Implementation of TPACK-Oriented Thematic Learning at SD Muhammadiyah 11 Mangkuyudan Surakarta

Asri Rahayuningtyas¹ Warotur Rohmah² Maryadi³

Master of Education Administration, Graduate School, Universitas Muhammadiyah Surakarta, Surakarta City, Central Java Province, Indonesia^{1,2,3} Email: <u>asrirahayuningtyas@gmail.com¹</u>

Abstract

Teachers are the main factor and determinant of the success of learning and efforts to update the quality of education. The development of the times requires teachers to be able to carry out learning using technology. TPACK (Technological Paedagogical and Content Knowledge) is the teacher's ability to combine strategies, media, materials, and evaluation of learning using technology. The TPACK ability must be owned by a teacher because it can affect the way material is delivered to students. Muhammdiyah 11 Mangkuyudan Elementary School is one of the private schools in Surakarta City, to be precise, in Laweyan District. Teachers who teach at these schools have good competence in their fields. This study aims to describe the implementation of TPACK-oriented Thematic learning at SD Muhammadiyah 11 Mangkuyudan Surakarta. This research uses a qualitative type of research, the data obtained will show objectively the TPACK abilities of SD Muhammdiyah 11 Mangkuyudan Surakarta teachers for the 2020/2021 academic year. The results showed that: Class teacher TPACK ability in thematic learning at Muhammadiyah 11 Mangkuyudan Elementary School was included in the sufficient category with a percentage of 58.69%. If viewed per aspect then: CK is in the very good category with a percentage of 85.65%, PK is in the sufficient category with a percentage of 54.22%, Kindergarten is in the adequate category with a percentage of 57.64%, PCK is in the good category with a percentage of 73.60%, TCK is in the adequate category with a percentage of 53.83%, and TPK is in the unfavorable category with a percentage of 46.12%

Keywords: Learning, Thematic, TPACK



This work is licensed under a <u>Creative Commons Attribution-NonCommercial 4.0 International License.</u>

INTRODUCTION

The success of the National Education Goals cannot be separated from the role of the teacher. Teachers are the main factor and determinant of the success of learning and efforts to update the quality of education. The right position and role of the teacher in educational interaction will ensure the achievement of educational goals. A teacher must always improve his expertise in the field he teaches and how to teach it to students (Zahroh, 2015).

Anif (2018) states that based on the Regulation of the Minister of National Education of the Republic of Indonesia Number 16 of 2007 concerning Academic Qualification Standards and Teacher Competency, it is explained that the academic qualifications of SD/MI, SMP/MTs, and SMA/MA teachers are a minimum of diploma four (D-4) or Bachelor (S-1). Besides that, teachers must also have four main competencies, namely pedagogical, personal, social, and professional competencies. In the 21st century, professional teachers are no longer just teachers who are able to teach well, but teachers who are able to become learners and agents of school change, and are also able to develop relationships to improve the quality of learning in schools (Djulia, 2020).

PCK (Pedagogical Content Knowledge) is a skill that must be possessed by a teacher on how to represent and formulate a subject that makes it easy for students to understand. PCK includes what approach fits the content or how content elements can be arranged for better



learning. Loughran, et al, (2012) in his research stated that PCK is the knowledge of a teacher in providing teaching situations to assist students in understanding the content of scientific facts. Currently, the role of the teacher who has been the only provider of knowledge has shifted more or less. In the future, the role and presence of teachers in the classroom will be increasingly challenging and require very high creativity. Along with the times, the development of technology is also growing rapidly. Teachers are also required to use technology that is considered "current" both in learning media, learning methods, or strategies used in the learning process so that the learning process is also more attractive to students. Therefore there is a new idea for the development of PCK which is also related to technological developments, namely TPACK. TPACK (Technological Paedagogical And Content Knowledge) is a combination of technology, pedagogy, and content that is applied according to the context in learning (Mishra, 2006).

The TPACK ability must be owned by a teacher because it can affect the way material is delivered to students. The method of delivering a teacher's material can be observed from the way the teacher prepares a learning tool in the form of a Learning Implementation Plan (RPP). In addition, the teacher's TPACK ability can also be assessed through the learning methods created by the teacher and the use of technology that is appropriate to the material to be taught and the selection of evaluations to be applied in class. According to Sholihah (2016) if a teacher has high TPACK skills, then the teacher also has the ability to compile learning tools such as good and correct lesson plans. The teacher must master TPACK so that the learning process that occurs can run properly. According to Mishra and Koehler (2013) the TPACK three basic knowledge framework is divided into seven tabular frameworks consisting of, TK, PK, CK, TCK, PCK, TPK and TPACK.

