Learning Analysis of Technological Pedagogical Content Knowledge (TPACK) of Pancasila and Civic Education Teachers of State Vocational High Schools in Pekanbaru

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Abstract
The background of this research is the teachers who have not fully implemented TPACK. During the implementation of TPACK in schools by teachers, many teachers are not familiar with the term TPACK, but on average they have implemented some of the indicators in TPACK. Therefore it is very necessary to examine how the teacher teaches, the use of technology when learning and others. The formulation of the problem in this study is How is Technological Pedagogical Content Knowledge (TPACK) PPKn Teachers of SMK Negeri Se-Pekanbaru. This study aims to determine the Learning Analysis of Technological Pedagogical Content Knowledge (TPACK) for PPKn Teachers at State Vocational Schools in Pekanbaru. This research is included in the quantitative research with a descriptive survey method. The population in this study were all PPKn teachers in Pekanbaru State Vocational Schools, totaling 32 people with a sample of 17 people. Based on the research results, it was found that the results of the Technological Pedagogical Content Knowledge (TPACK) Learning Analysis of PPKn Teachers at Sepekanbaru State Vocational Schools were in the "Medium" category. This can be seen from the results of the average alternative percentage value of 28.27% + 36.29% = 38.52% with an existence in the range of 33.34% - 66.67%. With these results, it can be concluded that the TPACK (Technological Pedagogical Content Knowledge) of PPKn Teachers in Pekanbaru State Vocational Schools is at the "Medium" level.
Keywords: Technological Pedagogical Content Knowledge (TPACK), PPKn Teachers.

INTRODUCTION

In line with the rapid development of the times, especially in the field of technology used in the field of education. The technology used in education is expected to assist teachers in developing learning media that are applied to students. With the existence of technology in the world of education in order to facilitate the process of teaching and learning between teachers and students. These technological developments encourage various learning developments, including in the areas of assessment and teaching. 21st century learning has characteristics and uniqueness, where learning is carried out focusing on 21st century skills, learning is designed according to 4C skills namely, 1) critical thinking skills (critical thinking skills), 2) creative and innovative thinking skills (creative and innovative thinking skills), 3) communication skills (communication skills), and 4) collaboration skills (collaborating skills) (Rosnaeni, 2021).

In the process of learning and teaching activities, the delivery of material carried out by the teacher must be good and clear because learning is a process of developing new knowledge, skills, and behavior in a person as a result of learning and interaction with various information and the environment (Lestari, 2015). Thinking critically in solving problems as

well as being creative and innovative in work, this ability is accompanied by being able to communicate and work together with others, then any toughest challenge can be overcome by a teacher. Teachers must also follow learning developments that are relevant to current conditions so that they can prepare learning plans and designs that are appropriate to the circumstances (Ahmal et al., 2020)

Judging from the national education goals contained in the Preamble to the 1945 Constitution of the Republic of Indonesia, the 1945 Constitution is to educate the life of the nation. This goal is a hope that the Indonesian people can compete with other nations in the international arena. If seen based on the national education goals, it is to assist students in forming individuals who have extensive knowledge, as well as the ability to apply the knowledge they have learned and can be accepted in society. To be able to reach this goal, of course, you have to go through the process and the right implementation method. One of them is through the concept of Technological Pedagogical Content Knowledge (TPCK), which is a teacher's framework for integrating technology in learning (Rosyid, 2016).

TPACK (Koehler, Mishra, & Cain, 2013: 17) has 3 measurement benefits. First, by measuring TPACK, it is found that TPACK mastery profiles can show the level of mastery enhancement in each knowledge domain. Second, the TPACK measurement can be a reflection in the provision of education for prospective teachers. Third, determine the impact of learning interventions related to technology integration given to prospective teachers when pursuing teacher education. TPACK is Knowledge of the use of various technologies to teach, enhance as well as represent and facilitate the creation of subject content specific knowledge which has three basic framework elements namely content, pedagogy, and technology (Rahimi & Pourshahbaz, 2019). It is hoped that through the concept of Technological Pedagogical Content Knowledge (TPCK) this can help and can facilitate students in understanding learning content, especially civics education lessons, so that it has an impact on their learning outcomes (Nurhayati, 2020). In addition to improving the quality of learning and updating the quality of education, a teacher must also be able to follow developments in science and technology as a medium for delivering material and how to teach material effectively and efficiently (Mishra & Koehler 2006).

