CHAPTER I
INTRODUCTION

1.1. Background

Mathematics is one of the science that has many important roles and close to human life. Therefore, mathematics became one of the principal subjects taught in formal education since elementary school level. By learning mathematics from an early age, students are trained to think critically, systematic, logical, and creative.

In the book Standar Isi untuk Sekolah Menengah Pertama (BSNP, 2006:140) stated that the aim of mathematical subjects so that students have the ability to: (1) understanding math concepts, explains the relationship between concepts and apply the concepts and algorithms, flexibly, accurately, efficiently, and appropriately, in solving the problem, (2) using the pattern and nature of reasoning, mathematical manipulation in making generalizations, compile evidence, or explain mathematical ideas and statements; (3) solving problems that include the ability to understand the problem, devised a mathematical model, solve the model and interpret the obtained solution; (4) communicate ideas with symbols, tables, diagrams, or other media to clarify the situation or problem; (5) has the respect usefulness of mathematics in life, namely to have curiosity, concern, and interest in studying mathematics, as well as a tenacious attitude and confidence in solving problems.

In line with the above, Fauzan and Yerizon (2013) stated:

> "Tujuan utama pembelajran matematika di sekolah adalah agar siswa memiliki kemampuan matematis yang memadai untuk melanjutkan pendidikan ke jenjang yang lebih tinggi dan untuk menyelesaikan masalah dalam kehidupan sehari-hari. Kemampuan matematis yang dimaksud meliputi pemecahan maslah, penalaran, komunikasi, koneksi, dan representasi matematis, sera kemampuan berpikir tingkat tinggi, seperti berpikir kritis dan kreatif".

Sumarmo (2006) classifies basic math skills in five standards, there are the ability: (1) to know, understand and apply the concepts, procedures, principles, and mathematical ideas, (2) mathematical problem solving, (3) mathematical reasoning; (4) mathematical connection, and (5) mathematical communication.

Mathematical connection ability is one of the basic skills that are important for students. Widarti (2013) revealed that the mathematical connection is a skill that must be developed and studied, contextual problem solving activities are activities that help students to be able to determine the relationship of various concepts in mathematics and applied mathematics in everyday life.

Most of students usually forget their previous mathematics learning material. They think that any mathematics material has no connection each other. In fact, every topic in mathematics has connections and some of them as a prerequisite for studying other topics. Students are still having trouble connecting knowledge they have learned previously with their newly learned knowledge. In other cases, students are lazy to learn math because they assume some mathematical topics that they studied only a theory and has no use in daily life. In fact, every subject taught in school mathematics has its benefits and immediate application in daily life that they may not realize. With connection ability, students are able to view mathematics as a unified whole. Students will realize that every mathematical ideas do not stand alone and isolated. NCTM (2000: 64) argues "when students can connect mathematical ideas, their understanding is deeper and more lasting". So the connection ability can increase students' understanding and make that understanding last longer.

Mathematical ideas are not only connected in the mathematics itself, but also connected to the outside of mathematics. Without realizing it, many human activities are carried out based on mathematical ideas. Many people who do the math without realizing that they are working on math. With connection ability, students will be able to understand and appreciate the useful of mathematics in their daily life.

In addition there is term known as mahtematics as queen of science and mathematics as servant of science. From both of the term can be seen that

mathematics has an important role in the development and progress of science. Mathematics is used as a tool or as a way of thinking in science to another. With connection ability, students will be able to see and understand the connection between the mathematical ideas with other sciences.

From the above explanation can be seen that with mathematical connection ability, students can build his understanding of mathematics itself. In addition they can also find patterns and relationships between mathematics well with others and with the science or daily life. Upon learning of these relationships, students can learn math more meaningful. In fact on the field, there are many students who have the low ability to connect. In a study conducted Yunita (2013) as well as Nainggolan (2013) showed that the ability of junior high school students the connection is still low. Nainggolan (2013) stated that students still have difficulty formulating the connection between math with other subjects.

