



## Efforts to Improve Student Activities and Outcomes in Physics Learning Using the Two Stay Two Stray Technical Cooperative Learning Model at Senior High School

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### ABSTRAK

**Purpose of the study:** The research aims to increase students' activity and learning outcomes in Class X in Senior high school 10 Kota Jambi.

**Methodology:** The research method used is a mixed method. This research is a Classroom Action Research which is carried out in three cycles. Retrieval of qualitative data using student activity observation sheets and teacher activity during the teaching and learning process takes place. Retrieval of quantitative data in the form of objective tests held at the end of each learning cycle.

**Main findings:** From the results of the study, it showed that there was an increase in learning outcomes for each cycle, namely, 59.53 for cycle I to 69.38 for cycle II and 75.48 for cycle III. While increasing the average percentage of student activity. In cycle I was 47.24%, the average percentage of student activity increased to 60.17% in cycle II, and experienced another increase in cycle III to 70.87%.

**Novelty/Originality of this study:** That research using the two stay two stray learning model to improve learning outcomes is very little done in high schools, mostly the application of the two stay two stray model is applied in elementary schools

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## 1. INTRODUCTION

Learning is a development in human life, through the learning process humans will experience changes in their lives so that behavior develops through interaction with other people and their environment [1],[2]. Factors that influence students in learning come from within and outside students. Factors from within which are referred to as internal factors which contain the attitudes of students towards learning. While external factors also affect the learning activities that are around the students themselves [3]. So these two factors are interrelated in influencing the learning process.

The learning process carried out in the classroom is an activity of transforming knowledge, attitudes, and skills [4]. Learning is carried out more student-centered, so that students participate in the learning process, can develop ways of independent learning, and play a role in planning, implementing, assessing the learning process itself, so here student experience is prioritized in deciding the starting point for activities [5],[6]. Learning activities must involve all psychological aspects of students both physically and spiritually, so that accelerated changes in behavior can occur quickly, precisely, cheaply and correctly, both related to cognitive,

affective and psychomotor aspects. Psychological aspects of students that involve the body and spirit must be in balance so that the results obtained are as expected [7].

Based on observations and information from the physics subject teacher and several students at Senior high school 10 Kota Jambi, there are several factors that cause low physics learning outcomes, some of which can come from students themselves or from outside students. Factors from within students regarding students' perceptions of difficult physics lessons. This causes students' interest in learning physics to be low. Factors from outside the student's self that hinder the learning process are the learning process activities that are still teacher-centered. The teacher explains the learning material directly and the teacher also often gives individual assignments so that students are lazy to do the task and students are only waiting for answers from other students who have done it. According to Kim, (2020) "every student will be able to master a lesson if given sufficient time or opportunity to study it"[8]. One of the efforts used by a teacher or teacher is to develop teaching and learning activities to be even better. One of them is using an interesting learning model that can generate student activity and student learning outcomes, so that the learning process is more alive. One learning model that can involve all students is the cooperative learning model.

Cooperative learning or cooperative learning is a learning model that is currently widely used to realize student-centered teaching and learning activities, especially to overcome the problems raised by teachers in activating students, who cannot work with other people, students who are active and do not care to others [9]. The two stay two stray teaching and learning technique is a learning technique that can provide students with sharing, receiving information, responding to opinions as well as being able to interact with other students so that students are expected to be more active and able to think creatively in sharing or receiving information [10].

Cooperative learning technique *two stay two stray*. The *Two Stay Two Stray* technique is a technique that provides opportunities for groups to share results and information with other groups [11]. With the activity of sharing opinions between groups, students can get used to respecting the opinions of others and learn to express opinions to others. Based on the background of the problem, the research question in this study is "Can cooperative learning using the *Two Stay Two Stray technique* increase the activity and learning outcomes of students in class X at Senior high school 10 Kota Jambi?"

## 2. RESEARCH METHOD

The research method used is a mixed method. Mixed method is a study that combines qualitative research with quantitative research [12]. In accordance with the problems previously stated, the type of research to be carried out is *Classroom Action Research*. This class action research was carried out in class X Semester I Senior high school 10 Kota Jambi. The subjects of this study were students of class X at Senior high school 10 Kota Jambi with a total of 26 students, consisting of 13 female students and 13 male students.

Research was conducted in three cycles consisting of cycles I, cycle II, and cycle III. Each cycle has certain stages according to the stages in class action proposed, namely (1) planning, (2) implementation, (3) observation, and (4) reflection. Retrieval of qualitative data using student activity observation sheets and teacher activity observation sheets during the teaching and learning process takes place. Quantitative data collection is done by using a set of test equipment (formative tests) in the form of objective tests held at the end of each learning cycle.

