Increasing Students' Achievement on Simple Two-Dimensional Figure Materials Through Students STAD for Third Graders of Elementary School

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Abstract

The purpose of this study was to describe the implementation of STAD cooperative approach learning to improve student learning outcomes in the material two-dimensional figure in third graders of state Elementary School of Dadapsari 129 Surakarta. This research is classroom action research which refers to the design of Kemmis and McTaggart which consists of four components: planning, action, observation, and reflection. This study was conducted in two cycles. The data is collected in this research by the observation sheets, interviews, field notes, and student scores. The participants of this study was 33 students consist of 10 male and 23 female. The findings showed that the percentage of completeness of classical study increased by 30.7% in the pre-cycle to 87% in the second cycle. The average score of students also increased from 62.15 for the pre-cycle to 76.03 in the second cycle. Based on these results, it can be concluded that the implementation of STAD cooperative learning model can improve student learning outcomes at the material of two-dimensional figure to follow the phases of class presentation phase, the study group phase, study team and monitoring phase, evaluation phase, and, appreciation group.

Keywords: STAD; Learning Outcomes; Two-Dimensional Figure; Third Grader

Introduction

Mathematics is a universal science that underlies the development of modern technology, have an important role in a variety of disciplines and promote the power of human thought (mone., 2006). Therefore, compulsory learning of mathematics taught at all levels of education from elementary school to college. To learn maths, student should be provided by a situation that force them to think critically (Irawan & Febriyanti., 2016). Math is become important since by the learning people can derived their problem of metacognition. Metacognition problem is also come from the unsuitable methodology applied in learning (Panjaitan., 2015) Less successful learning can also be caused by the choice of approaches or methods that are less creative and innovative, so that students become passive and ultimately the results obtained are not satisfactory or lower than the minimum criteria expected (Hossain., Tarmizi., & Ayub., 2012).

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Mathematics achievement of third graders of state elementary school of Dadapsari 129 Surakarta was recognized still very low. Students have not been able to identify the nature and elements of a simple two-dimensional figure appropriately. It is supported by the test results of students that showed an average score below the expected minimum score 7.2. From the preliminary observation, researchers suggest that the lower ability students in identifying the nature and elements of a simple two dimensional figure presumably because the teacher was not utilizing appropriate method in learning addition and subtraction. Addition and subtraction is the basic way to understand the nature of two dimensional figure by counting the elements. Students tend to just memorize the formulas without understanding the concept, in addition to the teacher-centered learning that lead to passive students. Based on these problems, it is necessary to a implement a relevant approach of learning so as to improve the understanding of the students on the concept of a simple two dimensional figure.

One of the methods that can attract attention, interest and participation of students in critical thinking, creativity and foster a sense of high social is cooperative learning (Leonard., 2013). Cooperative learning model is a form of change of mindset that are designed to help students understand the theory in depth through the learning experience and empirical practice (Palennari., 2016). This learning model can be educational programs that encourage competence, responsibility and participation of learners (Tran., 2013). Learning to assess and ventured to participate in activities between students, between schools and between community members. One of the alternative option of cooperation model is STAD (Student Teams-Achievement Divisions). STAD type of cooperative learning which is developed by Slavin (Slavin., 2010) can help improve learning outcomes as well as foster a participatory level learners. In this STAD type of cooperative learning, students learn in a group of 4-5 people, where every student has been through an individual *pre-test*. The teacher will give the task through worksheets and learning devices. Heterogeneous grouping of students is conducted by result of pre-test (a mixture of high, moderate and less). After discussion, and share the task from the teacher, then the teacher will provide *post-test* for each student. Researchers assume that the cooperative learning model STAD can be an alternative to learning to improve understanding and make students more active during the learning takes place. Moreover, in the model type STAD cooperative learning and group learning phase there is a study monitoring team (Wahyuni & Abadi., 2014), which in this phase is expected the students to become more active and better understand the concept of dimensional figure (Zakaria., 2013).

Several studies have shown that the application of STAD type of cooperative learning model can improve student learning outcomes especially in maths. Hidayati concluded that with the implementation of STAD cooperative learning model can improve student learning outcomes in the subject matter of algebra and social arithmetic (Hidayati., 2008). She said that STAD is a type of learning that directs learners to provide mutual encouragement and cooperation. Mutual helps to master the subject matter and awareness between students is very important. It will create an enjoyable learning atmosphere encourage their ability to mastery excellent materials (Abimanyu., Mallo., & Hadjar., 2015). Abimanyu, Mallo and Hadjar also have proven that STAD effectively improve ability of junior high school student to analyze the volume of three dimensional figure on mathematics subject. The effectiveness comparison of mathematics instructions through the Students Team Achievemant Division (STAD) and Numbered Head Together (NHT) in terms of mathematics achievement and attitude also studied by (Marlina & Sanjaya., 2017).

