

CHAPTER I INTRODUCTION

1.1 Background

Education is very important for humans, because education is an investment in human resources in the long term. Education is also a vehicle to improve and develop the quality of human resources and not only seen as an attempt to provide information and skills formation, but expanded to include efforts to realize the desires, needs and abilities of individuals to achieve personal and social lifestyle satisfactory.

Mathematics is a subject matter that has the important role in education world. Mathematics is one of science which can increase the ability of thinking and argumentation. Mathematics is the main role that contribute to become scientific thinking role which needed by student to develop their power of thinking and logic ability. Mathematics develops critical, analytical, systematical, logical, and creative thinking of someone. Creativity can be increased through learning mathematics. Through learning mathematics expected there is the environment for students to develop their skill and talent optimally. That role is possible caused by creative teacher in there, such as the teacher who actively can use many approach in teaching and learning process and guidance the students.

But in Indonesia, learning mathematics is often associated with memorizing formula lessons, without concern to the concept. This situation can make the students do not trained or do not have chance to develop the talent they have. The students learn to remember the formula from teacher without understand the concept. The low of students' creative thinking ability caused by the students often remembering the formula without meaning, students do not understand the related of each mathematical concept, and how difficult the mathematics calculation it is. As we know, creative thinking is very important in various living aspects.

Based on the observation in SMP Negeri 37 Medan, which was held on January, 23th 2015, is found that mathematical creative thinking ability of students

in that school is very low. It was known by giving test which was consisted problem of rectangle and square as the prerequisite topic of cube and cuboid. From 42 students who followed the test, there was only four students who gave the solution more than one way. But the all solution they gave still in strict rule and there was not student who can give unique way. Where, based on Silver's opinion, creative thinking ability can be identified by three indicators, namely fluency, flexibility, and originality. In mathematics, fluency can be looked from how many ways can be made by students. The flexibility can be looked from the solution is no strict rule. And the originality can be looked from not commons methods used by students. If three indicators are low, the mathematical creative thinking of student is certainly low. So that, based on the observation above can be concluded that the mathematical creative thinking ability of students in SMPN 1 Medan is still low. This following figure describe how did one of students solve the problem when the initial test given.

Sebuah balok memiliki ukuran panjang 20 cm lebih besar dari ukuran lebarnya. Keliling dari balok tersebut ialah 200cm. Tentukanlah luas balok tersebut!

a. Tuliskan informasi penting seperti hal yang diketahui dan ditanya!

dik: $P = 20 \text{ cm} + l$
 $K = 200 \text{ cm}$
 dit: $L \square ?$

b. Selesaikan masalah di atas dengan cara anda sendiri!

$20 = k: 200$
 $P = 20 \text{ cm}$
 $K = 2p + 2l$
 $200 = 2(20 + l) + 2l$
 $200 = 40 + 2l + 2l$
 $200 = 40 + 4l$
 $200 - 40 = 40 - 40 + 4l$

$160 = 4l$
 $l = 160 / 4 = 40$

$P = 20 + l = 20 + 40 = 60$

$L \square = 40 \cdot 60 = 2400$

c. Apakah ada cara lain? Coba tuliskan sebanyak mungkin cara untuk menyelesaikan masalah di atas (min 2)!

The solution given by student is strict rule and general.

Student cannot give solution more than one way

Figure 1.1. Student's Answer for The First Creative Thinking Question

From the pictures of the students' answer show that students are have good enough for understanding problem, but cannot give the unique way to solving the problem and the solution that have given by students still in the strict rule and general. This show that the students' mathematical creative thinking ability is still low.

In Question 2, was obtain that the students' understanding about the material are good enough, but cannot answer the question with the unique way. The students still answer the question in the strict rule and general. This shows that the students' mathematical creative thinking ability is still low.

Perhatikan gambar berikut!

Jika $BF = CG$. Hitunglah luar bagian yang diarsir!

$BF = CG = 3$

a. Tuliskan informasi penting seperti hal yang diketahui dan ditanya!

Dik: $AD = BC = 12 \text{ cm}$
 $AB = CD = 8 \text{ cm}$
 $CG = BF = 3 \text{ cm}$
 $GH = 5 \text{ cm}$
 Dit: Luar yang diarsir?

b. Selesaikan masalah di atas dengan cara anda sendiri!

Luar yang diarsir : $\text{Luas } ABCD - \text{Luas } EFGH$
 $\text{Luas } ABCD = 12 \times 8 = 96 \text{ cm}^2$
 $\text{Luas } EFGH = 5 \times 6 = 30 \text{ cm}^2$
 Luar yang diarsir : $96 \text{ cm}^2 - 30 \text{ cm}^2$
 $= 66 \text{ cm}^2$

c. Apakah ada cara lain? Coba tuliskan sebanyak mungkin cara untuk menyelesaikan masalah di atas (min 2)!

The solution given by student is strict rule and general.

