in the learning process by realizing their strengths and weaknesses in mastering each aspect of TPACK. It is very basic and important for students. Considering knowing and realizing one's strengths and weaknesses is an important factor in a teacher's efforts to develop his professional abilities (Simon & Campbell, 2012). Furthermore, doing self-reflection activities that are done well can allow teachers to improve their learning activities based on the process experienced by themselves. This self-experienced process is fundamental for a teacher to realize his own condition before further exploring himself (Nugraha et al., 2020).

With self-reflection, students can learn to recognize the nature of their strengths to become qualified teacher candidates, set goals, and construct understanding to become human beings who do not stop learning (lifelong learners). They can understand the characteristics of students

and provide the best teaching for their students. Merrifield, as quoted by Shandomo explains, when teacher candidates enter a teacher education program, they have already developed a worldview that shapes what they learn from the course and how they will interact with their students (Shandomo, 2010).

Related to the aspect of TPACK, based on the data as shown in the table, technological, pedagogical, and content knowledge skills are good, with a percentage above 80%. In comparison, the aspect that is still low is mastery related to technological content knowledge with an average percentage below 50%.

1. Technology Knowledge

Technology knowledge is knowledge about various technologies ranging from conventional to the latest technology, namely digital technology. Technological knowledge includes understanding how to use computer software and hardware or technology in an educational context (Suyamto et al., 2020). The reflection on technology knowledge is that students have mastered various technologies and applications that can be used in online and offline learning. Online learning can use several learning platforms that can be easily downloaded for free and the use of digital teaching materials. At the same time, offline learning can also use these platforms with added hardware. Students also know that there are still few teachers who can master technology and teach using technology, so prospective teacher students need to master and apply the use of technology well in learning. In general, students' ability to master technology and understanding of technical knowledge is good.

In addition, students understand that technology is very important in teaching, so prospective teachers need to master technology because the use of technology in learning can accelerate students' understanding of the material. However, based on the self-reflection results, students realized that they had not been maximized in the implementation of technology, especially in teaching micro-teaching; this is because students find it difficult to prepare technology to assist in teaching.

2. Pedagogical Knowledge

Pedagogical knowledge is knowledge about managing classes, providing assessments, developing lesson plans and student learning processes (Schmidt & Denise, 2009). The results of reflection on pedagogical knowledge are that students already know and master things related to knowledge in managing learning, which is related to prospective teachers' pedagogic competence. In general, students reflect that students have been able to make lesson plans, can arrange learning steps well in learning planning. They also know the learning methods and strategies that are commonly used in teaching. However, based on the results of their reflection, students identified that students realized that they did not know much about active learning methods and had not been able to apply varied learning methods to one learning topic. In addition, they feel the need to improve their public speaking skills. In this case, the public speaking ability is that students do not feel confident when teaching in front of their students.

3. Content Knowledge

The third aspect, namely content knowledge, is knowledge about the subjects to be studied or taught. Content knowledge refers to the knowledge or specificity of disciplines or lessons (Suyamto et al., 2020). Based on the results of reflection on content knowledge, the average value is quite high, namely 85.4%, and is considered very good. Related to this aspect, students reflect that they have mastered and understood all learning

materials/topics, both material at the elementary, junior high, and high school levels. In addition, students have also been able to classify material based on its type, namely fact material, concept material, procedure material, and principle material. It's just that based on their reflection, in delivering the material, students realize that they have not been able to emphasize the graduality aspect, namely the systematic delivery of material from easy to difficult material, also from concrete to abstract material.

4. Technological Content Knowledge

Technological content knowledge is a knowledge concept that exists to explain the three main components of teacher and prospective teacher knowledge (content, pedagogy, and technology). Technological content knowledge is knowledge about how technology and content affect each other. Teachers and prospective teachers-student need to create multimedia and understand concepts in scope with the help of specific technologies (Fuada et al., 2020). The results of student self-reflection on technological content knowledge are in a low category, namely 48.4%. Students have mastered and understood content with the help of technology, implementing applications following current technological developments but have not been able to create innovative and creative learning materials with the help of technology, such as creating multimedia content. Students can only make teaching materials or broadcast materials in micro-teaching practice using PowerPoint only. That technological content knowledge has a great influence on teacher competency development. Based on research, the domain of technological content knowledge in TPACK is proven to help teachers understand how to plan and implement learning by integrating technology in the classroom.