TPACK is the basis for research that is quite interesting because it needs to be done by teachers at this time seeing that technological progress is increasing rapidly so that there is a need for technological elements in every aspect of life, one of which is in the educational aspect. According to Nofianti (2018) in her research entitled "TPACK Science Teacher CLASS VIII SMP Negeri Sawit District on Respiratory System Material Based on RPP TA 2018/2019" stated that the results of the TPACK ability of science teachers in junior high schools throughout the Palm District were in the good category. This can be seen from the total percentage obtained, which is 75%. In line with Nofianti's research (2018), research conducted by Hidayat (2017) with the research title "TPACK Capabilities (Technological Paedagogical And Content Knowledge) Biology Teachers Class X SMA Negeri Se- Surakarta Academic Year 2019/2020" found that the teacher's TPACK ability State high school biology in Surakarta is also in the good category with a percentage of 81%. In contrast to the two previous studies, the results of research conducted by Hidayani (2017) obtained the result that the TPACK ability of class X Biology teachers at Muhammadiyah High Schools in Surakarta City was in the poor category. According to Fuada (2020) states that the ability of elementary school teachers' TCK is quite good in designing multimedia, but the ability to manage content is still lacking and needs to be improved.

SD Muhammdiyah 11 Mangkuyudan is one of the private schools in Surakarta City, to be precise, in Laweyan District. Even though it is located among quite large private schools in Laweyan District, Muhammadiyah 11 Mangkuyudan Elementary School is quite attractive to the community. This can be proven from the number of students who have more than one study group. Teachers who teach at these schools have good competence in their fields. The learning carried out in these schools still uses thematic learning concepts. Thematic is a subject that must be implemented in elementary schools that use curriculum 13.

Based on Permendiknas Nomor 22 Tahun 2006, thematic learning is integrated learning that uses themes to link several subjects so as to provide meaningful experiences to students.



Researchers are motivated to conduct research on the TPACK ability of class teachers in implementing Thematic learning at Muhammadiyah 11 Mangkuyudan Elementary School. The reason the researcher chose this school was because the researcher wanted to know whether TPACK had been applied to Thematic learning in the classroom. In addition, researchers also want to know whether the implementation of learning in class is in accordance with the lesson plan made by the teacher and whether the use of technological infrastructure in the school has been utilized optimally or not. Based on the background above, a study was conducted with the title "Implementation of TPACK-Oriented Thematic Learning in SD Muhammadiyah 11 Mangkuyudan Surakarta".

RESEARCH METHODS

This research uses a qualitative type of research, the data obtained will show objectively the TPACK abilities of SD Muhammdiyah 11 Mangkuyudan Surakarta teachers for the 2020/2021 academic year. In this study the researcher interpreted and described the data obtained from the interview results. This research is also based on current conditions, and is not the result of an experimental manipulation.

In this study, researchers used data collection techniques with interview, observation, and documentation techniques. This is in line with the natural research philosophy, in data collection researchers mingle and interact intensively with respondents. Documentation and collection of supporting data in this study researchers use to complete research and to maximize research results.

RESULTS OF RESEARCH AND DISCUSSION

Results Of Research

The data obtained in this study were in the form of the TPACK abilities of class I-IV teachers in thematic learning at Muhammadiyah 11 Mangkuyudan Elementary School for the 2021/2022 academic year, obtained from the results of identification of lesson plans and the teaching performance of each teacher. There are seven aspects studied, namely CK, PK, TK, PCK, TCK, TPK, and TPACK. The results of the recapitulation of class teacher TPACK ability data in terms of the lesson plans made along with thematic teaching performance are presented in Table 1.

Knowledge	Р	erforma	V (0/)
Kilowledge	1	2	Λ (%)
CK (Content Knowledge)	83,23%	88,05%	85,65 (Very good)
PK (Pedagogical Knowledge)	52,82%	55,61%	54,22 (Enough)
TK (Technological Knowledge)	58,03%	57,25%	57,64 (Enough)
PCK (Pedagogical Content Knowledge)	88,05%	82,20%	85,12 (Very good)
TCK (Technological Content Knowledge)	54,12%	53,54%	53,83 (Enough)
TPK (Technological Pedagogical Knowledge)	45,99%	46,25%	46,12 (Not good)
TPACK (Technological Pedagogical And Content Knowledge)	59,41%	57,97%	58,69 (Enough)

Tabel 1. Classroom Teacher TPACK Ability Data Recapitulation in Thematic Learning at SD Muhammadiyah 11 Mangkuyudan.

The information in the table is adapted from the score interpretation criteria of Widoyoko (2012)84%-100%: Very good (SB)52%-67% : Enough (C) ≤ 35 : Bad (TB)68%-83%: Good (B)36%-51% : Not good (KB)

Based on Table 1, it can be seen that from the seven aspects, namely CK is good with a percentage of 85.65%, PK is sufficient with a percentage of 54.22%, TK is sufficient with a percentage of 57.64%, PCK is sufficient with a percentage of 73.60%, TCK sufficient with a percentage of 53.83%, TPK is not good with a percentage of 46.12% and TPACK is sufficient

with a percentage of 58.69%. Of the seven aspects studied, TPK is the aspect with the lowest percentage. While the highest percentage of the seven aspects is CK or knowledge of concepts and materials. The results of the description of each aspect will be described as follows.

