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Application of Think Pair Share Type Cooperative Learning Model on Students' Cognitive Learning Outcomes in Class VIII Of SMP Negeri 1 Tualang

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Abstract- This study investigates the effectiveness of the Think Pair Share (TPS) type of cooperative learning model in improving students' cognitive learning outcomes in Class VIII of SMP Negeri 1 Tualang. The primary objectives of this research are to describe the learning outcomes of students taught using the TPS learning model and to compare them with students who were taught through conventional methods. The population of this study consisted of 288 eighth-grade students, with a sample of 64 students determined by a random sampling technique. The research employed a quasi-experimental method with a post-test only control group design to ensure reliable comparisons between the experimental and control groups. The results revealed that the application of the TPS model in the experimental class produced a significant improvement in students' cognitive outcomes. Students in the experimental group achieved an average cognitive ability score of 85.68, which falls under the very good category. Meanwhile, the control class that received conventional instruction obtained an average score of 68.74, categorized as fairly good. Furthermore, statistical hypothesis testing confirmed that there was a significant difference between the two groups, indicating that the TPS model contributed positively and effectively to students' cognitive development. The findings of this study highlight that cooperative learning, particularly the TPS model, not only enhances individual student engagement but also promotes collaborative knowledge construction through structured peer interaction. This approach allows students to articulate their ideas, compare solutions, and refine understanding through discussion, thereby strengthening both comprehension and retention of concepts. In contrast, conventional teaching methods were found to limit opportunities for active participation and peer feedback, which in turn hindered optimal cognitive achievement.In conclusion, the application of the Think Pair Share cooperative learning model is proven to significantly improve cognitive learning outcomes among eighth-grade students of SMP Negeri 1 Tualang. The TPS model is recommended as an effective pedagogical strategy for teachers to foster higher student achievement and to encourage more interactive and student-centered learning environments.

Keywords: *Think Pair Share*, Cognitive Learning Outcomes, Vibrations and Waves

1 Introduction

Education has a crucial role in improving the quality of human resources. Education is a humanization process that aims to form individuals who think critically, have good attitudes, and can contribute to society. Therefore, education does not only focus on cognitive aspects alone, but must also pay attention to affective and psychomotor aspects in learning (Pristiwanti et al., 2022:1).

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One indicator of educational success is the achievement of student learning outcomes, especially in the cognitive domain. Cognitive learning outcomes reflect the extent to which students understand, remember, and apply the concepts that have been learned. In fact, initial observations at SMP Negeri 1 Tualang showed that the cognitive learning outcomes of grade VIII students had not reached the expected level. Based on interviews with several teachers, it was found that many students had difficulty in understanding science concepts, especially in wave material due to lack of active involvement in learning (Maknun et al., 2025).

The learning process carried out in the classroom is a factor that influences student learning outcomes. Learning models that are less varied and the dominance of lecture methods cause students to be less active in learning. The lecture method that is still often used makes students only act as listeners so that they do not provide opportunities to think critically, discuss, and understand the material independently. As a result, students tend to be passive and have difficulty understanding the concepts taught (Rizal, 2022:2).

Teachers act as educators, guides and role models who are able to create a generation that is qualified, has character and is ready to face future challenge (Ahmad, 2016:96). However, teacher-centered learning has several weaknesses, especially in encouraging interaction between students. According to research, the learning model that is still centered on the teacher hinders the development of critical thinking skills and students' learning independence (Chrisdiyanto & Hamdi, 2023:166). In addition, the lack of variation in learning methods also causes limitations in accommodating various student learning styles. Each student has a different way of learning; some understand better through discussion, some learn more effectively with a visual approach, and some need direct experience through practical activities. The one-way lecture method is unable to accommodate this diversity, so that students with low academic abilities are increasingly left behind.

Natural Sciences (IPA) is a subject that has special characteristics, namely based on observation and experimentation. IPA as a learning process requires an approach that allows students to be active in finding concepts through discussion and problem solving (Lukum, 2015:26). However, in practice, many IPA learning still uses conventional methods that do not encourage students to think critically and be actively involved in learning (Alfirahmani et al., 2025).

The Think Pair Share learning model is designed to increase student interaction in learning. Students are guided to have individual responsibility and responsibility in their group or partner (Amaliyah et al., 2019:127). This model consists of three main stages: (1) Think, where students are given time to think independently about questions or problems given by the teacher; (2) Pair, where students pair up and discuss their thoughts with friends; and (3) Share, where students present the results of their discussions in front of the class (Rianingsih et al., 2019:339). Through these stages, students are more active in constructing their understanding of the material being studied.

