The effect of using play-think-pair-share (PTPS) model to improve student learning outcomes in magnet topic for elementary school

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Abstract. This research is motivated by the low student learning outcomes of science in magnet topic. To improve student learning outcomes on magnet topic, the application of a model that has accommodated the principles of learning at the elementary school level is needed. The model in question is PTPS. The purpose of this study was to see the effect of the PTPS learning model in improving students' science learning outcomes on magnet topic. This type of research is quasi-experimental, with a sample of all class VI students enrolled in SDN 12 Nan Sabaris in the 2018/2019 school year. The sampling technique is purposive sampling, and data analysis techniques used a paired sample t-test. Based on the results of data analysis it can be concluded that there are significant differences in learning outcomes between before using the PTPS model and after the use of the PTPS model.

1. Introduction

Education provides opportunities for change towards sustainability, based on system thinking and understanding of development as well as various dimensions and aspects [1]. The main purpose of education is to make changes and to educate students towards improving the quality of life. Changes to be made are related to the conscious and planned business aspects to add insight and knowledge so that they have competencies that can be used in the future. Today's formal education continues to educate students to prepare themselves for increasingly competitive competition [2,3].

Learning is related to how to increase students' curiosity. Curiosity can be grown or eliminated is very depending on how learning is carried out. If students' curiosity is eliminated caused by several problems where one of them is an inappropriate learning approach, it will have the effect of understanding students to be inferior to the material presented to them [4].

Ways to develop student curiosity can be designed through process-oriented teaching [5]. An important part that needs to be considered before the implementation process is how to determine the direction of learning. The goal of learning is the learning process or outcome. Questions that need to be formulated before learning activities relate to what, how and why are also important components in education that aim to develop students' competencies and skills [6].
Many skills can be trained in the purpose of developing student competencies. The skills involved include critical thinking, discussion, communication, problem solving and collaboration. [7]. Students' current learning preferences are students who are different from the previous generation because they are more directly involved in the learning process. Student involvement is related to the concept of teaching by creating challenges, group discussions, and an interactive learning environment. Learning is a process that involves active collaboration with team members [8, 9, 10].

Learning is a process where students actively build knowledge by linking to their experiences [11]. To build knowledge that students will have, the teacher can direct and ask questions as a process of extracting information [12, 13]. In the view of constructivist learning is interpreted as a process of building meaning, in this concept it relates to how students understand their experiences [14, 13]. Students actively associate their experiences with the knowledge that will be obtained in the learning process. Learning is a process where students actively build knowledge by linking to their experiences [15]. To build knowledge that students will have, the teacher can direct and ask questions as a process of extracting information [12, 13]. In the view of constructivist learning is interpreted as a process of building meaning, in this concept it relates to how students understand their experiences. Students actively associate their experiences with the knowledge that will be obtained in the learning process.

Referring to the view of constructivism, that the concept of student knowledge comes from the search for meaning that makes students construct individual interpretations of their experiences. Construction of students during learning activities, analyzing, relating to experience will produce new knowledge [16]. The learning process can also be interpreted as a process involving social interaction. When individuals interact with each other with the environment in which they live, they can create meaning [17]. Constructivist learning theory has relevance to learning objectives, one of which is science learning at the elementary school level.

The objectives of science learning in elementary schools according to Permendiknas No. 21 of 2016 include:

- Developing knowledge and understanding of science concepts that are useful and applicable in everyday life
- Develop curiosity, positive attitude and awareness of the existence of interrelated relationships between science, technology, and the community environment
- Develop process skills to investigate the environment, solve problems and make decisions
- Obtain knowledge, concepts, and skills of science as a basis for continuing to junior high/high school

One of the goals of science learning in elementary schools is to develop process skills, namely problem-solving skills. Problem-solving skills are one of the top skills in 2020 that need to be developed and owned by students [8]. In solving problems needed reasoning skills to find solutions. Problem-solving is a process that requires logic in order to find a solution to a problem.

