

CHAPTER I INTRODUCTION

1.1 Background

Words of education, counseling, teaching, learning, and training are technical terms concerning to activities united in educational activity. Education is one of the basic needs for human life, because through education human can change a person's attitude and ethics code in daily life. Furthermore, education is investment in human resources who have a long-term strategic value for the survival of human civilization in the world. As well as the presentation, the quality of nation's human resources in general can be seen from the quality of the nation's education. History has proven that the progress and prosperity of a nation in the world is determined by the development in the filed of education.

Therefore, almost all countries put education variable as something important and major in the context of nation building. Likewise, Indonesia put education as an important and major. It can be seen from the contents of the fourth paragraph of the Preamble of the 1945 Constitution which asserts that one of the national goals of Indonesia is the intellectual life of the nation.

Mathematics as one of the fundamental science education develop in people's life and very needed in the development of science and technology. Therefore, mathematics can be said as the mother of all science, so mathematics is very important to be taught. As proposed by Cockroft (1982: 1-5) that "Mathematics should be taught to students because of (1) is always used in life; (2) all fields of study require skills appropriate mathematics; (3) is a powerful means of communication; (4) can be used to present information in a variety of ways; (5) improve the ability to think logically, accuracy, and awareness spatial; (6) provide satisfaction to solve business challenging problem.

Because mathematics is very important to learn, so mathematics is considered as the main lesson in education, so time lesson for mathematics is much than the other lesson. Even though mathematics lesson is very important to be taught in school but many students have many problems in study mathematics

in school. This problem is because of students assumed that mathematics is a lesson that very difficult to be studied and mathematics is not interested to be studied.

There some factors that caused the students have assume that mathematics is difficult and not interested to be studied, one of the problem is students have less problem solving ability in mathematics. There some competences that hoped be able to reach by students in study mathematics in every level of education such as SD, SMP until SMA. Depdiknas (in Shadiq, 2014 : 11), he said that the competence that be hoped can be reached by students are:

1. Showed the understanding mathematical concept that be studied, explained the relation between concept widely, accurately, efficiency, and right in problem solving.
2. Have the ability to communicate the idea using symbols, tables, graphs, or diagrams in explaining the problem.
3. Using reasoning in pattern, characteristic or do manipulate mathematics in make generalization, arranging the fact or explaining idea and mathematics statement.
4. Showing the strategy ability in making (formulating) the model of mathematics in problem solving.
5. Having the respect in used mathematics in daily life.

Based on the competences that be hoped by Depdiknas, problem solving ability must be have by students in study mathematics in school. Because of problem solving ability was very important to have by students, the problem solving ability must be one of the factors that students have in mastering and understanding of mathematics especially in solving the problem.

Problem solving is considered central to school mathematics as being states from NCTM (in Chapman, 2005):

Instructional programs should enable all students to build new mathematical knowledge through problem solving; solve problem that arise in mathematics and in other contexts; apply and adapt a variety of

appropriate strategies to solve problems; and monitor and reflect on the process of mathematical problem solving.

Similarly, Kilpatrick et al (2001: 420) explained,

Studies in almost every domain of mathematics have demonstrated that problem solving provides an important context in which students can learn about number and other mathematical topics. Problem solving ability is enhanced when students have opportunities to solve problems themselves and to see problems being solved. Further, problem solving can provide the site for learning new concepts and for practicing learned skills.

From some explanation above, we know that problem-solving ability is a process of applying the knowledge that has been acquired prior to the new situation that has not been known. Problem solving method is a way of learning to exposes students to a problem to be solved or resolved. Problem solving in mathematics learning is an approach and goals are achieved. Used as a problem-solving approach to discover and understand the material or mathematical concepts. While solving the problem as the expected destination for students to identify elements that are known, were asked and the adequacy of the required elements, to formulate the problem and explain the results according to the origin of the problem. In solving the problem students are encouraged and given the widest possible opportunity to take the initiative and systematic thinking in the face of a problem with applying the knowledge gained previously. Polya illustrates the problem solving ability of students is constructed include the ability of students to understand the problems, plan solutions, resolve the issue according the plan and to re-examine the results of the settlement procedure.

