



Perception Of Understanding About Tpack To Achieve The Sustainable Development Goal (SDGs): Quality Education By Vocational Teacher Candidates

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Abstract

One of the targets of the SDGs is that education must be supported by qualified, trained, and professional teachers. One of the concrete steps that need to be taken to achieve this goal is the preparation of prospective vocational teachers. Efforts to prepare prospective vocational teachers are carried out by increasing the understanding of TPACK. TPACK consists of Content Knowledge (CK), Pedagogical knowledge (PK), Technological Knowledge (TK), Technological Pedagogical Knowledge (TPK), Technological Content Knowledge (TCK), Pedagogical Content knowledge (PCK). This study aims to measure the perceptions of TPACK understanding of students of the Electrical Engineering Education Study Program who are prospective vocational teachers. Measurements were carried out using a questionnaire containing statements about Content Knowledge (CK), Pedagogical knowledge (PK), Technological Knowledge (TK), Technological Pedagogical Knowledge (TPK), Technological Content Knowledge (TCK), Pedagogical Content knowledge (PCK) and Technological Pedagogical. Content Knowledge (TPACK). The subjects of this study were 6th-semester students who had attended the Schooling Field Practice course consisting of 19 people. The measurement results show that the understanding of CK is in a good category, PK is in a good category, TK is in the very good category, TPK is in a good category, TCK is in a good category, PCK is in a good category and TPACK is in a good category.

Key words: Perception, TPACK, SDGs, Vocational Teachers Candidates, Quality Education.

1. Introduction

The urgency of Sustainable Development Goals (SDGs)-oriented learning at the higher education level is currently in the spotlight. The United Nations has made SDGs the most pressing public policy [1]. Education is one of the factors for the progress of a nation and a form of human capital for economic growth and sustainable development, following the background of the formulation of the SDGs (Sustainable Development Goals) [2]. The purpose of education is used as



the basis for pushing the goals and targets of the SDGs program, one of which is by building the country through quality and proper education [3]. The teacher is one of the elements of education that is the center of development and innovation. This is in line with one of the targets in the SDGs which states that education must be supported by qualified, trained, and professional teachers. One of the concrete steps that need to be taken to achieve this goal is the preparation of prospective vocational teachers. Colleges that produce prospective teachers must continue to innovate to prepare their graduates. Along with current technological developments, prospective teachers are also required to master the use of technology in learning. As prospective teachers, they need to have ICT skills to support learning activities and create a fun learning atmosphere. Furthermore, the ability to use this technology is also needed to form professional teacher candidates [4]. This is in line with research which states that the use of technology in the teaching and learning process is inevitable to increase the efficiency of education following the development of information technology in the 21st century [5]. The synergy in the use of technology, pedagogy, and mastery of this material is known as TPACK or Technological Pedagogical Content Knowledge. TPACK has several elements in it namely Content Knowledge (CK), Pedagogical knowledge (PK), Technological Knowledge (TK), Technological Pedagogical Knowledge (TPK), Technological Content Knowledge (TCK), Pedagogical Content knowledge (PCK) [6].

Efforts to prepare prospective vocational teachers are carried out by increasing the understanding of TPACK. Learning for prospective teachers needs to be developed regarding TPACK and its application to improve the skills of prospective vocational teachers so that they can use technology to maximize learning in the era of the Industrial Revolution 4.0 [7]. Using TPACK as a basis for teacher preparation is an appropriate step. TPACK can be used to guide prospective teachers to deal with challenges that occur in learning due to rapid technological advances [8]. By 2030, all students are ensured to acquire the knowledge and skills needed to promote sustainable development through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship, and appreciation of cultural diversity and contribution culture for sustainable development [9], [10]. Here the teacher's role is very important in creating education following the SDGs targets.



Therefore, to prepare for this, the preparation of prospective teachers, especially vocational teachers, is very important.

