

**THE EFFORTS TO INCREASE STUDENTS' LEARNING OUTCOMES ON HEAT MATERIALS WITH COOPERATIVE LEARNING MODEL TYPE THINK PAIR SHARE (TPS) ASSISTED IN PHYSICS EDUCATION TECHNOLOGY (PhET) MEDIA AT GRADE X SEMESTER II SMA NEGERI BATANG KUIS  
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**ABSTRACT**

This type of research is classroom action research (Classroom Action Research) with the aim of improving student learning outcomes on heat material with a cooperative learning model of Think Pair Share (TPS) type assisted by Physics Education Technology (PhET) learning media to improve student learning outcomes in class X semester II SMK Negeri 1 Dolok Merawan TP 2019/2020. The subjects of this study were all students of class X semester II SMA Negeri 1 Batang Kuis. The object of this research is the application of the Think Pair Share (TPS) cooperative learning model with the help of Physics Education Technology (PhET) media on vibration and wave material in class X SMA Negeri 1 Batang Kuis. The instruments used in this research are learning outcomes tests and student activity observation sheets that have been tested and declared valid. After the data is collected and analyzed, the results of data analysis are obtained: There is an increase in the average grade value from the initial test to the first cycle and from the first cycle to the second cycle by 35.76 to 56.53 and from 56.53 to 83.85. the percentage of completeness from the initial test to the first cycle is 26.92% and from the first cycle to the second cycle is 61.08%. This can be seen from the classical completeness of 0% to 26.92% and from 26.92% to 88%. From the results of the data analysis, it can be concluded that the Think Pair Share (TPS) Cooperative learning model assisted by the Physics Education Technology (PhET) learning media is able to improve learning outcomes in heat material for class X semester II students of SMA Negeri 1 Batang Kuis T.P. 2019/2020.

**Keywords:** *TPS, PhET, and Learning Outcomes.*

**INTRODUCTION**

Education is one of the most important factors to improve human resources (HR), in line with that advances in science and technology require humans to improve the quality of education. In accordance with Law Number 20 of 2003 concerning education, education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, self-control, personality,

intelligence, noble character, and skills that needed by himself, society, nation and state.

According to Giancoli (1999) Physics is the most basic science, because it deals with the behavior and structure of objects. The main goal of physics is to find regularities in human observations of the natural surroundings. Basically physics is an interesting science, because it studies natural phenomena or phenomena and attempts to uncover the secrets and laws of the universe that occur in everyday life.

The current condition of education is not fully in line with the educational objectives described above, where from the results of the Programmer For International Student Assessment (PISA) study, the quality of Indonesian education, especially in the field of science, from year to year is very worrying, because it does not show significant improvement in results. This is evidenced by the results of the PISA survey in the field of Indonesian education science literacy which always shows results below the international average score.

**Table 1. Indonesian Students' Science Literacy Achievement Ranking**

Year	Indonesia Ranking	Score	Number of Study Participating Countries
2000	38	393	41
2003	38	395	40
2006	50	393	57
2009	60	383	65
2012	64	383	65

Sumber: <http://litbang.kemdikbud.go.id/index.php/survei-internasional-pisa>  
[http://repository.upi.edu/13461/4/T\\_IPA\\_1201421\\_Chapter1.pdf](http://repository.upi.edu/13461/4/T_IPA_1201421_Chapter1.pdf)

According to Irham R. (2012:90) in his thesis entitled Identification of Physics Learning Difficulties, he explained that the factors that became a source of student difficulties in learning physics were: 1) The weak factor in the use of learning resources and learning media. 2) Factors not implementing learning that can trigger and

maintain student involvement. 3) Factors in the assessment of learning processes and outcomes. Thus, the internal and external factors of teaching and learning activities must make dynamic innovations for the sake of increasing results and achieving educational goals.

Based on the observations of the researcher as a Physics subject teacher in class X SMA Negeri 1 Batang Kuis, students also have difficulties and bad perceptions of the subject, so that it affects the learning outcomes obtained by students.

One of the learning models that can build students' self-confidence, connect the acquired knowledge with the context of real situations and encourage their participation in class is the Think Pair Share (TPS) cooperative learning model assisted by Physics Education Technology (PhET). According to Trianto (2011:81) Think Pair Share (TPS) type or think in pairs is a type of cooperative learning designed to influence student interaction patterns. The Think Pair Share (TPS) type was first developed by Frang Lyman and his colleagues at the University of Maryland, as quoted by Halawa (2012), stating that Think Pair Share (TPS) is an effective way to create variations in the atmosphere of class discussion patterns. While Physics Education Technology (PhET) is a site that provides simulations of learning physics, chemistry, biology, and mathematics that can be downloaded for free at <http://PhET.colorado.edu>.