Training on student analytical skills can be achieved by applying problem-solving steps that can be used to find a way out of a problem. Students are involved with real problems by exposing them to the stages of exploration, guiding them to recognize conceptual problems, and guiding them to plan ways to overcome problems [18]. Problem-solving is important for students because it allows students to exercise control over the environment. The importance of problem-solving skills is based on the following reasons:

- Problem-solving is one of the 21st-century skills and is one of the basic skills in education in the industrial revolution 4.0 era which aims to prepare students to be able to face competition globally
- Providing active solutions: Problem-solving can allow students to get used to propose solutions to problems so that they can become active problem solvers in the future.
- Positive attitude: problem-solving skills will support the creation of positive attitudes of children such as self-confidence, cooperation, honesty, and others.
• Supports accuracy skills, and logic and reasoning.
• Problem-solving as a basic skill to improve: a mechanism for identifying things, figuring out why something needs to be improved and determining actions to improve it can be given to students in problem solving [8, 20].

Problem-solving skills are an important part of everyday life, developing and improving these skills through training in learning can provide the ability to solve problems more effectively and over time overcome problems with greater levels of complexity and difficulty.

Previous research on problem solving skills of students at the elementary level shows that students' problem solving skills are still low, one of which is caused by the lack of student participation in learning activities carried out by Neslihan in 2018 [21]. If it is associated with Indonesia, conclusions on the results of the assessment of students' problem-solving skills can be seen based on the results of TIMSS. Observations regarding the 2015 TIMSS results, especially for the assessment at the elementary school level, show that Indonesia is in the bottom 4 positions with the category of Science and Mathematics assessment for grade IV SD [22]. The questions tested in the TIMSS assessment are reasoning questions that require high-level thinking skills and student problem-solving skills. Based on the results of TIMSS 2015, it can be concluded that students' problem-solving skills are still in the low category.

The low level of problem-solving skills of students is strengthened by the results of observations in the form of interviews conducted at SDN 12 Nan Sabaris with the results obtained namely students' skills in solving problems are classified as low, this is because students are familiar with learning patterns where students have not been actively involved build his own knowledge. The statement is supported by observation data in the form of exposure to test results with a focus on the assessment of problem-solving skills. The percentage of students who have difficulty in understanding the problem is 75.25%, difficulties in preparing the problem formulation plan 70.50%, and difficulty checking back the results obtained at 65.75%. The results of the analysis of learning devices oriented to improving problem-solving skills are still low, namely 6% of the activities of the total learning activities in one theme. The low level of problem-solving skills of students is caused by several factors, including:

• Low motivation and student participation in uncovering problems
• Lack of books or activities about solving problems in learning
• Lack of problem-solving practices during class
• Inadequate training in unit problems [23].

To improve students' problem-solving skills, a model is needed that can direct students to improve their problem-solving skills. One learning design that can improve students' problem-solving skills is an active learning model.

2. Literature Review
The constructivist learning model emphasizes the students' initial knowledge as a benchmark in learning. The most essential principle of this theory is that students get a lot of knowledge. The entry of knowledge into the cognitive structure of students through two ways, namely assimilation and accommodation. The stages of constructivism learning are: (1) initial knowledge stage, (2) exploration phase, (3) discussion stage and concept explanation, and (4) development stage and concept application [15].

Science learning at the elementary school level includes activities with communication skills, answering questions, observing, doing and finding solutions to several questions related to the problems raised in learning activities. Basically in learning at the elementary level, students like learning that is oriented towards increasing motivation, fun in every learning process and involves peers in building knowledge [24].

The weakness of TPS when applied in learning at the elementary level is the difficulty of creating active participation of each student and introducing problems to students. This is based on learning orientation that has not adjusted to the stage of child development. Students who are at the elementary
level tend to be active in learning that involves them in pleasant conditions, especially the integration of games in learning.

The connection of game and problem solving has been investigated by Vandenberg in 1980. The game has a positive impact on improving students’ problem solving skills. Several experiments have been conducted that recommend suitable and relevant games used for students with age ranges in the category of children and late childhood [25]. Integration of games in learning that can be a reference in developing a learning model that can improve students' problem solving skills, especially in the age range of childhood and late childhood. This concept is also reinforced by the theory of some psychologists such as Piaget and Hurlock who mention the greatest age range of play is in childhood and late childhood. The most fundamental difference in the selection of games for these two groups lies in the type of game that is dominantly performed. Children (more precisely early childhood) are more fond of free games, while children aged 6-12 years prefer games that have rules and are run by adults.

In applying the TPS model, to start the problem, the teacher can package and introduce the problem in a form of play. In other words, students in starting learning are not immediately presented with a problem, but are invited to first follow a game. Games that are raised in learning activities aim as vehicles to material.

