

***THE STUDENT TEAMS ACHIEVEMENT DIVISION (STAD) COOPERATIVE
LEARNING MODEL USED BY STUDENT ACTIVITY SHEETS (LKPD) ON
PHYSICS LEARNING OUTCOMES IN THE MATERIAL OF DYNAMIC
ELECTRICITY***

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ABSTRACT

Entering the era of Society 5.0, learning is expected to be student-centered, as this can maximize learning outcomes. To achieve optimal learning outcomes, teachers must implement various learning models that can motivate students to learn. This study aims to determine the effect of the Cooperative Learning Model Type *Student Teams Achievement Division* (STAD) Assisted by Student Activity Sheets on Physics Learning Outcomes on the Main Material of Dynamic Electricity for Class IX of SMP N 1 Adiankoting Academic Year 2023/2024 . This type of research is *quasi-experimental* . The population of this research is all students. Class IX of SMP N 1 Adiankoting consists of 5 classes with a total of 160 students . Sampling was done by *cluster random sampling* , and the sample in this study was students of class IX - 1 as an experimental class, which was taught using the STAD model assisted by LKPD and students of class IX- 1 as an experimental class. I X – 2 as a control class taught with a direct learning model. The results of the study showed that $t_{count} > t_{table}$ ($3.65 > 1.67$) then this result indicates that there is a significant influence of the *Student Teams Achievement Division* (STAD) learning model assisted by Student Activity Sheets (LKPD) on Physics Learning Outcomes on the Main Material of Dynamic Electricity of class IX SMP N 1 Adiankoting 2023/2024 academic year.

Keywords: *STAD, LKPD, Learning Outcomes*

1. INTRODUCTION

The aim of education according to Law Number 20 of 2003 concerning the National Education System is to develop the potential of students to become human beings who believe in and fear God Almighty, have noble morals, are knowledgeable, capable, creative, independent, and become democratic and responsible citizens.

Education in general is inseparable from the learning process, both in formal and non-formal educational institutions. Slameto (2013: 61) said that: "The family is the first and foremost educational

institution." The way parents educate their children will influence their learning outcomes. According to Slameto (2013: 2) learning is a process of effort undertaken by a person to obtain a new change in behavior as a whole, as a result of his own experiences in interacting with his environment.

Today, education in Indonesia has deviated from the goals of the founding fathers of the Indonesian nation. Slameto (2013: 61) said that, "Parents pay less attention to their children's education, and parents educate their children by spoiling them." Parents who are too sorry for their children do not have the heart to force their children to study, even allowing their

children to not study because of reluctance, because if this is allowed to continue, the children will become naughty, do whatever they want and their learning outcomes will be unsatisfactory or even fail in their studies. The nature of such children does not match the criteria for educational goals, namely having noble character, being healthy, knowledgeable, capable, creative, independent, and becoming democratic and responsible citizens.

Faturrahman et al (2012: 183) said that: The quality of education in Indonesia is currently very concerning, as evidenced by the declining human resource index. Indonesia ranks 12th out of 12 Southeast Asian countries, posing a significant threat to its competitiveness.

The role of a teacher encompasses several aspects, including acting as a teacher, class leader, mentor, learning environment organizer, learning planner, supervisor, motivator, and evaluator. Teachers are a very dominant determining factor in education in general, as they play a crucial role in the learning process, which is the core of the overall educational process.

The reality of learning in formal education (schools) today is that students' absorption is low. This is evident in the average student learning outcomes, which remain consistently concerning. Based on the results of interviews with the Physics teacher of SMP N 1 Adiankoting Tarutung, Mr. H. Tambunan, S.Pd, it shows that the results of learning Physics for class IX₁ of 32 students in the 2022/2023 academic year with the highest score of 81 and the lowest score of 43, while the average score is 64 where the minimum completion criteria is 68 so that there are still many students who have not reached the specified KKM.

The low learning outcomes of students, especially in Physics, are caused by the low absorption capacity and initial abilities of students when attending lessons and the learning models used by teachers are less varied, resulting in a lack of student

interest in learning physics and teacher-centered learning. However, teachers prefer to apply this model, because it does not require tools and practical materials, it is sufficient to explain the concepts in textbooks or other references. This problem is often encountered in teaching and learning activities in the classroom, therefore it is necessary to apply strategies or learning models that can help students understand the teaching material and its application and relevance in everyday life.