Further research conducted by Wahyudi (2011) concluded that the application of STAD cooperative learning model can improve student understanding of mathematical concepts in quadratic equations and inequalities materials of class X computer engineering network program of Wonosari vocational school. The results of states that the implementation of cooperative learning STAD model can improve mathematics achievement in students. In addition, the use of cooperative learning STAD model also can increase student motivation to learn mathematics. Demitra (2015) stated that STAD cooperative learning has increased participation and students' understanding of the learning material. The results of

student learning was found to increase from the previous classical completeness only 21.6% to 100% passing. Another research also conducted by Hijrihani & Wutsqa (2015) where STAD is effectively proven to improve the self-efficacy better than handep type. By those proof, STAD type of cooperative method are assumed can improve learning outcomes and participation in third graders of Dadapsari 129 elementary school.

Methodology

This type of research is classroom action research consisted of two cycles. The design refers to the Kemmis and McTaggart model of research procedure through four stages (Barron & Hammond., 2015), namely Planning Acting, Observing, Reflecting in each cycle. The subjects were all students of third grade class with 33 students, consisting of 10 male and 10 female students
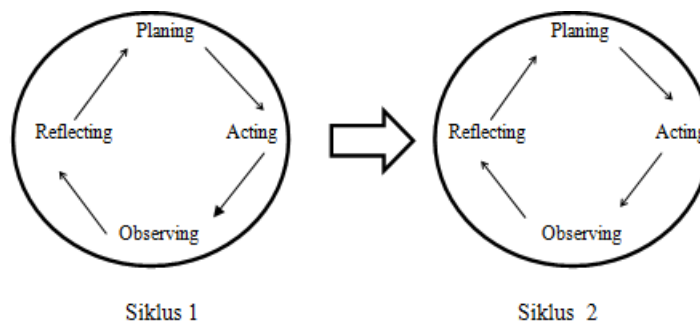

Fig. 1 Cycle regulation of research

Data collection techniques in this research is observation, interviews, field notes, and test. Data obtained from observations in the form of activities of researchers and students during the learning activities recorded through observation sheet activities and student activity observation sheet. Data obtained from field notes are student activity or other events during the learning that is not recorded on the observation sheet and interview data analysis was conducted based on the analysis of qualitative data model of Miles and Huberman (Sugiyono., 2012) ie, data reduction, data presentation and conclusion.

Results and Discussion
Pre-Cycle Condition

In the pre-cycle phase teachers applied the conventional lecturing methods combined with question and answer session. At the end of the learning activities teachers undertake an assessment by providing some questions related to the subject matter. But after the teacher assessment, the result is still below the minimum expected score. Only 7 from 33 students who are able to understand the nature of the elements of simple two dimensional figure. This is due to several factors, such as the subject matter is still theory-oriented and principles, as well as the low interest of the child at standard competence since did not see its benefits in everyday life just so that there is no clear picture of the real evidence. Teacher did not display a picture or a clear model two dimensional figure, so students have no idea about the basic competencies described by the teacher. The use of lecturing and question and answer does not quite engage students in analyzing the matter of two dimensional figure image. Teachers were not linking the subject matter to the real thing in daily life, so it is less the case relevance of education to the needs of society. Teachers do not give an opportunity to students for demonstration or play a role so that.

Those situation is supported by the score obtained in pre-cycle. The following formative test result at the stage of pre-cycle showed that the everage score obtan is still under the expected passing grade. Recapitulation data test scores of students on the elements and nature of the two dimensional figure at pre-cycle can be seen in Table 1.

Table 1 Frequency of student score in pre-cycle phase

No	Interval value	Mean (x)	Frequency (f)	f (x)	Percentage
1	78-72	75	7	525	17.9%
2	71-65	68	5	340	12.8%
3	64-58	61	5	305	12.8%
4	67-51	54	9	486	23.1%
5	50-44	47	5	235	12.8%
6	43-37	40	4	160	10.3%
Total			33	2,051	100%
average				62.15	-

Based on the table above it can be seen that students who get value ≥ 65 there are 12 students or 30.7%. The average score obtained is 62.15. The average score before the action is still below the average score expected by teachers and school as a passing grade. The number of completeness percentage of students is 12 students or 30.7% of the 33 students thus in the mathematics subjects especially for basic competence of elements and properties of two dimensional figure the expected percentage is 75% of students. From the initial results it can be concluded that while the learning outcomes is categorized as low. Therefore, it is necessary that proper teaching model to overcome these problems is through implementation of STAD Cooperative Learning Model.