Problem solving has the main function in the activity of teach and learn mathematics. By mathematical problem solving, students can try to interpret the concepts, theorems and skills that be studied. (Hudojo, 2005)

From the description above can be concluded that problem solving plays an important role and needs to be improved in learning. But the facts on the field show that the problem solving ability of students is still low. For example, as seen from the students' answers on questions that measuring students' mathematical

problem solving on the subject probability in class X SMA Negeri 1 Lubukpakam T / A 2015/2016 as follows:

Ani menerima kembalian uang Rp 300 berupa tiga buah uang logam. Ia melemparkan ketiga uang tersebut secara bersamaan. Jika sisi uang logam tersebut berupa gambar (G) dan angka (A) maka tentukanlah ruang sampel dan banyak ruang sampel dari kejadian tersebut!

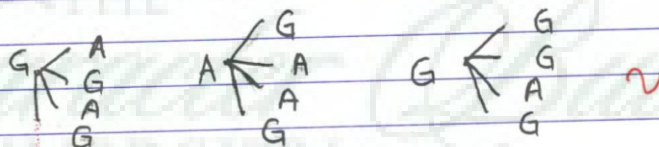
The question story above is an example of matter for problem solving, to solve the problem students often do not know how to make a mathematical model so that the matter is considered difficult to do. To resolve the problem with the necessary steps students must understand the problems, develop mathematical models and finishes with the basic knowledge then they draw conclusions from the settlement. Here are the answers to the students of one of the problems that exist

2) A, A, A. G, AA 2.
 A, G, G. G, G, G $\frac{3}{0} = 3:0$
 A, A, G. G, A, G
 A, G, A G, G, A.

(a)

2) Dik : 3 buah uang logam . Dilempar secara bersamaan
 dari uang logam tersebut gambar (G) dan angka (A)
 Dit : Tentukanlah ruang sampel dan banyak ruang sampel dari kejadian tsb !

Jb :



Jadi, banyak ruang sampelnya yaitu

(b)

Figure 1.1 The Students' Answer Sheets in Diagnostic Test in Class X

From the students' answer above it can be seen that the answer is incomplete yet. The answers are from two students in different class. At figure a) the answer didn't use the steps of problem solving. The students was directly answer without trying to understand the problem first. So we did not know how to solve or how to determine the sample space and the point space of the problem.

And for the students' answer in figure b), the student had been known how to understand the problem by classifying the solution into known, asked, and answer. It means that the student understand what are being known from the problem, what are being asked from the problem and the last try to solve the problem. But in process to answer, it can be looked that the student did not know how to solve it. The student can not relate one item to another item and the student can't to give conclusion or another way that may be can be used to solve the problem in the last solution of that worked.

From the answers which's shown, it can be seen that the students do not fully understand the problems that exist while these materials are basic probability subject that already exist in their current ninth grade material, but they are not yet fully understood in the problem of solving the problem.

In solving the mathematics problem, it can be denied that we must understanding what the problems are, what the questions are, what is plan to solve it, how to solve it and is there any another way to solve the problem or not? All of that contents are so important to be applied in solving mathematics problem. The step below can be applied in solving the given problem.

