INCREASING INTEREST AND MATHEMATICAL LEARNING OUTCOME IN MATHEMATICS OF TRIGONOMETRY BASIC COMPETENCE (KD) BY USING RECIPROCAL TEACHING MODEL FOR STUDENTS OF CLASS X MIPA 4 SMA NEGERI 5 MAGELANG IN THE EVEN SEMESTER OF ACADEMIC YEAR 2017/2018

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Abstract
This type of research was classroom action research that aims to increase students’ interest and learning outcomes in Mathematics of SMA Negeri 5 Magelang through Reciprocal Teaching Model. This study involved 26 students of class X MIPA 4, which were conducted in two cycles and each cycle consisted of 3 meetings. In Cycle I, each group was a large group consisting of 6-7 members and in Cycle II, each group was a small group consisting of 3-4 members. In cycle I, the one who has medium capability in Mathematics was selected as a leader to present the material, while in cycle II, the one who possess the best capability in Mathematics was selected as a leader to present the material. In each cycle there were four stages; planning, implementation, observation and reflection. Data regarding on learning interest was taken from the observation sheet filled in by students. Then, learning outcome data was taken through daily tests at the end of each cycle. Data were analyzed by using comparative descriptive and qualitative descriptive techniques. The results of the study showed that there was a significant increase in learning interest and student learning outcomes after applying Reciprocal Teaching Model. The improved learning outcomes were indicated by daily test scores increase in the initial conditions, cycle I and cycle II. The percentage of students with high interest categories in the initial condition was 7.69%, increasing to 30.77% in cycle II. The percentage of students with interest was very high, that was 0% in the initial condition increase to 57.69% in cycle II. The improved learning outcome was indicated by daily test scores increase in the initial conditions, cycle I and cycle II. In the initial condition, the average score of 41 students increased to 86 in cycle II. The classical learning completeness also experienced a significant increase, from 26.92% in the initial conditions to 96.15% in the final condition. Reciprocal Teaching Model provides benefits for improving student understanding and quality of learning.

Keywords: Reciprocal Teaching Model, learning interest, learning outcomes.
INTRODUCTION

One of the problems faced by educators in general is the low quality of education and teaching at every level and education unit, especially in primary and secondary education. Various efforts have been made to improve the quality of education and teaching, for instance, through various teacher training, improving the curriculum, supplementing learning resources and infrastructure needed.

Improving the quality of education and teaching is inseparable from the role of principals and teachers in managing educational units, especially in high schools. One effort to improve the quality of education in secondary schools is to improve the teaching and learning process carried out by the teacher.

According to the author’s observation, recently, many students think that Mathematics is a difficult and frightening subject. Those assumptions can affect students’ attitudes and mental. As a result, students are reluctant and afraid to learn Mathematics. Moreover, it can make them achieve not optimal score.

As a Mathematics teacher in class X MIPA, the author is truly concerned about seeing the real conditions in the class, because in general the interest of students, especially those majoring in science, in learning Mathematics are still low (see Annex 4.3.1.1). From these data it can be seen that the lowest interest of students in learning mathematics is in class X MIPA 4. Likewise, from the data of students’ score (attachment 4.3.2.1) in the initial conditions it is seen that the X MIPA 4 score in Mathematics test is the lowest. The average score is 41 from minimal completeness criteria (KKM) 68, while classical completeness is 7 people (26.92%).

One of the factors causing low interest and low Mathematics learning outcomes of students is the use of less varied learning model. Teachers often use lecture and assignment methods, which do not involve students maximally. The teachers still use teacher-centered learning method. They use the media and conventional approaches strategies that make students as objects not as subjects of learning.

Based on the above conditions, it encourages the writer to find a solution by making changes to the mechanistic learning model, with a learning model that is in accordance with the characteristics and conditions of students, especially students of class X MIPA 4 SMA Negeri 5 Magelang. The researcher intends to improve learning by applying a learning model that is thought to be in accordance with the conditions of students in SMA Negeri 5 Magelang, especially students of class X MIPA 4. The learning model is called Reciprocal Teaching Model (flipped learning model).