Tabel 2. Recapitulation of data on the results of Class Teacher Content Knowledge skills in Thematic Learning at SD Muhammadiyah 11 Mangkuyudan.

Knowledge		Performa		X (%)	
	Aspect	Sub Aspect	1	2	
СК	Knowledge	Breadth material	94,94	98,45	96,70
	material	The Breadth and the depth material	88,70	91,83	90,27
	concept	Material development	66,06	73,88	69,97
X (%)			83,23 (SB)	88,05 (SB)	85,65 (SB)

The information in the table is adapted from the score interpretation criteria of Widoyoko (2012)84%-100%: Very good (SB)52%-67% : Enough (C) ≤ 35 : Bad (TB)68%-83%: Good (B)36%-51% : Not good (KB)

Tabel 3. Recapitulation of data on the results of Class Teacher Pedagogical Knowledge skills in Thematic Learning at SD Muhammadiyah 11 Mangkuyudan.

Knowlodgo	Aspect Sub Aspect		Performa		V (04)
Kilowieuge	Aspect	Sub Aspect	1	2	Λ (%)
	Knowledge Penggunaan model		25,41	34,78	30,10
	Learning	Penggunaan pendekatan	69,95	71,91	70,93
РК	Strategies	Penggunaan metode	72,70	73,48	73,09
	Knowledge	Knowledge Learning media	68,38	69,55	68,96
	Learning media	Type of Learning media	62,12	36,75	49,44
	Knowledge	Selection type of evaluation	41,44	69,94	55,69
	evaluation	Selection of evaluation technique	29,72	32,84	31,28
X (%)		52.82 (C)	55.61 (C)	54.22 (C)	

The information in the table is adapted from the score interpretation criteria of Widoyoko (2012)84%-100%: Very good (SB)52%-67% : Enough (C) ≤ 35 : Bad (TB)68%-83%: Good (B)36%-51% : Not good (KB)

Tabel 4. Recapitulation of data on the results of Class Teacher Technological Knowledge skills in
Thematic Learning at SD Muhammadiyah 11 Mangkuyudan.

Vnowladge	Acrost	Sub Agnest	Performa		V (0/)
Kilowieuge	Aspect	Sub Aspect	1	2	Λ (70)
τv	Knowledge	Type of technology	71,89	71,89	71,89
IK	technology	Technology use	44,17	42,61	43,39
	Х	(%)	58,03 (C)	57,25 (C)	57,64 (C)

The information in the table is adapted from the score interpretation criteria of Widoyoko (2012)84%-100%: Very good (SB)52%-67% : Enough (C) ≤ 35 : Bad (TB)68%-83%: Good (B)36%-51% : Not good (KB)

Tabel 5. Recapitulation of data on the results of Class Teacher Pedagogical Content Knowledge (PCK) skills in Thematic Learning at SD Muhammadiyah 11 Mangkuyudan.

Unaveladas	Agnost	Sub Aspect	Performa		X (%)
Knowledge Aspect		Sub Aspect	1	2	
	Compatibility	Compatibility of material with strategi	84,78	83,22	84,00
PCK	between CK and	Compatibility of material with media	85,97	85,19	85,58
	РК	Compatibility of material with evaluation	83,23	84,20	83,71
X (%) 84,66 (B) 84,20 (B) 84,33 (SB)					84,33 (SB)
he information in the table is adapted from the score interpretation criteria of Widovoko (2012)					

The information in the table is adapted from the score interpretation criteria of Widoyoko (2012) 84%-100% : Very good (SB) 52%-67% : Enough (C) ≤ 35 : Bad (TB)

84%-100% : Very good (SB) 52%-67% : Enough (C) 68%-83 : Good (B) 36%-51% : Not good (KB)

Tabel 6. Recapitulation of data on the results of Class Teacher Technological Content Knowledge (TCK)skills in Thematic Learning at SD Muhammadiyah 11 Mangkuyudan.