Initial tests of the eighth grade students of SMP Assisi Medan show unsatisfactory results. Many students are still having trouble connecting mathematics in dailly life. In addition they are also still difficulties in making connections with other subjects, especially physics.

Here are the questions and answers of students to the questions given by researchers in order to find out the mathematical connection ability students in the school items, namely:

1. A rectangular field with a length of 25m and has an area of 200m^2. One afternoon Steven and Joni exercise running around the field.

   a. When Steven ran at a constant speed of 1m / s, how many minutes the time it takes Steven to circumnavigate the field twice?

   b. Joni rest after circling the field one time. After checking his watch Johnny realizes that he may take a minute to circumnavigate the field. What is the average speed of Joni when running?

   c. From the information above, if Joni and Steven collided run the same distance, who do you think will be the winner? Mention the reason!
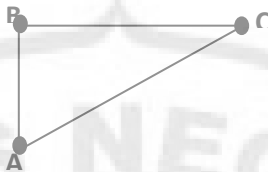
2.

Figure 1.1 Ilustration of City A, B, and C

In the figure 1.1, city A and city C is 130 km, while the city A and city B is 50 km. Andy plans toward the city C from city A to drive a car. Because the bridge that connects the city A and 'city C' was broken, Andi rotate past the 'city' B '. Because in all the way to the 'city C' there is no gas station Andi had to refuel from 'A town'. If Andi's car spent 1 liter of premium to travel as far as 15 km, at least how many liters of premium to be charged to his car Andi?

Variance of student' answer:

1.

Figure 1.2 Variations In Students' Answers To The Connection With Physics

From the results of the figure 1.2 it can be seen that the students have difficulty in connecting mathematics with physics in determining the relationship of distance, speed, and time. Total percentage of students in the class that have difficulty to connect mathematics with physics is 66.67%.

2.

Figure 1.3 Variations In Students' Answers To The Connection With Real Life

From the results of the figure 1.3 it can be seen that the students have difficulty in connecting math to the daily life, that is determining the race winner based on information about the runner's speed. Total percentage of students in the class that have difficulty to connect mathematics with daily life is 40%.

3.

Figure 1.4 Variation Of Students' Answers To The Connections Between Mathematics Topics

From the results of the figure 1.4 it can be seen that students are have difficulty connecting Pythagorean theorem to calculate length of path. Total percentage of students in the class that have difficulty to

connect mathematics with daily lifebetween mathematics topics is 46.67%.

Based on the results of interviews with one of the teachers of mathematics in eighth grade, it is known that most students are able to write down the information that is known from contextual problem into mathematical form. But in the settlement, they have difficulty. They did not complete the mathematical models they have made, but rather to answer questions based on their daily experiences. It can be said the students have difficulties to connect math to everyday life.

According to constructivist learning theory, knowledge can not simply transferred from teacher to the students. Students need to build their own knowledge. Learning approach that could make active learning and develop students' mathematical connection ability are Realistic Mathematics Education approach and Problem Posing approach. Both of these learning approach use real context which could help students build their own knowledge.

To develop students' mathematical connection ability, Realistic mathematics education have an unique characteristics that is intertwinement. Realistic mathematics education puts intertwinement between mathematical concepts as things to be considered in the learning process (Wijaya, 2010: 23). Further Wijaya (2010) said "through this connection, the study of mathematics is expected to introduce and build more than one at the same mathematical concepts (although there is a dominant concept)". With intertwinement as the main characteristic of realistic mathematics education, then the mathematical connection ability of students could be better.

Characteristics of realistic mathematics education, namely: (1) the use of context, (2) the use of a model for progressive mathematization, (3) utilization of students' construction, (4) interactivity, and (5) intertwinement. The use of context means the learning process comes from contextual problems. The use of models in realistic mathematics education means the use of models and models for. Model of used in horizontal mathematization, ie to connect to the real problems in the form of informal mathematical While model for use in vertical mathematization,

ie to change the form of the mathematical form of formal or informal to formal form to the form of formal higher.

