

The Analysis of TPACK's Ability to Increase the Professionalism of Elementary School Teachers in DKI Jakarta

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ABSTRACT

The study aims to analyze the Technological Competence, Pedagogics, and Content Knowledge (TPCK) of elementary school teachers and how to integrate and implement TPACK in learning. The research method used is descriptive quantitative survey research with the population and sample being elementary school teachers in DKI Jakarta, which are taken randomly using a simple random sampling technique. Data collection instrument used the TPACK Self-assessment instrument developed by researchers. The results of this study are: the use ICT in learning by elementary school teachers in DKI Jakarta has not been maximized, low skills of technology cause this; Online learning platforms, both synchronous and asynchronous, are still monotonous; not many choices are used, even direct to be conventional; The use of learning applications that help in the presentation of subject matter is still deficient and monotonous.

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1. INTRODUCTION

The 21st-century learning emphasizes the individual skills that relate to creativity, critical thinking, communication and collaboration, problem-solving, media and technology literacy, life and career skills (Goradia, 2018). In the era, education had challenges building social-based knowledge that integrated ICT into learning (Hernawati and Jailani, 2018). In the 4.0 industrial era, technological products have been produced and helped people in many lives, including education.

Technological advances, especially in the scope of ICT, have contributed to the advancement of the global digital era, where knowledge is developed very fast (Yalcin & Celiker, 2011; Rahayu, 2017). ICT is a tool/instrument used to make it easier to provide services, knowledge, transactions and interactions between individuals and communities as well as make it easier to access new sources of knowledge that are extensive and open. The integration of ICT in learning requires teachers to have

skills and knowledge about technology, media, teaching skills, and subject matter to be taught in the class. Teachers must have teaching knowledge and skills and also be able to combine pedagogic abilities and subject matter with technology in the learning process. TPACK is teachers' ability to integrate the curriculum with learning technology, including the ability to educate (teaching), and the knowledge of subject matter combined with the knowledge of technology in learning (Knolton and Davin V, 2014).

Using internet-based information communication technology as an online learning medium requires sufficient technological capabilities from hardware, software, and other devices (Ceha et al., 2016). The teacher's ability to learn technology is a necessity that the teacher must own in preparing and explaining learning materials that students will learn. Preparation of learning materials online, of course, through various applications that make it easy for teachers and students, but not enough with one monotonous learning application, but how to combine and integrate learning applications in one effective learning and easily accessible, especially by students.

The ability of teachers in the field of technology is still minimal, and this is because there is no development of effective and fun learning designs for students. The Ministry of Education and Culture reports that 60% of Indonesian teachers are still limited in mastering technology (Liputan6.com). This means that learning during a pandemic is very problematic because one of the best ways of learning during a pandemic is online (virtual) learning. Online learning is also carried out with two approaches. There are synchronous and asynchronous. Synchronous learning (video conferencing) is carried out using video conference applications such as Zoom, google meet, Webex, skype, jitsi and others. Meanwhile, asynchronous learning (non-face-to-face online) is carried out through the respective institutional websites, the Learning Management System (LMS) service, or the E-Campus.

Elementary school teachers should have adequate knowledge and skills related to technology and subject matter. In addition to understanding the subject matter (content knowledge), elementary school teachers must be able to manage learning (pedagogical knowledge) with many multicultural student characteristics. In elementary school, individual skills begin to develop, including the critical power of the digital era. Therefore teachers must participate in facilitating learning with an approach to integrating subject matter and teaching skills with technology or TPACK (Technological, Pedagogical, Content Knowledge), which can help teachers and students better understand the subject matter.

A study conducted by Hidayati et al. (2018) found that the TPACK scores of social sciences and humanities teachers at the high school/vocational school level in Malang City, with an average score of male teachers, were higher than female teachers. Meanwhile, the research conducted by Santos and Castro (2021) concluded that a structured approach should be designed to help teachers integrate 21st-century skills with technology. Research conducted by Huang and Lajoie (2021) explains that teachers who have high TPACK abilities also have high Self Regulated (SRL). In the study of Sabri Sharir et al., the results obtained were that Arabic teachers who were given TPACK training were more enthusiastic and had high confidence in teaching (Sahrir et al., 2022)

Based on these problems, it is important to research the TPACK competency skills of elementary school teachers in Jakarta, which aims to photograph and map the teacher's ability to implement TPACK according to the demands of 21st-century learning (Shafie et al., 2019). That is the ability to use ICT and integrate it into classroom learning.