Citizenship Education lessons are subjects that focus on the formation of citizens who are able and understand how to carry out their rights and obligations as Indonesian citizens who are smart, skilled, and have character as mandated in Pancasila and the 1945 Constitution. We as citizens must take part in carrying out the rights and obligations that have been set. The results of the study found that TPACK is a new type of knowledge that teachers must be able to master to integrate technology well in learning, TPACK measurements are carried out to see the level of TPACK mastery activities carried out using the TPACK framework, and TPACK development is a continuation of the measurement process carried out to improve TPACK mastery. TPACK can be used as a framework for designing a teacher education curriculum that is more in line with the 21st Century era and learning.

There are still many teachers who do not understand the TPACK concept, what causes learning to be less effective, TPACK has 7 indicators of self-assessment, namely the TK (Technological Knowledge) component such as using a text processing application, CK (Content Knowledge) such as developing material with appropriate concepts, PK (Pedagogical Knowledge) such as determining appropriate learning strategies, PCK (Pedagogical Content Knowledge) such as differentiating learning strategies with different concepts, TCK (Technological Content Knowledge) such as using technology, for example PPT in explaining material, TPK (Technological Pedagogical Knowledge) such as using technology to train students' thinking skills, and TPACK (Technological Pedagogical Content Knowledge) such as

using technology to help students understand concepts and expand learning (Rukmana, 2022). So an understanding of appropriate technology is needed when learning and mastery of existing technology. it is hoped that knowing such a situation it is hoped that the government can provide facilities and infrastructure for schools so that they can be used during learning. As well as being able to conduct training for teachers so they can use technology in every lesson.

The problem that can be concluded based on this description is How the Learning of Technological Pedagogical Content Knowledge (TPACK) of PPKn Teachers of SMK Negeri Se-Pekanbaru, while the purpose of this research is to find out the Learning of Technological Pedagogical Content Knowledge (TPACK) of PPKn Teachers of SMK Negeri Se-Pekanbaru. So the benefits of conducting this research are: To add insight, knowledge and understanding for other parties regarding Technological Pedagogical Content Knowledge (TPACK) PPKn Teachers at SMK Negeri Se-Pekanbaru The results of this research can be used as a reference for all parties involved as well as additional references in the world of education in paying attention to the quality of education. For the author himself, this research can add insight, knowledge, experience, and increase awareness in the world of education. For teachers and students to be material for review as well as learning and studies in order to better understand and know and study the study of the influence of civic education learning in forming Technological Pedagogical Content Knowledge (TPACK) for PPKn Teachers at SMK Negeri Se-Pekanbaru. And for agencies or readers can be used as reference material and references in carrying out further research that is effective and relevant.

RESEARCH METHODS

According to Sugiyono the research method is defined as a scientific way to obtain data with specific purposes and uses. The four keywords that need to be considered are the scientific method, data, objectives, specific uses. The scientific method means that research activities are based on scientific characteristics, namely rational, empirical, and systematic. This method aims to test predetermined hypotheses that are used to research certain populations and samples, collect data with research instruments, and analyze data that is quantitative or statistical, with the aim of testing the hypotheses that have been set (Sugiyono, 2019).