5. Pedagogical Content Knowledge

Pedagogical content knowledge is a combination of content and pedagogical. It is in terms of understanding how certain topics and problems or issues are organized, represented, and adapted to the interests and abilities of diverse learners and explained in the form of instruction (Fuada et al., 2020). The reflection results on the pedagogical aspect of content knowledge got an average value of 63.4%, which was in the good category. The result of reflection on pedagogical content knowledge is that students have been able to choose approaches and learning strategies according to the material to be taught and provide questions to measure students' understanding of the material being taught. However, this ability is not maximized. Students have not been able to adjust the type of material (facts, concepts, principles, procedural) with the learning method because every teaching material requires different strategies, techniques, media, and evaluation systems. Besides, students reflect that their ability to assess is still weak because they have not made a comprehensive grid of test and non-test instruments.

6. Technological Pedagogical Knowledge

Technological pedagogical knowledge is knowledge about how various technologies are used in teaching, and the use of these technologies can change the way teachers teach (Schmidt & Denise, 2009). Technological pedagogical knowledge occurs because of the reciprocal relationship between technology and pedagogy (Suyamto et al., 2020). The result of reflection on technological pedagogical knowledge got an average score with an average of 70.7%. The result of reflecting on technological pedagogical knowledge is that students can choose technology according to learning approaches and strategies. Can also use

internet facilities to communicate with students, for example to collect assignments or teaching materials. The shortcomings identified in this aspect of technological pedagogical knowledge are the inability of students to integrate various technologies, learning media, with selected learning methods or strategies on a learning theme. Indeed, in this case, of course, students need skills and sincerity to be able to harmonize technology with pedagogic techniques.

Based on the results of students' self-reflection regarding their TPACK abilities, it can conclude that, in general, students' TPACK skills are good. It just needs to be deepened. Students need to get used to and improve their skills, especially in terms of their confidence in delivering learning, also related to integrated technology in learning. This self-reflection is certainly good for students to always know what things need to be improved in themselves to improve their quality when teaching as teachers in the future. Students can realize that an improvement in the quality of teacher teaching needs to start from the teacher's habit of always doing self-reflection.

A teacher who can reflect on himself will adapt his learning to remain relevant to developments and open to novelty (VEO, 2019). It will encourage them to be innovative and always creative, and as a student-teacher candidate, this needs to be a concern. This reflection process can determine a new way for students to see a problem, clarify something, develop skills, and solve problems.

In the end, giving more attention to self-reflection in the affective development of prospective teacher students to support their professionalism when they become teachers must always be developed and become a special concern, especially in implementing educational courses. It is important because it can make student-teacher candidates more aware of the quality of their students. In addition, they will be better able to guide students in their learning and help mobilize the quality of students in school and their future lives.

D. CONCLUSION AND SUGGESTIONS

The case-based learning model can stimulate students' self-reflection skills related to their mastery of TPACK in the learning process by realizing their strengths and weaknesses in mastering each aspect of TPACK. Some points that can be identified are students as prospective teachers will encourage an improvement in their competence. It is important, considering that future teachers must always try to upgrade their competencies and knowledge to always adapt to the times.

On the other hand, the analysis results related to the mastery of TPACK can be used as material for evaluating lectures for improvements and adjustments to the learning outcomes of courses. It is also a material to assess which aspects need improvement to prepare quality teacher candidates in the future.

