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Effectiveness of Project-Based Learning and Think-Pair-Share Cooperative Learning Models in Improving Students' Learning Outcomes Based on Their Learning Interest

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ABSTRACT

This study aims to examine the effectiveness of the Project-Based Learning (PjBL) and Think Pair Share (TPS) models in improving students' learning outcomes in social studies subjects viewed from the level of learning interest. This study used a quantitative approach with a quasi-experimental design of the non-equivalent control group pretest-posttest type. The sample consisted of 60 seventh-grade students of SMP Negeri 3 Banguntapan, divided into two experimental groups. The research instruments included a learning outcome test, a learning interest questionnaire, and an observation sheet. Data analysis was conducted using an independent t-test, gain score test, and simple linear regression with the assistance of SPSS. The results of the study showed that both learning models were effective in improving learning outcomes; however, their effectiveness was affected by students' level of learning interest. The PjBL model was more effective for students with a high level of learning interest, while the TPS model was more suitable for students with moderate to low learning interest. These findings emphasize the importance of selecting learning models that are adaptive to students' characteristics to optimize learning achievement.

Kata kunci: *project based learning*, *think pair share*, learning outcomes, interest in learning

INTRODUCTION

Quality education plays a very important role. To achieve this, the government has developed both human and non-human resources. One of the efforts undertaken is to improve teaching techniques. The success of a school depends on various elements involved in the learning process, which is viewed as a system [1]. These components include learning strategies, curriculum, teachers, media, methods, students, and other elements that generally support education [2]. Education plays a role in improving the quality of human resources [3]. Through instruction, the attitudes, personalities, and abilities of society can be enhanced, making them more prepared to face a better future. Education is an important asset for the future that can improve a country's welfare [4]. Many experts argue that the learning process needs to be improved to enhance the quality and quantity of education.

Quality education is highly important. To achieve it, the government has developed both human and non-human resources [5]. One of the measures taken is the improvement of teaching methods. The success of a school is determined by various components in the learning process, which function as a system. These components include teachers, curriculum, learning strategies, media, methods, students, and other elements that support education as a whole. Education plays a role in improving the quality of human resources [5]. Through instruction, the attitudes, personalities, and abilities of society can be enhanced, thereby preparing them for a better future [6]. Education is also an important asset for improving a country's welfare in the future. Many experts state that the learning process needs to be improved to enhance the quality and quantity of education. Social studies education is a broad body of content that has been simplified and adapted from concepts in history, geography, sociology, anthropology, and economics, and aims to provide students with perspectives, knowledge, and skills relevant to daily life. [7] stated that the goal of social studies is to prepare students to become effective citizens in a democratic society. Social studies emphasizes the importance of students' ability to function well in a democratic society [8].

Social Sciences (Indonesian: *Ilmu Pengetahuan Sosial*; IPS) play an important role in preparing students to actively participate in society and contribute to the development of Indonesia. Understanding basic concepts of science and the humanities, sensitivity to

environmental issues, and the ability to solve social problems are qualities required for teaching Social Sciences [9]. The goal is to foster the attitudes and skills necessary to become responsible citizens. Considering the importance of democracy for modern society, it is essential to educate students about its principles [10]. Therefore, Social Sciences should be regarded as an essential component of the education system.

However, many students overlook the Social Sciences and consider them easy. This often occurs because much of the Social Sciences material is perceived as memorization, which is frequently regarded as boring. This presents a challenge for the Social Sciences itself. Social Sciences education often faces various problems that hinder the achievement of national educational goals in this field. One major issue is the notion that Social Sciences learning is often boring because teachers use textual and lecture-based methods to deliver the material [11]. [11] stated that one of the main factors responsible for the low progress rate in education is the lack of teachers' knowledge about various learning models. This condition can lead to monotonous and one-way learning, where the teacher dominates the classroom while students only listen passively [12].

As a result, students' understanding of Social Sciences material remains low, which leads to unsatisfactory learning outcomes. This condition is not in line with the concept of 21st-century learning, which has undergone a significant paradigm shift in the field of education. The current learning approach is more student-centered and interactive, in contrast to the previous model that emphasized the teacher's role. Every individual in the 21st century is expected to possess critical thinking skills, broad knowledge, digital literacy, information literacy, media literacy, as well as an understanding of information and communication technology [13]. However, the phenomenon in the field shows a gap between the expected objectives of Social Sciences learning and the reality that occurs.