The development of TPS models with game integration (Play Think Pair Share / PTPS) in the learning process has paid attention to and based on several aspects, including:

- Creating constructivist and constructivist social learning concepts
  The PTPS model was developed while still referring to the philosophical foundation of constructivist learning theory. Learning that is carried out still pays attention to the concept of how students build their own knowledge by linking to the experiences they already have. Students actively build knowledge and learning that is carried out while still having the nuances of a student center.
  The PTPS model adheres to the philosophy of learning in a social constructivist view, where learning can occur based on interaction and collaboration between students and peers, teachers or the environment. Learning by involving peers is reflected in play and share activities. Peer involvement is also one of the principles of learning that needs to be considered when developing a learning model that will be applied in learning at the elementary level.

- Accommodate all principles of learning at the elementary school level, one of which is the principle of learning while playing which has not been seen in the current learning model
  The application of the TPS model in learning at elementary school does not fully fulfill the principle of playing in learning. The integration of games in learning at the elementary level is one of the considerations that also influences the course of the learning process considering that elementary school age children are still psychologically active in the age range of play. The PTPS model is present to create learning conditions where learning in elementary schools continues to apply the principle of playing in learning activities.

- Keep paying attention and not eliminate the concept of cooperative learning in the process of implementing learning
  The PTPS model does not eliminate the principles and basic references in cooperative learning. The focus of learning with the PTPS model remains by involving peers in processes such as in the Play and Pair stages. The development of the PTPS model will not eliminate cooperative taste in the learning process.

- Adapt the learning base at the stage of development of elementary school age children
  The PTPS model is the development of the TPS model where the game syntax is added to the novelty of the model. The addition of this game syntax has been based on the analysis of the stage of growth in elementary school children psychologically. The tendency of elementary school children and high interest in the game makes it an opportunity to develop a learning model that can be applied in elementary schools, especially TPS models.
The linkage between the PTPS model has been adjusted to the science learning objectives, one of which is improving students’ problem solving skills. One of the goals of science learning in elementary school is how to develop student reasoning and improve logical thinking skills and problem solving skills. The obstacle that arises in applying the TPS model to learning is the difficulty of introducing and packaging the problems to be raised so that it will lead to active awareness and participation of students in learning. The link between problem solving and games is based on Vandberg's 1980 research. With the basis of the findings of the results by Vandberg, games are stated to have contributed to problem solving for learning for children.

Table 1. Syntax of Learning Models Play-Think-Pair-Share

| No | Syntax | Teacher’s Activity | Student’s Activity |
|----|--------|--------------------|--------------------|
| 1  | Play   | Guiding and directing students to follow the rules of the game in learning activities. The game chosen is a game related to the problems that will be raised in learning | Actively participate in game activities designed by the teacher |
| 2  | Think  | Invite students to solve problems related to material (note: the problem raised must be linked in the context of the game at the play stage) | Look for solutions to problems raised in learning activities |
| 3  | Pair   | Guiding students to discuss solutions to problems with their peers | Discuss with peers and exchange opinions about the issues being raised in learning activities |
| 4  | Share  | Guiding students to communicate the results of their discussions with classmates | Communicate the results of discussions with peers to classmates |

With the addition of syntax play on the PTPS learning model it is expected to motivate students, increase participation, interest and problem solving skills of students. The end of the game students are faced with a problem that has been related to the game being lifted.

The concept of active learning is the parent of several learning models such as Discovery, project-based, Inquiry, Problem Based Learning, Collaborative and Cooperative. Learning with the Cooperative model is part of the concept of student-centered teaching. In the cooperative learning model, the classification of models is further divided into several types, including Two Stay Two Stray, Jigsaw, Snowball Throwing, Play-Think-Pair-Share (PTPS) and others.

PTPS is one of the learning models that can improve students’ problem-solving skills, this is because, in learning, the teacher raises problems related to the subject matter [26]. In learning at the elementary level, the application of the PTPS learning model has met the criteria and principles of learning, including the principle of problem-solving, social relations, concentration, motivation, and others. Some of the advantages of using the PTPS learning model include:

- Enable students to express their reasons, reflect on their thoughts, and get immediate feedback on their understanding
- Improve the quality of student responses, practice problem-solving skills and improve high-level thinking skills
- Give students time to think about important questions or problems and great effects. Students feel more comfortable if they are given enough time to think and organize their thoughts before they start expressing themselves. It is better than responding directly
• Preparation is generally easy and requires a short time
• Teachers can submit various types and levels of questions to develop reasoning skills and problem-solving for students
• It involves the whole class and allows students to calm down and answer questions without having to stand out from their classmates [27, 28, 29, 30].

