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The Influence Of The Think Pair Share Cooperative Model On Gender-Based Mathematical Problem-Solving Ability At SDN 2 JIRAK

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Abstract

Education is an effort or plan to realize a bright future by providing a positive impact on life. The Think Pair Share cooperative model is one of the models that emphasizes student collaboration in problem-solving through three stages: thinking independently, working together, and presenting ideas or findings. The purpose of this study is to determine the effect of the Think Pair Share cooperative model on mathematical problem-solving abilities based on gender at SDN 2 Jirak. The method used in this study is an experimental method with a Posttest Only Control Group Design. The population in this study consists of grade VA and VB students at SDN 2 Jirak, totaling 46 students. The data collection technique in this study uses essay tests to measure students' mathematical problem-solving abilities. The data analysis technique of this research used a two-way ANOVA test which shows that (1) there is an effect of the Think Pair Share cooperative model on students' mathematical problem-solving abilities; (2) there is an effect of differences in mathematical problem-solving abilities based on students' gender; (3) there is an interaction between the Think Pair Share cooperative model and gender on students' mathematical problem-solving abilities.

Keywords:*TPS Model, Mathematical problem-solving ability, Gender.*

INTRODUCTION

Education is a crucial foundation for creating quality and competitive human resources in

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the era of globalization. A country can be considered successful if the quality of its education is taken into account (Sinaga et al., 2021). Through education, individuals begin the learning process, beginning at the elementary school level. According to(Ardiyani & Gunahardi, 2019)The learning process at the elementary school level should encourage students to actively seek knowledge through interaction and collaboration with their peers, rather than simply receiving information from teachers. Therefore, elementary school education plays a crucial role in developing knowledge in the learning process.

In today's educational context, effective learning should motivate students to think critically, collaborate, and actively participate in learning activities. Mathematics instruction at the elementary school level is crucial for developing logical, analytical, and systematic thinking skills in children from an early age. Effective mathematics instruction should encourage students to independently discover concepts through active thought and exploration, rather than simply passively receiving information during the mathematics learning process.(Sekarsari et al., 2023).

Mathematics plays a crucial role in improving problem-solving skills, critical thinking, and systematic thinking. However, various studies have shown that elementary school students in Indonesia still have relatively low mathematical abilities, particularly in problem-solving and critical thinking.(Ahdhianto et al, 2020). This is in line withSuryawan & Sudiarta (2023)states that critical thinking and problem-solving skills in mathematics are key indicators of students' success in deeply understanding mathematical concepts. Therefore, mathematics plays a crucial role in solving problems that arise in learning through problem-solving skills.

According toSeptian et al., (2022)This ability includes students' skills in understanding problems, planning strategies to solve them, implementing procedures, and evaluating the results of the solution in a logical manner. Research conducted byFalebita & Olofin (2020)emphasized a clear improvement in the performance and self-efficacy of both male and female students, with a slight advantage in the female group in discussion engagement. Researchers conducted initial observations at SD Negeri 2 Jirak on September 29, 2025, and obtained data from interviews with the fifth-grade homeroom teacher of SD Negeri 2 Jirak, who stated that problem-solving skills were still very low. Based on assessments of daily exercises and tests in mathematics learning about the characteristics of flat shapes, only a few students understood, remembered, and obtained the best grades. In addition, mathematics lessons are also known as a difficult subject to understand and are often avoided by students. In the learning process, educators still use lecture and conventional methods that allow students to feel bored quickly and have difficulty understanding the material being taught and make students less active in problem-solving.

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Therefore, the need for an appropriate learning model/method in developing students' problem-solving skills.

This study is interested in using the Think Pair Share cooperative learning model to improve students' problem-solving skills. Think Pair Share is a learning method that prioritizes group work, where students are asked to work in pairs to solve problems given by the teacher and then present their findings.(Sulistio & Haryanti, 2022). In line with the opinionArlina et al (2023)Think Pair Share is an effective learning method because it provides students with the opportunity to think independently, engage in discussions with peers, and exchange ideas. Research conducted by Sevilla et al. (2025) found that the Think Pair Share cooperative learning model had an impact on students' mathematical problem-solving abilities. The explanation above indicates that the Think Pair Share cooperative learning model is a learning model carried out in pairs to solve a problem.

