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# Implementation of STAD Cooperative Learning to Improve Students' Learning Outcomes

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**Abstract** The purpose of this study is to describe the improvement of student learning outcomes through the implementation of STAD cooperative learning. This research is a class action research that refers to Kemmis and McTaggart's design which consists of four components: planning, action, observation, and reflection. This research was conducted in two cycles. Data collection techniques have used observation sheets and learning outcomes tests. Participants in this study were 37 students of Physics Education of Riau University. The data obtained were analyzed descriptively. The findings have shown an increase in learning outcomes from cycle I (58,0951) to cycle II (63,170). STAD cooperative learning is effective for improving student learning outcomes not only at the level of knowledge but also at the level of understanding and application.

Keywords: STAD Cooperative, Learning outcomes

## 1. Introduction

Mathematics is a tool in studying various Physics lectures. This form of mathematical expression is used to describe the phenomenon of physics (Adúriz-Bravo, 2012). Mathematics for Physics courses requires a lot of mathematical analysis so that students who have low motivation will find it difficult to follow this lecture. In the lecture process students tend to be passive and when asked are unable to answer, causing low learning outcomes. The slowness of learning outcomes is also caused by inappropriate choice of approach or method so that students become passive (Hossain., Tarmizi., & Job., 2012). According to Kutbiddinova (2014), there are some problems added to the learning process. Some students lack the ability to understand independent concepts and traditional teaching methods so learning becomes boring.

Cooperative learning is a learner who can attract the attention, interest and participation of students and foster high social interaction is cooperative learning (Leonard, 2013, Pallennari, 2016). In cooperative learning, the teacher organizes students into small groups, who then work together to help each other understand concepts. Cooperative learning consists of five basic elements: positive interdependence, promotive interaction, individual accountability, teaching of interpersonal and social skills and the quality of group processing. (Slavin, 2011, p.344).

One type of cooperative learning that can increase a more positive attitude, actively participate and improve achievement is the Student Team Achievement Division (STAD) (Slavin, 2011). STAD steps: (1) form groups of four or five students, (2) identify goals and focus on expected results, (3) explain the process, and present new information to students, (4) give students time sufficient to understand the material, (5) provide worksheets to students so students can help each other learn the material through quizzes and group discussions, (6) test student understanding at both the student and group level. through quizzes to see expected results, (7) quiz scores and give each individual student in each group an improvement score, and (8) add individual improvement scores to give a group score.

Based on the background of the problems above, this study aims to improve student learning outcomes in the Mathematics for Physics course through the application of the STAD type cooperative learning model.

## 2. Methodology

This research is classroom action research. This research consists of two cycles. The design refers to the model of Kemmis and McTaggart's research procedures through four stages (Barron & Hammond., 2015), namely planning, implementation, observation and reflection in each cycle.

The implementation of this research consisted of several stages, namely:

### (1) Planning:

-Compose learning devices: (1)Make SAP (unit lecture program) in accordance with STAD cooperative, (2) Creating Student Worksheets, (3) Making an evaluation tool, (4) Make an observation sheet

- Forming study groups that meet the STAD cooperative learning requirements

### (2) Implementation

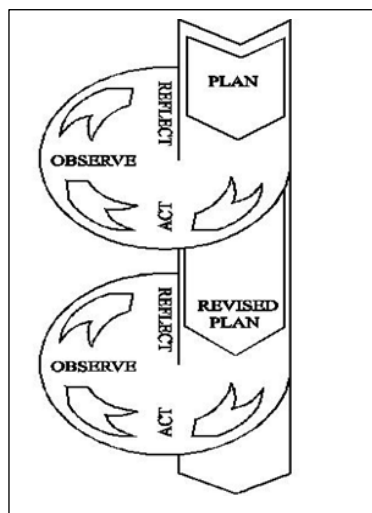
The activities carried out at this stage are implementing planned learning scenarios. The research was carried out in two cycles.

### (3) Observation

Observation activities are carried out in conjunction with implementing actions. Observations were made by three observers to observe learning activities. Evaluation of group work results is carried out at each meeting and evaluation for one topic is carried out at the end of each cycle.

### (4) Reflection

Data obtained from the results of observations, group assessments and repetition of each topic analyzed its achievements then discussed at the time of reflection to determine actions for improvement in the next cycle.



**Figure 1.** Regulation of the classroom action research cycle

Research participants were 37 students of Physics Study Program of Riau University. Data collection techniques in this study were observation and tests. Data obtained from observations, and tests of each topic were analyzed descriptively and became a reflection for the next cycle.

### 3. Result and Discussion

In the pre-cycle phase, the lecturer applies conventional teaching methods. Student learning outcomes are low. The use of conventional lectures is not enough involve students in analyzing physics problems.

**Table 1.** Descriptive data on the application of the STAD cooperative learning model

	N	Minimum	Maximum	Mean	Standart Deviation
Pre-cycle	37	23.00	75.00	50.0591	16.27179
Cycle I	37	31.00	83.00	58.0951	16.30937
Cycle II	37	35.56	88.60	63.1970	16.59722

Based on table.1 an increase in learning outcomes from cycle I to cycle II. Topic in cycle I is about partial diffraction. There are many physics applications that must use mathematical analysis on this topic. Observation results provide notes in the first cycle, namely: (1) need better motivation in the introduction stage, (2) still need guidance to students when working on the worksheet. These notes provide input for the implementation of the second cycle as a reflection of suggestions. Improvements have been made for the second cycle, which is to give a concrete example when motivating students in learning and improving worksheets. After repairs, actions are taken for cycle II.

The group learning process and individual responsibilities within the group make students able to work together effectively (Amornsinlaphachai, 2012; Anowar Hossain, 2013; Kasíková, 2007; Macarena Navarro-Pablo, 2015). Involvement of students in using worksheets helps them gain concepts (Gunes, 2005; Tutak, 2008a, 2008b). In addition, social interactions formed within groups have an impact on social skills so that cooperation increases (Tiantong and Teemuangsai, 2013).

Cooperative type STAD in this study requires the provision of a quiz at the end of each meeting. Giving quiz is a means to monitor student progress in learning (Chang and Wimmes 2016). Quizzes have an impact on the seriousness of students to continue determined to understand the concepts that have been learned so that the learning outcomes obtained by students increase. This is in line with the results of Gholami's research (2013), which is an increase in learning outcomes after quizzes.

This study supports several previous studies which showed that cooperative learning groups produce social interactions among students (Vaughan, 2002; D. Johnson & R. Johnson, 2005; Zakaria, Chin & David (2010). The results of this study reveal that STAD type cooperatives can improve learning outcomes; these findings agree with the findings of previous researchers such as, Khan (2012), and Gemechu and Abebe (2017) and show the conflicting results obtained by Buchs et al (2015). This is consistent with what Tuna Gencosman explained in Mustafa Dogru (2012) that STAD cooperative learning can improve student learning outcomes that are greater than traditional methods. The cause of the high outcomes in this study was teamwork. Yamarik (2010) that students who work in groups will be more successful in tests on students who work on individuals.

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#### 4. Conclusion

In the STAD cooperative type a good learning environment is created so that collaboration within the group appears. That is, cooperative STAD is effective for use in learning. Cooperative type STAD can increase the achievement of learning outcomes not only at the level of knowledge but also at the level of understanding and application. This finding can have implications not only for teachers and students, but also for worksheet designers and material developers.

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