Knowlodgo	Aspect Sub Aspect	Performa		V (04)	
Kilowieuge Aspect		Sub Aspect	1	2	Λ (70)
	Compatibility	Mastery of material with technology	53,14	50,41	51,77
ТСК	between TK and CK.	Compatibility of material with technology.	55,11	56,67	55,89
		X (%)	54,12 (C)	53,54 (C)	53,83 (C)

The information in the table is adapted from the score interpretation criteria of Widoyoko (2012)84%-100%: Very good (SB)52%-67%: Enough (C) ≤ 35 : Bad (TB)68%-83%: Good (B)36%-51%: Not good (KB)

Tabel 7. Recapitulation of data on the results of Class Teacher Technological Pedagogical Knowledge(TPK) skills in Thematic Learning at SD Muhammadiyah 11 Mangkuyudan

Vnoudad	Accord		Performa		$\mathbf{V}(0/)$
Kilowieuge Aspect		Sub Aspect	1	2	Λ (%)
Compatibility		Compatibility technology and strategies	48,45	46,50	47,48
TPK betw ar	between TK	Compatibility technology and media	50,81	47,29	49,05
	and PK	Compatibility technology and evaluation	38,72	44,97	41,84
X (%)		45,99 (KB)	46,25 (KB)	46,12 (KB)	

The information in the table is adapted from the score interpretation criteria of Widoyoko (2012)84%-100%: Very good (SB)52%-67%: Enough (C) ≤ 35 : Bad (TB)68%-83%: Good (B)36%-51%: Not good (KB)

Tabel 8. Recapitulation of data on the results of Class Teacher Technological Pedagogical and Content Knowledge (TPACK) skills in Thematic Learning at SD Muhammadiyah 11 Mangkuyudan

Knowlodgo	Aspect	Sub Aspect	Performa		V (04)
Kilowieuge			1	2	Λ (70)
TPACK	compatibility between	Opening activity	71,12	71,89	71,50
	technology and strategies,	Core activity	78,16	67,22	72,69
	media, materials, and evaluation in learning	Closing activity	28,95	34,81	31,88
X (%)			59,41 (C)	57,97 (C)	58,69 (C)

The information in the table is adapted from the score interpretation criteria of Widoyoko (2012)84%-100%: Very good (SB)52%-67%: Enough (C) ≤ 35 : Bad (TB)68%-83%: Good (B)36%-51%: Not good (KB)

Discussion

In research on the implementation of TPACK-oriented thematic learning at SD Muhammadiyah 11 Mangkuyudan, there were 7 aspects that were observed. Of the seven aspects, each is divided into several aspects and each aspect is divided into four indicators so that it is easier for researchers to analyze lesson plans which are then adjusted to the classroom teacher's teaching performance. There were 12 class teachers who were sampled in this study. Observations were made 2 times so that the researcher assessed 2 lesson plans and 2 times the teaching performance of each class teacher.

The ability Content Knowledge (CK) of Class Teacher in Thematic Learning at SD Muhammadiyah 11 Mangkuyudan

Content Knowledge (CK) or material knowledge is knowledge that teachers must have in understanding content or material. The teacher must know the content or material that will be delivered so that the learning process can run smoothly so that learning objectives can also be achieved. Content Knowledge can be assessed by looking at the breadth of the material, the depth of the material, the development of the material, and the mastery of the material by the teacher. According to Agustina (2015) Knowledge about the characteristics of material or content is important in learning because teachers can teach material if they really master the characteristics of the material.

Based on Table 2, it can be seen that the Content Knowledge ability of class teachers gets the highest percentage of the other 6 aspects. The result is very good with a percentage of 85.65%. This indicates that good class teachers in performance 1 and 2 can deliver material in accordance with KD, competency achievement indicators, and the learning objectives they make. The breadth of the material and the depth of the material owned by the class teacher is very good because the class teacher can adjust the material according to the level of education and can convey the material in detail. with the maeri delivered. In the material development sub-aspect, they get a lower percentage than the previous 2 sub-aspects because class teachers only take references from books and rarely take references from the internet. Even though they take material from books, in the lesson plan that is made, the class teacher still includes the bibliography of the book that is used as a teaching reference. Content Knowledge (CK) ability is very important for teachers because the subject matter that will be delivered in class is the most important thing in implementing the learning process. Content Knowledge (CK) capability is used so that the implementation of learning is in accordance with the KD that has been determined so that the learning objectives can be achieved properly..

The ability Pedagogical Knowledge (PK) of Class Teacher in Thematic Learning at SD Muhammadiyah 11 Mangkuyudan

Pedagogical Knowledge (PK) or Knowledge of learning strategies is the teacher's ability to manage the learning process. According to Tabi'in (2016) Pedagogic competence includes understanding students, designing and implementing learning, evaluating learning outcomes, and developing students to actualize their various potentials. The ability of class teacher Pedagogical Knowledge (PK) can be assessed by looking at Knowledge strategy, Knowledge media and Knowledge evaluation of the results of teaching and learning activities.