Based on the problems described above, the use of the Think Pair Share type Cooperative learning model can improve students' mathematical problem-solving abilities. Therefore, researchers are very interested and try to conduct research with the title "The Effect of the Think Pair Share Type Cooperative Model on Gender-Based Mathematical Problem-Solving Ability in SD Negeri 2 Jirak" with the hope that this learning model can continue to be implemented continuously so that mathematics learning is not considered boring but can make students happy in the learning process.

THEORETICAL BASIS

Learning models are the models educators use during the learning process. The selection of various learning models needs to be tailored to the subject being taught.(Harefa, 2020)This means that teachers, as educators, must determine and prepare learning models appropriate to the subjects they will teach. Based on the opinions above, it can be concluded that a learning model is a framework or initial bridge used to plan and implement the learning process to achieve learning objectives. Therefore, implementing a learning model requires careful consideration and significantly impacts the core competencies, learning objectives, and varying levels of student ability.

According to(Silalahi & Hutauruk, 2020)The cooperative learning model represents a shift in thinking in the learning process in schools, shifting from teacher-centered to more student-centered, where students interact with each other and take responsibility for the group's success. The cooperative model can also increase student motivation and make the learning process more enjoyable. Meanwhile,Khair & Misnawati, (2022)states that cooperative learning plays a role as a

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successful teaching method in improving students' social and communication skills, especially in learning Indonesian at the elementary school level. Therefore, it can be concluded that the cooperative learning model is a learning model that uses small groups to solve a problem where each student is required to be active and work together to achieve shared learning goals. In this model, the teacher acts as a facilitator and students are expected to be more active in the learning process.

*Think pair share*is a learning method that focuses on group cooperation by inviting students to work in pairs to find solutions to problems given by the teacher and then present them.(Sulistio & Haryanti, 2022). According toTriyanto (2011)states that the Think Pair Share (TPS) cooperative learning model consists of three stages: thinking, pairing, and sharing, which aim to build interaction patterns between students so they can interact with each other. Through the Think Pair Share (TPS) cooperative learning model, students' self-confidence can be improved and they can participate in class. According to Trianto, the stages of the Think Pair Share cooperative learning model are:(Nuryani et al., 2022): Thinking stage, Pairing stage, Sharing stage

METHODOLOGY

This study uses a quantitative approach with a quasi-experimental research type (Quasi Experimental Design). The design used is Posttest Only Control Group Design. In this design, the research subjects are divided into an experimental group that is given treatment (learning model) and a control group that is not selected randomly. The research was conducted at SD Negeri 2 Jirak, Musi Banyuasin Regency, in the even semester of the 2025/2026 academic year. The population in this study were all students of SD Negeri 2 Jirak from grades I to VI, totaling 216 students. The sample determination used a purposive sampling technique. The samples determined were students of class VA as the experimental class (a total of 23 students, consisting of 9 boys and 14 girls) and students of class VB as the control class (a total of 23 students, consisting of 11 boys and 12 girls), so that the total sample was 46 students. Research Variables This study involved three types of main variables:

- Independent Variable: Cooperative learning model, Think Pair Share (TPS) type.
- Dependent Variable: Mathematical problem solving ability.
- Moderator Variable: Student gender.

The data collection technique used to measure students' mathematical problem-solving abilities is a written test method. This test consists of 5 essay-style questions given at the end of the treatment session (posttest) on the characteristics of plane figures. Before being implemented

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on the sample, the instrument has gone through a trial (validation) stage which includes a validity test (Bivariate Pearson), a reliability test (Cronbach's Alpha), a difficulty level test, and a test of the item's discriminatory power. To answer the research hypothesis, data analysis uses a comparative hypothesis test in the form of a Two-Way ANOVA Test assisted by the SPSS version 26 program. Before the ANOVA test, two prerequisite analysis tests are carried out, namely the normality test of data distribution using the Shapiro-Wilk test and the homogeneity test of variance using Levene's Test of Homogeneity of Variances.

RESULTS

In this implementation stage, the researcher conducted learning in the experimental and control classes, which were conducted six times. For the control class, three meetings were held without using the Think Pair Share model, while for the experimental class, three meetings were held using the Think Pair Share (TPS) model. This test was used to determine students' mathematical problem-solving abilities using the Think Pair Share (TPS) model.