a. *Understanding the problem*

Known : three coins are thrown simultaneously

Picture side as G and number side as A

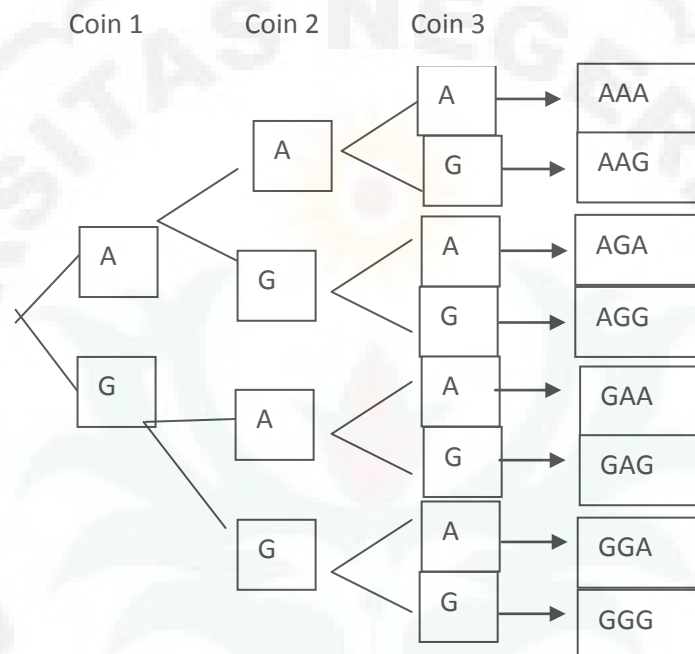
Asked : Determine the sample space and the number of sample space!

b. *Devising a Plan*

For knowing the sample space of this event, we have to draw the tree line as follow:

c. *Carrying Out the Plan*

We have devise to solve this problem, we have to make the tree line.



d. *Looking Back*

From the tree line above it can be seen that the sample space of the event are (AAA), (AAG), (AGA), (AGG), (GAA), (GAG), (GGA), (GGG). And if we count that the sample space so the total is 8. So the number of sample space $n(S)$ is 8.

To solve the that problem we can not jus using the tree line but we can using the table of probability .

The explanation above are the way to solve the given problem by focusing in students' understanding in solving the problem by steps. If we compare the solution above with the students' solution are very different. So we can know that the students' problem solving ability in mathematics subject is still low.

Furthermore, it's very needed to increase the students mathematical problem solving ability. To increasing this ability, the teacher have to create the learning system which will make the students' desire of learning, understanding, and solve the problem of mathematics are increasing. Some lectures have

researched that there are some learning model which able in increasing the students' mathematical problem solving ability. Some of them are problem based learning, contextual teaching learning, cooperative learning, realistic mathematic education, etc.

There are some learning model that looked like very similarity. Some of them is Contextual teaching Learning and Realistic Mathematics Education. Both of them are applying the mathematics learning model that focus in problem of mathematics which relate with daily life context. And there are some of researchers have researched that both learning model able to increasing the student's mathematical problem solving ability. This is reinforced by the relevant research conducted by Yeni Septiani Rambe 2013 states that Contextual Teaching Learning can improve students' mathematical problem solving ability. It means that, Realistic Mathematics Education and Contextual Teaching Learning can improve students' mathematical problem solving ability. As well as research conducted by Iwan Prakasa in 2013, the results showed that the implementation of Realistic Mathematics Education can improve students' mathematical problem solving ability.

Another research by Julham Sahmulia state that there are significant differences in both learning model. From his research, he got that the students' outcomes which's taught by the Contextual Teaching Learning is better than the students' outcomes which's taught by the Realistic Mathematics Education those were taught in VIII grade. These make the researcher would like to do the research between that two model learning in difference school level and difference problem.

Contextual Teaching and Learning (CTL) is a concept that helps teachers link the content of subjects to real world situations and motivate students to make connections between knowledge and application in their lives as family members, citizens, and workers

Elaine B. Johnson (in Trianto, 2009) said contextual learning is a system that stimulates the brain to compose patterns that embody meaning. Furthermore, Elaine says that contextual learning is a learning system that matches the brain

that produce meaning by linking academic content to the context of the daily life of students. Thus, contextual learning is an attempt to make students active in pumping ability without losing ourselves in terms of benefits, because the students are trying to give the concept of simultaneously apply and relate it to the real world.

Contextual Teaching is a teaching that allows students kindergarten till high school to strengthen, expand, and apply their academic knowledge and skills in a variety of arrangements in and outside the school in order to solve the problems of the real world or simulated problems. (Trianto,2009: 104 – 105)

Meanwhile, according to Hans Freudenthal (in Wijaya, 2012: 20) realistic mathematics learning approach is “mathematics is a human activity”. Statement “mathematics is a human activity” shows that Freudenthal not put mathematics as a ready product, but rather as a form of activity or process. According to Freudenthal mathematics should not be given to students as a ready product that is ready to use, but rather as a form of activity in constructing mathematical concepts. Freudenthal familiar with the term “guided reinvention” as the students are actively committed to rediscover a mathematical concept with teacher guidance. Furthermore, do not put mathematics as a closed system but rather as an activity called mathematize.