Based on Table 3, there are 3 main aspects of the Pedagogical Knowledge (PK) assessed in the study, namely Knowledge of learning strategies, Knowledge of learning media, and Knowledge evaluation. The results obtained are that the ability of the class teacher's Pedagogical Knowledge (PK) is sufficient with the average percentage of the 2 performances being 54.22%. Class teachers are good enough for making lesson plans related to learning strategies because in their lesson plans they include the strategies, models and approaches used along with the steps in the learning process. However, there are several research samples that are still not precise in distinguishing between learning approaches and learning models. In the table, the use of the model produces not good results with an average percentage of 30.10%. This is because of the 2 teaching performances the class teacher has not been able to collaborate on various kinds of learning models both in the lesson plans that are made and in their implementation in the learning process. Unlike the opinion of Purwaningsih (2015) in his research, he stated that teachers are familiar with several innovative learning models. In using the model it is said to be good if the teacher's profile meets several criteria including being able to choose the right model, write down the learning steps correctly according to the model, master various models, and collaborate on various models. In contrast to the use of learning approaches and learning methods that get good results with a percentage for using an approach of 70.93% and using a learning method of 73.09%. The approach used by classroom teachers is in accordance with the 2013 curriculum by placing students as the center of learning. This is related to the use of learning methods, where class teachers use the discussion method during the learning process, so that the percentages obtained are good.



Jurnal Pendidikan Amartha

The second aspect that is assessed in terms of Pedagogical Knowledge (PK) is Knowledge of learning strategies. This aspect consists of 2 sub-aspects, namely Knowledge of learning media and types of learning media. The Knowledge media aspect of learning media gets a percentage of 68.96%. In general, the teacher's knowledge of learning media is good, because the class teacher knows various types of conventional and electronic media. Class teachers can also choose learning media that suit their needs and can collaborate with various kinds of media during the learning process. The next sub-aspect is the type of learning media that gets enough results with a percentage of 49.44%. This is because the class teacher is only fixated on one learning media, namely electronic learning media such as PPT and video. Even if the class teacher can take advantage of the environment around the class and combine several other learning media, learning will feel more interesting and not boring for students. This opinion is in line with Nurrita (2018), which states that the development of media to facilitate and motivate students is very necessary to focus students' attention and create admiration for students in the material being taught.

The third aspect that is assessed is Knowledge evaluation. Knowledge evaluation consists of 2 sub-aspects that are assessed, namely the selection of evaluation domains and the selection of evaluation techniques. The sub-aspect of selecting the evaluation realm gets enough results with an average percentage of 55.69%. This is because class teachers make incomplete assessments, they only make affective assessments and psychomotor assessments, not accompanied by cognitive assessments. However, the lesson plan made by the class teacher also attaches an assessment instrument. The sub-aspect that is assessed next is the selection of evaluation techniques that get bad results with an average percentage of 31.28%. This is because most class teachers can only fulfill 2 points, namely being able to make an assessment rubric and only being able to make questions C1 – C3 in the lesson plans they make. This is in accordance with the results of Rahmat's research (2014) which states that the teacher's difficulties in developing evaluation questions for a higher cognitive level cause some indicators of planned learning success to be not measured, and can even lead to not measuring the success of a learning process.

The ability Technological Knowledge (TK) of Class Teacher in Thematic Learning at SD Muhammadiyah 11 Mangkuyudan

Technological Knowledge (TK) or Knowledge technology is the ability of Biology teacher candidates on how to use computer software and hardware, presentation equipment such as presentation documents, and other technologies in an educational context. Technological Knowledge (TK) also includes the ability to adapt and learn new technologies. The existence of this capability needs to be owned considering that technological developments and changes continue to occur (Rosyid, 2016).

Based on the research results in Table 4, it can be seen that the Technological Knowledge (TK) ability of class teachers in thematic learning is categorized as sufficient with a percentage of 57.64%. In general, class teachers are good at Knowledge of the types of technology that are often used, both simple technologies such as OHP, DVD, radio and so on, as well as high-level technologies such as laptops, computers, projectors and others. This can be proven by the results of the assessment getting a percentage of 71.89%. However, the use of technology during the learning process is included in the not good category as shown in the average table, which is 43.39%. This is due to the limited tools used by classroom teachers, due to the limited availability of LCDs and projectors, so not all teachers can use them. The teacher must take turns using the LCD and the projector. Teachers who don't have a turn using LCDs and projectors are forced to only do learning simulations with learning tools or media that are around.



According to Budiana (2015) states that in the learning process, technology is a tool that can help teachers' tasks so that the teaching and learning process is good inside and outside the classroom to be better. Therefore mastery of technology in teachers is a must in order to improve teacher professionalism. In line with this, Sumintono (2012) in his research stated that technology in learning can be divided into two roles, namely: (1) as a learning presentation medium, for example in the form of power point slides and animation with flash programs; (2) as an independent learning medium or E-Learning, for example students are given the task of reading or searching for sources from the internet, sending assignment answers, even trying and doing learning material. Through E-Learning, learning is no longer limited by space and time. Learning can be done anytime and anywhere.

