

CHAPTER 1

INTRODUCTION

1.1 Background

Mathematics is the universal science which bases on modern technology development. Mathematics has important role toward various disciplines. Mathematics develops critical, analytical, systematical, logical, and creative thinking of someone. Mathematics is developed from nature so that it has logical concept. But generally in Indonesia, mathematics is often taught by giving formula, without concern to the concept. One thing caused if student does not understand the concept is mathematical creative thinking of student is low. As we know, creative thinking is very important in various living aspects.

Based on the observation in SMPN 27 Medan, which was held on January, 20th 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 system of linear equation of one variable. From 30 students who followed the test, there was only one student who gave solution more than one way. But the all solutions they gave still in strict rule and there was not student who can give unique way. Where, based on Torrance'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 27 Medan is very low.

Jumlah uang Ani dan Dina adalah Rp25.000,00. Jika perbandingan jumlah uang Ani dan Dina 2 : 3, maka berapakah jumlah uang Ani dan Dina berturut-turut?

a. Tuliskan informasi penting atau hal yang diketahui dan ditanya pada masalah di atas (anda dapat menuliskannya dalam model matematika)!

Dik. $A + D = \text{Rp } 25.000,00$
 $A : D = 2 : 3$
 Dit. A dan D
 Uang Ani
 Uang Dina

b. Selesaikan masalah di atas dengan cara anda sendiri!

$A = \frac{2}{5} \times 25.000 = 10.000$
 $D = \frac{3}{5} \times 25.000 = 15.000$

c. Apakah ada cara lain? Coba temukan dan 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 Solving Toward Creative Thinking Question

The other problem was found when researcher observed the teacher who was teaching mathematics in Class VII-8. 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.

One of expert, Boaler in Pound (2011: 25) argues that:

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 make students be creative is make the meaningful learning. According to Tan (2009: 23), “if we adopt a mindset of learning from problems, there will be real improvement and advancement”. Then, he continues that in real-world problem solving, the context always appears unstructured in the first instance, and it takes big picture thinking (i.e., a broad overview or a helicopter view of things), analytical thinking, as well as generative and divergent thinking to produce effective solutions.

Kline in Tan (2009: 24) articulates most apply that “the intelligent person is far from easily spotted from his response to new problems not his knowledge of old solutions.” Since time immemorial, the intelligent of individuals has been gauged from the questions they ask and the problems they are able to solve. If only schools are able to nurture students who are curious and capable of solving new problems, we would have cultivated more intelligent and creative adults for the future society. Tan (2009: 25) argues that:

Problems can trigger 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, one of model of teaching which provides problem in the initial learning is Problem Based Learning Model. Problem based learning is an instructional method in which student learn usually work in collaborative group to identify what they need to learn through facilitated problem solving. “Pembelajaran Berbasis Masalah (*Problem-based learning*) merupakan salah satu model pembelajaran inovatif yang memberi kondisi belajar aktif kepada peserta didik dalam kondisi dunia nyata”(Yamin, 2013: 62). Innovative learning means packed learning by teachers or other instructors which are form of ideas or new techniques considered in order to facilitate the students to make progress in the learning process and results. “The essence of problem-based learning consists of presenting students with authentic and meaningful problem situations that can serve as springboards for investigations and inquiry” (Arends, 2012: 396).

Problem based learning model is expected to develop students' thinking and problem solving skill, helps students perform in real-life situations and learn important adult roles (Adult role modeling), and help students become independent and *self-regulated learners* (Arends, 2012).

So, in this research, researcher will use model of problem based learning to improve mathematical creative thinking, but researcher also want to combine the model with scientific approach because by applying this approach, 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. In addition, information can also be obtained through math facts were disclosed, be it observed the phenomenon of everyday life environment related to the topic of mathematics or observe abstract mathematical objects. The steps of the scientific approach include: (1) observing, (2) questioning, (3) experimenting, (4) associating, and (5) communicating (Kemendikbud, 2013).

So, the title of this research is "The Implementation of Problem Based Learning Model with Scientific Approach to Increase the Mathematical Creative Thinking Ability in SMP Negeri 27 Medan in Academic Year 2014/2015"

1.2 Problem Identification

Based on the background above, there are some problems are identified, namely:

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

1.3 Problem Restriction

To avoid misunderstandings and expansion problems, this research will be focused on the implementation of problem-based learning model (PBL) with scientific approach to increase students' mathematical creative thinking ability in SMP Negeri 27 Medan.

1.4 Problem Formulation

Based on the problem restriction above, then the problem in this study is formulated as:

1. How the implementation of problem based learning model with scientific approach increase the mathematical creative thinking ability in SMP Negeri 27 Medan?
2. Is the implementation of problem based learning model with scientific approach can increase the mathematical creative thinking ability in SMP Negeri 27 Medan?

