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# Using of student teams achievement divisions model (STAD) to improve student's mathematical learning outcomes

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**Abstract.** The purpose of this study was to improve the mathematics learning outcomes of fifth-grade students through the application of the Student Teams Achievement Divisions (STAD) learning model. The research method used a classroom action research using Kemmis and Taggart model consisting of three cycles through stages consisting of planning, implementation, observation, and reflection. Data were collected using interview, observation, and learning outcome tests. The study was conducted on 32 students by assessing teacher activity, student activity, and learning outcomes. The score of minimum mastery learning (KKM) is 80. Data analysis using qualitative analysis. The results of the pre-cycle study stated that ten students (31.25%) managed to achieve learning outcomes above the KKM. The first cycle reported that there were 20 students (62.5%) completing scores above KKM, and cycle II as many as 28 students (87.5%) achieved scores above KKM. The study states that the STAD model can be used as a fun learning model and a solution in solving the difficult problem of students understanding the fifth-grade elementary school mathematics material.

## 1. Introduction

Education is a planning process of learning so that students actively develop their potential to have intelligence and skills [1]. While the teacher is the best key in carrying out the educational process. Thus the role of the teacher in the implementation of the learning process in elementary school (SD) becomes very important. Teachers must act as educators, counselors, and innovators [2].

Characteristics of elementary students can understand abstract concepts through concrete objects. Thus, elementary students need to be invited to learn to understand concrete objects to foster their reasoning. Mathematics is one of the subjects that require the concept of recognizing concrete objects through experience. Besides, students at the elementary school age also need a lot of space to move because they are in a period of dynamic development where they will often run a lot, play in groups but also sit quietly. If the teacher is unable to manage the class properly, then this condition will cause students to feel uncomfortable and bored when they are told to sit and pay attention to the teacher. In general, students in Indonesia are only able to manifest their skills in the form of memories of knowledge



obtained by students at the school. On the other hand, skills such as reasoning and application cannot be understood by students. Therefore, the instructional design must be changed from teaching to learning to remembering - teaching to learning thinking [3].

Various ways are carried out to improve the quality of education in Indonesia. Starting from enhancing the curriculum, infrastructure, teacher competency to learning methods used in the learning process. Efforts to improve the education infrastructure have become constrained when there are still elementary schools that have not been able to produce students who have the value of learning outcomes following the minimum KKM. The researchers found in SDN 3 Cicurug Sukabumi that there were 68.75% of students with grades below the KKM. This became a breakthrough to provide an introduction and use of the STAD learning model for teachers in the learning process in the classroom so that the value of student learning outcomes is following the KKM.

Learning outcomes are the abilities acquired by students after going through learning activities. Some factors can affect student learning outcomes, including intelligence, motivation, an effort undertaken by students and the opportunities given to students. Learning outcomes and a low learning process can be improved by applying various learning models. The collaborative learning model is one of them, namely the approach to education in the learning process that involves students in working together in solving problems, completing tasks, and creating products. In this learning model, teachers act as facilitators in group discussions, consultants when conflicts occur, and observers in group progress [4].

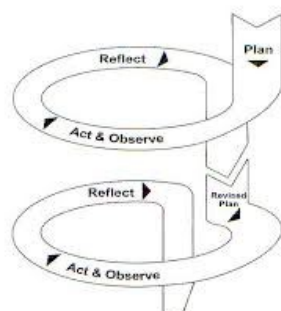
Mathematics is a subject that is considered difficult by elementary students, whereas mathematics is a core subject taught at all levels of education. Mathematics is the foundation of knowledge needed by students for higher education. Besides that Mathematics is not only about the operation of numbers but also ways of thinking, universal language, art, and tools that have goals that are very close to everyday life [5]. Mathematics is a symbol, a deductive science that does not accept inductive proof, the knowledge of order patterns, and organized structures, ranging from the unclear, the defining elements, uses or postulates and finally to the postulates. The constructivism flow states that mathematics learning has characteristics: (1) students are involved in learning, (2) the material information is conveyed to students well, (3) using investigations and findings in problem-solving. Mathematical learning aims to shape respect, curiosity, attention and raise interest in learning so that they feel confident to solve problems. Thus, it needs a fun learning model that is used by teachers to increase mathematics teaching outcomes for elementary students.

Cooperative learning can provide instructional arrangements for students to practice directly the inherent skills they have. The STAD method is best suited to teach well-defined goals with the single right answers, such as mathematical calculations and applications, the use of language and mechanics, geography and map skills, as well as scientific facts and concepts. However, it can be easily adapted for use with undefined goals by including more open assessments, such as essays or performances [6]. The STAD method is consistently one of the simplest and most effective CL methods in improving learning outcomes. STAD is a cooperative learning method where students help themselves and their group friends learn in small heterogeneous groups. The STAD model provides the concept of accelerating group learning to students; it allows students to develop their social abilities that are indispensable in the modern era [7]. STAD is the simplest cooperative learning method for new teachers using a cooperative approach. The teacher's style of walking around to guide students during group learning allows students to interact with the teacher without fear. STAD can make students active and motivated to find solutions to problems and communicate their knowledge to other students, so that each student is more able to master the material [8].