REFERENCES

- Anas, A. (2018). *Menjadi Guru yang Profesional*. Media Indonesia. <https://mediaindonesia.com/opini/158024/menjadi-guru-yang-profesional>
- Çimer, A., Çimer, S. O., & Vekli, G. S. (2013). How does Reflection Help Teachers to Become Effective Teachers? *International J. Educational Research*, 1(4), 134.
- Fuada, Z., Soepriyanto, Y., & Susilaningih. (2020). Analisis Kemampuan Technological Content Knowledge (TCK) Pada Mahasiswa Program Studi Pendidikan Guru Sekolah Dasar. *Jurnal Kajian Teknologi Pendidikan (JKTP)*, 3(3), 251. <https://doi.org/10.17977/um038v3i32020p251>

- Hidayati, N., Setyosari, P., & Soepriyanto, Y. (2018). Kompetensi Technological Pedagogical Content Knowledge (TPACK) Guru Soshum Setingkat SMA. *Jurnal Kajian Teknologi Pendidikan (JKTP)*, 1(4), 292.
- Kohler, M. J., & Mishra, P. (2009). What is Technological Pedagogical Content Knowledge? *Contemporary Issues in Technology and Teacher Education*, 9(1), 60–70.
- Kustandi, C., Ibrahim, N., & Muchtar, H. (2019). Virtual Reality Based on Media Simulation for Preparing Prospective Teacher Education Students. *International Journal of Recent Technology and Engineering (IJRTE)*, 8(IC2), 400.
- Lestari, S. M. P. (2019). Perbedaan Tingkat Refleksi Diri Dalam Pembelajaran Mahasiswa Fakultas Kedokteran Universitas Malahayati Tahun 2019. *Jurnal Ilmu Kedokteran Dan Kesehatan*, 6(4), 258.
- Nugraha, I., Widodo, A., & Riandi. (2020). Refleksi Diri dan Pengetahuan Pedagogi Konten Guru Biologi SMP Melalui Analisis Rekaman Video Pembelajaran. *Jurnal Pendidikan Sains Indonesia*, 8(1), 15.
- Nurpratiwi, S., & Amaliyah. (2020). Penerapan Manajemen Berbasis Sekolah dalam Mengembangkan Kualitas Peserta Didik. *JUPIIS: Jurnal Pendidikan Ilmu-Ilmu Sosial*, 12(2), 457. <https://doi.org/https://doi.org/10.24114/jupiis.v12i2.18164>
- Oyanagi, W., & Satake, Y. (2016). Capacity Building in Technological Pedagogical Content Knowledge for Preservice Teacher. *International Journal for Educational Media and Technology*, 10(1), 33–44.
- Schmidt, A., & Denise. (2009). Technological Pedagogical Content Knowledge (TPACK): The Development and Validation of an Assessment Instrument for Preservice Teachers. *Journal of Research and Technology Education*, XLII(2), 123–149.
- Shafira, N. N. A. (2015). Penerapan Refleksi Diri dan Self Evaluation Sebagai Keterampilan Dasar Dalam Meningkatkan Profesionalisme Pada Mahasiswa Kedokteran. *Jambi Medical Journal (JM)*, 3(1), 64. <https://doi.org/10.22437/jmj.v3i1.2720>
- Shandomo, H. M. (2010). The Role of Critical Reflection in Teacher Education. *ERIC*, 4(1), 102. <https://eric.ed.gov/?q=shandomo&id=EJ915885>
- Simon, S., & Campbell, S. (2012). Teacher Learning and Professional Development in Science Education. dalam Nugraha, I., Riandi., Widodo, A. *Jurnal Pendidikan Sains Indonesia.*, 8(1), 15.
- Sugiyono. (2014). *Metode Penelitian Pendidikan: Pendekatan Kuantitatif, Kualitatif, dan R&D*. Alfabeta.
- Suyamto, J., Masykuri, M., & Sarwanto. (2020). Analisis Kemampuan TPACK (Technological, Pedagogical, and Content Knowledge) Guru Biologi SMA dalam Menyusun Perangkat Pembelajaran Materi Sistem Peredaran Darah. *Inkuiri: Jurnal Pendidikan IPA*, 9(1), 48. <https://doi.org/10.20961/inkuiri.v9i1.41381>
- VEO. (2019). *5 Benefits of Self-Reflection for Teachers*. <https://veo.co.uk/benefits-of-self-reflection-for-teachers/>