Implementation of Control Class Research

The implementation of learning activities in the control class did not use the Think Pair Share learning model. In this control class, the conventional method was used in chapter 7 "Comparing the Characteristics of Planar Shapes" with subtopic B "Comparing the Characteristics of Quadrilaterals".



Figure 1.Researchers provide an explanation of the Control Class material

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Implementation of Experimental Class Research

In this experimental class, the implementation of learning uses the Think Pair Share (TPS) model in the learning process of the material "Comparing the Characteristics of Flat Shapes". This study aims to determine 3 objectives, namely: 1) To determine whether there is an influence of the Think Pair Share type cooperative learning model on mathematical problem solving. 2) To determine whether there are differences in mathematical problem solving abilities based on gender at SDN 2 Jirak. 3) To determine whether there is an interaction between the Think Pair Share type cooperative learning model and gender on mathematical problem solving abilities at SDN 2 Jirak.

Data collection on mathematical problem-solving skills was conducted after the researcher conducted three learning sessions. Two meetings were held in the control class using conventional learning methods, and two meetings were held in the experimental class using the Think Pair Share model. The next meeting, which was one meeting, provided a final test/posttest on all material comparing the characteristics of plane figures in both the control and experimental classes.

From the results obtained from the mathematical problem solving ability test of 46 students, consisting of 23 students in the control class who were taught using conventional learning methods and 23 students in the experimental class who were taught using the Think Pair Share (TPS) model. There was a final test/posttest carried out at the 3rd (three) meetings carried out in the experimental class and the control class, thus the average score percentage of the experimental class and the control class will be described.

Table 1. Description of Mathematical Problem Solving Ability Final Test Data
(Descriptive Statistics)

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Control Class	23	12	60	710	30.87	16,457
Experimental Class	23	52	96	1628	70.78	10,950
Valid N (listwise)	46					

Source: Research Data, Processed in SPSS Version 26

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Table 2.Percentage of Average Score of Students' Mathematical Problem Solving Ability Test Indicator

Indicator	Average of Control Class		Average of Experimental class	
	Man	Woman	Man	Woman
Students are able to mention the differences in the characteristics of flat shapes.	29.5	29.1	50	67
Students are able to create simple mathematical models	18.1	41.6	58.3	62.5
Students are able to compare the characteristics of flat shapes based on their sides and sizes.	22.7	27	47	58.9
Students are able to prove the truth of statements about flat shapes.	15.9	29.1	33.3	60.7

Table 3.Results of Students' Mathematical Problem Solving Ability Test

No	Learning model	Average
1	Cooperative Model type *Think Pair Share*	70.78
2	Conventional (without TPS learning model)	30.87

Based on the table above, in the mathematical problem-solving abilities of students there are differences between the experimental class and the control class. For the results of the experimental class's score using the Think Pair Share (TPS) cooperative model on mathematical problem-solving abilities, the average is 70.43 and the largest value is 96 while the smallest value

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is 52. Compared to learning using conventional methods, namely the control class with an average value of 30.87 and the largest value is 60 and the smallest value is 12.

Data analysis

Data Normality Test

In this test, the data obtained from the control class and the experimental class can use the data normality test calculation using Shapiro-Wilk, because the data will be calculated using two-way ANOVA if the data is normally distributed.

Table 4.Data Normality Test Results (Shapiro-Wilk)

Shapiro-Wilk	Class			
		Statistics	*df*	*Sig.*
Problem Solving Skills	Experimental Class	.956	23	.385
	Control Class	.945	23	.225

Source: SPSS Researcher Data version 26.

Based on the table above, the experimental class obtained a value for the Shapiro-Wilk statistic of 0.956 and Sig 0.385 0.05, Ho is accepted. So the results of the data on the mathematical problem-solving abilities of students in the experimental class are normally distributed. While the control class obtained a Shapiro-Wilk statistic of 0.945 and Sig 0.225 0.05, Ho is accepted. So, the data on the mathematical problem-solving abilities of students in the control class and the experimental class are normally distributed. The results of this normality test calculation use SPSS version 26.≥≥

Data Homogeneity Test

In this data test, to see the similarity of the variants, a homogeneity test needs to be carried out, where the sample is taken from a homogeneous variant population.