Test validity is a degree that indicates the validity of a test instrument. According to Arikunto (2013) a test is said to have content validity if it measures certain specific objectives that are parallel to the material or content of the lesson given [13]. Therefore, the material taught is listed in the curriculum. The difficulty level of the test is called good if it has a balanced level of difficulty. Good questions are items that are neither too easy nor too difficult. The difficulty level of the questions can be determined using the formula proposed, namely [14]:

$$P = \frac{B}{Js}$$

The discriminating power of a question is the ability of a question to distinguish between students with high abilities and students with low abilities, which can be determined by the following formula:

$$DB = \frac{BA}{JA} - \frac{BB}{JB}$$

Qualitative data collection was carried out using observation sheets of student activities and observation sheets of teacher activities during teaching and learning activities. Data about student learning outcomes are taken through tests (formative tests) held at the end of each learning cycle. Quantitative data used to observe the assessment of student learning outcomes in each cycle. The formula used is the following equation :

$$S = \sum \left( R - \frac{W}{n-1} \right) x Wt$$

The class average value is calculated using the equation proposed, as follows:

$$\bar{x} = \frac{\sum Na}{N}$$

To calculate the percentage of the success rate of learning, the equation proposed is used as follows:

$$Score = \frac{raw\ score}{maximum\ score} \times 100\ %$$

Qualitative data collection was carried out using observation sheets of teacher activity during teaching and learning activities. Qualitative analysis for observational data regarding student learning activeness is calculated by the formula:

$$A = \frac{Na}{N} \times 100\ %$$

#### Performance Indicator

The action given is said to be successful, if the criteria are as follows, calculation of the average formative test in each cycle there is a significant development. The ideal learning completeness for each indicator is 0-80%, with a minimum ideal criterion limit of 75% with a minimum score of 75 (which is the minimum learning completeness score set by the school). The percentage of student activity has been in the active and very active category.

### 3. RESULTS AND DISCUSSION

#### 3.1. Results

Student learning outcomes obtained from the application of the *cooperative learning* model of the *two stay two stray* technique can be seen as follows:

Table 1. Improving Student Learning Outcomes

No	Observed variable	Amount or Percentage (%)		
		Cycle I	Cycle II	Cycle III
1	Student grade point average	59, 53	69, 38	75, 48
2	Number of students who achieve Minimum Completeness Criteria	11 (42.31 %)	16 (61.54 %)	21 (80.77 %)

The learning outcomes obtained by students on aspects of deep knowledge implementation of cycle 1 action is still low. Of the 26 students who followed test results of 11 successful students or 42.31% of the total number of students which was found to be above the Minimum Completeness Criteria (KKM), namely > 75. While students who have not reached the Minimum Completeness Criteria are 15 students. Score the average student is still low, namely 59.53, this shows that the implementation the learning process in cycle I still has many shortcomings and needs be improved in the next cycle, namely by implementing action in cycle II.

Learning outcomes in cycle II have increased. This can known from the average value obtained increased from 59.53 in cycle I to 69.38 in cycle II, with 16 students or 61.54% getting grades > 75. While students who have not reached the Minimum Completeness Criteria are 10 students. Because the actions given in cycle II have not reached the proportion of work indicators determined, namely 75% of the total number of students then the action is continued in cycle III.

Implementation of the action cycle III has increased. This can it is known from the results of student learning in cycle III which was attended by 26 students, the average value obtained increased from 59.53 in cycle I to 69.38 in cycle II and increased again to 75.48 in cycle III. Students who score  $\geq 75$  as many as 21 people. This means the success of students in achieving learning 80.77%. This success rate indicates that the action taken can be carried out said to be successful.

Student learning activity has also increased. The description of the average increase in student activity in each cycle is as follows :

Table 2. The average increase in student activity in the implementation of learning

Observed variable	Percentage (%)		
	Cycle I	Cycle II	Cycle III
Average student learning activity	47,24	60,17	70,87

### 3.2. Discussion

This research was carried out for 12 hours of lessons for 3 cycles, while the implementation of learning using the *cooperative learning* model of the *two stay two stray* technique can increase the activity and results of students' physics learning assessed from the aspect of knowledge and student activities and processes learning activities. The observation process was carried out in each cycle and after the cycle with the number of students 26 students. In order to make the observations more objective, the researcher cooperates with the subject teachers and other observers.