Previous research shows that the implementation of the Think Pair Share model can improve student learning outcomes in various subjects, including science. For example, research conducted by Rahmawati (2022) found that the implementation of the TPS model can improve student learning outcomes by 20% compared to the lecture method. This shows that learning strategies that involve discussion and active participation are more effective than passive methods such as lectures (Fajria et al., 2025).

In practice, the implementation of the Think Pair Share model in various schools is still not optimal. Some teachers still tend to use the lecture method because it is considered more efficient, while students are still passive in learning. Based on the problems that have been raised, the author is interested in conducting a study entitled "Application of Think Pair Share Type Cooperative Learning Model on Students' Cognitive Learning Outcomes in Class VIII Of SMP Negeri 1 Tualang".

2 Research Methodology

The research design used in this study is quantitative research using experimental research type. The type of experiment conducted is quasi-experiment. The design used in this study is post-test only control

group design, which is a study by looking at the difference in post-test scores to determine cognitive learning outcomes between two class groups, namely class VIII.2 as an experimental class with 32 students and class VIII.9 as a control class which also has 32 students. This research design can be explained in Table 1.

Table 1. Think pair share research design

Group	Treatment	Post-test
Experiment	X	O_1
Control	-	O_2

(Ikhsan, 2025)

This study aims to determine the effect of the Think Pair Share model on student learning outcomes. This study was conducted inState Junior High School 1 Tualangclass VIII in the even semester of the 2024/2025 academic year. The research implementation period starts in April-May 2025.

The population in this study was all students in grade VIII in the even semester atState Junior High School 1 Tualangacademic year 2024/2025 consisting of 9 classes, namely VIII.1, VIII.2, and VIII.3, VIII.4, VIII.5, VIII.6, VIII.7, VIII.8, and VIII.9 with a total of 288 students. From this population, 2 classes were selected as samples, namely the experimental class and the control class. One class, namely VIII.2 with 32 students who received learning with the Think Pair Share model and class VIII.9 with 32 students as the control class, namely the class that uses conventional methods in its learning. The instrument used in this study was a test instrument in the form of 15 multiple-choice questions. Post-test questions were made based on indicators of achievement of learning objectives.

Students' cognitive learning outcomes are analyzed through the calculation of the average percentage of the values obtained by students. The values obtained by students are calculated using the following formula:

$$\text{Cognitive learning outcomes} = \frac{Jumlah\ soal\ benar}{Jumlah\ seluruh\ soal} \times 100$$

The level of students' cognitive abilities is grouped into four criteria. The criteria for students' cognitive learning outcomes can be seen in Table 2.

Table 2 Student absorption capacity criteria

Interval (%)	Absorption Capacity Category
$85 \leq x \leq 100$	Very good
$70 \leq x \leq 84$	Good
$50 \leq x \leq 69$	Pretty good
$0 \leq x \leq 49$	Not good

3 Results and Discussion

The learning process was carried out in four meetings, then a post-test was conducted using a written test instrument in the experimental class and the control class. The purpose of the post-test was to see the extent of students' abilities in each class after being given treatment. The post-test learning outcome score was measured by giving 15 multiple-choice questions to determine the achievement of indicators C1-C5. This study consisted of two data analyzes, namely descriptive analysis and inferential analysis.

1. Descriptive Analysis Results

The data obtained through the results of the post-test assessment are then presented in the form of descriptive analysis in the experimental class and control class groups. Descriptive analysis is one of the analysis techniques to describe the cognitive learning outcomes of class VIII students on vibration and wave material at SMP Negeri 1 Tualang after the learning process was carried out in the experimental class and control class. Student interpretations for each category in the vibration and wave material can be seen in Table 3.

Table 3. Analysis of students' cognitive learning outcomes for each indicator

No	Cognitive Aspect	Experimental Class		Control Class	
		Average	Category	Average	Category
1	Remembering (C1)	93.75	Very good	71.43	Good
2	Understanding (C2)	88.54	Very good	7 1.43	Good
3	Implementing (C3)	77.34	Good	61.43	Enough
4	Analyze (C4)	84.38	Very good	59.43	Enough
5	Evaluate (C5)	84.38	Very good	80.00	Good
Average (M)		85.68		68.74	
Category		Very good		Pretty good	

Based on Table 3, the data on the cognitive learning outcomes of students in both classes, namely the experimental class, is better by implementing the cooperative learning model of the think pair share type compared to the control class that applies conventional learning. Each indicator has a difference in the average score on students' cognitive learning outcomes, in the experimental class the average score is 85.68 with a very good category and in the control class the average score is 68.74 with a good category. The difference in the average value of the two classes is 16.94, so that the results of the descriptive analysis of the data are shown in Table 4.