The results of the documentation analysis showed that the seventh-grade students of class VII-C at SMP Negeri 3 Banguntapan had an average daily learning outcome score of 76.8, while the students of class VII-E had an average score of 73.2, with a minimum mastery criterion of 70. There was a relatively small difference between the two classes, namely 6.8 for the experimental class VII-C and 3.2 for the experimental class VII-D. Therefore, the researcher believes that new variations in learning are necessary to improve learning outcomes. One way to increase students' learning interest in the classroom is by selecting an appropriate learning model. Various learning models, such as Project-Based Learning (PjBL) and Think Pair Share (TPS), can have a positive impact on learning outcomes, especially within the context of the current independent curriculum. The PjBL model encourages students to create projects or products that help them solve problems [14]. This approach enhances students' learning outcomes by providing them with opportunities to express themselves through projects as a form of discovery of what they have learned. PjBL emphasizes the importance of students' creativity in disseminating knowledge through the projects they create [15].

This learning model provides an engaging and project-based experience, encouraging students to be more active in asking and answering questions [16]. Thus, this method facilitates critical thinking, information seeking, and a deeper understanding of the concepts being learned [17]. Both models are highly suitable for Social Sciences learning, which requires critical and active student participation and provides opportunities to represent knowledge through projects. The teacher takes on the role as a facilitator, monitors the learning process, and conducts collaborative evaluations [18].

The Think Pair Share learning method, which prioritizes student interaction, is believed to improve student learning outcomes [19]. This method emphasizes four elements that can help students develop: simplicity, enjoyment, and empowerment. This model focuses on students who actively participate in groups through independent exploration of the material. Think Pair Share emphasizes that students should feel valued, safe, and successful in their own learning environment. By implementing this model, it is expected that students' learning interest will increase. Students are given the opportunity to participate more actively in expressing their opinions, which motivates them to think critically and seek solutions to problems that arise during the learning process. This is one of its main advantages. With only two students in each group, task division becomes easier because each group member can complete more tasks. In addition, teachers can more easily monitor the progress of each group and conduct more efficient evaluations of each student's development.

RESEARCH METHOD

This study used a quantitative approach with a quasi-experimental design of the non-equivalent control group pretest-posttest type. This design was chosen because field conditions did not allow the researcher to conduct full randomization of the subjects, yet it still provided an opportunity to make a valid comparison of the effectiveness of two different learning models. This study was conducted at SMP Negeri 3 Banguntapan with a total of 60 seventh-grade students as the subjects. The subjects were divided into two groups, each consisting of 30 students; the first group received treatment through the Project-Based Learning (PjBL) model, while the second group underwent learning using the Think Pair Share (TPS) model.

Data collection was carried out using three types of instruments, namely a learning outcome test, a learning interest questionnaire, and an observation sheet. The learning outcome test was developed in the form of multiple-choice questions to measure the cognitive aspects of students. Meanwhile, the learning interest questionnaire was constructed based on a four-

point Likert scale that had undergone content validity and internal reliability testing to capture students' affective tendencies toward learning. Observation was conducted to record student activities and engagement during the learning process, to support the quantitative data obtained from the other instruments.

Before the treatment was given, all research participants took a pretest to measure their initial abilities. Subsequently, the PjBL experimental group underwent project-based learning for six sessions, which were designed to engage students in tasks based on real-world problems. On the other hand, the TPS group participated in cooperative learning for six sessions, involving individual thinking, paired discussions, and classical sharing activities. After the treatment was completed, a posttest was administered to both groups to determine the improvement in learning outcomes that had occurred.

The data obtained were analyzed using descriptive statistics to describe the mean scores, standard deviations, and the distribution of learning outcome scores. To test the research hypotheses, an independent t-test was employed to determine the differences in learning outcomes between groups after the treatment. In addition, gain score analysis was applied to measure the effectiveness of each learning model in improving learning outcomes by comparing the pretest and posttest scores. Simple linear regression analysis was also used to examine the relationship between the level of learning interest and the improvement in students' learning outcomes, as well as to identify possible interactions between the learning model variable and learning interest. All data analysis procedures were conducted with the assistance of the latest version of the SPSS statistical software to ensure the accuracy and reliability of the results obtained.

RESULTS AND DISCUSSION

This study found that the Project-Based Learning (PjBL) and the Think Pair Share (TPS) cooperative learning models were effective in improving the learning outcomes of seventh-grade students at SMP Negeri 3 Banguntapan. Based on the results of the t-test analysis, there was a significant difference in learning outcomes between the groups that received instruction using the PjBL and TPS models. Students who learned using the PjBL model showed a greater improvement in learning outcomes compared to those who used the TPS model [20]. The average posttest score in the PjBL group was significantly higher than that in the TPS group ($p < 0.05$).