A realistic problem is not necessarily a real-world problem and usually found in daily life of students. A problem called “realistic” if the problem can be imagined or real in the student’s mind (Wijaya, 2012: 20-21). Realistic problem presented by teacher at the beginning of the learning process so that the idea or mathematical knowledge can appear from the realistic problems. During the process of solving realistic problems, students will learn problem solving and reasoning, in the discussion the students will learn to communicate. The results obtained during the learning process will be easy to remember because mathematical ideas students find themselves with the help of the teacher. In the end, the students will have respect for mathematics because with realistic problem related to real life day-to-day learning process of mathematics not directly to the abstract from so that students are motivated to learn mathematics and develop

their ideas and solve problems in mathematics. Using realistic mathematics education starts from a realistic problem is expected that students will be able to construct their own understanding and will make learning more meaningful so that students' understanding of the material more depth that would be beneficial to enhance the ability in problem solving.

Because Contextual Teaching Learning and Realistic Mathematics Education have some similarity especially that both of learning model start from the contextual problem that related to the human daily life, so the researcher want to know whether between of both models is better in helping the students to understanding the mathematics especially in solving the problems that always exist in mathematics.

Based on the description above, the researcher has interested in conducting research entitled **“The Comparison of Students' Mathematical Problem Solving Ability on Contextual Teaching Learning and Realistic Mathematics Education Implementation on Grade XI in SMAN 1 Lubukpakam Academic Year 2016 / 2017”**

1.2 Problem Identification

Based on the background above, some problems can be identified as follows:

1. The students ability to solve the mathematics problem are still low.
2. Mathematics students outcome are still low because the problem solving ability of students are still low.
3. For some students, mathematics is still as a difficult subject.
4. Students still dominant passive and tend to only receive information from the teacher.
5. Many of students still argue that mathematics can't be applied in their daily life.
6. There are some learning model that can be applied to increase the students' mathematical problem solving ability.

7. The contextual teaching learning and realistic mathematics education are two models that looked similar.

1.3 Problem Limitation

Based on the problem identification and the relevant research that have been described before, the research is limited on students' mathematical problem solving ability in SMAN 1 Lubukpakam using Contextual Teaching Learning and Realistic Mathematics Education for Probability subject.

1.4 Problem Formulation

Based on the problem limitation above, then the problem can be formulated as follows:

“Is the students' mathematical problem solving ability in the classroom taught using Contextual Teaching Learning is higher than students' mathematical problem solving ability in the classroom that using Realistic Mathematics Education?”

1.5 Research Objective

Specifically, the objectives of the research is to know whether the students' mathematical problem solving ability in the classroom taught using Contextual Teaching Learning is higher that students' mathematical problem solving ability in the classroom that taught using Realistic Mathematics Education.

1.6 Research Benefits

1. For teachers mathematics:
To be an alternatives sources for teacher in selecting the appropriate instructional model in the classroom to enhancing students' mathematical problem solving.
2. For school:
To be as reference that can be used by the other teacher.
3. For students:
To enhance the student's mathematical problem solving ability.

4. For other researchers:

To be inspiration or comparison to do or develop the similar research.

1.7 Operational Definition

1. Students' mathematical problem solving ability is the ability of students in solving problem in mathematics, starting from understanding the problem, devising the plan, carrying out the plan till looking back to the problem.
2. Contextual Teaching and Learning is a kind of instructional that helps students to understand the significance of the subject matter learned by relating the material to the context of their daily lives and help teachers relates instructional activities to subjects matter.
3. Realistic Mathematics Education is a procedure used in discussing mathematics materials that have characteristics using context, model, students contribution, interactive activities, has related material between guided reinvention and progressive mathematization principles, learning phenomenon (didactical phenomenology) and self-developed model.