Student cannot give solution more than one way

Figure 1.2. Student's Answer for The Second Creative Thinking Question

The other problem was found when researcher observed the teacher who was teaching mathematics in class VIII-2. There were many students were passive, only some students with good learning achievement who active in learning. Researcher observed there were many students who less concern to learning and interest with other things not relevant with mathematics lesson. When researcher interviewed five students, four students responded that mathematics is very difficult and bore. The mathematics teacher of this class also

confessed that there were many students who passive in each meeting and could not solve the problem given confidently. When researcher asked about the model implemented in teaching learning, in fact, teacher still often use conventional model. Therefore, the less of teacher creativity in teaching mathematics can also be one factor the low of mathematical creative thinking ability of students.

According to Boaler in Pound (2012:25), “Children begin school as natural problem-solvers and many studies have shown that students are better at solving problems before they attend math classes. They think and reason their way through problems, using methods in creative ways, but after a few hundred hours of passive math learning students have their problem solving abilities knocked out of them.” It means that, one of effort to increase the creative thinking of students is make the meaningful learning. Tan (2009:25) argues that:

Problem can tigger curiosity, inquiry, and thinking in meaningful and powerful ways. Education needs a new perspective of searching for problems and looking at problems that will achieve the aim of helping students construct their own knowledge.

Based on the explanation above, Problem Based Learning is one of model of teaching which provides problem in the initial learning. Yamin (2013:62) argues that, “Pembelajaran Berbasis Masalah (*Problem Based Learning*) merupakan salah satu model pembelajaran inovatif yang memberi kondisi belajar aktif kepada peserta didik dalam kondisi dunia nyata.” Inovatif learning means packed learning by teachers or other instruction which are form of ideas or new techniques considered in order to facilitate the students to make progress in the learning process and result. “Problem based learning model is expected to develop students’ thinking and problem solving skill, helps students perform in real-life situations and learn important adults roles (Adult role modeling), and help students become independent and *self-regulated learners*” (Arends, 2012).

To improve the mathematical creative thinking of students, it’s best if we combine the model of problem based learning with scientific approach. Kementrian Pendidikan dan Kebudayaan (2014:36) said that scientific approach refer to investigation techniques for something or some of phenomenon or indication, get new knowledge, or correction and integrate the knowledge

before. to called as scientific, method of inquiry must be bases on the evidence from object that can observed, empirical, and measurable with the specific reasoning principles. Because of that, scientific approach generally load any series of data collector activity or experiment, to process the information or data, analyze, and then formulate, and test the hypothesis.

So, in this research, the researcher will use model of problem based learning combine with scientific approach to improve the mathematical creative thinking ability. This combination can make the learning process will be more memorable and meaningful for students, because it invites students to acquire knowledge and new information independently that can come from anywhere, anytime, and do not rely on the information in the direction of the teacher. The steps of the scientific approach include: (1) observing, (2) questioning, (3) experimenting, (4) associating, and (5) communicating (Kemendikbud, 2014).

Based on explanation above, so the researcher extracted to arrange the research with title "The Implementation of Problem Based Learning with Scientific Approach to Increase The Mathematical Creative Thinking Ability in SMP Negeri 37 Medan in Academic Year 2015/2016."

1.2 Problem Identification

Based on the background above:

1. Learning mathematics is often associated with memorizing formulas lessons.
2. In the course of learning, students are not usual to be involved in solving particular problems that require creativity.
3. Student's creative thinking ability in problem solving is still very low.
4. Student's generally less actively participate in the learning process in the classroom.
5. The lack of variation in the teaching model applied in the learning by the teacher, applied learning models generally still conventional.

1.3 Problem Restriction

To avoid misunderstanding and expansion problem, this research will be focused on the implementation of problem-based learning model (PBL) with scientific approach to increase student's mathematical creative thinking ability in SMPN 37 Medan.

1.4 Problem Formulation

Based on the problem restriction above, then the problem in this study is formulated as how the increase of student's mathematical creative thinking ability by implementing problem based learning model with scientific approach.

1.5 Research Goals

The goal of this study is to increase the student's mathematical creative thinking ability by implementing problem based learning model with scientific approach.

1.6 Research Benefit

1. For students
Increase the student's creativity in solving problem of mathematics.
2. For teacher
Opening teacher's insight about the important of creativity for student and how to increase the student's creativity.
3. For school
As a consideration for school to make an innovation learning model especially in increasing student's creative thinking ability.
4. For student or advanced researcher
Increasing the insight, ability, and experience in increasing the competence as teacher candidate.

1.7 Operational Definition

The variable of this research are define as below:

1. Learning is a process or effort which done by each people to gain a permanent change relatively in the behaviour, like knowledge, skill, attitude or positive value as the result of the experience or training which is done continuously.
2. Models of teaching is a plane or pattern that can be used to shape curriculum, to design instructional materials and to guide instruction in the classroom and other setting. They are really models of learning as help students acquire information, ideas, skills, values, ways of thinking, and means of expressing themselves, we are also teaching them how to learn.
3. The problem-based learning model with scientific approach is an instructional method in which student learn usually work in collaborative group to identify what they need to learn trough facilitated problem solving by using the concept of scientific thinking are observing, questioning, associating, experimenting, communicating and networking.
4. The mathematical creative thinking is the ability to synthesize ideas into new ideas where new ideas are a combination of logical thinking and divergent thinking based on intuition but still in awareness. Someone called creative if he/she can develop their knowledge of mathematics to solve the problem with more than one method of settlement through understanding, fluency, flexibility, and originality.