The Independent Curriculum, a revision of the 2013 Curriculum, requires that learning not only encompass concepts, theories, and facts but also their application in everyday life. Therefore, learning materials are not simply composed of simple concepts for memorization and understanding, but also comprise complex material that requires analysis, application, and synthesis. Therefore, teachers must be wise in selecting an appropriate model that can create the situations and conditions for the teaching and learning process to proceed according to the desired goals.

Of the many learning models that have developed, researchers propose *the Student Team Achievement Divisions* (STAD) type of cooperative learning model as an alternative to increase students' interest and motivation in learning so that their learning outcomes also improve.

The researcher considers that the cooperative learning model of *the Student Team Achievement Divisions* (STAD) type assisted by Student Activity Sheets (LKPD) is suitable to be applied to physics subjects because it greatly improves conceptual improvement. Considering that physics is a subject full of concepts and often experiences misconceptions. The researcher sees that the lack of conceptual understanding is one of the strong causes why students are afraid, even hate physics subjects, so considering these things, the researcher hereby submits a thesis title: *The Effect of the Cooperative Learning Model of the Student Teams Achievement Division*

(STAD) Type assisted by Student Activity Sheets (LKPD) on Physics Learning Outcomes on the Subject of Dynamic Electricity for Grade IX Students of SMP N 1 Adiankoting Academic Year 2023/2024.

2. LITERATURE REVIEW

A. Theoretical Study

1. The Nature of Learning and Learning Outcomes

In the entire educational process at school, learning is the most fundamental activity. This means that the success or failure of achieving educational goals depends largely on the learning process experienced by students.

The Big Indonesian Dictionary (Rasyidin, 2011: 6) states that, "Learning is a change in behavior due to experience." In line with the above understanding, R. Gagne (in Slameto, 2013: 13) states that "learning is a process to obtain motivation in knowledge, skills, habits, and behavior."

Slameto (2013: 2) states that: "Learning is a process of effort carried out by a person to obtain a new change in behavior as a whole, as a result of his own experience in interacting with his environment."

Researchers conclude that learning is a change in a person's behavior through experience, skills, and habits in creating relationships between existing knowledge and new knowledge.

In essence, the learning process is the main determinant of educational success. Trianto (2009: 17) said that, "Learning is a conscious effort by a teacher to teach his students (directing student interaction with other learning resources) in order to achieve the expected goals." Meanwhile, Daryanto (2012: 212) argues that, "Learning is a set of actions designed to support the student's learning process."

Bruce Well (Jufri, 2013: 41) there are three important principles in the learning process as follows:

- a. The learning process creates an environment that can change the cognitive structure of students.
- b. The learning process is related to the types of knowledge that must be learned, including physical, social and logical knowledge.
- c. In implementing learning, teachers must involve the role of the social environment.

This competency is essential experience required for all types of jobs, as it will help someone participate actively and effectively in work organizations in the business and industrial worlds.

b. Student-Focused Learning

It is an interaction between students and teachers, where the activities are focused on the students. Thus, students are positioned as subjects who must manage learning activities to achieve certain competencies, while the teacher shifts to a facilitator role.

Researchers concluded that the principles of learning are that learning requires experience, good interaction between teachers and students, forming students' cognitive, physical and social knowledge, and learning involves the role of the social environment.

Gagne (Jufri, 2013: 58) says that, "Learning outcomes are abilities that can be observed in a person and are called capabilities." Bloom (Jufri, 2013: 59) groups learning outcomes into three domains, namely: cognitive, affective, psychomotor. The cognitive domain of learning outcomes includes mastery of concepts, ideas, knowledge, and intellectual skills.

Learning outcomes relate to attitudes. Affective learning outcomes are evident in students' various behaviors, such as their attention to lessons, discipline, and social interactions. Psychomotor learning outcomes, on the other hand, relate to learning outcomes expressed in manual task completion skills and physical movements or the ability to act.

a change in both behavior and environment.

B. STAD Model

the Student Team Achievement Division (STAD) cooperative learning model is a type of cooperative learning that emphasizes the activity and interaction between students to motivate and help each other in mastering the subject matter in order to achieve maximum achievement. In its implementation, students are divided into several groups consisting of 4-5 people who are heterogeneous and work together in discussing the subject matter.

Stages STAD consists of six, namely as shown in table 1

Table 1 STAD Stages

No	Stages	Explanation
1.	Conveying goals and motivating students	Convey all the learning objectives that you want to achieve in the learning and motivate students to learn.
2.	Presenting information	Presenting information to students by means of demonstrations or through reading materials.
3.	Organizing students into study groups	Explain to students how to form study groups and help each group make the transition efficiently.
4.	Guiding group work and learning	The ability to search for and organize data, present data in the form of diagrams, images and tables to facilitate understanding.
5.	Evaluation	Evaluate learning outcomes regarding material that has been studied by the group or each group presents the results of their work.