This research was conducted at State Vocational Schools in Pekanbaru. The time of this research was carried out starting from March 2022. According to Sugiyono (2021; 145) the population is a generalized area consisting of: objects/subjects that have certain quantities and characteristics determined by researchers to be studied and then drawn conclusions. The population in this study were all PPKn teachers in Pekanbaru State Vocational Schools with a total of 32 teachers with a sample of 17 teachers. According to Sugiyono (2021; 146) the sample is part of the number and characteristics possessed by the population. The researcher took a sample of 17 teachers from SMK Negeri in Pekanbaru. According to Sugiyono (2021; 148) the sampling technique is the technique used in sampling. To determine the sample to be used in research, there are various sampling techniques used.

This study uses a non-probability sampling technique, namely a sampling technique that does not provide equal opportunities or opportunities for each element or member of the population to be selected as a sample. The sample technique used in this study is incidental sampling, namely a sampling technique based on chance, in which anyone who coincidentally or incidentally meets the researcher can be used as a sample, if it is deemed that the person met by chance is suitable as a data source.

RESEARCH RESULTS AND DISCUSSION
Description of TK (Technological Knowledge)

Kindergarten (Technological Knowledge) is about technology that teachers must be able to master as a tool to support the learning process, which includes understanding how a teacher uses computer software and hardware, as well as other supporting presentation equipment such as presentation documents, and technology used in educational contexts (Dhawati & Hariyatmi, 2017).

Table 1. Recapitulation of Respondents' Answers Regarding the Operation of the Ms. Program Office such as Word, Excel and PPT

		SS	S		J		JS	
	F	%	F	%	F	%	F	%
	6	35.3%	10	58.8%	1	5.9%	0	0%
	6	35.3%	9	52.9%	2	11.8%	0	0%
	5	29.4%	11	64.7%	1	5.9%	0	0%
Total	17	100%	30	177%	3	24%	0	0%
Average	5.7	33.4%	10	59%	1	8%	0	0%

Source: Processed Data 2022

The ability of Kindergarten PPKn teachers on indicators regarding the Operation of the Ms. Office such as Word, Excel and PPT (59%) of respondents answered "Frequently" which lies in the range of 33.34% -66.67% included in the "Moderate" category. Based on the results of the study, it was shown that teachers at State Vocational Schools throughout Pekanbaru often used Ms. Office in every lesson this is proven by using Ms. Office makes it easier for teachers to learn, this is in line with research results which show that, apart from being used for administrative needs, such as writing learning tools, assessments, and analysis, Microsoft Word can assist teachers in writing citations and references to the results of classroom action research, with the integration of other applications. Ms. Excel which can help teachers in managing student grades and easily add up scores, do division, multiplication and make percentages from a large list of numbers and Excel can also determine the highest grades from students so that there is no difficulty in compiling teacher ratings. The teacher's use of PPT can increase student learning interest in class, especially if the PPT is equipped with pictures, video or audio and contains important points from the material to make it easier to understand what is conveyed by the teacher (Anggraini et al., 2021).

Description of CK (Content Knowledge)

CK (Content knowledge) is how the teacher's ability to master the knowledge in the fields of science, technology, arts and culture that they teach, which at least includes mastery of learning material broadly and in depth in accordance with the standard content of the educational unit program that has been set (Rosyid, 2016).

Table 2. Recapitulation of Respondents' Answers Regarding Using the Latest References, Participating in Seminars or Activities Relating to Subjects, and Mastering Civics Learning Materials

		SS	S		J		JS	
	F	%	F	%	F	%	F	%
	5	29.4%	12	70.6%	0	0%	0	0%
	3	17.6%	12	70.6%	2	11.8%	0	0%
	10	58.8%	7	41.2%	0	0%	0	0%
Total	18	106%	31	183%	2	12%	0	0%
Average	6	35.4%	10.4	61%	0,7	4%	0	0%

Source: Processed Data 2022

The CK ability of Civics teachers on indicators regarding the use of the latest references, attending seminars or activities related to subjects, and mastering Civics learning materials (61%) of respondents answered "Frequently" which lies in the range 33.34% - 66.67% included in the "Moderate" category. Mastery of material, use of learning references and adding skills are also obtained through seminar activities. The benefits are such as helping teachers to teach and understand the technology currently used, increasing knowledge that can be shared with students, teachers will also receive the latest information that will increase teaching abilities (Mulkeis, 2012).

