

CHAPTER I INTRODUCTION

1.1 Background

Education holding a vital role in the development of human resources and determine the progress of a nation. Currently the education system has progressed very rapidly. Various ways have been introduced and used in the learning process in the hope that the teachers will be memorable and learning for pupils will be more meaningful. In fact there are problems in the learning process that takes place in schools. This problem is especially felt by the teachers who teach in schools. They had difficulty in providing information that should be presented to students.

Education gives knowledge, good thinking patterns, and a more systematic framework. Education need logical thinking to connect the abstract part in the mind to applied in solving problem of reality life. To construct this logical thinking, it needs mathematics. Mathematics is a foundation and framework of the development of science and technology. In everyday life we use and need mathematical concepts and principles, as a tool in applications other disciplines as well as in the development of mathematics itself. Seeing the importance of the role of mathematics in everyday life, mastery of the subject areas of mathematics is a must.

Mathematics is a compulsory subject set by the government to be learned by students ranging from elementary to high school. This is because mathematics has an important role in the progress of a country. In learning mathematics students must have comprehension, skills, and knowledge which is this aspect is known and can be done by teachers and students on learning mathematics in a school. NCTM (2000) states that the expected goals in learning mathematics are to set of five process standard that must be owned by student are problem solving, Reasoning and Proof, Communication, Connection, Representation. The five of characteristics are the goal to be achieved in mathematics learning. So mathematics is a learning that has final result more than a score in the final report.

Representation is a form of interpretation of students' thinking of a problem which is used as an aid to find solutions to these problems. Students can be a form of interpretation of words or verbal, text, images, tables, graphs, concrete objects, mathematical symbols, and others.

Representations should be treated as essential elements in supporting students' understanding of mathematical concepts and relationships, in communicating mathematical approaches, arguments, and understandings to one's self and to others, in recognizing connections among related mathematical concepts, and in applying mathematics to realistic problem situations through modeling. New forms of representation associated with electronic technology create a need for even greater instructional attention to representation. So, representations underpin conceptual understanding, communications, connections, and problem solving. All of these processes are assisted by an effective representation. Students should engage with each of these in all of their mathematics courses, so that is effective presentations.

- Create and use representations to organize, record, and communicate mathematical ideas.
- Select, apply, and translate among mathematical representations to solve problems.
- Use representations to model and interpret physical, social, and mathematical phenomena.

At times, teachers should present a representation explicitly, while at other times, they should guide students to “discover” how best to represent a mathematical model.

Goldin and Shteingold (2001) wrote of two systems of representation. External systems of representation include conventional representations that are usually symbolic in nature. Internal systems of representation are created within a person's mind and used to assign mathematical meaning. Our numeration system, mathematical equations, algebraic expressions, graphs, geometric figures, and number lines are examples of external representations. These representations have been developed over time and are widely used. External representations also include

written and spoken language. Examples of internal representations include personal notation systems, natural language, visual imagery, and problem solving strategies. Low ability of representation showing a lack of skilled students in generating ideas, ask questions and respond to questions or opinions of others. But on last situation mathematical representation ability of students is in school less attention since many students don't comprehend about their mathematical representation ability. Though mathematical representation ability is very important in learning mathematics since facilitating the students to represent problem in form of mathematical visual object which is more interesting.

Based on explanation above, can be concluded that representation is one of the important thing in understanding mathematics. Mathematics can be understood if the students have good representation. So they able to describe, interpret, express, symbolize or even modeling ideas, mathematical concepts and the coherence among them and contained in a configuration, construction or certain situations that appear in various forms in order to obtain clarity of meaning, show understanding or looking for a solution of the problems.

However, the reality in the field is still a lot of problems that happened during the learning process and the learning outcomes, especially in mathematics. The problems that happened during the process learning identified in SMA Negeri 5 Medan is a learning approach that teachers use still teacher centered learning, students are passive, low interest of the students towards mathematics, mathematical representation ability is low.

Many teachers still follow the paradigm of transfer of knowledge in mathematics. This paradigm assumes that the student is the object or target to learn, so this way mostly done by teacher. It also found when conducted observation in class X SMA Negeri 5 Medan, teacher is still doing conventional teaching, where the teacher give material in the form of discourse and then giving a test. These situation make student don't have the opportunity to represent the ideas that they have. On the other side, Hudojo (2001) states that "The learning activities are conventionally not accommodate the development of students' skills in problem solving, reasoning, connections and communication of mathematics students".