The data obtained from the posttest results in Social Sciences learning showed that students with high learning interest had an average score of 82.18, with the highest score being 100 and the lowest score being 65. Meanwhile, students with low learning interest had an average score of 78.43, with the highest score being 90 and the lowest score being 65. Furthermore, the data on students' learning outcomes using the TPS model showed that the pretest scores of students with high learning interest had an average of 46.56, with the highest score being 55 and the lowest score being 30. In the posttest results, students with low learning interest had an average score of 75.62, with the highest score being 90 and the lowest score being 65.

Thus, the analysis results indicate that learning interest has a significant effect on students' learning outcomes. Students with high learning interest experienced a more significant improvement in learning outcomes compared to students with moderate or low learning interest. In the PjBL group, students with high learning interest showed a highly significant improvement in learning outcomes, whereas in the TPS group, students with moderate and low learning interest responded more positively to the learning model. These findings suggest that learning interest plays an important role in mediating the effectiveness of the implemented learning model.

By using the PjBL and TPS models, students were grouped based on their level of learning interest. This was done to identify the students' conditions during the learning process. After identifying the students' level of interest, experimental class 1 was treated using the PjBL model, and experimental class 2 was treated using the TPS model. After the treatment was completed, an assessment of the students' final condition was conducted to determine the differences between the pre-treatment and post-treatment conditions. The following is the table of the experimental research design.

Overall, the PjBL model is more effective for students with high learning interest, while the TPS model is more suitable for students with moderate to low learning interest. The results of this study imply that the selection of a learning model should be adjusted to the students' level of learning interest in order to achieve optimal learning outcomes. The steps of the research process can be observed in the table below.

SMP Negeri 3 Banguntapan is located in Bantul Regency, Special Region of Yogyakarta, where this research was conducted. The study was carried out during the odd semester of the 2024/2025 academic year, from July to August. Class selection was based on students' cognitive abilities as reflected in daily test scores, the suitability of the curriculum, and the material being taught. Experiment 1 was conducted on seventh-grade students of classes VII-C and VII-E at SMP Negeri 3 Banguntapan.

The questionnaire was used as a tool to collect data on students' learning interests both before and after receiving the learning intervention. By using the TPS and PjBL learning models, the level of students' learning interest before and after the intervention could be assessed through this questionnaire. The results of this study indicate that both learning models, namely Project-Based Learning (PjBL) and Cooperative Think Pair Share (TPS), were effective in improving students' learning outcomes; however, their effectiveness differed when viewed to students' learning interests. These

findings align with previous studies, which have stated that project-based learning models, such as PjBL, encourage students to be more active and explore the material more deeply because they are directly involved in a meaningful learning process [21]. Students with high learning interest tend to feel more challenged and motivated in completing projects that require them to think critically and creatively. This explains why students with high learning interest showed a more significant improvement in learning outcomes in the PjBL group [22].

To obtain data on learning interest, a questionnaire was distributed to the research classes. Zhang, Zhou, Wijaya, Chen, and Ning [23] explained that based on the median value, or the midpoint value, students' learning interest is categorized into high and low learning interest. Experimental class 1 had a median of 117.5. The following table shows the frequency distribution of students' learning interests.

Table 1. Frequency of Learning Interest Scores of Students in Experimental Class 1

Criteria	Category	F (Students)	Relative F (%)
<117.5	High	16	50
>117.5	Low	16	50
Total			32

Based on Table 4, 16 students were classified in the low learning interest category, with a percentage of 50%, and the other 16 students were classified in the high learning interest category, with a percentage of 50%. A comparison of these data is presented in the figure below.