6.	Giving awards	Rewarding individuals or groups who achieve good results, for example by giving prizes.
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Source : (Jauhari, 2011: 54)

C. DI Model

Arends (Trianto, 2009: 41) states that, "The direct teaching model is a teaching approach that is specifically designed to support students' learning processes related to declarative knowledge and well-structured procedural knowledge that can be taught with a gradual, step-by-step activity pattern."

According to Kardi & Nur (Trianto, 2019:43) the DI model syntax consists of five stages, as shown in the following table 2:

Table 2 DI Syntax Table

Phase	The Role of Teachers
Phase 1 Conveying objectives and preparing students	The teacher explains the TPK, background information on the lesson, the importance of the lesson, prepares students to learn.
Phase 2 Demonstrate knowledge and skills	The teacher demonstrates the skill correctly, or presents information step by step.
Phase 3 Guiding training	Teachers plan and provide initial training guidance.
Phase 4 Checking understanding and providing feedback	Check whether students have successfully completed the task, provide feedback.

Phase 5 Provides opportunities for advanced training of implementation	Teachers prepare opportunities for further training, with specific training on application to more complex situations in everyday life.
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Source : Kardi & Nur, (Trianto, 2019:43)

D. Student Activity Sheet (LKPD)

Trianto (2009: 222) states that, "a student activity sheet is a guide for students to conduct investigations or problem-solving activities." A student activity sheet can be a guide for cognitive development exercises or a guide for developing all aspects of learning in the form of an experimental or demonstration guide.

The Student Activity Sheet (LKPD) contains a set of fundamental activities that students must complete to maximize understanding and develop basic skills in accordance with the learning outcome indicators. LKPD components include: the experiment title, a brief theory about the material, tools and materials, experimental procedures, observation data, and questions and conclusions for discussion.

3. RESEARCH METHODS

This research was conducted at SMP N 1 Adiankoting Tarutung for the academic year 2023/2024 in July – August 2023. The research population was all grade IX students consisting of 5 parallel classes with a total of 32 students per class . The sampling technique in this study was *total sampling*), The sample in this study consisted of two classes, namely class IX-1 for the experimental class taught using the STAD model assisted by LKPD and class IX-2 as the control class taught using the DI learning model.

The observation procedures are divided into

various stages including: 1) Preparation Stage is: a) Observation to school, b) Preliminary study, c) Preparing instruments, d) Trial of research instruments (Validity, Reliability, Differentiation power and Level of difficulty). 2) Implementation Stage is: a) Determining the sample group, b) Conducting a pretest for the sample group, c) Analyzing the pretest learning outcomes (Average, Standard Deviation, and Normality Test and Homogeneity Test), d) Testing the initial hypothesis (pretest average equality test), e) Providing learning recognition 1. Experimental class with STAD model assisted by LKPD 2. Control class with direct learning, f) Providing a posttest for the learning model group, g) Analyzing the posttest learning outcomes (Average, Standard Deviation, Normality and Homogeneity), h) Conducting the final hypothesis testing. The research design used is:

Table 3. Two Group Pretest-Posttest Design

Class	Pretest	Treatment	Posttest
Experiment	T ₁	X ₁	T ₂
Control	T ₁	X ₂	T ₂

Source: (Arikunto, 2013:85)

Information :

T₁ = Initial Test Administration (Pretest)

T₂ = Final Test (Posttest) Administration

X₁ = Learning using the STAD model assisted by LKPD

X₂ = Learning using the DI model

To determine the effect of learning ability between students in the experimental and control classes, a one-tailed t-test was used. The following formula for calculating the post-test mean equality test is:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{S \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

where S is the combined variance calculated using the formula:

$$S^2 = \frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2}$$

The testing criteria are:

Accept H_0 , if $t_{count} \leq t_{1-\alpha}$ with $t_{1-\alpha}$ obtained from the *t distribution list* with probability $(1 - \alpha)$ where $\alpha = 0.05$ and $dk = n_1 + n_2 - 2$ for calculated $t > t_{1-\alpha}$, then the hypothesis H_a is accepted and H_0 is rejected.

4. RESEARCH RESULTS AND DISCUSSION

The results obtained in this study are data on students' physics learning outcomes on dynamic electricity material in class IX of the 2023/2024 academic year, totaling 32 students per class. The type of this research is a *quasi-experimental study* involving two classes and given different treatments, namely class IX-1 as the experimental class taught using the STAD learning model assisted by LKPD and class IX-2 as the control class taught using the direct learning model.