Definition of Learning Interest

One of the important successful learning element is interest. A student who is interested in learning can learn everything seriously. No matter how difficult a subject, it will be pursued with full of responsibility, and also with instructor support and instructions.

Interest, according to Indonesian Language Dictionary is high tendency towards something. Interest is also interpreted as a condition that occurs when someone sees characteristics or situations that are associated with his own desires or needs. Interest is not appear suddenly, but it emerges through participation, experience, and study habit. Thus, interest will always be related to needs and desires. Therefore, the most important thing is how to create certain conditions so that students are always eager to learn (Sardiman, 2007).

Some Factors Affecting Interest

Mc. Clelland in Sutiyono (2007) said that interest in achievement is a psychological process that has the best direction and purpose for success, which is influenced by two factors; internal factors and external factors.

(1) Internal factor is a factor from individuals related to achievement interest. These factors include ability (interest, talent, health, concentration); needs (self-esteem, knowledge, maximum development); interest; and hope / belief;

(2) External factor is factor from outside of the individual related to achievement interest, for example the environment.

Indicator of Achievement Interest
According to Asrori (2007) there are indicators to find out that students have high or low learning interests. Indicators of students who have a high interest in learning include: having a high passion, full of enthusiasm, having high curiosity, independent, have self-confidence, have high concentration, difficulty is considered as a challenge, have a high struggle power.

On the other hand, indicators of students who have low interest include: lack of attention, low struggle power, reluctant to do something, depending on others, want to do something if forced, lack of concentration, tend to be noisy, complain of difficulties.

Learning Interest in Mathematics

Student Learning Interest is a force that encourages students to carry out learning activities influenced by needs. These needs include the need for achievement; desire to do something better and more efficient in solving problems, or mastering difficult exercises in certain subjects. If the subject is Mathematics, the desire meant is in learning Mathematics.

Hence, the authors conclude that learning interest in Mathematics is a force that encourages students to carry out learning activities influenced by needs. These needs include the need for achievement; desire to do something better and more efficient in solving problems, or mastering difficult exercises in certain subjects.

The Nature of Mathematics

The term of Mathematics comes from the Greek "Mathematikos" which means definite science or "Mathesis" which means theory, abstract and deductive knowledge, where conclusions are not drawn based on experience of intimacy, but conclusions are drawn based on certain rules through deduction (http://id.wikipedia.org/wiki/Matematika).

Mathematics is an exact and systematic branch of science. Mathematics is the study of quantities, structures, spaces, relations, changes, various topics and patterns, forms and entities (http://id.wikipedia.org/wiki/Matematika). Mathematics in general is affirmed as patterns, structures, changes, and research spaces with number and numeral.

From those definitions about Mathematics, the author can conclude that Mathematics is a field of science which is a tool of thought, a means of communication, a tool for solving practical problems, whose elements are logic, intuition and construction, analysis, generality and individuality and having branches include algebra, arithmetic, geometry, and analysis.

Mathematical Learning Outcome

According to Fontana (in Suherman, 2003), learning is a process of changing individual behavior that is relatively fixed as a result of experience; while learning is an environmental arrangement that gives nuance so that learning programs grow and develop optimally.

Winkel (1999) defines learning outcomes as changing that result in human attitudes and behavior. The aspect of change refers to the taxonomy developed by Bloom, Simson and Harrow in Winkel (1999), which includes cognitive, affective and psychomotor aspects.

According to Arikunto (1986) learning outcomes / learning achievement is a result of effort, ability and attitude of students in completing assignments in the field of education set in each level of study, expressed by numbers.

From the definitions above, the learning outcomes can be formulated as a process of changing behavior experienced by individuals in the interaction with their environment.