Table 4. Description of the number of students' cognitive learning outcomes

Score Range	Classification	Control Class			
		Number of Students	Percentage %	Number of Students	Percentage %
$85 \leq x \leq 100$	Very good	16	50	5	15.63
$70 \leq x \leq 84$	Good	16	50	13	40.63
$50 \leq x \leq 69$	Enough	0	0	14	43.75
$0 \leq x \leq 49$	Not enough	0	0	0	0
Amount		32	100	32	100

Based on Table 4, it shows that the cognitive learning outcomes obtained by students in the experimental class with very good and good classifications were 100%, while the cognitive learning outcomes of students in the control class with very good and good classifications were 56.26%.

2. Inferential Analysis

Inferential analysis was conducted with the help of SPSS version 25 to conduct normality tests, homogeneity tests, and hypothesis tests. Hypothesis testing first requires prerequisite tests, namely normality tests and homogeneity tests using post-test data on cognitive learning outcomes in both class groups. The normality test performed on this research data is the Kolmogorov-Smirnov test. The detailed results of the normality test can be seen in Table 5.

Table 5. Results of the post-test normality test in the experimental and control classes

Class Group	Sig. Post-test
Experiment	0.167
Control	0.137

Based on table 5, it can be seen that in the experimental class for the post-test has a significance value of 0.167 and in the control class, the results of the post-test normality test have a significance value of 0.137. Based on these results, the post-test data in the experimental class and control class are normally distributed where the significance value (Sig.) > 0.05.

The next stage in inferential analysis is the homogeneity test. After it is known that the data is normally distributed, the next step is to conduct a homogeneity test using the Levene Test. The results of the homogeneity test using the Levene Test attached to the t-test table can be seen briefly in Table 6.

Table 6. Results of homogeneity test and t-test of experimental class and control class

		Levene's Test for Equality of Variances		**t-test for Equality of Means**		
		F	**Sig.**	**t**	**df**	**Sig.(2-tailed)**
Cognitive abilities	Equal variances assumed	0.277	0.600	5,425	62	0,000
	Equal variances not assumed			5,425	60,812	0,000

In the output results of the independent t-test in both classes, the significance of p = 0.000 was obtained, where <0.05. Therefore, based on the provisions if p <0.05 then H0 is rejected and H1 is accepted. Therefore, the conclusion obtained is that there is a significant difference in students' cognitive learning outcomes between the two classes after being given treatment.

3. Discussion of Research Results

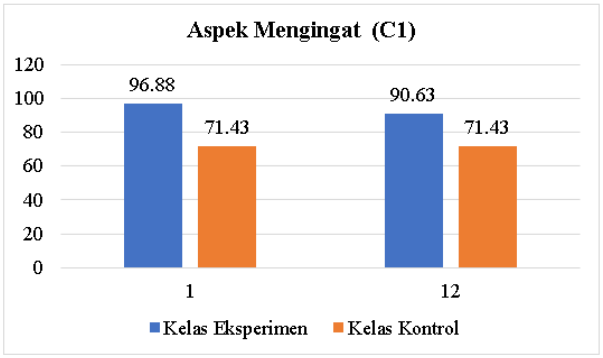
In the implementation of the research, the researcher acted as a direct educator who provided learning activities for both groups, namely the experimental class which was given treatment in the form of the application of the Think Pair Share learning model, while the control class was given treatment in the form of conventional learning. Learning for the experimental class had been planned and stated in the teaching module. Meanwhile, the control class was given treatment with conventional learning stated in the teaching module. After the treatment was given, a cognitive learning outcome test called a post-test of 15 questions was given which aimed to determine the effectiveness of the learning that had been implemented.

The average cognitive learning outcomes of the experimental class were 85.68 while the average cognitive learning outcomes of the control class were 68.74. Between the two classes there was a difference in the average value of cognitive learning outcomes of 16.94. In the class that implemented the Think Pair Share cooperative learning model, the average cognitive learning outcomes were relatively high, while in the class that did not implement the Think Pair Share cooperative learning model, the average cognitive learning outcomes were relatively low.

