

The Influence of the Think-Pair-Share Cooperative Learning Model on Learning Outcomes on the Topic of Work and Simple Machines

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Abstract: Science learning is often regarded as difficult by students due to the many concepts that are abstract and not well understood. Therefore, a learning model is required that can enhance students' academic performance. One of them is the cooperative learning model known as Think-Pair-Share (TPS), which encourages students to think independently, engage in paired discussions, and share ideas within their groups. This research aims to determine the effect of the Think-Pair-Share type cooperative learning model on the learning outcomes of simple machines and efforts in SMP Negeri 1 Kwandang. This study is an experimental research, utilising a one-group pretest-posttest Design. The sampling technique employed in this research is Cluster Random Sampling. The sample in this study uses class VIIIC as the experimental class, grouped through a random lottery. Data for this research were collected using a testing technique, which included normality tests, hypothesis tests, and n-gain tests. The analysis results indicate that the calculated values for all sample classes are greater than the tabulated values; thus, the hypothesis (H1) is accepted. The N-gain value of 0.80 indicates an improvement in learning outcomes that falls under the high category. The application of the Think-Pair-Share model, specifically for the material on simple machines and business, has rarely been researched before. This model has been proven to help students connect abstract concepts with real-life situations, fostering active participation in the learning process. Thus, the TPS type cooperative learning model has a significant impact on improving students' learning outcomes. This research also provides practical benefits as a basis for teachers to implement the cooperative model of Think-Pair-Share in learning, creating a more active, effective, and meaningful learning atmosphere.

Keywords: Cooperative; Learning Outcomes; Think-Pair-Share.

Introduction

Education is a conscious and planned effort to create a learning environment that enables learners to develop their physical and spiritual potential [1]. In educational studies, the term pedagogy is recognized, which means education, and pedagogic, which refers to the science of education, derived from the word pedagogos, which originally meant service and then evolved into the noble profession of guiding children towards independence. Education encompasses physical development, health, skills, intellect, emotions, social aspects, and faith. According to Ahmad D. Marimba, education is the conscious guidance by educators in order to realize the primary personality in students.

The quality of education in Indonesia remains concerning due to various obstacles, such as the low interest and motivation of students to learn, as well as teaching methods that do not encourage active participation [2-3]. The Merdeka Curriculum is introduced to address the learning crisis through more innovative education [4].

Learning outcomes refer to the level of mastery that learners have over educational objectives, both general and specific [5]. Learning outcomes play a crucial role in education, serving as indicators of student progress [6] and reflecting the psychological changes that result from the learning process [7]. The factors that influence learning

outcomes include internal factors, such as interest, talent, motivation, and learning methods, as well as external factors, including the school environment and family [8]. The success of education is marked by positive changes in students through learning programs designed by teachers. Meanwhile, the assessment of learning outcomes reflects the capabilities, development, and overall success of education [9].

Based on the observations conducted by the researchers at SMP Negeri 1 Kwandang, students experience difficulties and boredom while learning, particularly in the subject of Science. Students show a lack of interest in Science lessons, feeling challenged when studying and not fully comprehending the material due to the excessive number of formulas and theories, which diminishes their enthusiasm for the subject. This situation may lead to poor academic performance among students, resulting in them failing to meet the Minimum Passing Criteria (MPC).

One step that can be taken to address the problem is to modify the learning method, which is expected to enhance student engagement and result in improved learning outcomes for the students. One of them is outlined in the Lesson Plan (RPP) using the cooperative learning model of Think-Pair-Share [10]. The cooperative learning model of the Think-Pair-Share (TPS) type encourages students to actively engage in discussions to solve problems [11]. Think-

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Pair-Share creates effective and enjoyable learning experiences, reduces boredom, enhances motivation, and improves learning outcomes by facilitating information management and developing students' critical thinking skills [12]. The procedure provides students with more time to think, respond, and support each other, thereby enhancing the confidence and participation of all students [13].

This model is effective in fostering varied discussion patterns, providing students the opportunity to think critically, and assisting one another in problem-solving [14]. Especially in science education at the junior high school level, particularly regarding the topic of Work and Simple Machines. This research aims to identify the differences in student learning outcomes with MPC after the implementation of the Cooperative Learning model, specifically the Think-Pair-Share type (TPS), on the topic of Work and Simple Machines at SMP Negeri 1 Kwandang. It is hoped that the implementation of this learning model will enhance students' learning outcomes.

