

CHAPTER I INTRODUCTION

1.1 Background

Mathematics is one of the subjects studied at every level of education to equip students to have the ability to think logically, critically, systematically, analytically, and creatively. Mathematics also has an important role in various other disciplines and has a role to develop the power of human thought. Therefore students are expected to master mathematics because mastering mathematics will make it easier to understand other fields of science (Zulfa, 2014).

In learning mathematics students are required to have basic competencies in mathematics in accordance with the objectives of learning mathematics. According to PERMENDIKNAS No.22 of 2006 concerning Standard Content of Mathematics Subjects, that the purpose of learning mathematics is that students are able to:

1. Understanding mathematical concepts, explaining the interrelationships between concepts and applying concepts or logarithms, formally, accurately, efficiently, and precisely in solving problems
2. Using reasoning on patterns and properties, doing mathematical manipulation in making generalizations, compiling evidence, or explaining mathematical ideas and statements
3. Solve problems that need to be solved, solve mathematical models, solve models and solve the solutions obtained
4. Communicating with tables, diagrams, or other media to clarify the situation or problem
5. Having an attitude towards the usefulness of mathematics in life, namely having curiosity, attention, and interest in mathematics, as well as being tenacious and confident in problem-solving.

Reasoning ability is one of the competencies that must be possessed by students. That is because reasoning is one of the standards that is needed in learning mathematics and becomes one of the goals of learning mathematics and is very needed for solving problems in daily life. If the students' reasoning ability

is not developed, then for mathematics students will only become material that follows a series of procedures and mimics the examples given by the teacher without knowing the meaning or meaning of what they wrote. This is in line with Linuhung and Sudarman (2016: 53) which states, "The ability of reasoning in learning mathematics needs to be developed because it can help students improve their ability in mathematics, that is, from merely remembering the ability of understanding".

A student's perspective on mathematical problems also influences the mindset about the solution that will be done. Besides being a mathematical science that is understood through reasoning, but also because one of the goals of mathematics learning is that students are able to pattern and trait, do mathematical manipulation in making generalizations, compiling evidence, or explaining mathematical ideas and statements. As per according to Hasratuddin (2018: 95) which states about indicators of reasoning include:

- a. Able to submit allegations.
- b. Give reasons or evidence to the truth of a statement.
- c. Make conclusions from a statement.
- d. Checking the validity of the argument.
- e. Finding patterns in a mathematical phenomenon.
- f. Provides an alternative to an argument.

. In this case, the researcher limits several indicators of students' mathematical reasoning as follows: (1) presenting mathematical statements in writing, (2) submitting allegations, (3) doing mathematical manipulation, (4) make conclusions from statements.

The classic problem in mathematics education is the low mathematics learning achievement of students. This is because of the learning process of students. One example that indicates that reasoning is low is when students solve problems. Difficulties experienced by students in learning mathematics which makes students' mathematical reasoning problematic. It does not explore, discover traits, arrange conjectures then test it but only accept what is given by the teacher or students only accept what is said by the teacher (Linuhung and Sudarman, 2016).

As per (Safari, 2016) in general students have not been able to construct the process of solving a given problem. Students are only focused on the formula that will be used to solve a problem. Students do not try to find relationships, evaluate, analyze, and build images or models that are relevant to problem-solving.

According to (Safari, 2016) that the problem of the low ability of students' mathematical reasoning is caused by factors in the learning process that are not yet right. The teacher has not trained students to analyze each problem-solving process used. The process of metacognition of students has not run and has not been trained by the teacher. This situation shows the need for a learning process with a metacognitive approach to practice students' mathematical reasoning.

According to Roza (2017) which states that one of the efforts that can be made to overcome this problem is by implementing varied learning strategies such as learning metacognitive approaches. This strategy refers to improving students' thinking processes, as long as the thinking process of reasoning ability is very necessary. Increased students' thinking ability will have an impact on student activities in understanding and solving problems

Based on the previous explanation, it can be seen that mathematical reasoning ability is very important. Realizing the importance of mathematical reasoning ability for students, we need a learning that can improve students' mathematical reasoning abilities. One way that teachers can do to improve students' understanding of concepts and mathematical reasoning abilities is by applying relevant learning models that can make students more active and help students achieve their learning goals. This is supported by Sagala (2009: 63) which states that, The teacher must understand the nature of the subject matter proposed as a lesson that can develop students' thinking abilities and understand various learning models that can facilitate students' ability to learn by planning developed by the teacher.

