

THE APPLICATION OF COOPERATIVE LEARNING MODEL OF THE TYPE OF INVESTIGATION TEAM TO IMPROVE THE ABILITY OF PROBLEM SOLVING IN MATHEMATICS LEARNING MATERIAL FRACTIONS IN THE STORY

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ABSTRACT

Mathematical problem solving ability is one of the capabilities of the perceived difficult by students. Researchers working to improve students' ability in solving math problems and also enhance the learning interest of students. One effort that can be done is with the selection of an effective learning model and operates on problem solving learning model cooperative type i.e. the investigation team. Class action research aims to find out students' problem-solving ability improvement and learning interest of students. Research methods the research done is a class act. Implementation of the action classes each cycle addresses the matter to calculate the fractions in the form of a question of the story until it reaches the ketuntasan student learning outcomes. Research done in class IV (four) SDN 227 Margahayu North of Bandung city year lessons 2017-2018 with the number of learners 29 people. The achievement of the learning outcomes of students with 70 KKM is at pre-cycle average values gained 64.21 with percentage ketuntasan 41.37%, cycle I gained an average rating of 76.21 with percentage ketuntasan 68.96%, whereas in the achievement of the learning outcomes II cycle students gained an average rating of 86.03 with percentage ketuntasan 89.65%.

Keywords: Cooperative Learning Model, The Investigation Team Problem Solving, Mathematic

INTRODUCTION

In the current era of globalization of science and technology is evolving very rapidly. It requires the world community to join the developed world. It is necessary for human resources (HR) and empowered the high reason as well as have the ability to process information that can be used to develop a science and can answer the challenge – the challenge of environment more effective. Mathematics is very instrumental in human life, then every student must have a good ability in mathematics. But in fact the achievements of students learning math is still low, the learning activities of students are still less than optimal, a less conducive atmosphere, as well as the learning motivation of students who are less enthusiastic. One of the causes of low achievement of student learning math is math

problem solving ability is still low. Whereas the important mathematical problem solving ability. The activities of mathematical problem solving is an important activity in the activity of teaching and learning that is demanding students critical thinking and more creative.

Mathematical problem solving ability is one part that is important in learning math. Ability to troubleshoot problems need to be owned by the students, so they can use it for flexible good to learn more math, as well as to deal with the problem – the other problem. To overcome the difficulty of learning of students in mathematics, in particular in solving this problem, required an effort of teachers to improve students' ability in solving math problems. One effort that can be done is to use learning strategies. Learning successfully demonstrated by students learning mathematics material colonised. The rate of penguasaan students against the lessons revealed by the liveliness of the students in the learning process and the results or the value obtained on the basis of Minimum Criteria. Based on the results of the exercise value of the students as well as Deut.

Researchers tried to carry out a mathematical model of learning by using learning model cooperative in order to improve problem-solving abilities of students in the material fractions in the story. As for the Cooperative learning model that supposedly can improve the ability of solving math problems and unify learning projects which demand proficiency from each group, and analyzing to solve the problem is a learning model cooperative type of investigation team

A variety of learning where students learn, work, and interact in small groups heterogeneous so that students can work together, help each other, discuss in understanding the subject matter nor the task the group is a Cooperative learning learning model (Cooperative Learning) is based on the theory of konstruktivisme. According to Trianto (2007:13) this konstruktivis theory States that students should find itself and transform complex information, check out the new information with the old rules – rules and refine them if rules – rules that are no longer appropriate. The investigative Group learning model is one type of cooperative learning model. In this learning students learn model in heterogeneous groups of two to six members to find or resolve the problem. Based on the explanation above, the authors are interested in conducting a research on the application of the cooperative

learning model "type of investigation team to improve the ability of problem solving in Mathematics learning material fractions in a matter story. ".

Learning and Learning

Learning has meaning related to the changes, which include behavior as well as changes to some aspects of the personality of the individual. Behavior change it contains an extensive sense. This change can be expressed in various forms such as changing knowledge, understanding, attitudes and behaviors, skills, skills, habits as well as changes in other aspects of the individuals studied. As expressed by Hamalik (2003:27) defines learning as a process of changing individual behavior through interaction with the environment. Similar opinions expressed by Muhammad Ali (2004:14) that learning is the process of changing behavior, due to the interaction of individuals with their environment. Gagne (in Winataputra 2010:3.30 am) defines the notion of formal learning is a set of cognitive processes that change the nature of the stimulus from the environment into several stages of the processing of information necessary to obtain a capacity the new. As such learning is basically the process of changing behaviour thanks to experience. Learning is the process of mereaksi all the reaction to all situations that exist around the individual. Learning is a process which is directed at an objective, poses to commit through a variety of experiences. Learning is the process of seeing, observing, understand something learned. Anitah (2008:1.18) suggests that learning is a process of interaction between teachers and students with the learning resources in a learning environment. A learning environment is a system that consists of the elements of the purpose, materials, strategies, tools, students, and teachers.