Additionally, in the reality also shows that the condition of learning that takes place in the classroom make the students passive. Where the activities of students are limited to hear, noted, and doing the exercise given by teacher that making students' motivation is low. Students are not trained in conducting group discussions or presentation in front of the class. This is similar to the results of interviews with some of students of SMA Negeri 5 Medan said that mathematics becomes difficult because of teacher teach it monotonous and rigid, so it makes students reluctant to ask, and not make fun of creativity and innovation that makes learning math being boring. Besides books that teacher use different books used by students so that students' difficulties to understand the theory in the book.

Another problem is the interest of student in grade X SMA Negeri 5 Medan with mathematics is low. Many students think math can't be applied in everyday life because teacher rare spawns examples of problem related to everyday life. Lack of students' interest in mathematics makes low students math skills. This is reinforced by the result of an interview with one of the teacher of mathematics grade X SMA Negeri 5 Medan, said that many students who don't like math, they considers that mathematics is very difficult, only some students who scored completed, the result must be held remedial to add value to the students who didn't complete.

The information as describe above may give the impression that is not good for students can also educate students to be individualistic. They see mathematics as a set of rules and exercises that bring boredom of students activities only repeat and memorize without being given more opportunities to interact with others. The other side, the ability of students' mathematical representation is still low. Low ability students' mathematical representation can be seen from the diagnostic test researchers gave 44 students of class X SMAN 5 Medan relating to the ability of a mathematical representation that shows similar results, where the ability of a mathematical representation of participating students are still low.

Examples of student work:

Question 1

The scores of 25 students are as follows:

90, 87, 69, 76, 90, 100, 90, 88, 40, 98, 71, 79, 98, 100, 67, 54, 90, 87, 90, 100, 95, 95, 70, 65, 80

- Prepare a frequency table for the grouped data.
- Draw the data above in form of column chart.
- How many students passed the science quiz if the standard score > 70 ?
- Determine the value of mean.

1.) Nilai Siswa

$$\begin{aligned} \text{Rentang} &= \text{Nilai max} - \text{Nilai min} \\ &= 100 - 54 \\ &= \underline{\underline{46}} \end{aligned}$$

Table :

54-64	54-64
65-73	65-73
74-81	74-81
	82-93

$$\begin{aligned} \text{Rata}^{\text{r}} &= \frac{\text{Jumlah nilai data}}{\text{banyak data}} \\ &= \frac{2063}{25} \\ &= 82,52 \end{aligned}$$

2.)

Figure 1.1 Observation Result of Students' Answer Number 1

From the answers above, we can see that the student have not been able to represent the data into the form of mathematical expressions. Student doesn't understand how to prepare a frequency table for the grouped data and also don't know to find class interval. Student has not been able to represent the data into the form of diagram.

Question 2

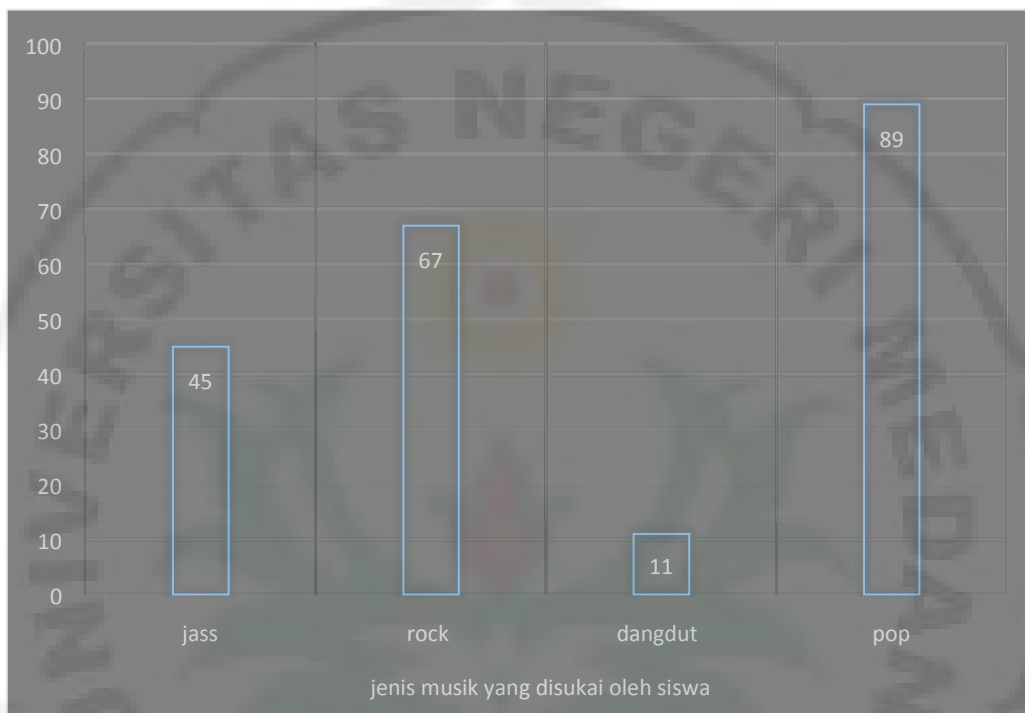


Figure 1.2 The Question of Observation Question no 2

See the bar chart of “jenis musik yang disukai oleh siswa” explain briefly, the overall pattern of the number of students with a background of music preferred by the students?