Furthermore, in realistic mathematics education students are required to construct their own knowledge of the problems faced. Because the students construct their own ideas, then they have the various answers. It can be used to compare the response of teachers and draw conclusions. The results of the research Yunita (2013) showed that students' mathematical connection ability in realistic mathematics class is better than students' mathematical connection ability in conventional class. It means that realistic mathematics education could increase students' mathematical connection ability.

Problem posing is learning approach which is the development of problem solving. In this learning approach, students require to pose problem and also the solution based on the given situation. The problem that can pose by the students could be problem from daily life, new problem from given problem, or problem that similar to given problem. The problem may be worded or re-worded either before its solution or during the solving process or after it. Problem posing affects both students' learning and teachers' teaching of mathematics (Barlow & Cates, 2006). Problem posing enable students to reflect their mathematical perceptions. Problem solving also allows students to connect their mathematical knowledge and abilities to each other, which helps them develop reasoning and communicating skills (Kilic, 2013). The result of research by Ramdhani (2012) showed that problem posing approach could increase mathematical connection ability of students. This means that problem posing approach has positive impact to students' mathematical connection ability.

Based on the above researchers interested in conducting research on realistic mathematics education and problem posing with the title: **"Difference of Students' Mathematical Connection Ability Using Realistic Mathematics Education Approach and Problem Posing Approach In SMP Swasta Katolik Assisi Medan Academic Year 2014/2015"**

1.2. Problem Identification

Based on the background of the problems described above, we can identify issues that are relevant to the study include:

1. Students are still difficulties in connecting between concepts in mathematics.
2. Students are still difficulties in connecting mathematical concepts with other subjects.
3. Students are still difficulties in connecting concept mathematics in daily life.

1.3. Problem Limitation

Seeing the wide scope of the problems identified than the time and ability to research, the investigator felt the need to limit the issues to be studied in order to analyze the results of this research can be conducted more in-depth and focused. Issues that will be examined in this study is limited to mathematical connection ability of eight grade junior high school students academic year 2014/2015 who are taught with Realistic Mathematics Education approach and Problem Posing approach.

1.4. Problem Formulation

Based on the background that has been disclosed, the formulation of the problem in this research are:

Is there any difference of students' mathematical connection ability taught using Realistic Mathematics Education approach and Problem Posing Approach?

1.5. Research Objectives

As for the objectives of this research were: To know any differnce of students' mathematical connection ability taught using Realistic Mathematics Education approach and Problem Posing approach.

1.6. Research Significance

After doing this research study is expected to provide significant benefits, namely:

1. As an input for teachers and prospective teachers of mathematics concerning the application of realistic mathematics instruction to increase student capacity of the mathematical connections.

2. As hint and enthusiasm for students to increase mathematical connection ability in mathematics learning.

3. For information and comparisons to other writers or readers who are interested in doing similar research.

1.7. Operational Definition

1. The indicators of students' mathematical connection ability which will be measured are:
   a. To use connection between mathematical topics
   b. To use connection of mathematics to other subject (Physics)
   c. To use connection of mathematics to daily life

2. The syntax of Realistic Mathematics Education approach as follows:
   a. Understanding contextual problem
      Teacher giving SAS that contain contextual problem and ask the student to understand the problem
   b. Solving contextual problem
      Students discuss in their own group to solve the contextual problem.
   c. Comparing or discussing answer
      Students present their group answer and the other group giving opinion and choose the best solution.
   d. Concluding
      Students make summary and conclusion from their activities.