Description of PK (Pedagogical Knowledge)

PK (Pedagogical knowledge) is the ability to manage student learning which at least includes an understanding of insights or educational foundations, development of curriculum or syllabus of learning designs and others (Rosyid, 2016).

Table 3. Recapitulation of Respondents' Answers Regarding Respondents' Answers Regarding Designing Learning Activities, Using Learning Methods and Assessment Techniques, Directing and Guiding Students, and Performing Reflective Actions

		SS		S		J		JS	
	F	%	F	%	F	%	F	%	
	5	29.4%	12	70.6%	0	0%	0	0%	
	5	29.4%	12	70.6%	0	0%	0	0%	
	5	29.4%	12	70.6%	0	0%	0	0%	
	5	29.4%	11	64.7%	1	5.9%	0	0%	
Total	20	89%	47	277%	1	6%	0	0%	
Average	6.67	29.7%	15.7	92.4%	0.4	2%	0	0%	

Source: Processed Data 2022

The PK ability of PPKn teachers on indicators regarding designing learning activities, using learning methods and assessment techniques, directing and guiding students, and taking reflective action (92.4%) of respondents answered "Often" which lies in the range of 66.67% -100% included in the "High" category. Before starting the lesson, teachers at State Vocational Schools throughout Pekanbaru prepare lesson plans or lesson plans so that learning is more directed and organized. Making a complete and systematic Learning Implementation Plan (RPP) for learning can make lessons interactive, inspiring, fun, challenging, and motivate all students to participate actively, and can provide adequate opportunities, creativity, and lead to independence of students according to their respective talents, interests, and physical and psychological development (Ahmal et al., 2020).

Independent learning is also often carried out because considering the current curriculum, namely independent learning, prioritizes student activity which aims to build individual initiative, independence, and enhance students' self-ability, so that learning is formed on their own accord, their own choices and a sense of responsibility that exists within students (Rahmawati, 2018). And at the end of learning the teacher will take reflective action to evaluate the learning activities that have been carried out. Apart from knowing student abilities, reflective activities are also carried out to evaluate teacher performance, analyze student learning difficulties, and improve the learning process (Fauziyah, 2021).

Description of PCK (Pedagogical Content Knowledge)

PCK (Pedagogical Content Knowledge) is effective teaching by separating learning and pedagogic content. The suitability of learning methods, and management of classroom settings and the material presented by educators can make the construction of learning understanding more easily accepted by students (Lestari, 2021).

Table 4. Recapitulation of Respondents' Answers Regarding Choosing Learning Approaches and Strategies, Using Various Learning Strategies that Can Improve 4C, and Preparing Lesson Plans

		SS	S		J		JS	
	F	%	F	%	F	%	F	%
	5	29.4%	12	70.6%	0	0%	0	0%
	4	23.5%	12	70.6%	1	5.9%	0	0%
	9	52.9%	8	47.1%	0	0%	0	0%
	9	52.9%	8	47.1%	0	0%	0	0%
Total	27	159%	40	236%	1	6%	0	0%
Average	9	53%	13.4	78.9%	0.4	2%	0	0%

Source: Processed Data 2022

The PCK ability of PPKn teachers on indicators regarding choosing learning approaches and strategies, using various learning strategies that are able to improve the 4C, and preparing lesson plans (78.9%) of respondents answered "Often" which lies in the range of 66.67% - 100% included in the "High" category. Before starting learning in the class of SMK Negeri Se-Pekanbaru teachers use learning strategies that are appropriate to what material will be delivered, one of which is the Problem Based Learning (PBL) Strategy (Problem Based Learning). There are many types of learning strategies namely; Problem Based Learning (PBL) Strategy (Problem Based Learning), Discovery Learning Strategy, Inquiry Learning Strategy, Project Based Learning Strategy, Scientific Learning Strategy (Haudi, 2021). By implementing learning strategies, it is hoped that students can improve their 4C abilities. The 4C Learning Concept includes Creativity, critical thinking skills and problem solving, communication, and collaboration (Karmila Sari, 2022).