Research Methods

This research employs a quantitative research approach, specifically an experimental research method with a one-group pretest-posttest design. The study was conducted at SMP Negeri 1 Kwandang, located in Moluo village, Kwandang sub-district, North Gorontalo Regency, Gorontalo Province. During the odd semester of the 2024/2025 academic year, this research was carried out for approximately one semester.

The subject of this research is the eighth-grade students of SMP Negeri 1 Kwandang. And the sample of this research is the experimental class consisting of 30 students

The steps taken are as follows: 1) The experimental class is given a pretest. 2) The experimental class is provided with the cooperative learning model known as Think-Pair-Share. 3) The experimental class is given a posttest.

The research data uses the pretest and posttest learning outcomes of students. A written objective assessment consisting of 15 questions and 5 essay questions was used as a testing instrument in this study. The research data were analyzed using n-gain analysis, hypothesis testing, and normality testing.

Normality Test

The normality test is used to examine the normality of the studied variable and determine whether the data are normally distributed. The decision-making is based on the principle that if the calculated value L_{count} is greater than the table value L_{table} , then H_0 is rejected, and if L_{count} is less than L_{table} , then H_0 is accepted [9]. The statistical test used is as follows:

H_0 : Data is normally distributed

H_1 : Data is not normally distributed

The statistical test used in the normality test is the Lilliefors test with a significance level set at 5% (0.05) using the following formula:

$$Z_i = \frac{x - x_2}{s}$$

Description:

X = the sample average used with the formula $X = \frac{\sum x_1}{n}$

S = standard deviation obtained using the formula

$$s = \frac{\sqrt{(\sum xi - x_1)2}}{n - 1}$$

To accept or reject the null hypothesis (H_0), this is done by comparing L_0 with the critical value L found within the chosen level of significance.

Hypothesis Test

Hypothesis testing aims to determine whether differentiated learning approaches, particularly those involving cooperative models, have an influence on student learning outcomes. Based on the data obtained in the study, statistical hypothesis testing was conducted, specifically a t-test. The formula for the t-test is presented as follows :

$$t = \frac{\bar{x} - \mu_0}{\frac{S}{\sqrt{n}}}$$

Description:

t = The calculated price t

\bar{x} = Average value x_i

μ_0 = Hypothesized value

s = Standard deviation

n = Number of research subjects

N-Gain Test

The N-gain test is conducted to measure the effectiveness of a learning or intervention in educational research. This is carried out to ascertain the cognitive improvement of students through learning. In this research, the learning of work and simple machines material utilises the cooperative learning model of the think-pair-share type. The N-gain test has the following formula:

$$N\text{-gain} = \frac{\text{Posttest Score} - \text{Pretest Score}}{\text{Ideal Score} - \text{Pretest Score}}$$

Table 1. N-Gain Criteria

| | | |
|----------|-----------------------|--------|
| | $g \geq 0.7$ | High |
| Criteria | $0.3 \leq g \leq 0.7$ | Medium |
| | $g \geq 0.3$ | Low |

Results and Discussion

After administering the pretest and posttest, the research findings regarding the influence of the think-pair-share cooperative learning model on the learning outcomes of simple machines and work are established. The researcher utilized n-gain tests, hypothesis testing, and data normality tests to evaluate the students' learning outcomes.

Based on the research results shown in Figure 1, there is an increase in student learning outcomes with the implementation of the think-pair-share cooperative learning model at SMP Negeri 1 Kwandang in the odd semester of the 2024/2025 academic year. Where is the presentation of the learning outcomes obtained after the implementation of the learning model, which is 80 for the objectives and 79 for the

essays from 30 students, the number of students who achieved scores above the Minimum Passing Grade.

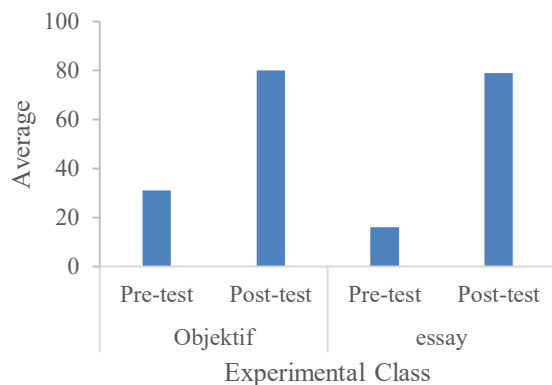


Figure 1. Average Scores of Students

Table 2. Normality Test Results

| Experimental Class | Liliefors Test | | |
|--------------------|----------------|-------------|----------------------|
| | L_{count} | L_{table} | Description |
| | 0.140 | 0.1614 | Normally distributed |