The various advantages offered in the use of the PTPS model make many teachers and instructors interested in applying it to learning. Significant differences are shown by the results of PTPS-based learning activities compared to Non-PTPS learning [31].

3. Research Methods
This study aims to determine the impact of applying the PTPS model to improve student problem-solving skills at the elementary school level. This type of research is quantitative with a quasi-experimental type and is conducted at SDN 12 Nan Sabaris. The total sample in this study was 21 students enrolled in the 2018/2019 school year. Data collected in research activities using questionnaires for the assessment of problem-solving skills.

4. Result and Discussion
The preliminary test conducted is the test for normality and homogeneity. Normality Test is a test carried out with the aim to assess the distribution of data in a group of data or variables, whether the distribution of the data is normally distributed or not.

4.1. Class of Control (Normality test).
Data from the analysis of the control class normality test are as follows:

Table 2. Results of Analysis of Data Normality Test of Control Class

| Class     | CONTROL |
|-----------|---------|
| N         | 22      |
| Normal Parametersa | Mean | 5.00 |
|            | Std. Deviation | 0.873 |
| Most Extreme Differences | Absolute | 0.227 |
|            | Positive | 0.227 |
|            | Negative | -0.182 |
| Kolmogorov-Smirnov Z | 1.066 |
| Asymp. Sig. (2-tailed) | 0.206 |

a. Test distribution is Normal.

Based on the results of data analysis using the normality test with Kolmogorov Smirnov, it appears that the mean = 5.00, standard deviation = 0.873, the value of Z = 1.066 and Sig 2 Tailed = 0.206, it can be concluded the experimental class data is normally distributed.

4.2. Experimental Class (Normality Test).
The results of the analysis of the experimental class normality test are as follows:

Table 3. Results of Analysis of Data Normality Test of Experimental Class

| Class     | Experiment |
|-----------|------------|
| N         | 22         |
Based on the results of data analysis using the normality test with Kolmogorov Smirnov, it can be seen that the mean = 6.50, standard deviation = 0.913, the value of Z = 1.402 and Sig 2 Tailed = 0.039, it can be concluded the experimental class data is non-normally distributed.

After both types of data are normally distributed, the homogeneity test is continued. The homogeneity test is a test of whether or not the variances are equal to two or more distributions.

4.3. Test of Homogeneity

Table 4. Results of Analysis of Homogeneity Tests of Student

| Levene Statistic | df1 | df2 | Sig. |
|------------------|-----|-----|------|
| 0.750            | 1   | 42  | 0.391|

By considering the value of sig. 2 tailed lines "Based on median" can be seen the sig value. (0.391) > value α (0.05). Based on the results of data analysis it can be concluded that the data is homogeneous.

Test the effectiveness with " Two-Way ANAVA "

Hypothesis 1
Ho: There is no significant difference between problem-solving skills of students who learn to use PTPS and conventional models
Hi: There is a significant difference between problem-solving skills of students who learn to use PTPS and conventional models

Statistical Hypothesis
Ho : $\mu_{\text{Eksperimen}} = \mu_{\text{kontrol}}$
Hi : $\mu_{\text{Eksperimen}} \neq \mu_{\text{kontrol}}$

Information:
Accept Ho if the value is sig. 2 tailed > 0.05
Reject Ho if the value is sig. 2 tailed <0.05

The results of data analysis are as follows:

Table 5. Results of Analysis of Two-Way ANAVA Data of Student

| Source          | Type III Sum of Squares | df | Mean Square | F    | Sig.          |
|-----------------|-------------------------|----|-------------|------|--------------|
| Corrected Model | 26.583\(a\)             | 3  | 8.861       | 11.193 | 0.000        |
| Intercept       | 1434.376                | 1  | 1434.376    | 1.812E3 | 0.000        |
| Gender          | 1.467                   | 1  | 1.467       | 1.853  | 0.181        |

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Normal Parameters

| Mean Std. Deviation | 6.50 0.913 |
|---------------------|-----------|

Most Extreme Differences

| Absolute Positive Negative | 0.299 0.299 -0.201 |
|-----------------------------|---------------------|

Kolmogorov-Smirnov Z

| Asymp. Sig. (2-tailed) | 1.402 0.039 |

a. Test distribution is Normal.
Based on the results of data analysis, it can be seen that the value of sig. (2 tailed) of 0.000 < alpha value of 0.05, it can be concluded that Ho is rejected means that there is a significant difference between problem-solving skills of students who learn to use PTPS and conventional models.