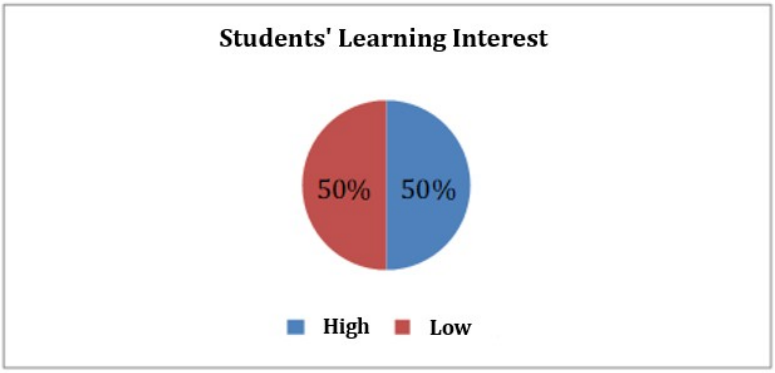

Figure 1. Frequency Chart of Learning Interest of Students in Experimental Class 1

In the second experimental class that received treatment using the TPS learning model, students had a median score of 111, indicating their level of learning interest. Students with scores <111 were considered to have low learning interest, while those with scores >111 were considered to have high learning interest.

Table 2. Frequency of Learning Interest Scores in Experimental Class 2

Criteria	Category	F (Students)	Relative F (%)
<111	Low	16	50
>111	High	16	50
Total			32

Based on Table 2, 16 students were classified in the low learning interest category, with a percentage of 50%, and 16 students were classified in the high learning interest category, with a percentage of 50%. The following figure illustrates the difference between these two categories.

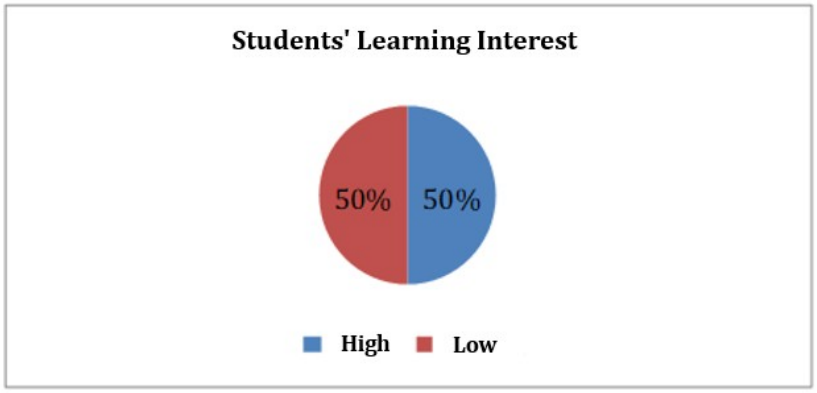

Figure 2. Frequency Chart of Learning Interest of Students in Experimental Class 2

After the validity test was conducted, the subsequent trial could only be carried out with 32 seventh-grade students of class VII B at SMP Negeri 3 Banguntapan. The instrument for measuring learning outcomes was then evaluated using SPSS version 24 with a significance level of 0.05. The criteria for item validity state that an item is considered invalid if the significance value is greater than 0.05 and valid if the significance value is less than 0.05. The empirical validity test was used to determine whether the instrument items met the validity standards. Research instruments may only be used if they meet the established criteria, while instruments that do not meet the criteria must not be used.

Table 3. Comparison of T-Test Results of Learning Outcomes Between the PjBL and TPS Groups

Group	N	Mean	Std. Deviation	t	Sig. (2-tailed)
PjBL	20	85.20	5.42	2.38	0.024
TPS	20	80.35	4.89		

Interpretation: A t-value of 2.38 and a Sig. (2-tailed) value of 0.024 ($p < 0.05$) indicates that there is a significant difference in students' learning outcomes between the PjBL and TPS groups.

Table 4. Linear Regression Test Results on the Effect of Learning Interest on Learning Outcomes

Free Variable	Unstandardized Coefficients (B)	t	Sig.	R-squared
Minat Belajar	0.68	3.45	0.001	0.45

Interpretation: A t-value of 3.45 and a significance value of 0.001 indicate that learning interest has a significant effect on students' learning outcomes. The R-squared value of 0.45 shows that 45% of the variation in learning outcomes can be explained by students' learning interest.

Table 5. Paired Sample T-Test Results: Improvement in Pretest and Posttest Scores

Group	N	Mean Pretest	Mean Posttest	T	Sig. (2-tailed)
PJBL	20	70.10	85.20	5.32	0.000
TPS	20	68.50	80.35	4.56	0.001

Interpretation: In both the PjBL and TPS groups, there was a significant increase between pretest and posttest scores. In the PjBL group, the t-value was 5.32 and the Sig. (2-tailed) was 0.000, while in the TPS group, the t-value was 4.56 and the Sig. (2-tailed) was 0.001 ($p < 0.05$).