The preparation of prospective vocational teachers starts with the implementation of various learning innovations in the classroom. Vocational teacher candidate students are required to have TPACK abilities. This is intended so that students can prepare for learning at school by current developments and demands. Students must be able to synergize material, pedagogical skills, and technology integration in learning. Students must be able to create effective and efficient learning following the current demands of the 21st century. One that is relevant to the needs of 21st-century life skills is creative thinking skills [11], [12].

2. Method

This research is a quantitative research using a survey method to explore the perceptions of prospective vocational teacher students in mastering technology through TPACK skills. Survey research is research in which data is collected using self-report, meaning that the parties studied are asked to report data about things that are in the respondent's self through instruments that have been tested for face validity and empirical validity through the Pearson correlation and reliability with Cronbach's alpha [11]. The instrument used in this study was a questionnaire containing TPACK elements, namely Content Knowledge (CK), Pedagogical knowledge (PK), Technological Knowledge (TK), Technological Pedagogical Knowledge (TPK), Technological Content Knowledge (TCK), Pedagogical Content knowledge. (PCK) and Technological Pedagogical Content Knowledge (TPACK). The subjects of this study were students who took the Introduction to Schooling Field course, which consisted of 19 students. The questionnaire in this study uses a Likert scale which has five answer choices 1-5. The five answer choices are strongly agree, agree, moderately agree, disagree, and strongly disagree [13]. Questionnaires are given at the end of lectures or after students have completed their final assignment in the Introduction to Schooling Field course. This questionnaire has 35 questions. The grid of questions on the questionnaire can be seen in Table 1.



Table 1. Questionnaire grid

No.	Aspects that are measured	Statement number
1	Content Knowledge (CK)	1-5
2	Pedagogical knowledge (PK)	6-10
3	Technological Knowledge (TK)	11-15
4	Technological Pedagogical Knowledge (TPK)	16-20
5	Technological Content Knowledge (TCK)	21-25
6	Pedagogical Content knowledge (PCK)	26-30
7	Technological Pedagogical Content Knowledge (TPACK)	31-35

The results of filling out the questionnaire were then analyzed and interpreted. The interpretation for the questionnaire is presented in Table 2. [14].

Table 2. Interpretation

Coefficient	Category
$1 \leq V_a < 2$	Very Not Good
$2 \leq V_a < 3$	Not Good
$3 \leq V_a < 4$	Good Enough
$4 \leq V_a < 5$	Good
$V_a = 5$	Very Good

3. Result and Discussion

The results of the questionnaire that was filled in by the respondents are presented in Table

3.

Table 3. Questionnaire Filling Results

Statement	Aspect	Value per item	average	Interpretation
1	CK	3.89	4.13	Good
2		3.74		
3		3.53		
4		4.58		



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Statement	Aspect	Value per item	average	Interpretation
5		4.89		
6		4.89		
7		4.47		
8	PK	4.58	4.56	Good
9		4.47		
10		4.37		
11		5.00		
12		5.00		
13	TK	5.00	5.00	Very good
14		5.00		
15		5.00		
16		4.53		
17		4.63		
18	TPK	4.47	4.66	Good
19		4.84		
20		4.84		
21		4.63		
22		4.74		
23	TCK	4.47	4.63	Good
24		4.79		
25		4.53		
26		4.53		
27		4.53		
28	PCK	4.79	4.63	Good
29		4.68		
30		4.63		
31	TPAC	4.79	4.75	Good
32	K	4.79		



Statement	Aspect	Value per item	average	Interpretation
33		4.53		
34		4.84		
35		4.79		