Approaches, Strategies, Methods, Techniques, and Learning Models

According to Akhmad Sudrajat in (https://akhmadsudrajat.wordpress.com/ 2008/09/12/pendekatan-strategi-metode-teknik-dan-model-pembelajaran/) which was accessed on March 23, 2018, define terms as follows:

Learning approaches can be defined as our starting point or point of view of the learning process, which refers to the process view occurrence that is still very general.

Learning strategy is a learning activity that must be done by teachers and students so that learning objectives can be achieved effectively and efficiently.

Learning methods can be interpreted as a method used to implement the plans prepared in the form of real and practical activities to achieve learning goals. Learning technique is a person's style in implementing certain learning methods that are individual.
Learning model can be said as a conceptual framework that describes a systematic procedure in organizing learning experiences to achieve certain learning goals and serves as a guide for teaching designers and teachers in planning and implementing teaching and learning activities (Winataputra, 2003).

**Reciprocal Teaching Model Definition**

Reciprocal Teaching Model is a peer teaching model. In this strategy, students act as teachers to replace the teacher's role to teach their friends. Reciprocal Teaching Model is a learning model that provides opportunities for students to learn independently, creatively, and more actively, where students are given the opportunity to learn the material before, then students explain the material learned to other students. The teacher only serves as a facilitator and mentor in learning. In this case, the teacher give the explanation of material that students cannot solve independently (Fajarwati, 2010: 17).

**Advantages of Reciprocal Teaching Model**

a) Train the students’ ability to learn independently, so that they can improve independent learning

b) Train students to re-explain the material learned to other students. Thus the application of this learning can be used to train students to come in front of the class.

c) Learning orientation is an investigation and discovery of problem solving. Thus the reasoning ability of students is also increasing.

d) Enhancing the students’ ability to solve problems.

**Drawbacks of Reciprocal Teaching Model**

Reciprocal Teaching Model requires students to always be active in learning activities, so that it makes some of the students not confident to be able to appear or show their abilities in front of their friends. In other words, it can be said that the active students is just those people. Therefore, the unconfident students find difficulties in receiving lessons.

**The Relevant Research**

Research results relevant to this study include:

- The research result from Luluk Afifah (2012) stated that the average learning outcomes in the experimental class taught by reciprocal teaching mode by doing fieldtrip in the subject of the comparison on the map (scale) is significantly different from the average learning outcomes in the control class. It also showed that the average learning outcomes of the experimental class are better than the control class.


- The research results from Latifa (2007) entitled "Efforts to Improve Learning Outcomes of Class IX F of MTsN Babakan Lebaksiu Tegal in the Subject of Quadratic Equations Through Flipped Learning Model (Reciprocal Teaching) ".


- The research results from Sulami (2010) entitled "Efforts to Increase Student Activity through Reciprocal Teaching Learning Models in the Subject of Cubes and Beams in Class VIII of SMP N 2 Sawit.

**Action Hypothesis**

Based on the study of theory and conceptual framework, the action hypothesis are proposed as follows:

1. Reciprocal Teaching Model allegedly can increase interest in learning Mathematics for students of class X MIPA4 SMA 5 Magelang;

2. Reciprocal Teaching Model allegedly able to improve Mathematics learning outcomes for students of class X MIPA4 SMA N 5 Magelang.

**RESEARCH METHOD**

**Types of research**

The type of the research is Action Research or Classroom Action Research (CAR). CAR actively involves Mathematics teachers and students who study Mathematics, and research observer teachers.