Answer:

2.) Jumlah siswa yang menyukai musik pop paling banyak yaitu 89 dan paling sedikit dangdut yaitu 11

Figure 1.3 Observation Result of Students' Answer Number 2

From the answers above, we can see that the student have not been able to explain the data clearly. Student have not been able to make conclusion that corresponds to a representation presented

The results of students' answers on diagnostic tests given toward 44 students with mathematical representation ability can see on appendix of "the result description of diagnostic test mathematical representation ability" with earned average is 1.41, there is no student who gained mastery value (KKM) ≥ 2.66 (B-) with details there were 1 student who obtained score (C+), 9 students who obtained score (C), 16 students who obtained score (C-), 10 students who obtained score (D+), and 8 students who obtained score (D).

Students reach the learning mastery individually if had reached the minimal mastery criteria (KKM) is ≥ 2.66 (B-). Minimal 85% of students that had followed the test had reached the learning mastery individual. Permendikbud No. 59 (2014) the criteria of mathematical representation ability if the scores of students 3.67 – 4 or (A) is excellent, 3.34 – 3.66 or (A-) is good, 3.01 – 3.33 or (B+) is good, 2.67 – 3 or (B) is good, 2.34 – 2.66 or (B-) is fair, 2.01 – 2.33 or (C+) is moderate, 1.67 – 2 or (C) is moderate, 1.34 – 1.66 or (C-) is moderate, 1.01 – 1.33 or (D+) is poor, and 0 – 1 or (D) is poor.

Based on the results of diagnostic test above, can be concluded that the value of average 1.41 be categorized in low, its mean students' mathematical representation ability was in low. Students had difficulties in answering the questions, students had difficulties to express mathematical description into mathematical model, students were not able to create mathematical model through diagram, graph, or table, and students had difficulties to explain mathematical model and do calculation.

To improve this mathematical representation, need to design a learning strategy that familiarize students to construct their own knowledge and to support and guide students on the ability of mathematical representations, so that students better understand the concepts being taught and to be able to represent ideas or mathematical notion.

Learning strategies that can be designed by implementing methods, models, or approaches relevant learning, an effective learning strategies that can be applied to improve the students' ability of mathematical representations is learning strategy of cooperative learning type Think-Pair-Share (TPS) because the syntax of Think-

Pair-Share suitable to improve the students mathematical representation that is Think-Pair-Share (TPS) is a cooperative learning that a combination of self-learning and learning in groups which students work together to solve a problem or answer a question about the given problem. This technique requires students to (1) think individually about a topic or answer to a question (it is possible that students can solve these problems own); and (2) share ideas with classmates. Think-Pair-Share help the student that difficult to understand an individual problem in the form of group discussion. Discussing an answer with a partner serves to maximize participation, focus attention and involve students in understanding the material.

According to Trianto (2009), Cooperative Learning Think-Pair-Share (TPS) type is a model that have in common in terms of problem solving activities, and also in the syntax model of learning which begin with giving problems to the students so that they can train students' thinking skills, organize learners to think, present the result of the discussion then the teacher to evaluate the problems that have discussed. In Cooperative Learning Think-Pair-Share (TPS), the technical implementation of solving the problem of learners consists of 2 people are paired together to solve problems by the teacher. Additionally, each step of the learning strategies Think-Pair-Share can develop any indicator of the ability of mathematical representation.

This Think-Pair-Share learning strategy is basically built through the process of thinking, pairing and sharing. The learning strategy of Think-Pair-Share starts from the involvement of students in the process of thinking or dialogue with themselves after the process of reading (think), then continue with the discussion with his partner (pair) and share his thoughts in the group (share). This allows students to build confidence in their abilities. With TPS learning strategy can assist students in constructing their own knowledge so that students can represent their thoughts in oral and written form with their friends, and can help each other and exchange ideas. With the implementation of Think-Pair-Share learning strategy is expected to train students to develop the ability of students' mathematical representation. There are so many model can improve students' mathematical representation ability, Researchers choose one that is Think-Pair-Share.