2. METHODS

The research method used in this study is a quantitative research method with a descriptive survey approach. Descriptive survey research is a quantitative research approach that distributes instruments (tests or questionnaires) to determine someone's perceptions, knowledge and abilities of a problem that is analyzed by descriptive statistical or descriptive approaches such as mean, median, mode, variance, standard deviation or percentage and graph or diagram. A special characteristic of

survey research is that the conclusions of the research results are generalized or applicable to the entire population, even though the research data is only obtained from the sample (Mulyatningsih, 2010). In this survey research, the object or population are elementary school teachers in DKI Jakarta to determine the level of teacher TPACK ability in learning that has been done. Meanwhile, the sample or respondents of this study were elementary school teachers who were randomly selected using a simple random sampling technique with an error 5% (Sugiyono, 2007).

The population of this study was DKI Jakarta elementary school teachers that consist of 24,218 PNS teachers, and the number of samples in this study amounted to 200 samples taken from various elementary schools in the DKI Jakarta area randomly. The determination of the respondent sample was limited to high-level elementary school teachers, and these are levels 4 to 6.

Measuring the teacher's TPACK ability can be done in many quantitative and qualitative ways. In general, there are five ways that can be done to measure TPACK, and these are ; 1) self-report-measurement; 2) open-ended questionnaire; 3) performance assessment; 4) interviews; and 5) observation (Abbit, 2011; Koehler, Shin, & Mishra, 2012, Rahmadi, 2019). In this study, the researcher used a self-report measure which is a method that takes respondents to choose the level of conformity of a statement with real conditions that occur in the respondent (Rahmadi, 2019). The teacher's TPACK ability was measured using the TPACK instrument, which was adapted from the instrument developed by Pamuk and Schmid (Pamuk et al., 2015; Schmid et al., 2020).

The data analysis technique used is a descriptive analysis technique, which analyses filed data with descriptive statistical analysis techniques such as analysis of average, variance, standard deviation, graph or table. The data analyzed included Teacher Technology Knowledge (PK) knowledgeability data, Teacher Pedagogic Knowledge ability data (PK), Teacher Content knowledgeability data (CK), and pedagogic content technology knowledge data (TPACK). In addition, the researchers also took a percentage approach by categorizing the abilities of the TPACK teachers with 5 categories/levels of Roger's model, including; *Recognizing* (knowledge), where teachers can use technology/ICT and recognize the alignment of technology/ICT with content but do not integrate technology in their learning, *Accepting* (persuasion), where teachers establish favorable or unfavorable attitudes towards content learning with appropriate technology. *Adapting* (decision), where the teacher is involved in activities that direct the choice to adopt or refuse learning with appropriate technology/ICT. *Exploring* (implementation), where teachers integrate learning in elementary school with appropriate technology/ICT actively. *Advancing* (confirmation), where the teacher evaluates the results of making decisions about integrating learning in primary schools with appropriate technology.



Figure 1. Implementation Analysis Research Framework

3. FINDINGS AND DISCUSSION

3.1. Result

These data were obtained from DKI Jakarta teachers who were selected at random totalling 88 teachers, to take and fill out questionnaires related to the experience and ability of teachers in using technology in learning, as well as designing and integrating technology in the classroom. Based on the data was got from filling out the questionnaires that were distributed to SD DKI Jakarta teachers, the ability scores were obtained based on the descriptive statistical table below:

Table 1. Descriptive Statistics

	N	Mean	Std. Deviation	Variance
TK	88	35.2614	5.00688	25.069
PK	88	67.9659	7.37571	54.401
CK	88	63.1364	6.95500	48.372
TPK	88	51.8409	5.45807	29.790
PCK	88	65.7386	6.65141	44.241
TCK	88	49.4091	5.45333	29.739
Valid	–			

3.1.1. Technological Knowledge

Based on the results of the distributed questionnaires, it was found that data relating to ownership of a computer/laptop and smartphone was 1.13% who did not own and 98.86 had a laptop or smartphone. Meanwhile, based on the descriptive statistics table above for the ability/knowledge of technology, the average value of ability is 35.26 from a maximum score of 40, std deviation of 5 from the average value of the data. This can also be seen in the graph below:

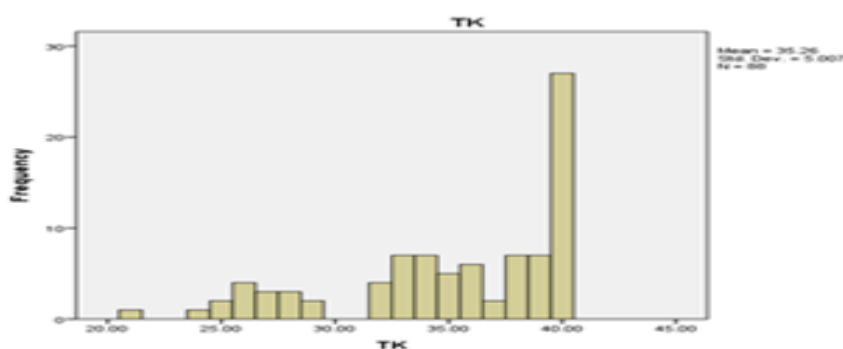


Figure 2. Average Technological Ability of DKI Elementary School Teachers

3.1.2. Pedagogical Knowledge

The pedagogic ability variable in the table above gave an average score of 67.96 from a maximum score of 90 with an standard deviation score is 7.37, or a variance of 54.40. This can be seen in the graph below:

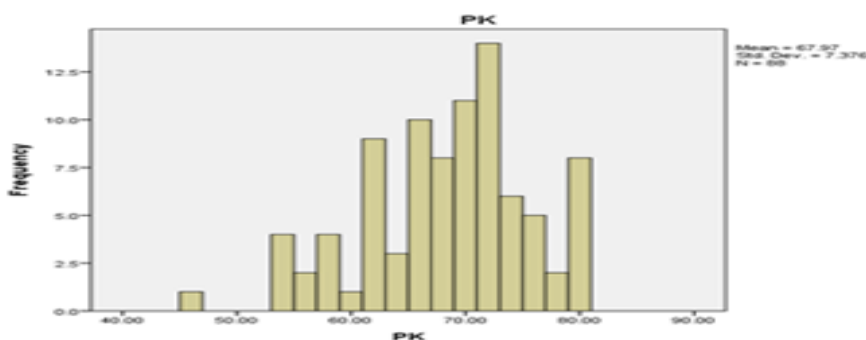


Figure 3. Average Pedagogical Knowledge of DKI Elementary School Teachers

3.1.3. Content Knowledge

In the Content, Knowledge variable was got the average score of content ability (knowledge) is 63, 13 from a maximum score of 70 with a standard deviation score of 6.9, which means that the ability of elementary school teachers in DKI Jakarta to construct content, teaching materials and teaching abilities are very good. This can also be seen in the graph below:

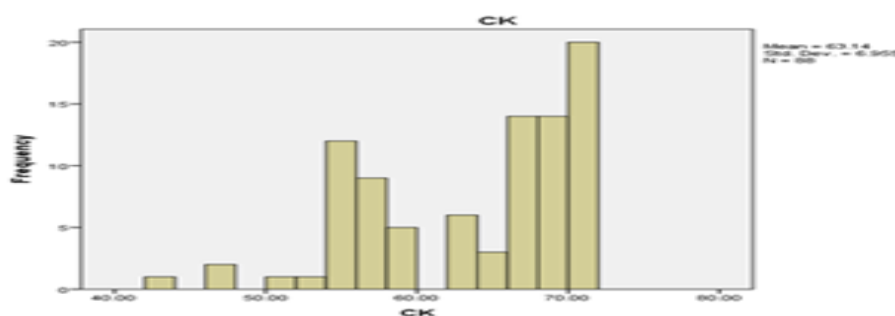


Figure 4. Average Content Knowledge of Elementary School Teachers

3.1.4. TPK (Technological Pedagogic Knowledge)

The TPK (Technological Pedagogic Knowledge) variable's average content ability (knowledge) score is 51.84 from a maximum score of 60 with a standard deviation score of 5.4, which means that the ability of elementary school teachers in DKI Jakarta in terms of integrating technology with educational capabilities is still in the medium category. This can also be seen in the graph below.

