Improving Student's Motivation To Learning Math By Cooperative Learning Technique Make A Match

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Abstract

This study aims to enhance student's motivation to learn mathematics by cooperative learning techniques make a match.

This study is classroom action research who carried out collaboratively between researchers and mathematics teacher of class experiment and assisted by three observers at each meeting. Subjects were students of class VIII C SMP Negeri 14 Yogyakarta on scholl year 2008/2009, which consists of 35 persons with a heterogeneous capabilities. Research carried out in 2 cycles. Cycle 1 consisted of 4 meetings, and every meeting there which lasted for 2 x 40 minutes and some are held for 1 x 40 minutes. Cycle 2 consists of 2 meetings with each meeting lasted 2 x 40 minutes. The techniques to collect the data are done through observation, interview, questionnaire, and documentation.

The results showed an increase in student's motivation to learn mathematics after given action in the form of cooperative learning techniques make a match. In general, the implementation phase of learning is discussion on group using worksheet, the explanation the results of discussion by students, critism of the results of discussions, the game looking for a partner and asked questions among students, and group awards.

Keyword: motivation to learning, cooperative learning technique make a match.

I. INTRODUCTION

1. Background

Learning mathematics has an important role in developing student's abilities. Subject matter of schools mathematics have a role in training students to think logically, critically, practical, positive attitude and creative (Erman Suherman, et al: 2003). Many factors affect student's success in learning mathematics. One of them is the motivation to learn mathematics. According Abin Syamsudin (2004: 37), "motivation is a strength or a complex situation and readiness within the individual to move towards a specific purpose either consciously or unconsciously". Students who have good motivation to learn will attempt to succeed in learning, and conversely students who have poor motivation to learn will reluctant attempt to succeed in learning.

Based on the results of observation on mathematics class in grade VIIIC SMP Negeri 14 Yogyakarta, researcher obtained information that the students in this class have less motivation to learn mathematics. This is indicated by the student's less

readiness to follow the lessons and less seriousness during the lesson. Based on interviews with 10 students, 8 students regard mathematics as a difficult subject and they often feel hopeless solve math problems. In addition they are also less self-contained in a task or test, it is seen from the interviews of students who stated that they sometimes cheat other student's task or test. Based on this, the researcher felt need for innovative models of teaching and learning mathematics to improve student's motivation to learn mathematics.

Nowadays, many models of learning are developed to improve the quality of learning mathematics. One model that can be applied is cooperative learning techniques make a match. It is a suitable model to enhance student's motivation because in this model students are given the opportunity to interact with other students, learning atmosphere in class can be created as game situation, there is competition among students to solve mathematics problems, so students can learn mathematics in a fun atmosphere. Therefore, the researchers were interested to conduct research about application of cooperative learning techniques make a match to enhance student's motivation to learn mathematics in grade VIIIC SMP Negeri 14 Yogyakarta.

2. Problem formulation

Based on the background, the problem formulation of this research is "how to increase students's of SMP Negeri 14 Yogyakarta VIIIC motivation to learn mathematics by model cooperative learning techniques make a match?"

3. Goal of the Research

This study aims to enhance students's, in grade VIIIC SMP Negeri 14 Yogyakarta, motivation to learn mathematics by cooperative learning techniques make a match.

4. Benefits of the Research

1. Can be consideration for teachers to designing the process of teaching and learning mathematics in class.
2. Can create an atmosphere of teaching and learning math fun.

II. RESEARCH METHOD

1. Subjects of the Research

The subject of this study were students in grade VIII-C of SMP Negeri 14 Yogyakarta, which amounted to 35 students with heterogeneous capabilities.

2. Design of the Research

Classroom Action Research model Kemmis and Taggart is used in this study. It includes four components in a spiral of inter-related systems. The study was designed in several cycles. The components are implemented in each cycle as follow.

1. Plan

   In this step researchers prepare:

   a. Learning devices that lesson plan, worksheets and card questions and answers.

   b. Research instrument that is the observation guidelines, questionnaire and interview guidelines.

2. Actions

   At this stage, the teacher gives the cooperative learning techniques make a match in mathematics instruction based on lesson plan that had been prepared.