**Research Settings**

a. Research Schedule
### Table 3.2.1. Research Schedule

<table>
<thead>
<tr>
<th>No</th>
<th>Activities</th>
<th>Month/Year 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>February 1 2 3 4</td>
</tr>
<tr>
<td>1</td>
<td>Writing a Proposal</td>
<td>V v</td>
</tr>
<tr>
<td>2</td>
<td>Preparing Research Instrument</td>
<td>V v</td>
</tr>
<tr>
<td>3</td>
<td>Collecting Data by doing:</td>
<td>v v v v</td>
</tr>
<tr>
<td></td>
<td>a. collecting data of initial condition</td>
<td>v v v v</td>
</tr>
<tr>
<td></td>
<td>b. Cycle I</td>
<td>V v v v</td>
</tr>
<tr>
<td></td>
<td>c. Cycle 2</td>
<td>V v v v</td>
</tr>
<tr>
<td>4</td>
<td>Analyzing Data</td>
<td>v V</td>
</tr>
<tr>
<td>5</td>
<td>Result and Discussion</td>
<td>V V</td>
</tr>
<tr>
<td>6</td>
<td>Writing Research Result</td>
<td>V v V V</td>
</tr>
</tbody>
</table>

#### b. Research Location

This Classroom Action Research was conducted in the class of SMA Negeri 5 Magelang.

#### c. Research Subjects and Objects

The subject of the study were 26 students of class X MIPA 4, consisting of 14 male students and 12 female students. The objects of research are the increased of learning interest, the increased of learning outcomes, and the application of Reciprocal Teaching Model.

#### Data

##### a. Source of Data

The source of research data comes from researchers and students as primary data in the form of daily student test results and observations of student learning interest. In addition, data comes from collaborators / peers or homeroom teacher in the form of secondary data.

##### b. Type of Data

The types of data obtained are quantitative data and qualitative data.

##### c. Stages of Data Collection

There are three stages of collecting data:
1. Data on students' initial conditions
2. Cycle I data
3. Cycle II data

##### d. Data Collection Technique

The data collection technique used in this study are: (1) Test devices; (2) Observation sheets of student learning interest; (3) Student observation sheet by the teacher (observer).

Data collection techniques in this study were in the form of test and non-test.

##### e. Data Analysis

After the research data was collected, the data was analyzed to achieve the research objectives. The analysis techniques used are:
1. Comparative descriptive technique
2. Qualitative data from observations are processed with qualitative descriptive analysis based on the observation result from each cycle then linked to quantitative data, as a basis for describing the success of the implementation of the study. The success is signed by the increase of interest in learning and student learning outcomes.

#### Indicators for Increasing Interest and Learning Outcomes

a. Performance indicators about learning interest
b. Performance indicators about learning outcomes
Procedure of Action and Research Cycle
The research steps done in this research were as follows:

a. Initial conditions
b. Cycle I
c. Cycle II

RESEARCH RESULTS AND DISCUSSION
This chapter presents the research results and discussion.

Student Learning Interest

Table 4.3.1.5 Percentage of Students Learning Interest in Class X MIPA 4 Initial Condition, Cycle I, and Cycle II

<table>
<thead>
<tr>
<th>No.</th>
<th>Levels</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Initial condition</td>
<td>Cycle I</td>
</tr>
<tr>
<td>1</td>
<td>Low interest</td>
<td>61.54%</td>
</tr>
<tr>
<td>2</td>
<td>Moderate interest</td>
<td>30.77%</td>
</tr>
<tr>
<td>3</td>
<td>High interest</td>
<td>7.69%</td>
</tr>
<tr>
<td>4</td>
<td>Very High Interest</td>
<td>0%</td>
</tr>
</tbody>
</table>

Based on Table 4.3.1.5 above, the average score of student interest in class X MIPA 4 in the initial conditions was 15.88 (low category) increased to 25.35 (high category). In cycle I, it is increasing to 34.50 (category very high).