The Learning Model

In order to make learning math can be absorbed and understood by students, in addition to the required learning strategies, teachers also need in choosing the methods and models that are deemed appropriate and in accordance with condition siswa. Learning models meant the existence of interactions between teachers and students in the learning process regarding strategies, approaches, methods, and techniques of learning applied in the implementation of teaching and learning in the classroom. According to Seokamto, dkk. Other

opinions about the notion of the learning model advanced by Joyce and Weil (Azhmi, 2011:13) "model of learning is a plan or pattern that can be used to form a curriculum (study plan long term), designing learning materials, and guide in the classroom or another. " From the above it can be concluded that the model of learning is a learning pattern or procedure used by teachers as a guide in carrying out the learning process in the classroom involving strategies, approaches, methods and techniques learning.

Cooperatif Learning

Is a model of learning, where students study and work in small groups whose members collaboratively, with 4-6 structure heterogeneous groups. Lie (2007:17) defined cooperative learning as learning which gives the opportunity to students to work together in a structured tasks. Cooperative learning model supporting students in learning, in which the working group can provide opportunities to use skills in students inquiring, discussing an issue, motivate students who are still shy to active, can create a the pleasant atmosphere of learning, develop leadership discussions, interaction with students more, a lot more information obtained, as well as the conclusions obtained can be accounted for. Learning kooperatif according to Dimiyati and Mudjiono, (2002:166) is one of the alternative learning which is the perbakan of classical learning which aims to: 1) gives the opportunity to students to develop the ability solve the problem rationally. 2) social attitude) developed and mutual passion in life. 3) Mendinamiskan group activities in learning so that each Member feel themselves as part of the group responsible. 4) Grow leadership skills-leadership in each Member of the group in the problem solving group. The position of teachers in cooperative learning is not a center of learning, but rather as a facilitator and motivator.

Learning Mathematics

Hudoyo (1997:1) States that a person is said to be studying mathematics in the person going on an activity that may result in changes in behaviour related to mathematics. These changes occur from not knowing something is becoming know the concept, and was able to use them in further material or in everyday life. Learning of mathematics teaching and learning is a process developed by teachers to develop creativity thinking of students can

improve students' thinking ability, and can increase the capability of constructing new knowledge in an effort to improve a better mastery of the material against mathematics. Susanto (2013:186), whereas learning according to Suherman, e., et al. (2001) "the Setup environment is an effort that is expected to give different shades on learning programs so it can grow and develop optimally." In learning math in school a teacher can use a variety of models, methods, strategies and approaches. Such use is intended in order to make students more interested in learning mathematics. So with their interest in the process of learning math can be berpengaruh in their liveliness during the learning process both mentally, physically, and socially. Active learning process which is expected to grow math learning goals that are creative and critical. As expressed by Suherman, e., et al. (2001) that the learning of mathematics not only emphasized on the coaching skills and hapalan, but in the understanding of the concept. And also not only in how to resolve the problem, but also why the dislesaikan question in a certain way. The end result of the learning of mathematics according to Suherman (2001:254) is "the understanding of students of comprehensive and holistic about the material presented. Understanding is against just meet the demands of learning objectives in substantif, but there are other influences are expected of the learning of mathematics. That includes these other influences such as students are able to think logically, critically, systematically, as well as more creative and innovative in finding solutions to solving a problem".

Problem Solving in Mathematics

In our daily lives we cannot escape problems. Reality shows that most of our lives are faced with problems. These solutions must be solved in order not to interfere with our activities in this life. Problems are relative things. A person considers a problem as a problem for him, but for someone at

a time, but it is not a problem for that person the next time. Problem solving is a process to overcome difficulties encountered to achieve a desired goal. In learning mathematics, problem solving is very important because in the learning process and its completion, students are allowed to use the knowledge and skills that they already have to be

applied to non-routine learning. Through this activity, important aspects of women's mathematics such as the application of rules on non-routine problems, pattern discovery, generalization, mathematical communication can be developed better.

In mathematics subjects, problem solving can be a matter of routine or story problems, which is a problem that for the right procedure requires deep thinking. Therefore, problem solving can improve the ability to think critically, logically, creatively, and systematically and can develop students' abilities in adapting to new learning situations. Polya (Sukasno, 2002: 15) argues, "problem solving is a level of intellectual activity that is very high, because in mathematical solving students must solve and use the rules that have been learned to formulate the problem".