3. The syntax of Realistic Mathematics Education approach as follows:
   a. Giving facts (situation)
      Teacher giving situation in SAS.

b. Discover problem

Students discover problem that they can met based on given situation in SAS.
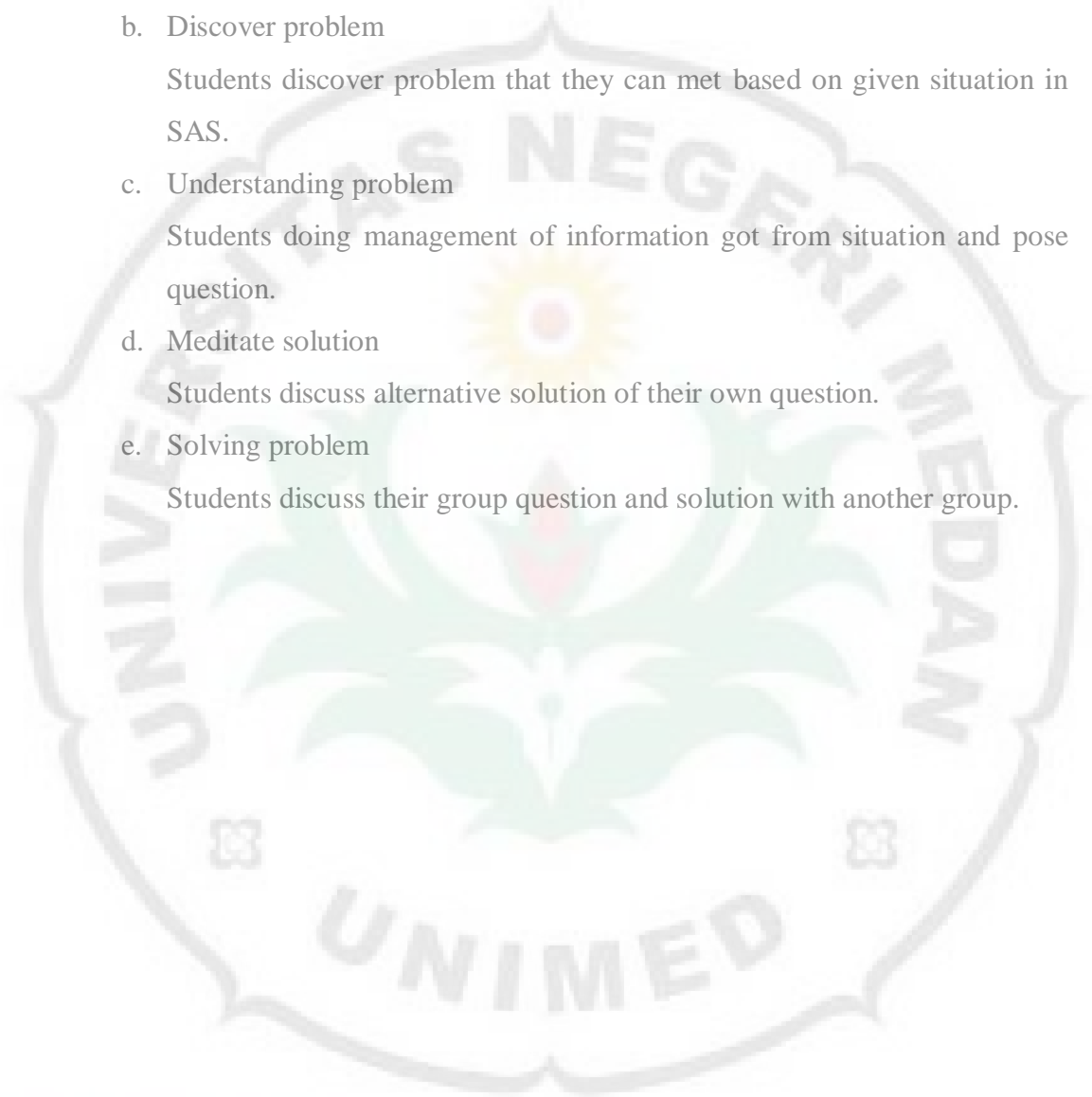
c. Understanding problem

Students doing management of information got from situation and pose question.

d. Meditate solution

Students discuss alternative solution of their own question.

e. Solving problem

Students discuss their group question and solution with another group.