A learning approach is needed so that it can support the creation of mathematical reasoning abilities. One learning approach that can be applied is to use a metacognitive approach. According to Roza research (2017), that learning

the Metacognitive approach is learning that is able to improve mathematical reasoning abilities better than students who learn with conventional learning model. According to Livingston (1997) Metacognitive activities are basically "thinking to thinking" activities, which are basically controlling activities about their own cognitive processes..

A metacognitive approach is a form of a person's ability to see their own abilities and control them so that what will be done runs optimally (Roza, 2017). The Metacognitive Approach refers to ways to increase awareness about students' thinking processes. Increased awareness of students' thought processes will have an impact on students' thinking activities to make conclusions or thought processes in order to make a new statement that is true based on statements whose truth has been proven or assumed previously. (Nasution & Surya, 2017)

According to Cardelle (in Fauzi, 2012) Learning with a metacognitive approach directs students' attention to what is relevant and guides them to choose the right strategy for solving problems through scaffolding guidance.

In learning activities students sometimes have difficulty in understanding the concepts or materials provided by the teacher well, therefore students need help from the teacher to understand the concepts of the lesson being learned. This difficulty can actually be overcome by the role of scaffolding in the learning strategy implemented by the teacher as a solution with the consideration that the role of assistance when needed is something very important and important.

In learning, scaffolding can be said as a bridge that is used to connect what students already know with something new students will know. The main thing in the application of scaffolding lies in the guidance of the teacher. Teacher guidance is given in stages after students have been given a problem so that their actual abilities reach potential abilities. The assistance can be in the form of instructions, encouragement, warnings, describe the problem in the steps of solving or provide examples.(Chairani, 2015)

Scaffolding means the efforts of educators to guide students in their efforts to achieve success. Teacher encouragement is needed during learning so that students will be able to do the task independently. Assistance provided by

teachers can be in the form of instructions, warnings, encouragement, describing problems in other forms that allow students to be independent.

Based on this background, the researcher conducted a research entitled :
“Analysis of Metacognitive Approach By Giving Scaffolding on Students’ Mathematical Reasoning Ability”

1.2 Problem Identification

Based on the background of the problems mentioned above, several problems can be identified as follows:

1. Students are not active in the learning process
2. Lack of student interest and motivation in learning mathematics.
3. Learning approaches and strategies applied are still ineffective
4. Mathematical reasoning ability of students in learning mathematics is still low.

1.3 Problem Limitation

Based on the background and problem identification, it needs problem’ limitation to more focused. Limitation problem in this research is Analysis of metacognitive approach by giving scaffolding on students’ mathematical reasoning ability.

1.4 Problem Formulation

Based on the identification and limitations of the problem above, the problem formulation in this research are:

1. How is the tendency of effect in metacognitive approach by giving scaffolding on students’ mathematical reasoning ability ?
2. How is the tendency of enhancement on students' mathematical reasoning ability taught using metacognitive approach by giving scaffolding ?
3. What are the advantages of the metacognitive approach by giving scaffolding ?

1.5 Research Objective

The objective in this research is :

1. To analysis the effect of the metacognitive approach by giving scaffolding to the student mathematical reasoning ability.
2. To analysis of enhancement of students' mathematical reasoning ability taught using a metacognitive approach by giving scaffolding.
3. To know advantages of a metacognitive approach to scaffolding.

1.6 Research Benefit

This research is expected will give the benefit as follow :

1. For students, through a metacognitive approach by giving scaffolding is expected students can more easily understand the material in mathematics, so that it can improve students' reasoning ability.
2. For teachers, it can expand knowledge about metacognitive approaches by giving scaffolding in helping students to improve students' mathematical reasoning ability.
3. For schools, can be used as consideration and input to school in improving the quality of teachers and classroom learning system.
4. For researcher , additional insight, ability, information and experince as prospective teachers in the future.
5. For readers, as information material who wants to conduct similar research.

1.7 Operational Definition

The operational definition in this research is :

1. The ability of mathematical reasoning is the ability to present statements in writing, submit guesses, mathematical manipulation, and make conclusions, compile proof, provide reasons the subject matter of parallelograms and rombus

2. Metacognitive is an awareness of what a person's ability to learn, think, understand, control themselves and manipulate the cognitive processes they have.
3. Mathematics learning with a metacognitive approach is student-centered learning that involves thinking skills. The ability to think in question is the ability to control awareness in thinking, planning and choosing mathematical problem-solving strategies, monitoring the strategies chosen, analyzing the effectiveness of the strategies used and changing strategies according to needs.
4. Scaffolding is giving a assistance to students during the initial stages of learning, then reducing assistance and providing opportunities to take over greater responsibilities after he can do it.

Analysis is the activity of deciphering, differentiating, sorting out something to be regrouped according to certain criteria and looking for its relation and then interpreting its meaning.

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