3. Observation

   Researcher observed teaching and learning process by using observation guidelines, questionnaires and documentation tools that have been prepared at the planning stage. Observations have been carried out to obtain data of the research.

4. Reflection

   At this stage, researcher, and teacher have discussed the results of observations that have been recorded. Results of the reflection was used as consideration for the teaching and learning process in the next cycle.

3. Research Instruments

1. Observation Guidelines

   Observation guidelines contain descriptions of the activities of teachers and students during lessons. Observation was divided on the observation of learning activities and guidelines for observation student's motivation for learning.

2. Questionnaire

   Questionnaire contains statements that may describe the students' motivation. These statements are made based on the following aspects: commitment to face tasks; persistence in learning; resilient facing difficulties; can be maintained; shown interest in various mathematical problems. Questionnaire is enclosed with the response categories provided were very always (SL), often (S), rarely (J), and never (TP).

3. Interview Guidelines

   Guidelines interview contains questions that will be given to students so that student's opinion about the learning can be known. Interview guidlines also contains questions for students about student's motivation to learn mathematics.

4. Data Analysis Techniques

1. Observation Data Analysis

   Data observations about student's motivation for learning was analyzed by this formula:

$$P = \frac{a}{\sum(n_i \cdot b_i)} \times 100\%$$

by: P = the percentage of student's motivation to learn mathematics
  a = number of students who carry the items on the sheet observation.
  b_i = a lot of students who attended the meeting.
  n_i = pieces of the observation points are observed at a meeting.

The results are categorized as follows:

Table 1. Categorized of Motivation to Learn

Percentage	Categorized of motivation
$66,66\% \leq X \leq 100\%$	High
$33,33\% \leq X \leq 66,65\%$	Medium
$0\% \leq X \leq 33,32\%$	Low

Data which obtained from pieces of the observation of learning activities have been analyzed to improve lesson at the next meeting.

2. Questionnaire Data Analysis

The analysis step of questionnaire data as follows:

1) Sum the scores of each item statement on the questionnaire each student based on questionnaire scoring guidelines that have been made.

2) Calculate the percentage of motivation to learn each student as follows:

$$P = \frac{a}{b} \times 100\%$$

by: P = percentage of motivation to learn each student's
   a = total score of each student in each cycle.
   b = the number of maximum possible score of each students each cycle.

3) Categorize these results in the classification of students' motivation (Table. 1)

4) Determine the percentage of students who have reached the category of high motivation to learn mathematics.

3. Interview Data Analysis

The research data which obtained through interviews is qualitative data. The analysis for it is the reduction, data presentation, and conclusions.

5. Success Indicators of the Research

1. Percentage of students' motivation to learn mathematics is obtained from the observation has reached the high category.

2. Questionnaire results showed at least 60 % of students have had the motivation to learn mathematics in high category.

III. RESULTS AND DISCUSSION

1. The Research Results

Before the implementation of cooperative learning techniques make a match on mathematics instruction, researcher gave questionnaires motivation to learn mathematics to research subjects. The results of data questionnaire analysis showed that 34.29% of students had motivation in high category, and 66.71% of students had motivation in medium category. The research has been carried out in two cycles. The first cycle consisted of four sessions, and the second cycle consisted of two sessions.

The First Cycle

Planning Phase

In the phase, researcher set up the equipment that are lesson plans, worksheets, quiz questions, manipulative kits, the questions and answers card about elements of cubes and blocks, nets of cube, surface area and volume of the cube. Researcher arranged the group discussions based on student's abilities to by see the score each student in last term. Cards have been designed with one side of a question and the other side as answer to another question on the other card. Problem that used was involved the ability of memory, comprehension, and application. There were 35 cards readiness for a game. Questions and answers on each card were made differently. One question just has one answer. The next card is classified into three groups: two groups each consisted of 12 cards, and one group consisted of 11 cards. Group of the cards match to the number of students who will play in each of the major groups, which was combination of the three discussion groups, consisted of 11 to 12 people.

Cards that have been designed to use in technique make a match as exercises for students after they study the material at least one basic competency through discussion using the worksheet.

Action Phase

At the first meeting, students were asked to learn about the elements of the cube and the block through worksheet that has been prepared. Students work in groups consists of 3-4 people. After the students finished their worksheets, students and teacher discussed about the elements of the cube. At the end of learning the teacher gives homework.

