

**ENHANCEMENT OF MATHEMATICS LEARNING USING RECIPROCAL TEACHING
APPROACH FOR CLASS X STUDENTS OF VOCATIONAL SCHOOL OF
MUHAMMADIYAH KRETEK**

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ABSTRACT

This research was conducted because the independence of learning mathematics in class X AK 1 even semester of SMK Muhammadiyah Kretek Bantul in the 2015/2016 academic year was still lacking. The purpose of this study is to improve the independence of learning mathematics using a reciprocal teaching approach to class X AK 1 even semester of SMK Muhammadiyah Kretek Bantul in the academic year 2015/2016. This research is a type of classroom action research. Subjects in this study were students of class X AK 1 even semester of SMK Muhammadiyah Kretek Bantul in the 2015/2016 academic year. While the object studied in this study is the reciprocal teaching approach as an effort to improve mathematics learning independence of students of class X AK 1 even semester of SMK Muhammadiyah Kretek Bantul in the academic year 2015/2016. The study was conducted in 2 cycles, namely, cycle I and cycle II, each cycle consisting of 2 meetings. Cycle I and cycle II use the Reciprocal Teaching Approach. Data collection techniques in this study, namely observation, interviews, tests, and documentation. Analysis of the data used is descriptive qualitative. The results showed that learning using the Reciprocal Teaching Approach could improve mathematics learning independence of students of class X AK 1 even semester of SMK Muhammadiyah Kretek Bantul in the academic year 2015/2016. This is evident from the results of observations of students' mathematics learning independence in each cycle has increased, namely the average percentage of students' mathematics learning independence in cycle I amounted to 48.5119% who achieved enough criteria, and in the second cycle increased to 64.88095% which achieved good criteria. The results of interviews with students showed a positive response to the independence of students learning mathematics.

Keywords: Independence Learning Mathematics, Reciprocal Teaching Approach.

INTRODUCTION

Mathematics is one of the subjects that is widely used in other subjects, for example, physics, chemistry, biology, economics, and other sciences. Many students think that mathematics is a difficult subject and requires an intelligent brain. This assumption is the cause of their lack of enthusiasm for learning and makes them passive during the learning process. Learning is essentially a process of interaction with all interactions around individuals. Learning is also a process of seeing, observing, and understanding something. Umar Tirtarahardja and Sulo (2012: 51) state that learning is defined as self-development activities through experience, relying on the ability of self-learning under the guidance of teachers. Trianto Ibnu Badar (2014: 19) states that learning is a two-way interaction between a teacher and students, were between the two become intense and directed communication (transfer) towards a predetermined target. According to Johnson and Myklebust quoted by Mulyono Abdurrahman (2003: 252), mathematics is a symbolic language whose practical function is to express quantitative relations and spaces while the theoretical function is to facilitate thinking. Umar Tirtarahardja and Sulo (2012: 50) state that independence in learning is defined as learning activities that take place more driven by their own will, their own choices, and their responsibilities from the learner. According to Rusman (2015: 366) students who are very independent have the following characteristics (1) already know exactly what they want to achieve in their learning activities (2) can already choose their learning resources and know where they can find learning materials desirable and (3) can already assess the level of ability needed to solve the problems encountered in his life. Arief S. Sadiman, et al. (2004: 105) suggested that the characteristics of learning independence are (1) there is a tendency to argue, behave, and act on their own will to solve problems freely and not depend on others (2) Having desires strong to achieve a goal (3) strive with perseverance and perseverance to realize their expectations (4) able to

think and act creatively, full of initiative, and not just imitate (5) have a tendency to achieve something themselves without the help of others (6) in dealing with problems trying to solve themselves without the help of others and (7) able to determine for themselves about something that must be resolved without expecting help from others. According to Trianto Ibnu Badar (2014: 191), reciprocal teaching is an approach to teaching students about learning strategies. Reciprocal teaching is a constructivist approach based on the principles of making or asking questions, where metacognitive skills are taught through direct teaching and modeling by teachers to improve the reading performance of students who read low comprehension. According to Palinscar in Aris Shoimin (2014: 153-154), reciprocal teaching contains four strategies. (1) question generating, i.e. students are allowed to make questions related to the material being discussed (2) clarifying, ie students can ask the teacher about concepts that are still difficult or cannot be solved with the group. In addition, teachers can also clarify concepts by giving questions to students (3) predicting, namely students doing hypotheses or estimates about what concepts will be discussed next by the presenter and (4) summarizing, namely opportunities for students to identify and integrate information contained in the material.