Polya (Sukasno, 2002: 12) suggests that there are four aspects or steps that can be taken in solving problems, namely:

1. Understanding the problem (understanding the problem solving)
2. Making a solution plan (dividing a plan)
3. Perform calculations (carrying out the plan)
4. Reviewing the results obtained (looking back)

Broken Material

Fractions or numbers are used to express a part of a whole. Fractions consist of two numbers, namely the numerator (the number above the line) and the denominator (the number below the line) $\frac{1}{2}$ the numerator / denominator. The denominator shows a lot of the whole one divided into equal parts, while the numerator shows some of the same parts used. For example I took $\frac{3}{5}$ sponge cake, meaning one sponge cake was cut into 5 equal portions, then I took 3 of them. Sometimes, it will be very helpful if the dividing line (the line in the middle of the fraction) is defined as "from". In other words, $\frac{3}{5}$ also means 3 pieces of 5 pieces of the whole cake (Jerry B. B. 2010: 29).

METHODS

This study uses a qualitative approach that requires researchers as the main instrument as well as data collectors. In this study there was collaboration between researchers and class teachers.

The type of research used in this study is Classroom Action Research (CAR) which is also known as Classroom Action Research (CAR) which is conducted with the aim of improving the quality of the learning process in the classroom. In classroom action research, the researcher or teacher can see for himself the practice of learning or with other teachers he can conduct research on students in terms of aspects of interaction in the learning process. According to Arikunto (2008: 3) Classroom Action Research is "a reflection of learning activities in the form of an action, which is deliberately raised and occurs in a class together."

RESULTS AND DISCUSSION

Results

Cycle 1

In the initial activities the teacher began to enter the room and do habituation such as praying, singing Indonesian Raya songs, then doing apperception. The teacher does apperception by asking "children if this one sticks the mother three times into three pieces?" The student answered "1/3 part". the teacher replied "yes right, therefore today we will study fractions in the matter of stories". The teacher conveys today's learning goals.

At the core activities the teacher and students identify the topic and classify students in predetermined groups. The second stage is the stage of planning learning tasks, at this stage the teacher guides the learning groups when they do their work. Students in each group, with the guidance of the teacher planning the learning procedure, do the group assignments in the worksheet. At this stage, students' activities are seen to increase by issuing their ideas. Only not all group members have participated.

The stage of carrying out the investigation task is the third stage, at this stage the teacher strictly follows the development and progress of each team and provides assistance /

guidance when needed. Students in the group carry out plans that have been formulated in the previous stage. At this stage it was still dominated by group leaders.

At the stage of preparing the final report, students in the group must analyze, evaluate, summarize and plan an attractive appearance in front of the class. However, there are some groups that have difficulty evaluating information so that many need teacher assistance. This stage is still dominated by the group leader, the other group members have not seen their courage.

Closing activities Students are given evaluation questions (individual ability tests) to determine the level of understanding of fraction material in story problems. Provide opportunities for students to ask questions about material that has not been understood. Students conclude learning outcomes with teacher guidance. The teacher begins to lure students with questions that lead to conclusions. The teacher closes the lesson by saying hello.

Based on the results of the analysis on the action of cycle 1, the researcher will make improvements in the next cycle. The material for the improvement of researchers is as follows. Conduct group discussions tailored to the time allocation that has been set. Make worksheets and questions about final evaluation with simple sentences so that it is easy for students to understand. Students are accustomed to expressing opinions, by giving them confidence and being motivated by the teacher to want to speak. For example, it provides an opportunity to ask or express opinions to all students or the teacher refers in turn, especially to students who are less active or play during learning.

Cycle 2

Similar to what was done in cycle 1, the teacher started learning with habituation such as praying, singing Indonesia Raya songs, motivating students to be enthusiastic in learning. Then the teacher does apperception by asking "what operations children can calculate the mathematical basis that we can do in fraction material?" Students answer "addition, subtraction, division, multiplication". the teacher replied "yes right, therefore today we will learn to find the results of fraction operations in the matter of stories". The teacher conveys today's learning goals.

At the core activity the teacher carries out each stage in the cooperative learning model type of the investigative team. In the first stage the teacher and students identify the topic and classify students in predetermined groups. The second stage is the stage of planning learning tasks, at this stage the teacher guides groups learn when they do their work. In this second cycle, it appears that all members expressed their opinions and ideas.