At the second meeting, students carry out the make a match technique to repeat material at the previous meeting. Before the game began, the researcher communicated rules of the game. The rules of the game are:

1. Each student received one card, which contains questions on one side and the other contains the answer to the question on another card.

2. Students think the answer to question on their card for 3 minutes.

3. Students find other students who hold cards which consists answers to their questions for about 2 minutes. Students are only looking for a partner card in large groups (the combined three discussion groups) that have been determined.

4. Students who have found a couple cards scream "*I get*", then sit close to the student holding the card pairs.

5. Students who can find a couple cards were given points for the assessment of the group award.

6. Some students were randomly assigned to read the question on their card, and other student (except their pairs) thinks the answer of the questions.

7. Students who can answer questions were given points for the assessment of the group award.

At the third meeting, the students in groups learn about nets and surface area of cubes by using the worksheets that have been prepared. After discussion, they carried out the make a match game.

At the fourth meeting, the students in groups learn about the volume of the cube by using worksheets. After discussion, students are asked to complete a quiz individually.

After learning of mathematics in the fourth meeting, the researchers gave the award groups based on the scoring rubric that has been prepared.

Observations Phase

Implementation cooperative learning techniques Make a match in math class has been going well. Teacher has carried out lesson plans so well. However, if viewed from the student side, there are still students who have not followed the learning activities properly, such as not following the discussions, too late to collect the results of discussions, do not collect homework and do not understand the rules of the make a match technique. In addition, data about student's motivation based on the observation were as follows:

Aspect	Percentage	Categorized
Student's commitment in task	73,02%	High
Student's learning persistence	69,23%	High
Students can maintain his opinion	36,64%	Medium
Students showed interest in mathematical problems vary	56,06%	Medium
Student's motivation in class	65,63%	Medium

Furthermore, results of questionnaire analysis showed 42.86% of students have had high motivation to learn mathematics.

Reflection

During the implementation of learning in a cycle there are some drawbacks, That are:

1. Some students use the discussion time to talk about things outside of lessons and did not cooperate when working worksheet.

2. Some students did not understand the rules make a match technique.

3. Students didn't have a record of the material being taught, because the group's worksheet was collected.

The Second Cycle

Based on the reflection on the first cycle , the correction for the second cycle were:

1. Teachers often remind students to collaborate while working on worksheet and to confirm processing time. In addition, the worksheet also included processing time.

2. Before make a match technique, each student was given the rules of make a match technique in writing, and given the opportunity to read and understand these rules.

3. Each student was given individual worksheet (after group discussion and before class discussion).

Planning Phase

In the planning stages, researchers prepare lesson plans, worksheets, quiz questions, manipulative kits, and card questions and answers about nets, surface area and volume of the blocks. The division of the group and draft of cards had been made equal to first cycle.

Implementation Phase

At the first meeting, the students in groups learn about the nets and surface area of the blocks by using the worksheets that have been prepared. After discussion student's work, they carried out make a match game with the rules of the game same as first cycle. Before the game students are given the rules of the game in writing and given an opportunity to understand.

At the second meeting, students in groups learn about the volume of the block

by using worksheets that have been prepared. After discussion, they carried out make a match game. Students enthusiastically follow the make a match game. At the end of meeting, they get some quiz about block.

After learning of mathematics in twice meeting, the researcher gave award groups based on the scoring rubric that has been prepared.

Observations Phase

In general, the implementation of learning math with a model of cooperative learning techniques make a match has been going well. Learning activities are conducted in accordance with lesson plans. In addition, the result of observation to student's motivation on second cycle are as follows.

Aspect	Percentage	Categorized
Student's commitment in task	79,91%	High
Student's learning persistence	77,61%	High
Students can maintain his opinion	37,31%	Medium
Students showed interest in mathematical problems vary	56,72%	Medium
Student's motivation in class	71,35%	High

Furthermore, the results questionnaires showed that 62.86% of students have high motivation.

Reflection

Reflections showed that the learning of mathematics with cooperative learning techniques Make a match has been carried out properly. But there are still some shortcomings in the implementation of learning with a model of cooperative learning techniques make a match, that is still some students who did not participate in the discussion process, although the number was reduced when compared to first cycle.