Table 5. Data Homogeneity Test Results

Leneve Statistics	*df1*	*df2*	*Sig.*
2,134	3	42	.110

Source: Researcher data using SPSS version 26

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From the table above, it can be seen that the significant value of students' mathematical problem solving ability is 0.110.≥0.05, based on the hypothesis testing criteria, it can be concluded that the data on the mathematical problem-solving abilities of students from the experimental class and the control class have the same or homogeneous variance.

Hypothesis Testing

Table 6. Hypothesis Test Results 1

Source	*Type III of Squares*	*df*	*ean Square*	*F*	*Sig.*
S Cooperative Model	17820.860	1	.7820.860	124,931	.000

Source: Research data, processed by SPSS version 26.

Based on the table above, the F count value of Think Pair Share≥Ftable is 124.931 4.10 and Sig value is 0.000 0.05 so that Ho is rejected and Ha is accepted. This can be concluded that there is a significant influence of the Think Pair Share cooperative model on mathematical problem solving abilities at SDN 2 Jirak.≥≤

Table 7. Hypothesis Test Results 2

Source	*Type III of Squares*	*df*	*Mean Square*	*F*	*Sig.*
Gender	1808,953	1	1808,953	.2,681	.001

Source: Researcher data, processed by SPSS version 26.

From the results obtained in the two-way ANOVA calculation using SPSS version 26, it can be seen in the table above, the F count value for Gender≥Ftable is 12.681 4.10 and the Sig value is 0.001 0.05 so Ho is rejected and Ha is accepted.≥≤

Thus, it can be concluded that there is a significant difference in mathematical problem-solving ability based on gender of fifth-grade students at SDN 2 Jirak. Although the second hypothesis shows a difference, it was not continued to further testing because one of the requirements for further testing is that there must be more than 2 groups being compared, while gender is only two, namely male and female.

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Table 8.Hypothesis Test Results 3

Source	*Type III of Squares*	*df*	*Mean Square*	*F*	*Sig.*
TPS*Gender	741,207	1	741,207	5,196	028

Source: Research data, processed by SPSS version 26.

Based on the table above, the F count value for Think Pair Share and Gender≥Ftable is 5.196 4.10 and Sig value is 0.028 0.05 so that Ho is rejected and Ha is accepted. The following is a table of interactions between the experimental class and the control class based on gender.≥≤

It can be concluded that there is a significant interaction between the use of learning models and gender on the mathematical problem-solving abilities of fifth-grade students at SDN 2 Jirak. The following is a picture of the interaction between learning models and gender on mathematical problem-solving abilities at SDN 2 Jirak:

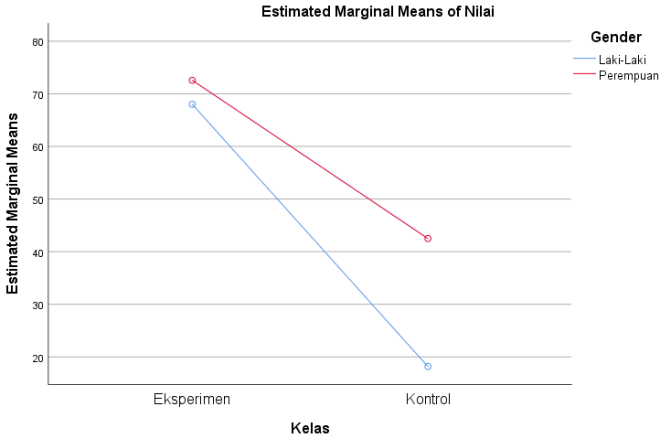


Figure 2.Interaction of Learning Models and Gender

DISCUSSION

The data from the research conducted by the researchers included a final test/posttest at the third meeting. The following points can be explained from the data analysis:

1. **There is an influence of the Think Pair Share learning model on mathematical problem solving abilities at SDN 2 Jirak.**

Based on the results of research conducted at SDN 2 Jirak, findings were obtained that there is an influence of the Think Pair Share learning model on students' mathematical problem-solving abilities. This can be seen from the difference in mathematical problem-solving abilities between the experimental class using the Think Pair Share learning model and the control class

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using conventional learning. Students in the experimental class showed better ability improvements compared to students in the control class. This shows that the application of the Think Pair Share model can have a positive impact on students' abilities in solving mathematical problems.