Table 3. Hypothesis Test Results

| Class | T_{count} | | T_{table} | Status |
|--------------|-------------|-------|-------------|----------------|
| | objektif | Essay | | |
| Experimental | 3.16 | 5.64 | 2.05 | H_0 Accepted |

Table 4. N-Gain Analysis of Student Learning Outcomes

| No | Class | N-gain | Criteria |
|----|--------------|--------|----------|
| 1 | Experimental | 0.80 | High |

Based on the results of the normality test in Table 2, it can be concluded that the research data are normally distributed. In Table 3, the Hypothesis Test concludes that H_0 is accepted and H_1 is rejected, indicating a significant difference in student learning outcomes regarding the MPC following the implementation of the cooperative learning model, Think-Pair-Share. In Table 4, the N-gain test indicates that the value falls within the high category, which demonstrates that the learning implemented in the experimental class is effective in improving learning outcomes. This demonstrates that students' learning outcomes have improved with the implementation of the cooperative learning model, specifically the think-pair-share approach, on the topic of Work and Simple Machines at SMP Negeri 1 Kwandang.

The research findings indicate that the Think-Pair-Share (TPS) type of cooperative learning model has a positive impact on student learning outcomes. The Think-Pair-Share cooperative learning model promotes social interaction and active collaboration in the classroom, which states that the TPS model supports deep thinking processes and better conceptual understanding [15]. The significant increase in N-Gain scores is evidence of the effectiveness of participatory and collaborative learning [16], especially in the learning of business and simple machines material at SMP Negeri 1 Kwandang. TPS enhances students' confidence in speaking and explaining their understanding, especially when they feel that the learning methods align with their individual learning needs [17,18].

Observing the improvement in student learning outcomes in the subject of Work and Simple Machines by implementing the cooperative learning model of Think-Pair-Share, it can be concluded that the Think-Pair-Share type of cooperative learning model significantly contributes positively to the learning process and optimal student learning outcomes and is very effective in improving the quality of learning in schools, particularly at SMP Negeri 1 Kwandang. This improvement occurs because the learning process utilizes the Think-Pair-Share model, which is capable of creating a pleasant and engaging learning atmosphere. Students assist one another and are able to communicate their ideas effectively during discussions, helping to solve problems. This is supported by the research of Junus et al. [19, 20], which indicates that the use of the Think-Pair-Share (TPS) learning model leads to improvements in students' science learning outcomes. It is intended to influence how students interact with one another so that they collaborate to solve problems in an organized manner starting from the think stage where students think independently, then the pair stage where students collaborate to solve existing problems. After the final stage, which is the sharing stage, in this phase, students provide various information that they have completed and draw conclusions obtained with others.

Although the cooperative learning model of Think-Pair-Share (TPS) effectively enhances student engagement and learning outcomes, its implementation presents challenges. Teachers often struggle to allocate time at each stage, uneven student participation, and less compatible pairings can hinder discussions. Moreover, the uneven understanding of the material results in less productive discussions, and the class can become noisy if the teacher's instructions are unclear. The evaluation of the discussion results also requires special strategies to ensure that all students are truly actively engaged. Therefore, implementing the collaborative learning approach requires thorough lesson planning and teacher training to ensure its optimal execution.

Thus, the cooperative learning model of the Think-Pair-Share (TPS) type is highly recommended for broader application in curricula that emphasize active and collaborative learning. Teachers need to be continuously trained to develop teaching materials that cater to the diverse needs of students and to implement cooperative strategies effectively, thereby achieving optimal learning outcomes.

Conclusion

The cooperative learning model of the Think-Pair-Share (TPS) type has proven effective in enhancing student engagement and learning outcomes, particularly because it provides opportunities for structured thinking, discussion, and the sharing of opinions. The implementation of cooperative learning methods can foster a communicative learning atmosphere, motivate students to engage actively, and help them develop critical thinking skills. However, the success of this model is highly dependent on well-prepared learning planning and the teacher's ability to manage time and the classroom, as well as appropriate evaluation strategies to ensure that all students are equally engaged. Future research may expand the application of the TPS model to different subjects or educational levels, combining it with digital learning media, or testing its effectiveness over

a longer period. In addition, it is recommended that teacher training be conducted to ensure the optimal implementation of TPS and to have a significant impact on the quality of learning.

Author's Contribution

Siskawati Akuba: conducted the research, performed data analysis, and wrote the manuscript; Abdul Haris Odja and Trisnawaty Junus Buhungo: provided supervision, conceptual guidance, and critical revision of the manuscript.

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