2. Discussion

Results of the research showed that motivation to learn mathematics subjects have increased during the learning of mathematics with cooperative learning techniques Make a match. This is evident from the learning process, questionnaire data and interview students. Judging from the learning process, most students have followed learning actively. Students learn through group discussions which consist of heterogeneous academic ability and gender. In understanding the material, students

who have low academic ability often ask to students who have better academic ability. This is in accordance with the opinion of Anita Lie (2004: 43) that a heterogeneous group allows students to teach each other (peer tutoring).

From interviews of students, it was known that students feel good about learning in groups because students can discuss when they have trouble. That means there was a feeling that they have a common goal of solving a problem that they face in the learning process. This is in accordance with one of the elements of learning together which stated by Johnson, Johnson, and Holubec (Richard I Arends and Ann Kilcher, 2010: 313) that learning together create an environment where all members of a group feel connected to each other in accomplishing common goals.

At events the make a match technique, subjects seemed enthusiastic and enjoy when thinking about the answers, looking for a partner, and answer the questions from other friends. This is consistent with the Tarmizi Ramadan's (2008) statement that cooperative learning techniques Make a match can create an active learning and fun. By the interviewed, it was known that students did not feel bored when they follow the teaching and learning and the atmosphere was not stressful for students. In other words the model of cooperative learning techniques makea match made students feel comfortable to follow the learning of mathematics. A comfortable learning atmosphere, which did not saturate and did not stressful too, effect on student's motivation condition. This is in accordance with opinion of Nana Sudjana and Ahmad Rivai (2002:208) that with a good learning environment, learning activities more interesting and not boring, so that student's motivation will be higher.

In addition, the group awards given at the end of the cycle can also increase student's motivation, as expressed by Sardiman (2006: 91-94) that giving gifts to students can enhance students' motivation. Furthermore, when students were doing make a match activities, there were competitions among students. Those encourage student to learn better. This is in accordance to the some expert's opinion that Ngalim Purwanto (2000: 81), Moh. User Usman (2002: 29-30), and Sardiman (2006: 91-94) who state the motivation to learn can be enhanced by creating competition among students. So the activities of cooperative learning techniques make a match can increase student's motivation to learn mathematics.

CONCLUSION AND SUGGESTION

1. Conclusion

Implementation of cooperative learning techniques make a match that can enhance motivation to learn mathematics students in grade VIIIC of SMP Negeri 14 Yogyakarta are as follows:

1. Students are split into a group with 3-4 people per group, to understand the material by discussed the worksheets that equipped with the processing time so all students know the time to complete the worksheets.

2. Teachers lead students who have difficulty in understanding the material or solve a problem.

3. Students are given the opportunity to present their discussion to the class.

4. Students and teacher discuss the results of group discussions, so all students know the truth of their discussion and students are given the opportunity to record the results of the discussions.

5. After students learn the material at least a basic competency, students are given exercises with technique Make a match.

6. Teachers communicate the rules of the make a match technique, students are given the rules of make a match technique in writing and given an opportunity to understand the rule.

7. Each student is given one card with one side of a matter and the other is the answer to the question on another card.

8. Students think the answer to question on their card, then find another student who holds the answers to their questions in a large group (a combined three discussion groups) that have been determined in limited time.

9. Students who have found their partner yelled "I get" and then sat close to her partner.

10. Students who find their partners get point for the assessment of the group award.

11. Some students read about on their card and other students think and compete to answer that question. Students who can answer the question get point for the assessment of the group award.

12. Give award groups.

Design a card that used in this study was designed with one side contains problem and the other contains the answer to another question on the another card. Each card has different questions and different answers.

2. Suggestion

The sugestion that can researcher tell based on this research are as follows:

1. In implementing cooperative learning techniques make a match in mathematics instruction, the teacher must be distinct about the duration of the discussion.

2. To implement cooperative learning techniques make a match, the teacher must be strict about the rules of the game so there is no chaos when execution.

3. In this study, the activities of finding partner is only carried out one round. For further research, finding a partner activities can be developed more than one round, so students have the opportunity to complete more than one problem.

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