Research is said to be successful if the average percentage of activity and learning outcomes is 26 students if there is an increase in the number or percentage of students who achieve success in learning (score 75) or 75% of the percentage of students who succeed in learning. The percentage of student learning activities has been in the active or very active category. These results can be seen from the average value of the percentage increase in student activity each cycle. In cycle I the average percentage of student activity was 47.24%, the average percentage of student activity increased to 60.17% in cycle II, and experienced another increase in cycle III to 70.87%. Increasing student activity in the learning process is also accompanied by an increase in learning outcomes obtained by students at the end of each learning cycle. The average value of learning outcomes in cycle I was 59.53 with the number of students who succeeded as many as 11 person (42.31 %), in cycle II the average value of learning outcomes increased to 69,38 with the number of successful students as much as 16 people (61.54 %), then in cycle III the average value of learning outcomes increases again to 75.48 with the number of successful students as many as 21 people (80.77 %). Based on the results of the classroom action research, it can be concluded that the implementation of learning using the *cooperative learning* model of the *two stay two stray* technique can increase activity and learning outcomes student physics on the material of straight motion and Newton's Laws and their Application in Senior high school 10 Kota Jambi. The improvement that occurs in each cycle is inseparable from the implementation of several improvements in the actions given to students so that the learning process runs better and continues to improve.

This is in accordance with research conducted by Suryani (2014) "Peningkatan Prestasi Siswa pada Konsep Fluida Statis dengan Model Pembelajaran Kooperatif Teknik Two Stay-Two Stray (TSTS) Bervariasi Demonstrasi di Kelas XI IPA SMA Negeri 5 Yogyakarta TA 2012/2013", that there is an increase in student achievement on the concept of static fluid with using cooperative learning model two stay two stray technique [15]. In addition, this research is also in line with previous research conducted by Purba (2017) where the results showed that there was an effect of applying the Two Stay-Two Stray cooperative learning model on the subject of colloids to learning outcomes and learning activities of class XI Semester 2 SMA Negeri 2 Sidikalang [6].

The novelty of this research is that research using the two stay two stray learning model to improve learning outcomes is very little done in high schools, mostly the application of the two stay two stray model is applied in elementary schools. This is the latest in this research. The limitations of this study only look at the learning outcomes of one school without comparing it with other schools. However, gender comparison testing has not been carried out between female and male students so that the learning outcomes of students can be identified specifically using the Two Stay Two Stray Technical Cooperative Learning Model. Researchers suggest conducting further research to compare learning outcomes using the Two Stay Two Stray Technical Cooperative Learning model based on gender and the researcher suggests conducting research at the senior high school level.

The implications of this research can be used as a guide in choosing a learning model in the classroom because the learning model is a whole series of presentation of teaching materials which cover all aspects before and after teacher learning and all related facilities that are used directly or indirectly in the teaching and learning process. Learning motivation means encouragement from students to achieve learning goals, for example understanding material or developing learning [17],[18]. Students who are motivated to learn will do so on their own initiative and without outside pressure [19],[20]. Therefore, it is very important to test the model of learning and motivation in future research.

### 4. CONCLUSION

Based on the results of classroom action research that has been carried out, it can be concluded that the implementation of learning by applying the cooperative learning model of the *Two Stay Two Stray technique* can increase activity and learning outcomes student physics on the material of straight motion and particle dynamics on a flat plane at Senior high school 10 Kota Jambi. This can be seen from the average percentage increase in

student activity in each cycle. In cycle I the average percentage of student activity was 47.24%, the average percentage of student activity increased to 60.17% in cycle II, and experienced another increase in cycle III to 70.87%. Increasing student activity in the learning process is also accompanied by an increase in learning outcomes obtained by students at the end of each learning cycle. The average value of learning outcomes in cycle I was 59.53 with the number of successful students being 11 people (42.31%) . In cycle II the average value of learning outcomes experienced an increase to 69.38 with the number of successful students as much as 16 people (61,54 %) , then in cycle III the average value of learning outcomes increased again to 75,48 with the number of students who succeeded as many as 21 people (80,77 %). As for suggestions for further research that is Before learning physics with the *Cooperative Learning learning model of the Two Stay Two Stray* technique begins, attention should be paid to allocating time for each activity so that all activities in teaching and learning activities can be carried out properly. In the learning process the teacher should be more assertive in instructing students to visit other groups or return to their original groups so that the syntax of the *two stay two stray technique* can be carried out properly.

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