## **2. Methodology**

This study uses Classroom Action Research which has the element of (1) activity observing (2) actions that aim to correct problems in the learning process, (3) the same class receives the same lesson from a teacher[9]. Data was taken through interviews, observation, documentation and student learning outcomes as many as 32 people. Data analysis techniques are done through tabulation of data from observations, data reduction, data exposure and analysis (data interpretation). The success criteria in this

study are if the value of student mathematics learning outcomes reaches a minimum of 81.25% or 26 people from the KKM. The research was conducted through a cycle phase consisting of planning, acting, observing, and reflecting. The model used is Kemmis and Mc Taggart as in Figure 1:



**Figure 1.** Model of Kemmis and Mc Taggart [10]

In Figure 1, the Kemmis & Taggart model is some steps consisting of four components, namely: planning, action, observation, and reflection in one cycle. The number of cycles in PTK depends on the problems that need to be solved.

### 3. Result and Discussion

#### 3.1. Result

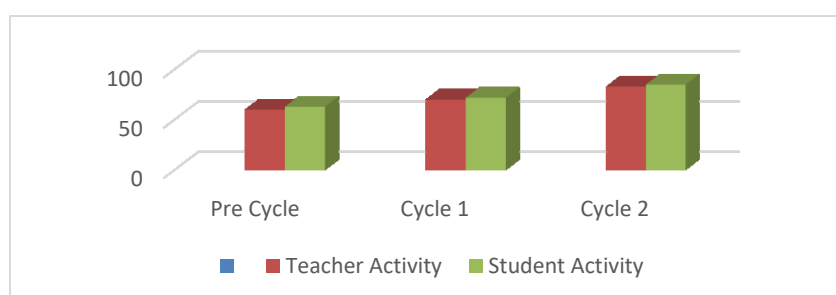
After formative observation and testing of fifth-grade students through classroom action research, the results are obtained as shown in Table 1. Student learning outcomes in pre-cycle have very low scores from the KKM.

**Table 1.** Completeness of Student Learning Outcomes

No	Level	Pre cycle Frequency (student/percentage)	Cycle 1 Frequency (student/percentage)	Cycle 2 Frequency (student/percentage)
1	Completed	10/ (31.25 %)	20/(62.5%)	28/ (87.5%)
2	Not Completed	22/(68.75%)	13/(37.5%)	4/ (12.5%)
	Total	32/ (100%)	32/ (100%)	32 (100%)

Table 1 display that in the precycle, the number of students who have reached the KKM is ten students or 31.25% while those who have not reached the KKM are 22 students or 68.75%. After reflection in the pre-cycle, the research cycle was carried out two times according to the KKM indicator which is 80, so that the number of students who reached the KKM in cycle 2 was 28 students or 87.5%.

Besides that, the data analysis carried out for observation and interviews produced that the assessment of the implementation of learning and changes in the behavior of students who experienced an increase in each cycle.



**Figure 2.** Teacher and Student Activity

Figure 2 display that the criteria for assessing teacher activity are: (1) Very good with a score of 90-100, (2) Good 80-89, and (3) Less good 70-79, and (4) Not good 60-69. While the indicator of changes in student behavior consists of: (1) Very good 90-100, (2) Good 80-89, and (3) Less good 70-79, and (4) Not good 60-69.

### 3.2. Discussion

Students' learning outcomes in the pre-cycle are of low value with a score of only 31.25% of students who are following the math KKM, which is 80. After being given treatment in the learning process using the STAD learning model the students' scores rose to 62.5%. In the second cycle there were only 4 people left who were not in the complete category according to the KKM. 2 students were unable to achieve the KKM target because they had limited ability and identified students in the slow learner category, while 2 other students had physical limitations on their eyes and legs, so they were more silent and sat listening to the teacher's instructions but were unable to solve the problems correctly.

Because of the 80 research success criteria, the researchers did not continue the next cycle and stated that the STAD model greatly influenced the value of learning outcomes of grade V students in elementary school. Through the STAD model, students can more easily understand mathematical material that is difficult for some students. Giving the right model makes students highly motivated to learn mathematics that requires concentration in solving and solving problems in the material. Mathematics is the result of human work. Thus it will be straightforward to solve problems in the mathematical material [11].

Student activity also increases in each cycle. Students look more enthusiastic about participating in class learning because the method given by the teacher is very varied and interesting so students are interested in taking lessons seriously but fun. Not only that, but STAD also has an impact on the activeness of teaching better teachers in the classroom. STAD is a technique in an effective learning process to increase students' motivation and enthusiasm, and can develop their responsibilities in their groups ". STAD is a good model because as a counting learning technique, it can increase students' motivation in learning by exchanging and sharing information, mutually reinforcing, providing feedback and having responsibility for their tasks in group work [12]. STAD is specifically chosen because it allows the involvement of students who are more active in the learning process in line with the design of the science curriculum rather than other cooperative learning strategies [13].

### 4. Conclusion

The results of the study can conclude that the STAD model can improve student learning outcomes in grade V elementary school mathematics. This increase in value is influenced by the activity of teachers and students in the learning process in the classroom. The STAD model provides a good level of student learning enthusiasm because it formulates fun learning techniques so that students do not feel bored when learning the material.

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