5. Discussion
This research was conducted to solve the problem of low student problem-solving skills. The solution offered in this study is the use of the PTPS model to improve students' problem-solving skills. The PTPS model that is used to integrate play activities in introducing a problem so as to adjust the design of learning to the level of child development. Child problem-solving skills are trained in each learning syntax using the PTPS model. Also the application of the Play-Think-Pair-Share (PTPS) learning model has an instructional impact in the form of increasing student reading interest [36].

Students' problem-solving skills can be trained by familiarizing students with learning and making it an active solution provider [32]. In applying the PTPS model, introducing problems to students in learning activities is provided by integrating these problems into the form of a game. The game designed has been tailored to the interests and level of development of students at the elementary school level. Challenge-based games are one of the most loved games by students at the elementary school level, this is reinforced by the results of pre-survey survey evidence that has been conducted where 78% of elementary school students prefer challenge-based games when compared to free games that have not been directed by the teacher.

The role of the game in the application of the PTPS model is to provoke, motivate and stimulate students to recognize a problem that will be discussed in the study. Based on previous research, to improve students' problem-solving skills, one of them can be done by giving students the opportunity to recognize what is actually the subject matter and guide them to start becoming active problem solvers on existing problems. Problems raised in learning are packaged in the form of a game so that each student feels challenged to find a solution to the problem being discussed.

Playing has a close relationship with the students' problem-solving skills [33]. It is this basic principle that the principle of play which is also one of the foundations for developing learning design at the primary school level needs to be inserted in the concept of problem-based learning [34, 35]. During the learning process using the PTPS model, the teacher actively monitors and provides direction and acts as a referee in managing the course of the game.

In the playing stage, students recognize problems, and then allow students to ask questions about how to solve existing problems. After questions arise, of course, students will think of tricks and strategies to solve existing problems. At this stage also allows students to try. The initial step in implementing the PTPS model has provided how students are conditioned to be able to practice increasing their problem solving skills.

After students have succeeded in concluding and having their own arguments for the concept of the problem being discussed, it is continued in the activity of conveying the arguments and conclusions that each of them gets to other students in pairs. In the pairing stage allows students to conduct self-regulation, as well as reflect on the truth of the translation and the results of the discussion in the pairing stage.
At the final stage of learning, students are asked to communicate with each other the results of the discussion about solving problems raised in learning. In order for learning to be more focused, the teacher can ask questions as a rectifier and guide students in communicating the results they get.

Each stage in the application of the PTPS model allows students to practice problem-solving skills in accordance with the assessment indicators developed. Problem-solving skills can be trained using the PTPS model. The PTPS model can be implemented and is friendly to child development at the elementary school level. The application of the PTPS model can be one of the solutions for elementary school level teachers who aim to improve students' problem-solving skills. The PTPS model can be recommended not only in science learning but can be modified in the application in other subjects.

6. Conclusion
The purpose of this study is to provide a solution to overcome the low problem-solving skills of students at the elementary school level. This research can be a gap to disseminate the PTPS model that is still relatively new and not yet known to the teacher/researcher so that it can be implemented in learning activities. A distinctive feature of this PTPS model is the presence of play activities that are tailored to the level of children's development so that they can meet learning needs and in accordance with the principles of learning at the elementary school level. The results of this study lead to the application of the PTPS model is tested statistically and can improve students' problem-solving skills at a high level of ability. Other researchers can continue this research to see other instructional effects of the application of the PTPS model at the elementary school level.