The stage of carrying out the investigation task is the third stage, at this stage the teacher strictly follows the development and progress of each team and provides assistance / guidance when needed. At this stage the group leader provides opportunities for its members to carry out investigative tasks.

In preparing the final report, in this cycle almost all groups have been able to plan and prepare the final report well. In this second cycle, it seems that the courage of other group members to appear in front of the class presents their final report. By involving the whole class, it is hoped that all groups will gain a broader view of the topic.

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Based on observations or observations of students' problem solving abilities for cycle II is the teacher has tried to correct the deficiencies in the previous learning activities, such as

in the time settings according to the planning. For students who are shy can be overcome by giving students the opportunity to take turns, answer, and express opinions. students begin to dare to express opinions, both asking questions and answering questions.

Based on the results of interviews this learning activity makes students more happy and active in groups. The worksheets given to each group have also been arranged in a way that makes it easier for students to work on them.

At the time of the activity of reporting work results on worksheets, there were different opinions between groups in terms of the use of formulas and stages of problem solving. The difference of opinion is then discussed then clarified and the teacher straightens out the problem by asking the student again the question

Discussion

Data taken in the implementation of cycle 1 clearly shows that there are still students who have not reached the KKM (KKM = 70), which is 9 students from 29 students or around 68.96% and students who have reached the KKM or have studied thoroughly. The average value is still relatively low at 76.21. Students' learning completeness is expected to reach more than 75% so action needs to be taken. So that in the second cycle it is expected that students' mathematical problem solving skills will increase.

The results of the reflection of the cycle 1 observation sheet is that the teacher's activity must further enhance students' abilities by exploring their knowledge. The time used does not match the time allocation provided. Allocation of time provided is not achieved because learning activities take too much time, especially in discussions. In the evaluation stage there are still many students who skip the stages in solving the problem, especially the stage of re-examining the results of calculations that are at the end of the problem solving process. The results of observations on the activities of students and teachers during the learning activities that the teacher's activities in the cycle 1 action are still at a sufficient level so that it needs improvement.

The results of the development data analysis of student learning outcomes in learning improvement actions cycle II can be concluded that the average value experienced a

significant increase from 76.21 in learning cycle 1 to 86.03 in the improvement of cycle II learning. Likewise the percentage of learning completeness of students experienced a significant increase of 68.96% in learning cycle 1 to 89.65% in the improvement of learning cycle II or an increase of 20.96% with the value of KKM 70. These results indicate that there was an increase in learning outcomes which is very significant, although there are still around 3 students or 10.34% who still have not achieved complete learning. After reflecting and discussing with supervisor 2, the learning improvement action is felt to be sufficient and does not need to proceed to the next cycle.

Based on the results of data processing and analysis, students' mathematical problem solving ability with the Cooperative Learning Team type of Investigation Team increases. This is due to the Cooperative learning model of the Investigation Team type emphasizing the student's own learning experience with a broad scope and also emphasizing student activities. This statement is in accordance with Krismanto's opinion (2007: 15), " The Cooperative Learning Model Type of Investigation Team prepares students with a broad scope of study and various learning experiences to put pressure on activities on students'. Therefore, students are given the freedom and opportunity to apply their own ideas obtained from the results of investigations and discoveries made in small groups.

CONCLUSION

Based on the results of Classroom Action Research in Mathematics Learning Through Learning Cooperative Learning Models Type of Investigation Team conducted in class IV (Four) SDN 227 Margahayu Utara Kota Bandung concluded that the Cooperative Learning Model Type Investigation Team can improve students' problem solving abilities. Through Learning Cooperative Learning Models Type of Investigation Team achievement of improvement of problem solving abilities in the form of learning outcomes of fourth grade (SD) students of SDN 227 North Margahayu has increased. This is shown by the results of learning on pre-cycle obtained an average score of 64.21 and a percentage of completeness of 41.37%, then carried out the action learning cycle I obtained an average of 76.21 with a completeness percentage of 68.96%. Student learning outcomes in cycle II action obtained an

average of 86.03 with a percentage of completeness of 89.65% at a very good level and also an increase in learning completeness that is very significant. By increasing learning outcomes students also show an increase in students' mathematical problem solving skills. These results illustrate that learning Mathematics through Learning Cooperative Learning Models Type of Investigation Team can improve student learning outcomes.

Other conclusions that the use of the Cooperative Learning Model Type of Investigation Team can increase student learning interest, this is seen from the results of student activity observations that show improvement, this is shown in the positive attitude of students during learning, students are enthusiastic in following the ongoing learning in carry out the stages in the Cooperative learning model Type of Investigation Team

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