The ability Pedagogical Content Knowledge (PCK) of Class Teacher in Thematic Learning at SD Muhammadiyah 11 Mangkuyudan

Pedagogical Content Knowledge (PCK) PCK is a thinking concept that gives an understanding that to teach science it is not enough just to understand science content (knowing science) but also how to teach (how to teach) (Sukaesih, 2017). The teacher's PCK profile is important as an initial description of pedagogical competence and mastery of class teacher content before carrying out learning in schools. Classroom teacher Pedagogical Content Knowledge (PCK) abilities can be assessed by looking at the suitability of teaching materials with the media and strategies used as well as the evaluations chosen in learning.

Based on Table 5 it can be seen that the average results of the PCK ability of class teachers are in the good category with a percentage of 73.60%. The teacher's PCK ability is considered good because class teachers are able to collaborate between CK and PK and implement PCK well in the learning process. The teacher is able to determine appropriate learning strategies. media, and evaluations and adapt them to the teaching materials in the lesson plans that have been made previously. There are three sub-aspects that are analyzed in this PCK ability, namely the suitability of the material with the strategy, the suitability of the material with the media, and the suitability of the material with the evaluation. The results of the sub-aspect assessment of the suitability of the material with the strategy and the suitability of the material with the media obtained very good results with percentages of 84% and 85.58%. These very good results indicate that the teacher has been able to make appropriate learning strategies to convey learning material, besides that the teacher is able to use learning media that are appropriate to the material presented so that students more easily understand the material presented by the teacher and learning objectives can also be achieved. Similar to the two previous sub-aspects, in the sub-aspect of the suitability of the material with the evaluation results obtained a good assessment with a percentage of 83.71%. This is because the teacher is able to make evaluation questions that are in accordance with the material being taught and the evaluation questions have been attached to the lesson plans that have been made. This is in line with Rusman's statement (2012) which says that evaluation needs to be done to measure the level of competency achievement of students and is used as material for improving the learning process.

The ability Technological Content Knowledge (TCK) of Class Teacher in Thematic Learning at SD Muhammadiyah 11 Mangkuyudan.

Technological Content Knowledge (TCK) is Knowledge about the methods used by teachers in delivering learning material using technology. In accordance with this understanding, Technological Content Knowledge (TCK) can be assessed by looking at the teacher's ability to present material with modern technology according to the material to be taught.



The results of class teacher TCK data recapitulation based on Table 6 are included in the enough category with an average percentage of 53.83%. In the sub-aspect of material mastery with technology, the results were not good. Because, both in the 1st and 2nd performances, most of the teachers did not use technology to deliver learning material, even though in the RPP that was made the teacher wrote down the use of technology such as video or PPT during the learning process. Whereas in the second sub-aspect, namely the suitability of the material with the choice of technology, the results were sufficient with a percentage of 55.89%. Zabir (2018) states that currently the use of technology in the learning process is widely used to assist teachers in delivering learning material, at least it can be said that this is a form of adaptation to the current development of knowledge. Technology is very important to assist teachers in developing learning materials, so teachers should be able to make the most of existing technology.

The ability Technological Pedagogical Knowledge (TPK) of Class Teacher in Thematic Learning at SD Muhammadiyah 11 Mangkuyudan.

Technological Pedagogical Knowledge (TPK) is the teacher's ability to use technology in the learning process. Technological Pedagogical Knowledge (TPK) can be assessed by looking at adjustments and implementation of strategies, media, and evaluation of learning with appropriate technology in the teaching and learning process. From this explanation, there are 3 sub-aspects that will be assessed, namely the suitability of technology with strategy, suitability of technology with media, and suitability of technology with evaluation.

Based on Table 7 it can be seen that the teacher's TPK ability is included in the not good category with a percentage of 46.12%. This is because during the learning simulation the teacher does not make good use of the available technology. From the 3 sub-aspects assessed, all of them got not good results. In the first sub-aspect, namely the suitability of technology and strategy, teachers get an average percentage of 47.48%. This is because the teacher has not been able to adjust the use of technology with the strategy used. The RPP that was made also did not include the use of technology in the learning strategies used. In the second sub-aspect, namely the suitability of technology with the media, a presentation of 49.05%. The cause of the low percentage obtained was because of the 12 teachers who were used as research samples, only 2 teachers used existing technology as a learning medium, for example by making learning media in the form of PPT, while most of them only used conventional media and digital media. print only during the learning process. The third sub-aspect is the suitability of technology with an evaluation which gets an average percentage of 41.84%. The reason is that only a few teachers use technology, such as online exams through the Googleform application. Most of the teachers still choose to use oral or written evaluations without using technology. As in Zahara's research (2015) which states that evaluation of web-based online learning is an interesting evaluation process but it is still rarely done and some have never even implemented it. This happens because of the limited knowledge of educators regarding the application of e-learning evaluations, the lack of time to prepare evaluation development and other constraints.