The reciprocal teaching procedure according to Trianto Ibnu Badar (2014: 192), namely (1) the teacher assigns students to read readings in small groups (2) the teacher models four skills (asking questions, summarizing readings, clarifying difficult points, and predicting what is difficult which will be written in the next reading section) (3) the teacher appoints a student to replace his role as a teacher and acts as the leader of the discussion in the group, and the teacher switches roles in the group as motivator, mediator, trainer, and gives support, feedback, and enthusiasm for students and (4) gradually and gradually the teacher transfers more teaching responsibilities to students in the group, and helps monitor the thinking and strategies used.

The strengths of the reciprocal teaching approach according to Aris Shoimin (2014: 156) are as follows (1) fostering cooperation between students (2) students learn by understanding (3) students learn independently (4) students are motivated to learn and (5) foster the courage to think and talk in front of the class. The formulation of the problem in this study is "Is the reciprocal teaching approach can improve the independence of learning mathematics in class X AK 1 even semester of SMK Muhammadiyah Kretek Bantul in the academic year 2015/2016?". The purpose of this study is to improve the independence of learning mathematics using the reciprocal teaching approach of class X AK students in the even semester of SMK Muhammadiyah Kretek Bantul in the academic year 2015/2016.

METHODS

This research is Classroom Action Research (CAR). The subjects of this study were students of class X AK 1 even semester of SMK Muhammadiyah Kretek Bantul in the 2015/2016 academic year. The object of this research is the whole process and results of learning mathematics using the reciprocal teaching approach as an effort to improve the mathematics learning independence of students of class X AK 1 even semester of SMK Muhammadiyah Kretek Bantul in the academic year 2015/2016. This research procedure consisted of two cycles. Learning in the stages of a cycle I and cycle II using the reciprocal teaching approach then the researcher acts as a teacher. According to Suharsimi Arikunto, et al (2007: 16-20), the activities carried out in each cycle are as follows (1) planning, (2) implementation of actions, (3) observation and (4) reflection. At this planning stage, researchers compile and prepare the following (1) learning implementation plan (RPP) (2) observation sheets of student learning independence (3) student interview sheets and (4) question descriptions for each cycle. At the implementation stage of the action, the researcher applies the lesson plans that have been made, namely learning by the reciprocal teaching approach. The material discussed is about the linear program with the details as follows (1) in cycle I discuss the linear inequality system of two variables (2) in cycle II discusses mathematical model material. In the observation stage, the researcher was assisted by two UAD students as observers who observed all the students' learning independence during the learning

activities. In the reflection stage, the researcher and observer conduct a discussion to evaluate the teaching and learning process that has been going on and prepare an action plan in the next cycle.

Data collection techniques used in this study are as follows (1) interviews were conducted at several students at the end of each cycle meeting, (2) observations were made to determine the independence of students' mathematics learning during the learning process (3) triangulation was used to find out the data obtained so more clear, consistent, thorough and certain and (4) Tests are used to determine the level of student success in participating in learning. Analysis of the data used is descriptive analysis. The learning independence observation sheet is analyzed using the percentage formula:

$$NP = \frac{R}{SM} \times 100$$

Information :

NP : Percent value to be sought or expected

R : Raw scores obtained by students

SM : The ideal maximum score of the test in question

100 : Fixed numbers

(Ngalim Purwanto, 2006: 102)

The percentage criteria (NP) can be seen in the following table:

Table 1. NP Value Criteria

Percentage (%)	Criteria
$80\% \leq NP \leq 100\%$	Very good
$60\% \leq NP < 80\%$	Good
$40\% \leq NP < 60\%$	Enough
$20\% \leq NP < 40\%$	Less
$NP < 20\%$	Very less

(Suharsimi Arikunto dan Cepi Abdul Jabar, 2007: 35)

The indicator of success in this study is the independence of students learning mathematics increases, ie if the independence of learning mathematics students at least achieve good criteria or more than 60%.