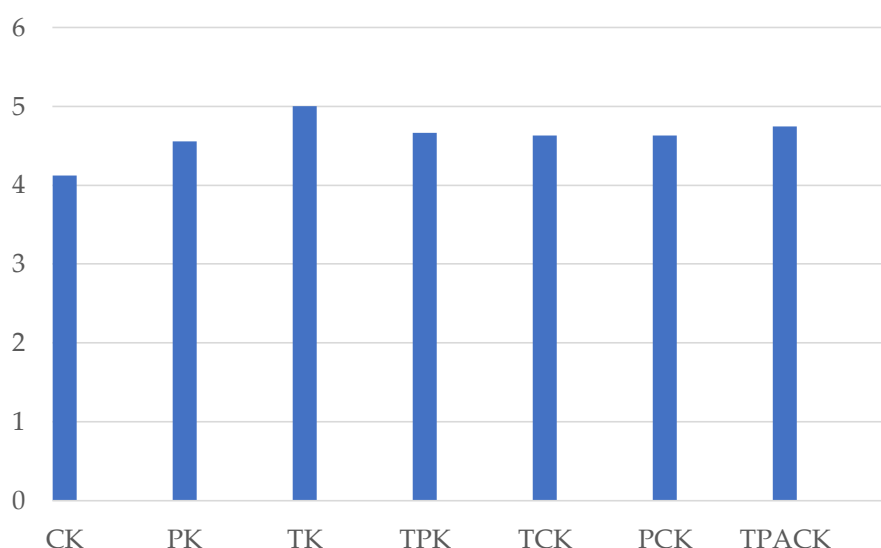


Figure 1. Graph of TPACK Perception Results

As seen in Table 3 and Figure 1 above, content knowledge ability has an average value of 4.13 and is included in the good category, pedagogical knowledge (PK) has an average value of 4.56 and is included in the good category, for technological knowledge (TK) has an average value of 5.00 and is in the very good category, for technological pedagogical knowledge it has an average value of 4.66 and is included in the good category, for technological content knowledge it has an average value of 4.63 and included in the good category, then pedagogical content knowledge (PCK) has an average value of 4.63 and is included in the good category, then for the last is the ability of technological pedagogical content knowledge (TPACK) which has a value of 4.75 and is included in the good category. Based on this data presentation, it can be concluded that prospective vocational teacher students have good TPACK abilities. Prospective vocational teachers who have TPaCK skills can integrate technology in the learning process according to learning materials and appropriate learning strategies according to student characteristics [15].



The value of technological knowledge (TK) has an average value of 5.00 and is in the very good category. Technological Knowledge (TK) is the prospective teacher's knowledge about what and how technology, software, or applications can be used for learning. TK also includes the ability to adapt and learn new technologies [16]. The ability to continue learning and find 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 software in learning, starting from PowerPoint, Lectora, Adobe Captivate, and Adobe Flash, until now Augmented Reality technology appears. This software can be used for the learning process [15]. The acquisition of high TK scores indicates that prospective vocational teacher students have very good knowledge of technology. This is in line with research which states that technology is a development that needs to be mastered by teachers [17].

Furthermore, based on the data above, the values of CK, PK, TPK, TCK, PCK, and TPACK are obtained which are in the good category. This shows that students have good pedagogical abilities and mastery of the material. In addition, students also can integrate technology into certain materials and can use technology in learning. Technological Pedagogical Content Knowledge (TPACK) is the teacher's ability to organize learning by integrating learning strategies and technology. This is what distinguishes the depth of competency mastery for each subject teacher. TPACK is an 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 [15]. Mastery of TPACK is a very important skill for prospective vocational teacher students. This is in line with research which states that TPACK is very important for educators, prospective educators, and researchers to have as a theory and concept to measure the readiness of prospective teachers and teachers to teach effectively with technology [18]. Further, similar studies also mention that with TPACK capabilities, teachers can create innovative learning processes and quality learning [17]. Mastery of TPACK is certainly an indicator of the readiness of prospective vocational teachers to achieve the SDGs targets.



4. Conclusion

Based on the above data exposure it can be concluded that understanding is in a good category, PK is in a good category, TK is in the very good category, TPK is in a good category, TCK is in a good category, PCK is in the good category and TPACK is in the good category. Mastery of TPACK owned by prospective vocational teacher students is one of their assets in achieving the SDGs.

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