Classroom Action Research (CAR) is a research activity that can be done to improve the quality of learning conducted by teachers. With classroom action research, the lessons that teachers present will become more effective. Classroom Action Research (CAR) is also a requirement for teachers to improve their professionalism as teachers. Classroom Action Research (CAR) is a research activity that is more effective when compared to other research activities, because according to Widayati (2008) Classroom Action Research (CAR) implemented by teachers has several objectives as follows:

1. Improving the quality of teaching practices implemented by teachers in order to achieve the learning objectives.
2. Improving the learning performance performed by the teacher.
3. Identify, find solutions, and solve classroom learning problems for quality learning.
4. Improving the teacher's ability to solve the problems of learning and making the right decisions for students and classes are taught.
5. Exploring and producing learning creations and innovations (eg, approaches, methods, strategies, and media) that can be done by teachers to improve the quality of the process and learning outcomes.
6. Try new ideas, thoughts, tips, ways, and strategies in learning to improve the quality of learning in addition to teachers' innovative abilities.
7. Exploring learning that is always insightful or research-based.

Based on background above, research interested in conducting research reveal whether Cooperative Learning Think-Pair-Share (TPS) type improve students' mathematical representation ability. So, this research has the title is:

“The Implementation of Think-Pair-Share Model to Improve Students' Mathematical Representation Ability for Grade X in SMA Negeri 5 Medan”

1.2 Problem Identification

Based on the explanation in the background, the problem identification:

1. Teacher learning model used is still less variation and the learning process is still conventional.

2. Students' learning motivation is still poor.
3. Students never doing a group discussion during mathematics lesson.
4. Students never doing a presentation in front of class.
5. Students still regard mathematics as a difficult subject.
6. Many of students have difficulty understanding the theory on the textbook.
7. Many of students still argue that mathematics can't be applied to their daily life.
8. Students aren't interested in the method used by teacher.
9. Students' mathematical representation ability is still poor.

1.3 Problem Limitation

Because of complexity of the problem that exist in this research and the limited ability of the researcher, the researcher limits the problem, the problems limitation in this research is as follow:

1. The author focus with the implementation of Think-Pair-Share model to improve students' mathematical representation ability for grade X in SMA Negeri 5 Medan.
2. Learning in this research topic is statistics

1.4 Problem Formulation

1. Whether by apply Think-Pair-Share model can improve students' mathematical representation ability for grade X in SMA Negeri 5 Medan?
2. How is the improvement of students' mathematical representation ability taught by using Think-Pair-Share model for grade X in SMA Negeri 5 Medan?
3. How is the effectiveness of Think-Pair-Share model to improve students' mathematical representation ability for grade X in SMA Negeri 5 Medan?

1.5 Research Objective

The purposes of this research are:

1. To know by apply Think-Pair-Share model can improve students' mathematical representation ability for grade X in SMA Negeri 5 Medan.

2. To know the improvement of students' mathematical representation ability taught by using Think-Pair-Share model for grade X in SMA Negeri 5 Medan.
3. To know the effectiveness of Think-Pair-Share model to improve students' mathematical representation ability for grade X in SMA Negeri 5 Medan.

1.6 Research Benefit

The benefits of this research are:

1. Improving students' mathematical representation ability.
2. As consideration and input for the teacher to implementing Think-Pair-Share model.
3. Improving the interesting filling of the student to learn mathematics.
4. As grip for researcher in mathematics lesson that will be a teacher.
5. Be motivated for the school in improving quality of education.
6. As input for the other researcher that will do the research with the same problem.

1.7 Operational definitions

To avoid difference of meaning clarity about important terms contained in this research, the operational definition is stated as follow:

1. Mathematical representation ability is the ability of students in the depiction, translation, disclosure, re-appointment, figuratively, or modeling, the idea of a concept in mathematics as an effort to gain clarity of meaning, show understanding or looking for a solution of his problems. Which can be interpreted in the form of words or verbal, text, images, tables, graphs, concrete objects, mathematical symbols etc.
2. Cooperative Learning Think- Pair-Share (TPS) type: The think, pair, share strategy is a cooperative learning technique that encourages individual participation and is applicable across all grade levels and class sizes. Students think through questions using three distinct steps:

Think: Students think independently about the question that has been posed, forming ideas of their own.

Pair: Students are grouped in pairs to discuss their thoughts. This step allows students to articulate their ideas and to consider those of others.

Share: Student pairs share their ideas with a larger group, such as the whole class. Often, students are more comfortable presenting ideas to a group with the support of a partner. In addition, students' ideas have become more refined through this three-step process.



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