**Table 2. Steps for Implementing the Think Pair Share Discussion Model**

Step	Teacher Activities
Step 1 Communicating goals and organizing students	1. give introduction, a. motivation, b. convey the basic purpose of the discussion c. apperception, and 2. Explain the purpose of the discussion

Step 2 Leading the discussion	1. Ask initial questions/problems, and 2. Modeling
Step 3 Holding discussions	1. Guiding/directing students in working on worksheets independently (Think), 2. Guiding / directing students in pairs (pairs), 3. Guiding / directing students in sharing (Share), 4. Implement waiting time, 5. Guiding student activities
Step 4 Ending the Discussion	Close the discussion
Step 5 Conduct a short question and answer about the discussion process	help students make a summary of the discussion with a short question and answer

*Tjokrodiharjo (2013) dalam Trianto (2011:125)*

The formulation of the problem in this study is: How are Student Learning Outcomes on Heat Material with the Think Pair Share (TPS) Cooperative learning model assisted by Physics Education Technology (PhET) learning media to improve student learning outcomes in class X semester II SMA Negeri 1 Batang Kuis T.P. 2019/2020?

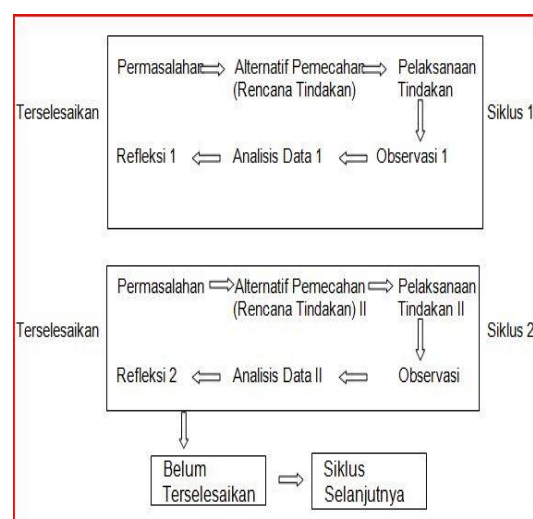
In accordance with the formulation of the problem above, the objectives to be achieved in this research are: To improve Student Learning Outcomes on Heat Material with the Cooperative Learning Model Type Think Pair Share (TPS) assisted by Physics Education Technology (PhET) learning media to improve student learning outcomes class X semester II SMA Negeri 1 Batang kuis TP 2019/2020.

### METHOD

Based on the problem formulation and research objectives that have been set in the previous section, the type of this research is classroom action research (Classroom Action Research). This research was conducted in Class X semester II of SMA Negeri 1 Batang Kuis T.P. 2019/2020. The subjects of this study were all students of

class X semester II of SMK Negeri 1 Batang Kuis. While the object in this study is the application of the Think Pair Share (TPS) cooperative learning model assisted by Physics Education Technology (PhET) media on vibration and wave material in class X SMA Negeri 1 Batang Kuis.

The procedure for implementing classroom action research according to Arikunto (2010:16), can be described as follows:



**Figure 1. Classroom Action Research Procedure**

From the picture above, we can see that this research begins with a problem faced by the teacher when he teaches in a

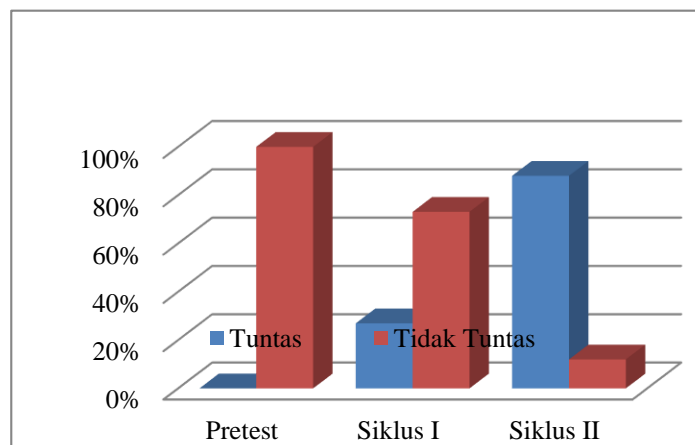
class. So this classroom action research must be carried out by the teacher and the class he teaches. After that, the teacher plans the best problem-solving alternatives according to the conditions of students and schools. After designing a good learning strategy and expected to be suitable for class conditions, the implementation of learning is in accordance with the prepared strategy. During the implementation of learning, all student and teacher activities that have been designed in the lesson plan are observed according to the observation sheet by the observer. After the post test was carried out, the learning evaluation was carried out from the observations. If there are still deficiencies or discrepancies with the expected design, planning is carried out for the next cycle. The cycle is terminated if the learning process consisting of teacher and student activities is good, then the next cycle does not need to be continued. The cycle can continue if there is an improvement in the strategy at each step of the learning model used. To find out the proportion of students who have completed classical learning, it can be seen by using the following formula:

$$PKK = \frac{\text{Banyakn siswa yang } KB \geq 65\%}{\text{Banyakn siswa}} \times 100\%$$

## RESULT AND DISCUSSION

### RESULT

The post test results for cycles I and II increased according to the following figure



**Figure 2.**  
**Percentage of complete learning outcomes**

The diagrams above show that there is an increase in the average value of the class from the initial test to the first cycle and from the first cycle to the second cycle by 35.76 to 56.53 and from 56.53 to 83.85. Increased individual mastery from the initial test to the first cycle as many as 7 people and from the first cycle to the second cycle as many as 17 people. This can be seen from there are no students who complete to 7 people and from 7 people to 24 people. Classical completeness from the initial test to the first cycle was 26.92% and from the first cycle to the second cycle was 61.08%. This can be seen from the classical completeness of 0% to 26.92% and from 26.92% to 88%.

From the results of data analysis, it can be concluded that the Think Pair Share (TPS) Cooperative learning model with the help of Physics Education Technology (PhET) learning media is able to improve learning outcomes in heat material for class X semester II students of SMA Negeri 1 Batang Kuis T.P. 2019/2020.

### Discussion

At the initial meeting, a pretest with 20 questions was given to 26 students of class X SMA Negeri 1 Batang Kuis to

determine the students' initial abilities before being given action in learning. From the results of this pretest, the teacher learns the weak points and understands the steps that must be focused so that after learning student learning outcomes can increase to what is expected. The learning steps arranged in the lesson plan are the Think Pair Share (TPS) cooperative learning model assisted by the Physics Education Technology (PhET) learning media.

The failure to achieve the percentage of classical learning completeness is set in this study at 80%. When this level of mastery learning has not been reached and by analyzing the observation sheet about the implementation of the learning model, the classroom action research must be continued to the next cycle with improvements and refinements of actions in the learning model. This classroom action research will stop if the learning steps of the Think Pair Share (TPS) Cooperative learning model assisted by Physics Education Technology (PhET) learning media have gone well and the classical learning completeness level is 80%. The results of observations in the first cycle have a successful implementation of the model by 60%. Therefore, reflection is carried out for improvement in the next cycle. Some of the steps that were improved were the lack of seriousness of students in group discussions and the lack of teacher assistance in supervising group discussions. Besides that, there is additional time in the group discussion step as well as giving rewards for the group that has the best score. After the second cycle that adopted the reflection results, the results of the second cycle of observations scored a value of 85. Thus, the implementation of the Think Pair Share (TPS) Cooperative learning model assisted by the Physics

Education Technology (PhET) learning media has been achieved as desired so there is no need to proceed to the next cycle.

## CONCLUSION

Based on the results and discussion of the research as described, the authors make several conclusions as follows:

1. There was an increase in grades from the initial test to the first cycle and from the first cycle to the second cycle by 35.76 to 56.53 and from 56.53 to 83.85.
2. There is an increase in individual completeness from the initial test to the first cycle as many as 7 people and from the first cycle to the second cycle as many as 17 people. This can be seen from there are no students who complete to 7 people and from 7 people to 24 people.
3. There is an increase in classical completeness from the initial test to the first cycle of 26.92% and from the first cycle to the second cycle of 61.08%. This can be seen from the classical completeness of 0% to 26.92% and from 26.92% to 88%.
4. From the results of data analysis, it can be said that the Think Pair Share (TPS) Cooperative learning model assisted by the Physics Education Technology (PhET) learning media is able to improve learning outcomes in heat material for class X semester II students of SMA Negeri 1 Batang Kuis T.P. 2019/2020.

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