1.5 Research Goals

The goals of this study are:

1. To know the general description of implementation of problem based learning model with scientific approach to increase the mathematical creative thinking ability in SMP Negeri 27 Medan?
2. To know whether the implementation of problem based learning model with scientific approach can increase mathematical creative thinking ability in SMP Negeri 27 Medan?

1.6 Research Benefit

1. For Students

Increasing 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 Students or Advanced Researcher

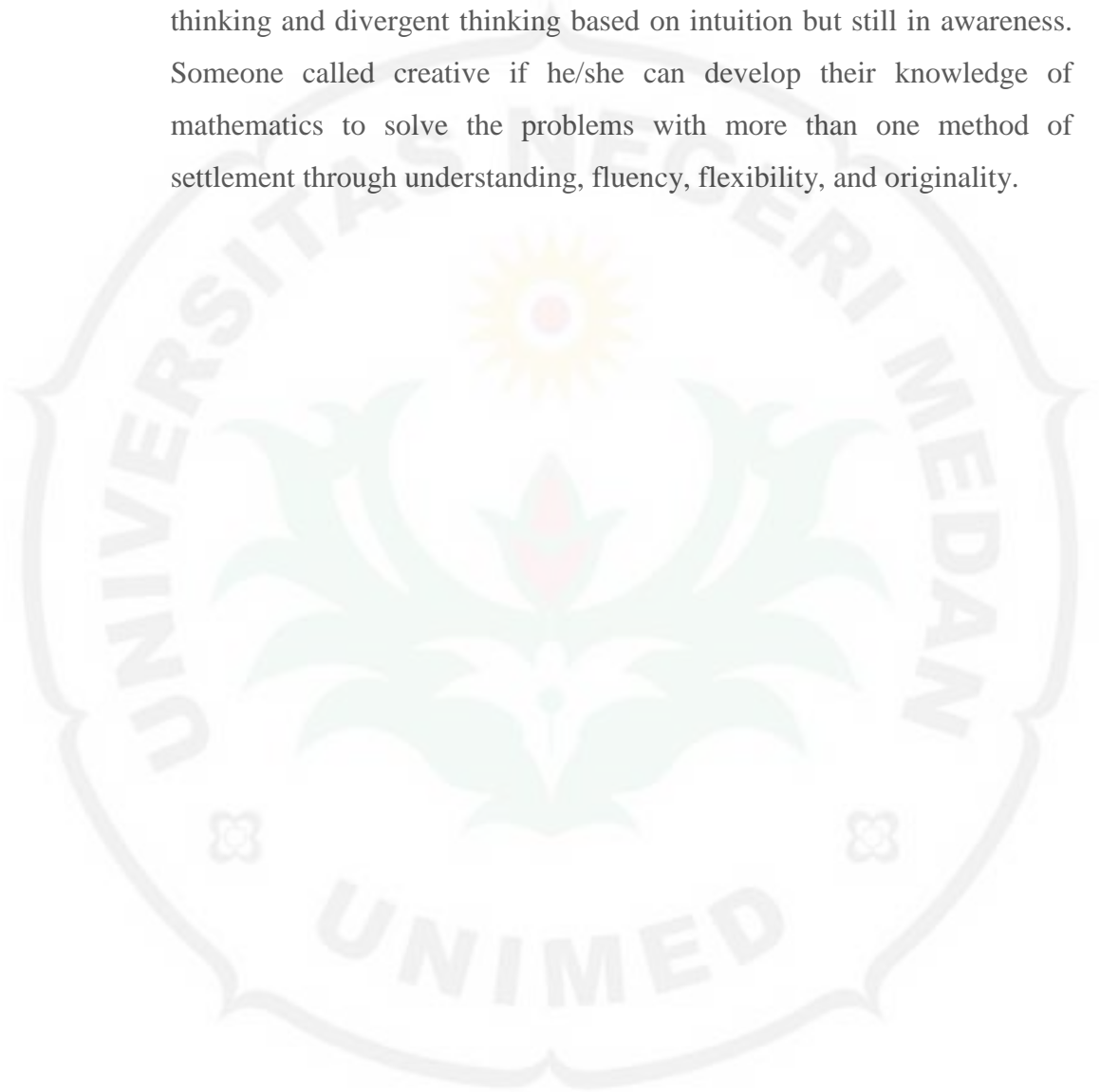
- a. Increasing the insight, ability, and experience in increasing the competence as teacher candidate.
- b. As information or reference for the advanced researcher in doing the relevant research.

1.7 Operational Definition

The variables of this research are defined 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 through facilitated problem solving by using the concept of scientific thinking are observing, questioning, associating, experimenting, communicating and networking.
4. The mathematical creative thinking ability 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 problems with more than one method of settlement through understanding, fluency, flexibility, and originality.



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