

Analysis of Mathematical Representation Ability of Grade VIII Senior High School

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Abstract—Mathematics recently have a substantial influence on other disciplines and have important role in various life. In other words, several of problems can be formed in the form of mathematics and it can be solved based on mathematics principles. Mathematics at school is expected to help the students to have the basic principles of mathematics in term of daily life. This qualitative research aims to describe the ability of mathematical representation of students in understanding the learning. The students will have a good understanding if they are able to represent their mathematical ideas. The ability of mathematical representation was analyzed from mathematics test result given to class VIII at one of Junior High School in Padang. The result of this research show that most of the students cannot, still, convey a mathematical way of thinking which is logically arranged well and interpreted the mathematical problems they encountered, so as to achieve the expected problem resolution.

Keywords— *Analysis, Mathematical Representation Ability*

I. INTRODUCTION

Mathematics is known as one of the disciplines of science and technology subjects. It is recognized to have great influence on other disciplines and has an important role in various aspects of life which means that various problems can be made in the form of mathematics and then finds the solution based on the principles of mathematics itself. Mathematics is taught at every level of education in Indonesia started from basic education to college by making it as a compulsory subject. The students are prepared to have ability to think logically, critically, creatively, innovatively, and affectively and able to contribute in the society life, nation, state, and world civilization. Learning Mathematics in the schools is expected to equip the students to have good basic math skills in order to make them applying it in everyday life.

According to *Nation Council of Teacher of Mathematics* [4], the students have to have the ability of basic mathematics which is the skills are consist of problem-solving, reasoning and proofing, communication, connection and representation. The process of learning mathematics is expected to give the space to students to be able to present the mathematical concepts that has been learned into various forms of mathematical models to solve mathematical problems encountered. It can be fulfilled by providing opportunities for students to develop the ability of mathematical representation.

The mathematical representation ability is the crucial ability to be developed for junior high school students. It is caused by the students have already have good ability in representing that will be able to make a variety of representations in order to make them easier to find the alternative solutions. As a result, for good representation will have impact of increasing the ability to solve the mathematical problems.

The ability of mathematical representation is the key in understanding the lesson. Since the students have well in representing their own mathematical ideas, the will have good understanding. It is caused by representing is a new form as a result of translations of the problems ideas of translation or des into the form of visual images or translations of diagrams or physical models into symbols or words. The students who have good mathematical representation will help them to think to express their ideas toward the mathematics problems given.

Representation is a model or a substitute form of a problem situation which is used to find a solution. For example, a problem can be represented with objects, images, words, or mathematical symbols [3]. Representation is one of the mathematical abilities of the fifth process standard established by NCTM. Representation is the way in which a person communicates a mathematical answer or idea in question [4]. Representation is an activity of conceptual interpretation or problem by giving meaning [1].

The representation supports the mathematical reasoning, mathematical communication and mathematical delivery of ideas. The role of representation is as a tool for manipulating objects, communication tools and tools to understand the concept. Mathematical representation plays a crucial role in various mathematical activities that are being the goals of education in some countries.

Related to the ability of mathematical representation, there are two types of representation; external and internal representation. First, external representation, it consist of symbols, rules, and diagrams that used by the students to state the definition. Second, internal representation, it related to how individual, build the psychology, and establish the definition. It can be seen that both of them have impact in development of the definition in mathematics.

Based on some experts' opinions before, it can be conclude that mathematical representation is the form of thinking interpretation of the students toward the problems that is used as a tools to help the solution, which can be

form of words, writings, pictures, tables, graphics, concrete things, math symbols, others. Lesh, Post dan Behr [2] divided the representation used the math education into 5 types, representation of the real-world objects, concrete representations, representation of arithmetics symbols, verbal language representation and image or graph representations .NCTM sets out the standard of representation that is hoped the students to master during school learning: (1) create and use representations to recognize, record or record, and communicate mathematical ideas; (2) select, apply, and translate between mathematical representations to solve problems, and (3) use representations to model and interpret the physical, social, and mathematical phenomena [4].

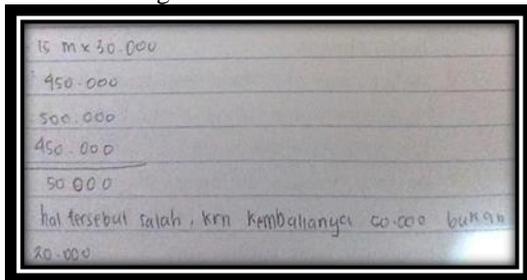
The indicators used as a reference to see the mathematical representation of the students i this study based on the indicators of mathematical representation ability that s formulated by NCTM.

II. RESEARCH METHODS

The approach used in this research is qualitative approach. The aim of this study was to know the ability of the students in mathematical representation where the subjects that was used was the students of grade VIII at one of Junior High Schools in Padang. The instruments used were questions and interview. The question was used to get the data about the mathematical representation ability of the students, meanwhile the interview was used to get more accurate and clear data. Data analysis techniques conducted in this study consists of presenting data and drawing conclusions. Data are categorized and presented in the form of narrative text. The conclusion of this study aims to describe the ability of mathematical representation of students.

III. FINDINGS AND DISCUSSION

One of example of the students' answer that belongs to unsatisfactory level in mathematical representation ability can be seen in the figure below:



Based on the figure, it showed that to find the solution of the students' problems are still not able to resolve the problem by systematic way and interpreted the result

obtained. Most of the students directly find the counting result based on the question given. It caused the form of the solving of the problem asked cannot be fulfilled. It means the students are still not able to fulfill one of indicators of the ability of mathematical representation of solve the problem. Then, the leaners still cannot deliver the mathematical ways of thinking logically arranged well and interpreted the mathematical problem encountered to achieve the expected problem resolution.

The cause of the low ability of mathematical representation that gives the biggest impact is the strategy and learning methods used at the school. Based on the interview with one of the teachers who taught in one of junior high school in Padang, it showed that the learning process that applied in the classroom still has not given space to the students to be able to represent their ideas. The learning process that has already been applied is one and two ways. It is caused by the teacher's belief, if they give the opportunity to the learner to represent their ideas they will spend more time so that the learning objectives can not be fullfilled. Along with that, the teacher in mathematics learning related to representation still use conventionl way. So that the students tend to imitate the step of the teachers, the students never given the opportunity to present their mathematical representation ability.

IV. CONCLUSIONS

Based on the result and the discussion of the research about the ability of mathematical representation, it can be concluded that the students are still not able to fullfill on indicators of the mathematical representation that are choosing, applying, and doing translation between mathematical representation to solve the problem. The students are still can not convey a mathematical ways of thinking that is logically arranged well and interpret the mathematical problems encountered, so as to achieve the expected solution.

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