TPK is the aspect with the lowest percentage of assessment. This is because when carrying out learning, the teacher is less able to adjust between the pedagogical knowledge and the technological knowledge used. Teachers have not been able to adjust the use of technology with strategies, media, and evaluations when carrying out learning simulations. Teachers only use technology in the form of laptops with the help of software to make it easier to make assessment instruments. The teacher's TPK ability is related to the percentage results on sub-aspects of technology use that are not good in kindergarten abilities.

The ability Technological Pedagogical and Content Knowledge (TPACK) of Class Teacher in Thematic Learning at SD Muhammadiyah 11 Mangkuyudan

Technological Pedagogical and Content Knowledge (TPACK) is the teacher's ability to combine strategies, media, materials, and evaluation of learning using technology. According to Kohler (2008) describes Knowledge that is synthesized from each Knowledge field previously described (TK, CK, PK, PCK, TCK, TPK) with a focus on how technology can be made uniquely to deal with the pedagogical need to teach the right content in certain context. Each element of the field describes a need and importance of that aspect in teaching.

Based on table 4.9, it can be seen that the implementation of TPACK from good teachers from performance 1 and 2 is average in the enough category, with a percentage of 58.59%. In this Knowledge TPACK there are 3 sub aspects that are assessed, namely preliminary activities, core activities, and closing activities. In the sub aspect, the preliminary activities are included in the good category and get a percentage of 71.50%. The teacher conducts apperception activities and motivates students. Similarly, the teacher invites students to open the material after delivering the material. However, none of the teachers conveyed learning objectives even though the RPP made by the teacher included learning objectives in the material presented.

In the second sub aspect, namely core activities in the good category with a percentage of 72.69%. Teachers involve students actively in learning (discussion) and formulate learning that includes components of a scientific approach according to the 2013 curriculum. Most of the sampled teachers have invited students to seek information using technology. It's just that not all of the teachers who were sampled were able to guide students in coordinating the use of content, technology, and approaches during learning. So that the use of technology during the learning process is not too optimal.

The third sub aspect, namely closing activities, the results are in the bad category with a percentage of 31.88%. In this closing activity, most of the teachers who were used as samples only carried out reflection activities, did not give oral or written tests to students. Only a few teachers give assignments to students to do at home. Even though in the RPP that was made, the teacher wrote that there were assignments that had to be done by students and collected at the next meeting.

The teacher has mastered and used technology well. If the teacher can make good use of technology, it can also increase students' interest in learning because with the help of technology, teachers can make learning media, learning strategies and learning evaluations by utilizing technology and of course learning will be more interesting and fun. If students are comfortable with the learning being carried out, the learning objectives will be more easily achieved. Along with the development of the times, the development of technology is also becoming more rapid. As stated by Rosyid (2016) states that among various learning approaches, a teacher educator should emphasize more on how teachers integrate technology in their teaching practices rather than emphasizing what teachers integrate into their teaching practices. Approaches that can be taken include learning technology by design and learning technology by activity types. The development of Technological Pedagogical Content Knowledge (TPACK) should start with a variety of known simple technologies and then gradually upgrade to more sophisticated ones.

CONCLUSION

The TPACK ability of class teachers in thematic learning at Muhammadiyah 11 Mangkuyudan Elementary School is included in the enough category with a percentage of 58.69%. If viewed per aspect then: CK is in the very good category with a percentage of 85.65%, PK is in the enough category with a percentage of 54.22%, Kindergarten is in the enough category with a percentage of 57.64%, PCK is in the good category with a percentage of 73.60%,



TCK is in the enough category with a percentage of 53.83%, and TPK is in the not good category with a percentage of 46.12%.

The author would like to thank those who have helped in the smooth running of this research. I would like to thank Mrs. Wafrotur Rohmah and Mr. Maryadi. as the thesis supervisor who has spent the time and energy to guide this research so that I was able to complete it. The author is also grateful to Mr. Poerwadhie as the Principal of SD Muhammadiyah 11 Mangkuyudan Surakarta, who has agreed to give permission to the author to conduct research at that location.