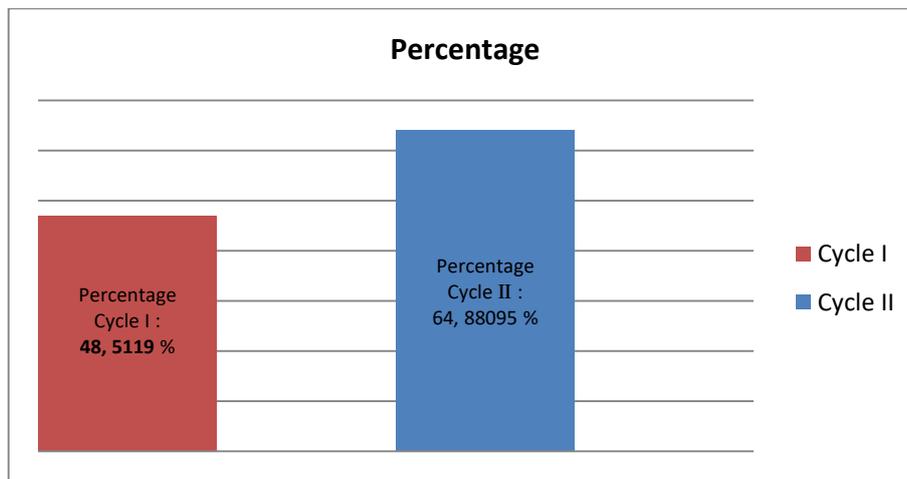
RESULTS AND DISCUSSION

Learning activities that have been carried out in cycle I and cycle II using the reciprocal teaching approach show that there is an increase in students' mathematics learning independence on the subject of linear programming. Increased independence of student mathematics learning can be seen in the following table:

Table 2. Analysis of Observation Results of Students' Mathematics Independent Learning

No	Indicator	Cycle I	Cycle II	Information
1	There is a tendency to argue and not depend on others	52, 08333 %	62, 5 %	Increase
2	Have a strong desire to achieve a goal	45, 83333 %	60, 41667 %	Increase
3	Trying with perseverance and perseverance	41, 66667 %	60, 41667 %	Increase
4	Able to think creatively	50 %	66, 66667 %	Increase
5	Having a tendency to achieve something alone	52, 08333 %	64, 58333 %	Increase
6	In the face of problems try to solve it yourself	52, 08333 %	70, 83333 %	Increase
7	Being able to determine for yourself about something that must be resolved	45, 83333 %	68, 75 %	Increase
Average		48, 5119 %	64, 88095 %	Increase
Criteria		Enough	Good	

For more details will be presented in the following graph:



Picture I. Average Percentage Graph of Mathematics Learning Independence in Cycle I and Cycle Students II

Based on Table 2 shows that as many as 48 students, 5119% are independent in learning activities. The number is not maximal because from the observation results there are still students who have not done it independently when solving mathematical problems. This is due to the lack of student responsibility in learning. After reflection on improvements in the teaching and learning process, in cycle II an increase in students' mathematics learning independence to 64, 88095%. This figure meets the desired research criteria of more than 60.00%. Student responses to mathematics learning using the reciprocal teaching approach are very good. This can be seen from the results of researchers' interviews with several students of class X AK 1.

Based on the indicators of research success that have been determined, this research has been successful. Provisions of success state that this study was successful if the independence of learning mathematics students achieved good criteria or more than 60%, meanwhile after carrying out the second cycle obtained independence learning mathematics students reached 64,88095%. That means that the independence of learning mathematics students has exceeded the success of this research.

CONCLUSION

Based on the results of the study it can be concluded that learning activities using the reciprocal teaching approach can improve mathematics learning independence of students of class X AK 1 even semester of SMK Muhammadiyah Kretek Bantul in the academic year 2015/2016. This can be shown from the results of observations of mathematics learning independence of students in the first cycle of 48,5119% or insufficient criteria and in the second cycle increased to 64,88095% or good criteria. Mathematical learning activities using the reciprocal teaching approach get positive responses from students, which means students can receive well and are interested in participating in learning.

REFERENCES

- Arief S. Sadiman, dkk. 2004. *Media Pendidikan*. Jakarta: Raja Grafindo.
- Aris Shoimin. 2014. *68 Model Pembelajaran Inovatif dalam Kurikulum 2013*. Yogyakarta: Ar-Ruzz Media.
- Mulyono Abdurrahman. 2003. *Pendidikan Bagi Anak Berkesulitan Belajar*. Jakarta: Rineka Cipta.
- Ngalim Purwanto. 2006. *Prinsip-prinsip dan Teknik Evaluasi Pengajaran*. Jakarta: Remaja Rosdakarya.
- Rusman. 2014. *Model-Model Pembelajaran: Mengembangkan profesionalisme Guru*. Jakarta: Raja Grafindo Persada.

- Suharsimi Arikunto, dan Cepi Safruddin Abdul Jabar. 2007. *Evaluasi Program Pendidikan Pedoman Teoretis Praktis Bagi Praktisi Pendidikan*. Jakarta: Bumi Aksara.
- Suharsimi Arikunto, Suhardjono, dan Supardi. 2007. *Penelitian Tindakan Kelas*. Jakarta: Bumi Aksara.
- Trianto Ibnu Badar. 2014. *Mendesain Model Pembelajaran Inovatif, Progresif, dan Kontekstual: Konsep, Landasan, dan Implementasinya pada Kurikulum 2013 (Kurikulum Tematik Integratif/TKI)*. Jakarta: Kencana Prenadamedia Group.
- Umar Tirtarahardja dan Sulo. 2012. *Pengantar Pendidikan*. Jakarta: Rineka Cipta.