Table 4. Pretest Score Data for Experimental Class and Control Class

Experimental Class			Control Class		
Pretest Score	Fi	X	Pretest Score	Fi	X
20	3	36.25	20	3	35.78
25	3		25	3	
30	4		30	6	
35	8		35	7	
40	6		40	4	
45	3		45	5	
50	5		50	4	
Amount	32		Amount	32	

From the table it can be seen that for the experimental class the average value obtained was 36.25 while for the control class the average value obtained was 35.78 so it can be concluded that the average value of the experiment was higher than that of the control class.

Then different treatments were given and after the learning process, a post-test

was conducted. The following are the post-test learning outcomes for the experimental and control classes.

Table 5. Post-test Score Data for Experimental Class and Control Class

Experimental Class			Control Class		
Posttest Score	Fi	X	Posttest Score	Fi	X
55	1	76.56	55	4	66.25
60	1		60	6	
65	3		65	8	
70	5		70	7	
75	4		75	6	
80	11		80	1	
90	4				
95	3				
Amount	32		Amount	32	

The table above shows that the experimental class had an average score of 76.56, while the control class had an average score of 66.25. This concludes that the experimental class had a higher average score than the control class. A summary of the pretest and posttest data normality tests can be seen in Table 5.

Table 6. Calculation of Normality Test for Pretest and Posttest Data

Data	Group	L_{count}	L_{table}	Conclusion
Pretest	Experiment	0.112	0.140	Normal
	Control	0.129	0.140	Normal
Posttest	Experiment	0.108	0.140	Normal
	Control	0.135	0.140	Normal

In the table above, it can be seen that $L_{count} < L_{table}$. This result indicates that the normality test for pretest and posttest data is normally distributed. The normal rule must be implemented if $L_{count} < L_{table}$ at a significance level α of 0.05.

Table 7. Homogeneity Test of Pretest and Posttest Data

Data	Group	Variance	F _{count}	F _{table}	Conclusion
Pre test	Experimental Class	91,473	1,154	1,723	Homogeneous
	Control Class	80,453			
Pos ts	Experimental Class	81,729	1,652		
	Control Class	64,416			

The table above shows that the results of the examination are homogeneous, thus meeting the requirements for testing exploration speculation. The test model shows that $F_{count} < F_{table}$, where F_{table} is obtained from the F allocation list with $\alpha = 0.05$.

Hypothesis Testing

The following are the results of the research hypothesis test.

Table 8. Results of Hypothesis Test Calculations

Data	Group	t _{count}	t _{table}	Conclusion
Pre test	Experimental Class	0.121	2.04	Initial abilities are the same
	Control Class			
Pos ts	Experimental Class	3.65	1.67	There is a significant influence of the model STAD assisted by LKPD

From the table above, it can be concluded that there is a significant influence of *the Student Teams Achievement Division* (STAD) model assisted by LKPD on physics learning outcomes in the subject matter of dynamic electricity for class IX of SMP N 1 Adiankoting in the 2023/2024 academic year.

5. CONCLUSION AND SUGGESTIONS

The conclusions obtained from this research include:

1. The learning outcomes of students taught using *the Student Teams Achievement Division* (STAD) model assisted by LKPD on the main material of dynamic electricity in class IX of SMP N 1 Adiankoting TP 2023/2024 with an average score of 76.56.
2. Learning outcomes of students taught using *the Direct Instruction* (DI) learning model on the subject of dynamic electricity in class IX of SMP N 1 Adiankoting TP 2023/2024 with an average score of 66.25.
3. Based on the t-test obtained $t_{count} > t_{table}$, where $3.65 > 1.67$. At the significance level of $\alpha = 0.05$, from the results obtained it can be stated that there is a significant influence of the *Student Teams Achievement Division* (STAD) cooperative model assisted by LKPD on the main material of dynamic electricity in class IX of SMP N 1 Adiankoting TP 2023/2024.

Based on the research results and conclusions above, as a follow-up to this research, the following things are recommended:

1. Educators, especially physics teachers, are expected to be able to utilize interesting learning models and media so that learning is more meaningful.
2. The use of *the Student Teams Achievement Division* (STAD) cooperative model assisted by LKPD can be utilized as one of the options in physics learning to further improve

- learning outcomes and increase students' psychomotor skills.
3. To Researchers who want a cooperative model of the *Student Teams Achievement Division* (STAD) model assisted by LKPD are expected to direct research on better materials, tools and materials so that the process of achieving student literacy increases .

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