The selected experimental and control classes have been tested for normality and homogeneity and it was found that the classes were normally distributed and had homogeneous data variance, which means that the average ability of students in both classes was the same. Learning treatment by implementing the Think Pair Share cooperative learning model was given to the experimental class and learning with conventional methods was given to the control class, it turned out that there was a difference in the average cognitive learning outcomes between the two classes. Based on the results of the data analysis, the acquisition of cognitive learning outcome scores for students in the experimental and control classes showed significant differences in each aspect of the C1-C5 indicators in detail as follows:

1. Remembering (C1)

Remembering is an effort to retrieve knowledge from past memories. The scope of remembering is recognizing and recalling. Recognizing means recalling past knowledge related to concrete things. While recalling is a cognitive process of recalling past knowledge quickly and accurately.(Astuti, 2021:85). In the cognitive learning outcome test of students or daily tests on vibration and wave material, there are two questions out of fifteen questions whose difficulty level is C1, namely numbers 1 and 12. A comparison of the achievement results of students in both classes can be seen in Figure 1.

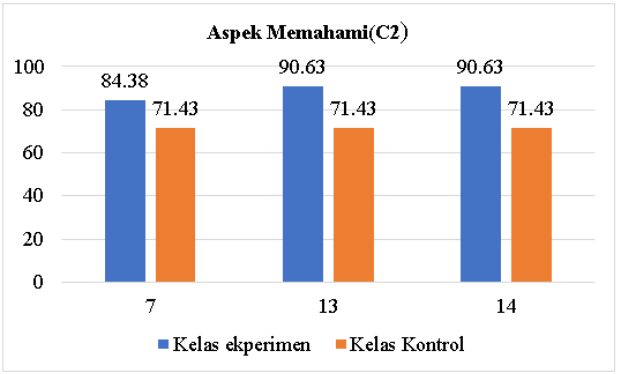


Based on Figure 1, in the level of difficulty indicator C1, the achievement of the control class and the experimental class is slightly different. In the indicator of question 1, the experimental class is higher than the control class, the experimental class is 96.88 while the control class is 71.43, the two classes have a difference of 25.45. While for question number 12, the experimental class has an average of 90.63 while the control class is 71.43 and has a difference of 19.2.

2. Understanding (C2)

Understanding is building understanding from various sources related to the activities of classifying and comparing. Classifying comes from specific information, while comparing is more about identifying similarities and differences between two or more objects.(Astuti, 2021:85).

The cognitive learning outcome test questions that have been given contain three questions that have indicators of the understanding aspect, namely 7, 13, and 14. In question number 7, students are asked to understand the characteristics of waves, in question 13, students are asked to explain the characteristics of sound, and in question 14, students can distinguish the characteristics of sound. The comparison graph of the achievements of students in the experimental and control classes for each question at the level of difficulty in understanding can be seen in Figure 2.

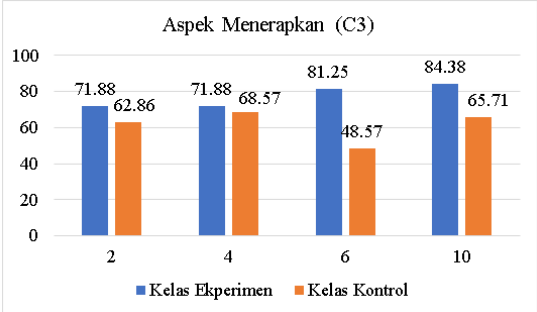


The achievement of students in the experimental and control classes for the level of difficulty in understanding has a very visible difference in achievement. For question number 7, the experimental class is superior with an average of 84.38, while the control class is 71.43. For question number 13, the experimental class gets a score of 90.63, while the control class is 71.43. Finally, for question 14, the experimental class gets a score of 90.63, while the control class is 71.43. This difference in value occurs because of the difference in learning models in the experimental and control classes regarding the material that has been studied.

3. Implement (C3)

There are four questions that have indicators of the applying aspect, namely questions number 2, 4, 6, and 10. In question number 2, students are asked to determine the frequency of the same vibration at different lengths of the pendulum string, in question number 4, students are asked to observe the picture and calculate the vibration frequency, in question number 6, students are asked to explain the speed of propagation in the medium by observing the picture, and in question number 10, students are asked to know the factors that affect the frequency and period of the pendulum vibration. The comparison graph

of the achievements of students in the experimental class and the control class for each question at the level of difficulty applying (C3) can be seen in Figure 3.



The achievement of students in the experimental and control classes for the level of difficulty in applying has a difference in achievement that is not so apparent in questions 2 and 4. The experimental class has a score of 71.88 and 71.88, while the control class has 62.86 and 68.57. In question number 6, the experimental class is far superior, the experimental class is 81.25, while the control class is 48.57. In question number 10, the experimental class is also superior with a score of 84.38, while the control class is 65.71.