If the percentage of student learning interest in the initial conditions, cycle I and cycle II is presented with a bar diagram, seen as follows:

Figure 4.3.1.5: Bar Diagram of Interest Percentage in Students of Class X MIPA 4 in Initial Condition, Cycle I, and Cycle II

Based on the data in Table and diagram 4.3.2.5 above it appears that:

a. The average value in the initial conditions (with conventional methods) is 41. After applying Reciprocal Teaching Model with
large groups and presenter from medium ability (in the first cycle) increased to 58. Then another action was taken using Reciprocal Teaching Model with small groups and presenter from the best ability (in the second cycle) the average value increased to 86.

b. Class completeness in the initial conditions (with conventional methods) is 7 people (26.92%). After applying Reciprocal Teaching Model with large groups and presenter from medium ability (in the first cycle) increased to 13 students (50%). Then another action was done using Reciprocal Teaching Model with small groups and presenter from the best ability (in the second cycle) the completeness of the class increased to 25 people (96.15%).

Hence, based on the above analysis both from the initial conditions to the first cycle, from the first cycle to the second cycle, and from the initial conditions to the second cycle, it can be said that there was a significant increase in learning outcomes in each cycle as the impact of implementation of Reciprocal Teaching Model.

CONCLUSION

a. Learning Interest in Mathematics

Based on the observation result and the observation on the initial condition before applying Reciprocal Teaching Model, student learning interest is relatively low. Achievement of the average score of student interest is 15.88 (low category). In cycle I, the achievement of the average score of student interest increased to 25.35 (high category). Whereas in cycle II, the average score of student interest increased to 34.50 (very high category). In cycle I, the study group consisted of 6-7 people with moderate-capable material presenters. While in cycle II, the study group consisted of 3-4 people with the best capable material presenters. From this condition there is an increase in students' interest in learning which can be seen in increasing the role of students in the learning process. It can be said that changes in the number of group members greatly influence the increase in student interest.

Therefore, it can be concluded that by applying Reciprocal Teaching Model, the learning process from the initial conditions to the final condition increases the "low" category in initial condition increases to the "high" category in the cycle I and increases again to the "very high" category in the cycle II.

b. Mathematics Learning Outcome

Reciprocal Teaching Model can significantly improve student learning outcomes in mathematics. This is indicated by an increase in the average daily test scores and an increase in the percentage of classical completeness in each cycle. In the initial conditions the average value of students 41, increased to 58 in cycle I and increased again to 86 in the cycle II. It means that there is an increase in the average value of 17 points from the initial conditions to cycle I and increased again by 28 points from cycle I to cycle II. Classical learning completeness also experienced a high increase from 26.92% in the initial condition to 50% in cycle I, and increased again to 96.15% in cycle II. It means that there is an increase of 69.23% (from the initial condition to cycle II).

Therefore, this classroom action research with two cycles can increase students interest and learning outcomes of Mathematics in class X MIPA 4 SMA Negeri 5 Magelang in the even semester of academic year 2017/2018.

Suggestion

a. Applied Implications

After this research successfully proved that Reciprocal Teaching Model can increase students’ interest and Mathematical learning outcomes, the researcher gives suggestions as follows:

1. For students, it is expected that they can learn from their friend who are smart to improve understanding of the difficult material, so the learning outcome is achieved optimally;
2. Reciprocal Teaching Model can be used as an alternative learning model in the classroom with conditions of interest and low student learning outcomes;
3. For colleagues, it is expected not only to use conventional learning models, but also choose models, methods or techniques that are appropriate to the situation and conditions of students;
4. For teachers, especially Mathematics teachers, they are expected to use Reciprocal Teaching Model to improve student learning outcomes optimally, because this learning model is
proven to increase student interest and learning outcomes;
5. For schools, they can facilitate and provide supporting facilities and encourage teachers to apply a variety of learning models so that the learning process becomes more qualified. Furthermore, student learning outcomes can increase and will have a direct impact on school performance.

b. Implications of Advanced Research
This research can provide positive results that can increase student interest and learning outcomes, but there are still students who have not been optimally interested in Mathematics learning. Likewise, there is still one student from 26 students whose daily test results have not reached KKM yet.

REFERENCES