References
[1] Salonen, A.O. (2010). Sustainable development and its promotion in a welfare society in a global age. Helsinki: Helsingin yliopisto.
[2] Sterling, S. (2009). Sustainable education. Science, society and sustainability: Education and empowerment for an uncertain world (pp. 105–118). New York: Routledge.
[3] Bogdanovic, Ivana. (2018). Teaching How to Learn. Problems of Education in The Century 21st Century, 76 (6), 760-761.
[4] Neslihan Usta, et.al. (2018). Impact of Visuals on Primary School 4th Graders’ Problem-solving Success. Universal Journal of Educational Research, 6(10), 2160-2168. DOI: 10.13189/ujer.2018.061014.
[5] Zakirman, Z., Lufri, L., & Khairani, K. (2019, January). Factors Influencing the Use of Lecture Methods in Learning Activities: Teacher Perspective. In International Conference on Islamic Education (ICOIE 2018). Atlantis Press.
[6] Almers, E. (2009). Action competence for sustainable development: Three stories about the path leading there. Diss. Jönköping: School of Education and Communication, Jönköping University.
[7] Hofman, M. (2012). Sustainable development in the Finnish teacher education—Political rhetoric or reality (Research report 34). Vasa: Faculty of Education, Åbo Akademi.
[8] Anealka, Aziz Hussin. (2018). Education 4.0 Made Simple: Ideas For Teaching. International Journal of Education & Literacy Studies, 6 (3), 92-98. http://dx.doi.org/10.7575/aiac.ijels.v.6n.3p.92.
[9] Yandell, John. (2010). New Labour, Old School Tie’: What Is Education For?, Changing English: Studies in Culture and Education, 17:2, 113-127, DOI: 10.1080/13586841003787217
[10] Byrne, Cathy. (2011). Freirean critical pedagogy’s challenge to interfaith education: what is interfaith? What is education?, British Journal of Religious Education, 33:1, 47-60, DOI: 10.1080/01416200.2011.523524.
[11] Zakirman. (2017). Pengelompokkan Gaya Belajar Mahasiswa Menurut Teori Honey Mumford Berdasarkan Intensitas Kunjungan Pustaka. RISTEKDIK Jurnal Bimbingan dan Konseling, 4(1), 48-53.
[12] Erdem E. (2001). Program gelistirmede yapilandirmacilik yaklasum. (constructivist approach in curriculum development). Published master thesis. Hacettepe Univerisity, Ankara.
[13] Roya, Jafari Amineh, & Hanieh Davatgari Asl. (2015). Review of Constructivism and Social Constructivism, Journal of Social Sciences, Literature and Languages, 1(1), 9-16.
[14] Caffarella RS & Merriam SB. (1999). Perspectives on adult learning: framing our research. In 40th Annual Adult Education Research Conference Proceedings. Northern Illinois University.
[15] Dofkova, Radka. (2019). Evaluation of Self-efficacy in Prospective Primary School Teachers in The Context of Mathematics Teaching. Problems of Education in The Century 21st Century, 77 (1), 244-253.
[16] Brown AL, Ash D, Rutherford M, Nakagawa K, Gordon A & Campione JC. (1995). Distributed expertise in the classroom. In G. Salomon (Ed.), Distributed cognitions. New York: Cambridge University Press.
[17] McManon M. (1997). Social Constructivism and the World Wide Web - A Paradigm for Learning. Paper presented at the ASCILITE conference. Perth, Australia.
[18] Vijaya Bhaskara, et.al. (2017). Students Problem-Solving Difficulties and Implication in Physics: An Empirical Study on Influencing Factors. Journal of Education and Practice, 8 (1), 59-62.
[19] Paterson, Kathy. (2009). Games That Promote Problem Solving Skill. New York: Pembroke Publisher.
[20] Sampsel, Ariana. (2013). Finding the Effects of Think-Pair-Share on Student Confidence and Participation. Honors Projects. 28. https://scholarworks.bgsu.edu/honorsprojects/28
[21] Ahmdd, Saghir., et al. (2016). Play and Cognitive Development: Formal Operational Perspective of Piaget’s Theory. Journal of Education and Practice, 7 (28), 72-79.
[33] Wood, E, & Attfield, J. (2005). Play, learning and the early childhood curriculum, London, P.C.P.

[34] Siegler, Robert., & Wagner Martha. (2005). *Children’s Thinking Fourth Edition*. New Jersey: Pearson International Education.

[35] Susanto, Ahmad. (2013). *Teori Belajar dan Pembelajaran di Sekolah Dasar*. Jakarta: Kencana Prenada Media Grup.

[36] Zakirman, Z. (2019). PENINGKATAN MINAT BACA SISWA MELALUI PENERAPAN MODEL PEMBELAJARAN PLAY-THINK-PAIR-SHARE DI SDN 19 NAN SABARIS. Shaut Al-Maktabah: Jurnal Perpustakaan, Arsip dan Dokumentasi, 11(1), 41-51.