Description of TCK (Technology Content Knowledge)

TCK (Technology Content Knowledge) is knowledge about how technology can create a new picture in certain materials by utilizing technology and knowledge of the interrelationships between technology and content that can be used during learning (Fuada et al., 2020).

Table 5. Recapitulation of Respondents' Answers Regarding Using Web-Based Information, Carrying Out the Learning Process with Technology Media, and Having Knowledge in Developing Student Activities and Assignments

		SS	S		J		JS	
	F	%	F	%	F	%	F	%
	5	29.4%	10	58.8%	2	11.8%	0	0%
	4	23.5 %	7	41.2%	5	29.4%	1	5.9%
	4	23.5 %	8	47.1%	5	29.4%	0	0%
Total	13	76.4%	25	147%	12	70.6%	1	5.9%
Average	4.4	25.5%	8.4	49%	4	23.5%	0.4	19.7%

Source: Processed Data 2022

The TCK ability of PPKn teachers on indicators regarding using web-based information, conducting learning processes with technological media, and having knowledge in developing student activities and assignments (49.4%) of respondents answered "Often" which lies in the range 33.34% - 66.67% included in the "Moderate" category. The importance of technology in the world of education is to help teachers in the classroom when delivering material so that it is easy for students to understand, not just the process of delivering material, but also concerning broader aspects such as fostering attitudes, emotions, character, habits and values of students. In teaching and delivering material as well as giving directions by the teacher are things that must be mastered by the teacher. Giving material must be planned by making an

overall problem analysis, identifying in more detail the types of relationships that exist between the elements discussed and the learning objectives (Sundari, 2020).

Teachers of State Vocational Schools throughout Pekanbaru, have used technology in carrying out the learning process with technological media such as LCD projectors and computers or laptops to help understand concepts and theory of learning material. Some schools have provided learning media such as audiovisual media, namely projectors in each class, but there are also schools that only have a few projectors, so when giving material to be conveyed they sometimes have to take turns. Even though the use of a projector can be more effective in delivering material because it can display teaching materials such as ppt or learning videos related to the material to be delivered.

Description of TPK (Technological Pedagogical Knowledge)

TPK (Technological Pedagogical Knowledge) is knowledge about the components and capabilities of using technology in the learning process, which is if educators understand the appropriate and effective technological devices or systems used in increasing student understanding (Study et al., 2020)

Table 6. Recapitulation of Respondents' Answers Regarding Using Computer Applications, Using Technology Appropriate With Learning Approaches and Strategies in Learning Practices, and Using the Internet

		SS	S		J		JS	
	F	%	F	%	F	%	F	%
	4	23.5%	9	52.9%	4	23.5%	0	0%
	3	17.6%	12	70.6%	2	11.8%	0	0%
	4	23.5%	12	70.6%	1	5.9%	0	0%
Total	11	65%	33	195%	7	42%	0	0%
Average	3.4	21.7%	11	65%	2.4	14%	0	0%

Source: Processed Data 2022

The TPK ability of PPKn teachers on indicators regarding the ability to use computer applications, use technology that is appropriate to learning approaches and strategies in learning practices, and use the internet (65%) of respondents answered "Often" which lies in the range of 33.34% - 66.67% included in the "Moderate" category. The learning method that is often used by teachers of SMK Negeri Se-Pekanbaru apart from the lecture method, also uses the question and answer method and discussion and learning media that is often used to explain, namely using PPT, sometimes they also make learning videos that are explained in class to discuss together. The learning process carried out by the teacher and students shows how the teacher's efforts in facilitating and providing understanding to students in realizing the achievement of the expected competencies greatly depend on how the teacher teaches and the responses of students when taught. The implementation of this learning process is seen from how the teacher builds and utilizes various methods, media, and selected learning resources in the stages of systematic learning activities. Thus, appropriate strategies, methods, media and learning resources are needed which teachers need to find, master and understand (Basir, 2017).