The results of this study also align with the Think Pair Share cooperative learning theory proposed by Sulistio & Haryanti (2022), which states that cooperative learning can improve student learning outcomes through collaboration and interaction between students. In the Think Pair Share model, students not only learn individually but also collaborate with partners to discuss solutions to problems. This discussion process helps students gain a deeper understanding of the learning material, thus improving their mathematical problem-solving skills.

The results of this study are in line with the results of research conducted by previous researchers, namely research conducted by Salwa, S. (2025) which stated that the Think Pair Share model can improve elementary school students' mathematics learning outcomes because it provides opportunities for students to be active in the learning process.

Based on the data analysis, students in the experimental class were better able to understand the problems, determine solution strategies, perform calculations accurately, and draw conclusions compared to students in the control class. This demonstrates that the Think Pair Share model is able to train students to think critically and actively in solving mathematical problems.

Thus, it can be concluded that the Think Pair Share learning model has a significant influence on students' mathematical problem-solving abilities at SDN 2 Jirak. The use of the Think Pair Share model in the experimental class proved more effective than conventional learning in the control class. Therefore, the Think Pair Share learning model can be used as an effective learning alternative to improve elementary school students' mathematical problem-solving abilities.

2. There are Differences in Mathematical Problem Solving Ability Based on Gender at SDN 2 Jirak.

Based on the results of research conducted at SDN 2 Jirak, it was found that there are differences in mathematical problem-solving abilities based on gender. This difference is evident in the results of the mathematical problem-solving ability test between male and female participants. Female students demonstrated better abilities in understanding problems, writing down solution steps, and drawing systematic conclusions. Meanwhile, male students tended to be faster in solving problems but less thorough in writing down complete solution procedures.

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This difference indicates that gender can influence how students solve mathematical problems.

The results of this study are relevant to the opinion of Lestari et al. (2021), who stated that there are differences in mathematical problem-solving abilities between male and female students. Female students appear more thorough and structured in solving mathematical problems, while male students are more willing to try direct problem-solving strategies. These differences in thinking patterns lead to differences in mathematical problem-solving abilities between male and female students.

The results of this study are also supported by research by Annisa et al. (2021), which states that there are differences in mathematical problem-solving abilities between male and female students. The study explains that female students generally excel in accuracy and problem-solving procedures, while male students are more dominant in quick-solving strategies.

Thus, it can be concluded that there are differences in mathematical problem-solving abilities based on gender at SDN 2 Jirak. These differences are influenced by students' thinking characteristics, learning strategies, and level of accuracy in solving mathematical problems.

3. There is an interaction between the use of learning models and gender on mathematical problem solving abilities at SDN 2 Jirak.

Based on the results of research conducted at SDN 2 Jirak, findings showed that there was an interaction between the use of learning models and gender on students' mathematical problem-solving abilities. This indicates that the influence of the Think Pair Share learning model on mathematical problem-solving abilities is not the same for each gender. Male and female students showed different responses to the application of the Think Pair Share model and conventional learning. In the experimental class using the Think Pair Share model, students' mathematical problem-solving abilities experienced better improvements compared to the control class, for both male and female students.

The results of this study are in line with the cooperative learning theory proposed by Damayanti et al. (2023), which states that cooperative learning can improve learning outcomes and learning enthusiasm through social interaction and collaboration in learning. In the Think Pair Share model, students are given the opportunity to think individually, discuss with a partner, and convey the results of the discussion to other groups. This process allows male and female students to exchange ideas and improve their understanding in solving mathematical problems. These activities that occur during learning help students develop critical thinking skills and mathematical problem-solving abilities.

The results of this study are in line with the results of previous research conducted by

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Salwa et al. (2025) where the results of the study showed that there was an interaction between the use of the Think Pair Share cooperative model and the mathematical problem-solving abilities of male and female students. With the results of this study indicate the importance of models in learning to improve students' abilities and, as with the Think Pair Share cooperative model. Likewise, differences between male and female students in learning styles that can improve problem-solving abilities in solving problems.