The first hypothesis in this study, namely "The Project-Based Learning model is more effective in improving students' learning outcomes in Social Sciences subjects," is supported. The results of the study show that there is a difference in the effectiveness of the learning models using PjBL and TPS, as evidenced by a significance value of $0.000 < 0.05$, where the PjBL model is more effective in improving students' learning outcomes in Social Sciences subjects.

The study at SMP Negeri 3 Banguntapan involved an experimental class 1 receiving treatment using the Project-Based Learning (PjBL) model, intending to make students active, creative, innovative, and collaborative learners, as well as develop their problem-solving skills. The learning process was conducted in groups, which were selected randomly.

This study is supported by research conducted by Annisa & Yunisrul [24] entitled "The Effect of the Project-Based Learning (PjBL) Model on Integrated Thematic Learning Outcomes of Fourth-Grade Students at SDN Gugus I, Batang Gasan District," which employed an experimental research design with a sample of 25 students. The data collection technique used was a multiple-choice test. The conclusion of the study stated that, based on the t-test results, there was a significant difference in students' learning outcomes between the experimental class that used the Project-Based Learning model and the control class that used conventional learning methods.

The findings of this study support previous research by demonstrating that the use of project-based learning is effective and can improve students' learning outcomes.

The second hypothesis in this study is "The Project-Based Learning model is effective in improving learning outcomes in Social Sciences subjects for students with high learning interest." The results of the study indicate that students with high learning interest benefit more effectively from the Project-Based Learning model, as evidenced by a significance value of 0.00, which is less than 0.05. The test results show that students with high learning interest in experimental class 1, which used the PjBL model, experienced greater improvement in learning outcomes compared to those in experimental class 2, which used the TPS model.

This is consistent with the study conducted by [25], which showed that the PjBL model is effective in improving learning outcomes through the implementation of its learning syntax. Project-based learning can train students to think critically and understand the application of concepts effectively [26]. Students with high learning interest are more likely to explore problems in greater depth, thereby forming experiences and knowledge that can be expressed in various ways. Students with high learning interest are more suited to the PjBL model, which offers them greater challenges and autonomy in learning, whereas students with lower learning interest benefit more from

cooperative approaches such as TPS, where social interaction and peer collaboration become the primary drivers of learning.

The third hypothesis in this study is "The TPS model is effective in improving learning outcomes in Social Sciences subjects for students with low learning interest." The results of the study indicate that for students with low learning interest, hypothesis testing shows that the TPS learning model is more effective than the PjBL learning model. This is evidenced by a significance value of 0.00 < 0.05.

The TPS model is more effective in improving the learning outcomes of students with low learning interest. The TPS model encourages student engagement through the syntax of the learning model. Students with low learning interest were identified based on the median score obtained from the learning interest questionnaire. This is in accordance with the view proposed by Sadipun [27], who stated that this model emphasizes students' active participation with their group peers through discussion and problem-solving. Students share problem-solving ideas with their groupmates. This learning model can create a more enjoyable and active classroom atmosphere, thus serving as a support for the learning process [28]. This condition encourages students to participate more actively in the learning process, which in turn affects the learning outcomes they achieve.

The overall results of the study have confirmed the validity of the proposed hypotheses; however, there are still several research limitations, as outlined below:

1. The implementation of learning using the PjBL model requires a longer time allocation because students are not yet accustomed to analyzing problems and completing them in the form of projects. This is also due to differences in students' skills in completing projects, which adds to the time allocation already specified in the teaching module.
2. Some students tended to be less serious when completing the test during the data collection process and were not yet able to manage their time effectively.

CONCLUSION

Based on the results of the research conducted, it can be concluded that the Project-Based Learning (PjBL) and the Think Pair Share (TPS) cooperative learning models are effective in improving the learning outcomes of seventh-grade students at SMP Negeri 3 Banguntapan. However, the effectiveness of these two learning models is affected by the students' level of learning interest. The PjBL model has been proven to be more effective for students with high learning interest, while the TPS model is more suitable for students with moderate to low learning interest.

Learning interest plays an important role in moderating the improvement of learning outcomes, where students with high learning interest show significant improvement under the PjBL model, while students with low learning interest respond more positively to the TPS model. Therefore, the selection of learning models should be adjusted to the characteristics of students' learning interests to optimize learning outcomes.

The implication of these findings is that teachers need to consider students' interests and motivation when selecting the learning model to be used, as well as create a learning environment that supports students' learning interests. Further research is needed to examine other learning models and expand the scope of the study; thus, the results can be more generalizable.

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