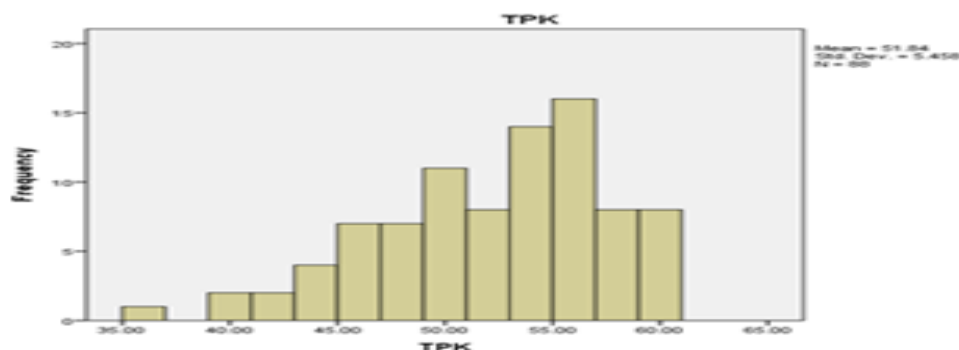


Figure 5. Average TPK Knowledge of elementary school teachers

3.1.5. PCK (Pedagogical Content Knowledge)

Based on the data processing results presented in the form of descriptive statistics, the pedagogic content knowledge (PCK) ability of DKI Jakarta Elementary School teachers with an average score of 65.73 from a maximum score of 75. This means that the ability of DKI Jakarta Elementary School teachers in the PCK aspect is still in the medium category.

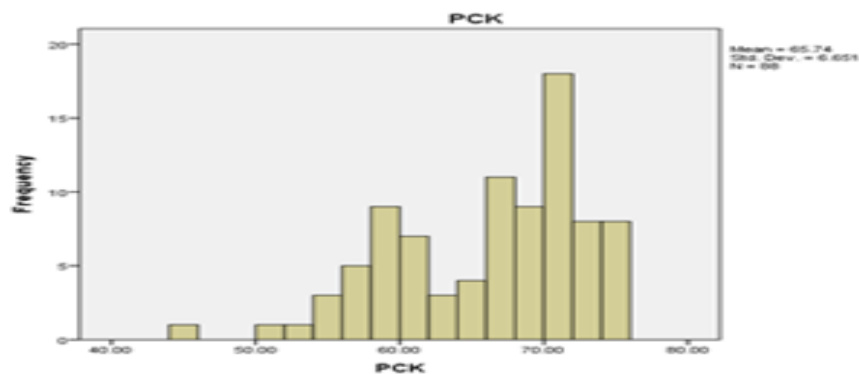


Figure 6. Average PCK of Elementary School Teachers

3.1.6. TCK

In the TCK ability, the average value of SD DKI Jakarta teachers is 49.40, with a maximum score of 55. This means that the ability of TCK SD DKI Jakarta teachers is in the medium category, as seen in the table below.

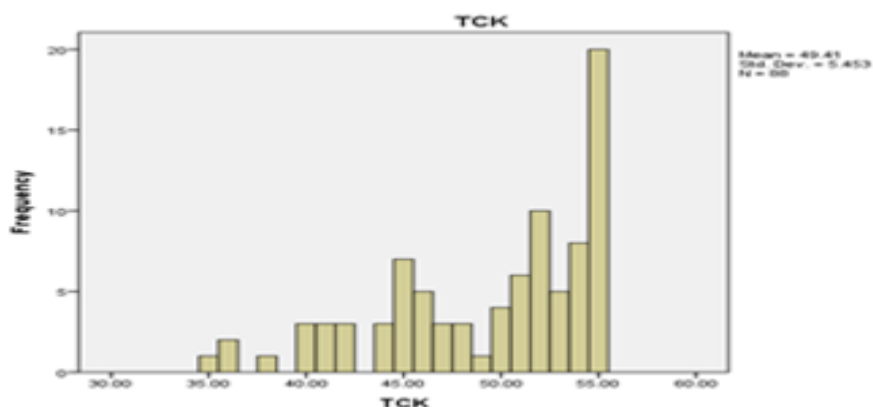


Figure 7. Average TCK of Elementary School Teachers

3.2. Discussion

The use of technology in learning among elementary school teachers in DKI Jakarta has not been massive, even supported by any budget and the availability of technical facilities and services by the government and the private sector because many of teachers like to use traditional methods in learning. Also, many elementary school teachers are nearing retirement age. This is also based on the data obtained in the field; an average of 35 out of a maximum score of 40 means they are still good ability.

In terms of pedagogic knowledge and content knowledge, they are in a good category. However, in integrating technology into learning, the use of technology-based media there are still in good competence. It means there are not yet achieved expectations as a teacher in the country's capital with the support of suitable facilities. The use of both synchronous and asynchronous online learning modes by SD DKI Jakarta teachers still uses common or conventional platforms such as WA Group and Youtube.