Description of TPACK (Technological Pedagogical Content Knowledge)

TPACK (Technological Pedagogical Content Knowledge) is a form of knowledge that emerges from the combined integration of the three core components, namely technology, pedagogic and learning content. (Harris, 2009).

Table 7. Recapitulation of Respondents' Answers Regarding Choosing Learning Strategies and Technologies that are Appropriate to the Material, Using Strategies that Combine Content, Technology and Teaching Approaches, and Can Teach the Right Lessons

		SS	S		J		JS	
	F	%	F	%	F	%	F	%
	4	23.5%	13	76.5%	0	0%	0	0%
	3	17.6%	13	76.5%	1	5.9%	0	0%
	3	17.6%	13	76.5%	1	5.9%	0	0%
Total	10	58.7%	39	230%	2	12%	0	0%
Average	3.4	19.6%	13	76.7%	0.7	4%	0	0%

Source: Processed Data 2022

The TPACK ability of PPKn teachers on indicators regarding the ability to choose learning strategies and technologies that are appropriate to the material, use strategies that combine content, technology and teaching approaches, and can teach appropriate lessons (76.7%) of respondents answered "Frequently" which lies in the range of 66.67% -100% included in the "High" category. The ability to choose learning strategies and technologies that are appropriate to the material to be taught by the teacher can be useful in facilitating the learning process, with many types of learning strategies, namely, Expository Learning Strategies (SPE), Discovery Learning Strategies, Mastery Learning Strategies, Inquiry Learning Strategies, Problem-Based Learning Strategies, Contextual Teaching Learning Strategies, Affective Learning Strategies, Cooperative Learning or Cooperative Learning, Learning Strategies to Improve Thinking Ability. As educators, choosing and having a strategy for teaching in class when delivering material really helps students in understanding the material presented (Haudi, 2021).

CONCLUSION

So overall it can be concluded that the Technological Pedagogical Content Knowledge (TPACK) PPKn Teachers at Sepekanbaru State Vocational School are in the "Medium" category. It was found that the Learning Analysis of Technological Pedagogical Content Knowledge (TPACK) for PPKn Teachers at Sepekanbaru State Vocational Schools was in the "Pretty Good" category. It can be seen from the results of the average alternative percentage value of 28.27% + 36.29% = 38.52% with an existence in the range of 33.34% -66.67%. Thus the TPACK (Technological Pedagogical Content Knowledge) PPKn teachers in Pekanbaru State Vocational Schools are at the "Medium" level. The following are some suggestions that can be submitted in relation to research: It is hoped that the government will provide a lot of training programs as well as complete facilities and infrastructure to support learning in each school. to teachers if they receive training, especially in the use of technology when learning in accordance with the material being taught. To every school to be able to provide complete facilities and infrastructure for teachers and students so that the teaching and learning process between teachers and students can be more effective and systematic. It is hoped that future researchers will be able to follow up with various field research that is more comprehensive and thorough as well as using reading sources and more complete data.

BIBLIOGRAPHY

Ahmal, A., Supentri, S., Pernantah, P. S., & Hardian, M. (2020). Peningkatan kompetensi pedagogik guru melalui pelatihan perangkat pembelajaran abad-21 berbasis merdeka belajar di Kabupaten Pelalawan Riau. UNRI Conference Series: Community Engagement, 2, 432–439. https://doi.org/10.31258/unricsce.2.432-439

Anggraini, H. W., Eryansayah, Petrus, I., Jaya, H. P., & Kurniawan, D. (2021). Pelatihan Pemanfaatan Microsoft Office Dalam Proses Pembelajaran Bagi Guru Bahasa Inggris Tingkat SMP Di Kota Palembang. Jurnal Karya Abdi, 5(1), 173–177.