Thus, it can be concluded that there is an interaction between the use of learning models and gender on students' mathematical problem-solving abilities at SDN 2 Jirak. The Think Pair Share model not only has a direct effect on improving problem-solving abilities but also has different effects on male and female students.

CONCLUSION

Based on the results of research conducted at SDN 2 Jirak, it can be concluded that:

1. There is an influence of the Think Pair Share type cooperative model on mathematical problem solving abilities at SDN 2 Jirak.
2. There are differences in mathematical problem-solving abilities based on gender at SDN 2 Jirak.
3. There is an interaction between the use of learning models and gender on mathematical problem solving abilities at SDN 2 Jirak.

REFERENCES

Ahdhianto, E., Marsigit, H., & Nurfauzi, YD (2020). Improving Fifth-Grade Students' Mathematical Problem Solving and Critical Thinking Skills Using Problem Based Learning. Universal Journal of Educational Research.

Annisa, R., Roza, Y., & Maimunah, M. (2021). Analysis of Junior High School Students' Mathematical Problem-Solving Ability Based on Gender. Jurnal Kependidikan: Jurnal Hasil Penelitian dan Kajian Sastra di Lapangan Pendidikan, 7(2), 481. https://doi.org/10.33394/jk.v7i2.3688

Ardiyani, SM, & Gunahardi, G. (2019). The Impact of Think Pair Share Model on Mathematics Learning in Elementary Schools. EduLearn Journal.

Arlina, A., Hasibuan, R., Syahida, N., Aqilla, N., & Aulaz, I. (2023). Increasing Student Engagement in Class Using the Think Pair Share Learning Model. At-Tadris: Journal of Islamic.

Damayanti, E., Nur, F., Anggereni, S., & Taufiq, A. (2023). The Effect of Cooperative Learning on

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Learning Motivation. Journal of Education.

Falebita, O., & Olofin, S. (2020). Effect of think-pair-share (TPS) learning strategy on senior secondary school students' performance and self-efficacy in circle geometry. Research Gate Publications.

Harefa, D. (2020). Improving Student Learning Outcomes with Make A Match Cooperative Learning in Distance and Displacement Applications. GEOGRAPHY: Journal of Educational Studies, Research, and Development., 8(1). https://doi.org/(10.31764/geography.v8i1.2253)

Khair, U., & Misnawati, M. (2022). Teaching Indonesian in Elementary Schools: Cooperative Learning Model with Explicit Instruction Type. Neliti Journal.

Lestari, W., Kusmayadi, TA, Nurhasanah, F., & Keguruan, F. (2021). Mathematical problem-solving ability viewed from gender differences. AKSIOMA: Journal of Mathematics Education Study Program, 10(2), 1141. DOI: https://doi.org/10.24127/ajpm.v10i2.3661

Nuryani, Dedeh, & Suwirta, U. (2022). The Influence of the Think Pair Share (TPS) Cooperative Learning Model on Economics Subjects in High School. Journal of Education, 3(2), 340-347.

Salwa, S., Nofriyandi, N., Zetriuslita, Z., & Wahyuni, A. (2025). The Effect of the Think Pair Share Cooperative Learning Model on Students' Mathematical Problem-Solving Ability. HOTS Research Journal of Mathematics Education., 5(1), 316-328.

Sekarsari, FFP, Wicaksono, AG, & Sarafuddin. (2023). Journal of Educational Learning and Innovation. 3(1), 213–225. https://doi.org/10.46229/elia.v3i1

Septian, A., Inayah, S., & Pelani, J. (2021). Development of Macromedia Flash-Based Learning Multimedia on Plane Structure Material. Journal of Mathematics Education, 2(2), 97-107.

Silalahi, T., & Hutauruk, A. (2020). Application of Cooperative Learning Model in Online Learning During the Pandemic. BIRCI Journal.

Sulistio, A., & Haryanti, N. (2022). Cooperative Learning Model. Purbalingga: Eurika Media Aksara.

Suryawan, I., & Sudiarta, I. (2023). Students' Critical Thinking Skills in Solving Mathematical Problems: Systematic Literature Review. International Journal of Elementary Education Research and Review.

Triyanto. (2011). Innovative-Progressive Learning Model. Jakarta: Kencana.

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