Even during the Covid-19 pandemic, which requires teachers to be more creative and has many alternatives in learning is still not maximized. The ICT ability of teachers also influences this; there are in the medium category. The Zoom or google meet application as a conference application is still a complex problem to operate or use optimally. This can be seen in the diagram below:

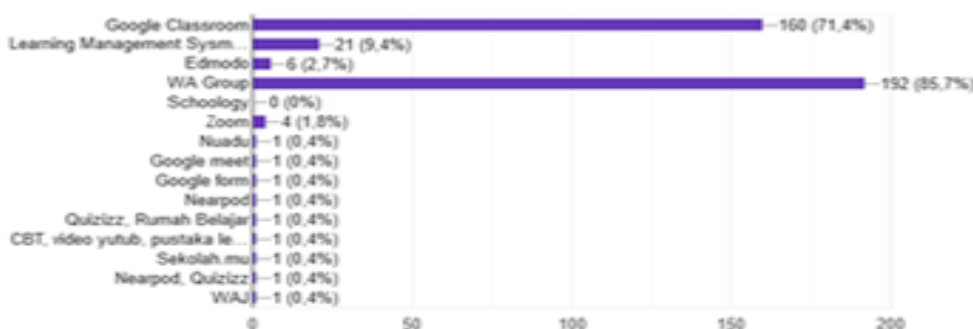


Figure 8: Application Use in Asynchronous Learning

In the chart above, data is obtained about the use of learning applications that teachers often use: the WA Group and Google Classroom. The use of the WAG application is the main choice for elementary teachers in providing learning materials in class, especially during the pandemic, in the form of assignments, videos, and teaching materials, including evaluation of learning in class. The use of other learning applications is still very low.

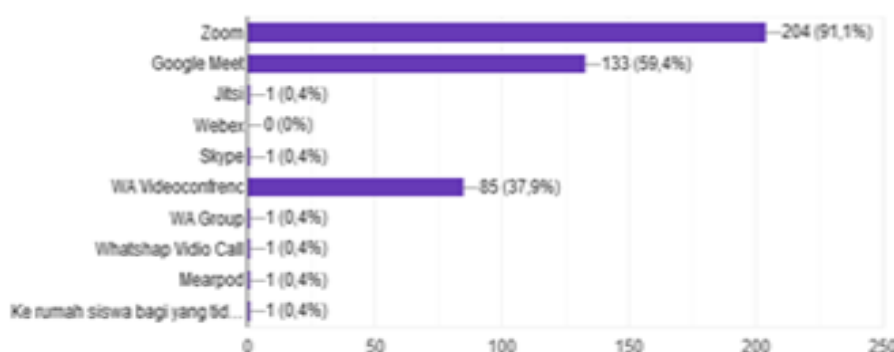


Figure 9: Use of Applications in Synchronous Learning

Moreover, the learning is carried out synchronously, and the teachers are familiar with using Zoom and Google Meet to transfer knowledge. In evaluating learning in class, teachers use the Google Form application as a medium for preparing learning evaluation instruments in class. It is like in the chart below.



Figure 9. Use of Applications in learning evaluation

Based on the chart, it can be seen that the use of online applications in learning is only an applications that most people have used, so it seems conventional even though it is relatively new among Indonesians. In preparing learning tools in the form of lesson plans, teaching materials, and assessment systems, most elementary school teachers have not formulated and integrated the elements of TPACK. This is due to the lack of massive ICT use training, even if some have attended but not yet fully utilized.

This is also in accordance with what Garba stated that teachers had not mastered pedagogic technology and integrated it into classroom learning (Shafie et al., 2019), even though electronic-based learning devices have been increasingly being used by teachers (Nevrita et al., 2020). Integrating TPACK into classroom learning is the responsibility of all stakeholders, especially the government through the Ministry of Education, which has launched various programs to increase teacher capacity in mastering technology in learning through the “*Program sekolah Penggerak*” and “*Guru Penggerak*” and also including school digitization program (Kemendikbud, 2020).

4. CONCLUSION

These descriptions and explanations, these below are several conclusions about the ability of DKI Jakarta Elementary School teachers to integrate TPACK in learning, especially during the pandemic, these are the use of ICT in learning by DKI Jakarta Elementary School teachers has not been maximized, low technological capabilities cause this; online learning platforms do not have many choices, and even tends to be conventional, such as WA Group, Youtube or Zoom; and the use of learning applications in asynchronous form is also still not optimal, such as the use of LMS, Google Classroom or other applications, although there are many choices.

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