Basir, Muhammad.(2017). Pendekatan Pembelajaran. Sulawesi Selatan. Diterbitkan oleh : Lampena Intimedia

Content, T. P. (2021). Implementasi Technological Pedagogical Content. 10(2), 159–171.

Dhawati, D. A. A., & Hariyatmi, H. (2017). Kemampuan Technological Knowledge (TK) Calon Guru Biologi FKIP UMS. Prosiding SNPBS (Seminar Nasional Pendidikan Biologi Dan Saintek) Ke-2, 2017.

Fauziyah, Z. (2021). Analisis Technological Pedagogical and Content Knowledge (TPACK) Guru Kelas VI di MIN 6 Sukoharjo.

Fuada, Z., Soepriyanto, Y., & Susilaningsih, S. (2020). Analisis Kemampuan Technological Content Knowledge (TCK) Pada Mahasiswa Program Studi Pendidikan Guru Sekolah Dasar. JKTP: Jurnal Kajian Teknologi Pendidikan, 3(3), 251–261.

Harris, J., Koehler, M., Koehler, M. J., & Mishra, P. (2009). What Is Technological Pedagogical Content Knowledge ? 9, 60–70.

Haudi. (2021). Strategi Pembelajaran.Sumatra Barat. Penerbit: Insan Cendekia Mandiri

Lestari, S. (2015). Analisis Kemampuan Technological Pedagogical Content Knowledge (TPACK) pada Guru Biologi SMA dalam Materi Sistem Saraf. 2006, 557–564.

Mishra, P., & Koehler, M. J.(2006). Technologigal Pedagogical Content Knowledge: A Framework For Integrating Technology In Teacher Knowledge. Teachers College Reord. 108(6), 1017-1054.

Mulkeis. (2012). Efektifitas Mengajar Guru Pendidikan Agama Islam Di Smp Negeri se Kota Padangsidimpuan Tesis Oleh Mulkeis NIM : 10 Pedi 2124 Program Studi : Guru Pendidikan Agama Islam Jurusan Pendidikan Islam Program Pasca Sarjana Institut Agama Islam Negeri.

Rosyid, A. (n.d.). Technological Pedagogical Content Knowledge: Sebuah Kerangka Pengetahuan Bagi Guru Indonesia Di Era Mea. 446–454.

Rukmana, D. (2022). Improving the skills of prospective elementary teachers in designing earth and space science digital teaching materials: TPACK framework. Jurnal Inovasi Pendidikan IPA, 8(2), 142–153.

Sari, Karmila. (2022). Penerapan Strategi Pembelajaran 4C Creative Thinking, Critical Thinking and Problem Solving, Communication, Collaboration, dalam Pembelajaran Bahasa Indonesia Siswa Kelas IV di MIN 01 Kepahiang. Skripsi.Universitas Islam Negeri Fatmawati Sukarno.Bengkulu.

Studi, P., Pendidikan, T., Kurikulum, J., Teknologi, D. A. N., Pendidikan, F. I., & Semarang, U. N. (2020). Kompetensi Technological Pedagogical Knowledge (TPK) Guru Pada Praktik Pembelajaran Di Kelas Olimpiade SMA Negeri 3 Semarang oleh Novi Kurniasih.

Sugiyono, (2021). Metode Penelitian Kuantitatif Kualitatif dan R&D (M.Dr. Ir. Sutopo, S.Pd (ed); ke2 ed). Bandung: Afabeta

Sugiyono.(2019). Metode Penelitian (Kuantitatif, Kualitatif Dan R & D). Bandung: Penerbit Alfabet

Sundari, F. S., Sukmanasa, E., Novita, L., & Mulyawati, Y. (2020). Keterampilan dasar mengajar. Bogor. Penerbit: Program Studi Pendidikan Guru Sekolah Dasar Universitas Pakuan