BIBLIOGRAPHY

- Anif, Sofyan, 2018, Pengembangan Kompetensi Profesional Guru Mapel Biologi. Surakarta: Muhammadiyah University Press.
- Budiana., N.A Sjafirah., dan Bakti. (2015). Pemanfaatan Teknologi Informasi Dan Komunikasi Dalam Pembelajaran Bagi Para Guru SMPN 2 Kawali Desa Citeureup Kabupaten Ciamis. *Jurnal Aplikasi Ipteks Untuk Masyarakat*, 4(1), 59–62.
- Djulia, Ely., Hasrudin., Arwita, Widya., Simatupang, Zulkifli., Brata, Wasis Wuyung Wisnu., Sipayung, Maryati., Aryeni., Amrizal., Simatupang, Halim., Rezeqi, Salwa., Pratiwi, Nanda., dan Purnama, Dirga, 2020, Evaluasi Pembelajaran Biologi, Medan: Yayasan Kita Menulis.
- Fuada, Z., Soepriyanto, Y., dan Susilaningsih. (2020). Analisis Kemampuan Technological Content Knowledge(TCK) Pada Mahasiswa Program Studi Pendidikan Guru Sekolah Dasar. Jurnal Kajian Teknologi Pendidikan, 3 (3), 251-261.
- Hidayani, N. (2017). Kemampuan *Technological Pedagogical Content Knowledge* (TPACK) Guru Biologi Kelas X SMA Muhammadiyah Se-Kota Surakarta Dalam Penyusunan RPP Tahun Ajaran 2016/2017. *Skripsi Sarjana Pendidikan*. Unversitas Muhammadiyah Surakarta.
- Hidayat, A. (2018). "Kemampuan TPACK (Technological Paedagogical And Content Knowledge) Guru Biologi Kelas X SMA Negeri Se- Surakarta Tahun Ajaran 2019/2020". *Skripsi Sarjana Pendidikan*. Unversitas Muhammadiyah Surakarta.
- Koehler, M. J., Misra, P., Akcaoglu, M., and Rosenberg, JM, 2013, The Technological Pedagogical Content Knowledge Framework for Teacher and Teacher Educators. Michigan : Commonwealth Educational Media Centre for Asia.
- Loughran, J.J., Berry, A., and Mulhall, P, 2012, Understanding And Developing Science Teacher's Pedagogical Content Knowledge 2*nd*. Rotterdam : Sense Publisher.
- Mishra, P., & Koehler, M. J. (2006). Technological Pedagogical Content Knowledge: A Framework for Teacher Knowledge. *Teachers College Record*, *108*(6), 1017–1054.
- Nofianti, E (2019). TPACK Guru IPA KELAS VIII SMP Negeri Sekecamatan Sawit Pada Materi Sistem Pernafasan Berdasarkan RPP TA 2018/2019. *Skripsi Sarjana Pendidikan*. Unversitas Muhammadiyah Surakarta.
- Nurrita, T. 2018. Pengembangan Media Pembelajaran Untuk Meningkatkan Hasil Belajar Siswa. *Misykat*. 03(01), 171 187.
- Permendiknas Nomor 22 Tahun 2006. Kurikulum Tingkat Satuan Pendidikan.
- Rahmat, A., Riandi., Solihat, R., Wuyung, W., Zaputra, R., dan Ferazona, S. (2014). Peta Kompetensi Guru Biologi Di Sma Kota Bandung Berdasarkan Analisis Kesesuaian Proses Pembelajaran Di Kelas Dengan Tuntutan Kompetensi Dasar. *Jurnal Pengajaran IPA*. 19(2), 197 – 187.
- Rosyid, A. (2016). Technological Pedagogical Content Knowledge: Sebuah Kerangka Knowledge Bagi Guru Indonesia Di Era MEA. *Prosiding Seminar Nasional Inovasi Pendidikan*.
- Rusman, 2012, Model-model Pembelajaran Mengembangkan Profesionalisme Guru Edisi Kedua. Jakarta : PT Raja Grafindo.



- Sholihah, M., Yuliati, L., dan Wartono. (2016). Profil Kemampuan Menyusun Perangkat Pembelajaran Calon Guru Fisika Universitas Negeri Malang dilihat dari Sudut Pandang TPACK (Technological Pedagogical Content Knowledge). *Prosiding Seminar Pendidikan Fisika*. Universitas Negeri Malang.
- Sukaesih, S., Ridlo, S., dan Saptono, S. (2017). Profil Kemampuan Pedagogical Content Knowledge (PCK) Calon Guru Biologi. *Lembar Ilmu Kependidikan.* 46 (2), 68 – 74.
- Sumintono, B., Wibowo, S. A., Mislan, N., dan Tiawa, D. H. (2012). Penggunaan Teknologi Informasi Dan Komunikasi Dalam Pengajaran: Survei Pada Guru-Guru Sains SMP Di Indonesia. *Jurnal Pengajaran MIPA*. 17(1), 122 – 131.
- Tabi'in, A. (2016). Kompetensi Guru dalam Meningkatkan Motivasi Belajar pada MTsn Pekan Heran Indragri Hulu. *Jurnal Al-Thariqah*. 1(2), 156 171.
- Zabir, A. (2018). Pengaruh Pemanfaatan Teknologi Pembelajaran Terhadap Motivasi Belajar Siswa SMPN 1 Lanrisang Kabupaten Pinrang. Universitas Negeri Makassar.
- Zahara, N. (2015). Evaluasi Pembelajaran Online Berbasis Web Sebagai Alat Ukur Hasil Belajar Siswa Pada Materi Dunia Tumbuhan Kelas X MAN Model Banda Aceh. *Prosiding Seminar Nasional*.
- Zahrah, A, 2015, Membangun Kualitas Pembelajaran Melalui Guru Profesional. Bandung: Yrama Widya.