Result on First Cycle

The first cycle performed several stages, planning phase, implementation phase and a phase of reflection. Planning stage is carried out by: 1) preparing lesson plan; 2) preparing the facilities and means of supporting such as designing the order desk for each group and invite students independently make hanging ornaments shaped two dimensional; 3) prepare observation sheets and evaluation sheets. The second stage is the stage of implementation. At this stage the researcher as well as classroom teachers apply learning using cooperative learning model STAD, in accordance with lesson plans were drawn up. At the end of the cycle, the result of students' activity showed an improvement on students active questioning. The display a picture of two dimensional figure, really help so students have idea about what is described by the teacher. The use of lecturing and question and answer start to engage students in analyzing the matter of two dimensional figure image this stage since student actively ask a question. It also supported by the increase of score obtained in first cycle.

According to Table 2, the highest score of students is at 78 and the lowest score is 40. Students who earn grades 78-72 there were 12 students or 36%. Students whose grades 71-65 there were 8 students or 24%. Students whose grades 64-58 there were 6 students, or 18%. Students whose grades 57-51 are 5 students or 12.8%. Students whose grades 50-44 there are 2 students or 6%. Students whose grades 43-37 students there are 0 or 0%. From these data it can be seen that students who scored ≥ 65 are 20 students or 60%. The average grade obtained is 65.88. Those data showed an improvement but unfortunately it still under the expected completeness grade. The average at the end of first cycle is still below the average

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of the desired value by teachers and school. The percentage of student mastery in this cycle is still under the expected percentage of 70%.

Table 2 Frequency of Student score in cycle 1

No	Interval value	Mean (x)	Frequency (f)	f (x)	Percentage
1	78-72	75	12	900	36%
2	71-65	68	8	544	24 %
3	64-58	61	6	366	18%
4	67-51	54	5	270	12.8%
5	50-44	47	2	94	6%
6	43-37	40	-	-	0%
Total			33	2,174	100%
average				65.88	

Result on Second Cycle

Based on the evaluation from first cycle, the researcher take a concern on activity of awarding. After a session of discussion, students were awarded by the result of the group. This change will encourage the level of competitiveness and awareness on less ability student. Those experiment gain the mobility of student to discuss with others, the also watch and pay more attention on other group presentation. The fact is proven by the average score obtained by students at the end of second cycle.

Table 3 Frequency of student score at cycle 2

No.	Interval Value	Mean (x)	Frequency (f)	f (x)	Percentage
1	90-82	86	8	688	24%
2	81-76	79	12	948	39%
3	75-70	73	5	375	15%
4	69-64	67	4	268	12%
5	63-58	61	2	122	6%
6	56-51	54	2	108	6%
Total			33	2,509	100%
Average				76.03	

According to Table 3 of learning outcomes in the second cycle that the lowest score obtained is 54 and the highest score is 90. In the second cycle there are 8 students scored between 82 and 90, or by 24%. 12 students scored between 81-76, or by 39%. There were five students received grades between 70 and 75 or by 15%. and 4 students scored between 64-69, or by 12%. Furthermore, two students received grades between 58 and 63 or by 6% and 2 students scored between 51-56, or 6% of totals. It is seen that after the implemented actions in second cycle the average score of students was 76.03. In this second cycle students who score ≥ 65 there are 29 children or completeness of 87% and the average score obtained is 76.03. The recapitulation of the value of the average student in cycle I and II showed an increase in the average value and the number of students who have achieved mastery compared with the pre-cycle.

Table 4 Comparison of results pre-cycle, cycle I and cycle II

No.	Characteristics of Class	Pre Cycle	After STAD Implemented	
			Cycle I	Cycle II
1	the average value of	62, 15	65.88	76.03
2	Percentege of Complete	30.7%	60%	87%
3	the highest value	70	75	90
4	the lowest value	40	50	55

Conclusion

There is a significant improvement on those characteristics and average score obtained during the implementation. From research conducted during two cycles can be concluded that there is a better result of learning of mathematics competency elements and properties of two dimensional figure of third graders Dadapsari 129 elementary school Surakarta with STAD learning model. This is evident by the increases in the score obtained by the students in each cycle as shown in the table and graph above. Although there is always an increase in each cycle, but the research conducted found many barriers that lead to learning has not been successful as expected. Encountered obstacles such as those found in the first cycle where students have not been used to learning in contextual or real, and the student activity to compete others. Those can be solved especially by using model *STAD* that provide students to think critically and activities that play an active role student discover the elements and properties of simple two dimensional figure.

This study therefore be proposed as a recommendation that the use of STAD model can improve the ability of students to learn elements and properties of simple two dimensional figure and of course the other materials of maths. Those result may be influence the teachers to try to use the same model to solve similar problem in other subject. In addition to academic values this technique can also improve socialization with other students. Students are given habituation in character education. With preferred caring neighbor, social care, and help each other if there is a friend that require clarification through peer tutoring.

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