4. Analyze (C4)

Analyzing is a problem solving by separating each part and looking for the relationship of each part and looking for information on how the relationship causes the problem. Analyzing as a cognitive process that includes: differentiating, organizing, and attributing.

The cognitive learning outcome test questions given consist of four questions that have indicators of the analysis aspect, namely questions number 3, 5, 8, 11, and 15. In question number 3 students are asked to analyze wave events, in question number 5 students are asked to analyze the relationship between frequency and period, in question number 8 students are asked to analyze wave events in everyday life, in question number 11 students are asked to identify mechanical waves, and in question number 15 students are asked to classify the characteristics of transverse waves and longitudinal waves. The comparison graph of the achievements of students in the experimental and control classes for each question at the level of difficulty in analyzing can be seen in Figure 4.

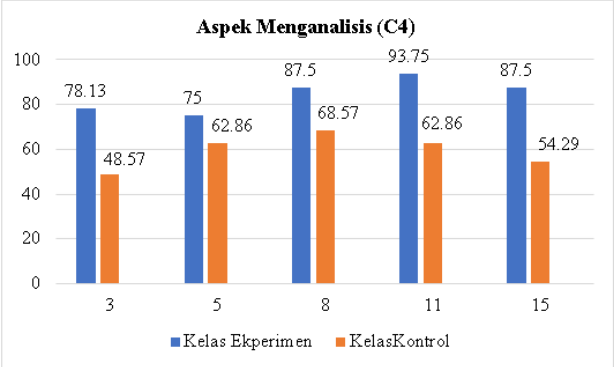


Figure 4. Analyzing

The achievement of students in the experimental and control classes for the level of difficulty of analyzing has a difference in achievement. In question number 3, the experimental class has a score of 78.13 and the control class 48.57, while in question number 5 the difference is not too far, namely the experimental class 75 and the control class 62.86. In question number 8, the experimental class is superior, where the experimental class is 87.5, while the control class is 68.57. In question number 11, the experimental class has a score of 93.75 and the control class is far away with a score of 62.86. In question number 15, the experimental class has a score of 87.5, while the control class has a score of 54.29. This is certainly inseparable from external and internal factors that affect the learning of each student.

5. Evaluate (C5)

Evaluating is giving an assessment based on the criteria and standards that are already available. The criteria commonly used are quality, effectiveness, efficiency, and consistency. Evaluating has a process scope, namely checking and criticizing.(Astuti, 2021:85). The cognitive learning outcome test questions that have been given in this category are one question, namely number 9. The comparison graph of the achievements of students in the experimental class and the control class for each question at the level of difficulty of evaluating can be seen in Figure 5.

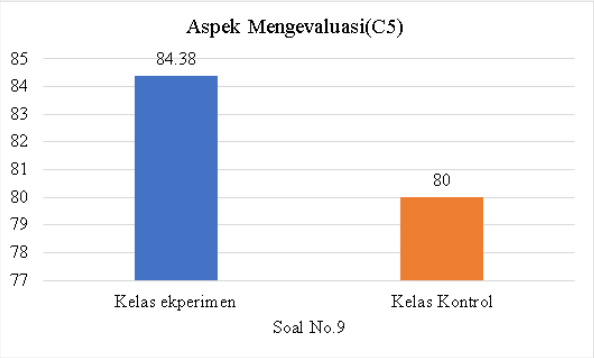


Figure 5. Evaluating

The achievement of students in the experimental class and control class for the level of difficulty in evaluating has a different value. The experimental class has a value of 84.38, while the control class has a value of 80. The cognitive learning outcomes of students on the vibration and wave material in the aspect of evaluating overall the experimental class is superior with a value of 84.38 and the control class value of 80, with a difference between the two classes of 4.38. This is in line with the research conductedAnggita et. al (2020:45)experimental class is 82.40 and while the control class is 65.76. This shows that in indicator C5 the experimental class is superior.

4 Conclusion

Based on the results of research conducted in class VIII of SMPN 1 Tualang by implementing the Think Pair Share type cooperative learning model on vibration and wave material to improve the cognitive learning outcomes of junior high school students, the conclusions that can be drawn are as follows:

1. The cognitive learning outcomes of students in classes that apply the think pair share type cooperative learning model on vibration and wave material are higher than those in classes that apply conventional learning.
2. There are differences in students' cognitive learning outcomes in classes that apply the Think Pair Share cooperative learning model to vibration and wave material and classes that apply conventional learning, which shows that the application of the think pair share cooperative learning model to vibration and wave material can improve student learning outcomes compared to conventional learning.

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