CHAPTER I
INTRODUCTION

1.1. Background

Humans are tied to education. Education is an important thing in our life from then until now. Education has become the basic foundation in living life in this industrial revolution era. Education has a very important role for the development of a country. The quality of education of a country is influenced by many factors. The quality of education is determined by several factors in the curriculum, teachers or teaching staff, facilities and learning resources. Teachers have an important role in improving the quality of learning in the classroom. To improve the quality of learning, teachers can carry out innovative learning in the classroom. Innovative learning puts students at the center of learning. This is in line with the opinion of Rini Kristiantari (2014) which states that the role of the teacher in the learning process remains the key to the success of an education.

Good learning in the classroom is able to foster students 'understanding of concepts and foster students' thinking. Retention, understanding, and active use of knowledge can be created only by learning experiences in which students think about, and think about, what they are learning (Eggen and Kauchak, 2012). Meanwhile, Mathematics is a discipline that can improve thinking and argumentation skills. Mathematics is a branch of science that has an important role in the development of science and technology, both as a tool in the application of other fields of science and in developing mathematics itself (Siagian, 2016).

Mathematics learning must be able to think critically in order to understand mathematical concepts correctly. Critical thinking is the process of analyzing or evaluating information on a problem based on logical thinking to make decisions

(Fristadi&Bharata, 2015). According to Van Gelde (2005) & Willingham (2007) critical thinking is a person's ability and tendency to make and assess evidence-based conclusions (in Eggen and Kauchak, 2012). Maulana (2008) states that by thinking critically, a person can organize, adjust, change, or correct his or her thoughts, so that he can make decisions to act more appropriately. Critical thinking skills in mathematics learning can be developed in schools to colleges. According to Maulana (2008, p. 39) critical thinking focuses on systems, structures, concepts, principles, as well as tight links between one element and another. Johnson (2007, p. 189) explains that critical thinking is a hobby of thinking developed by every human being, both at the elementary, junior high and high school levels.However, the reality in the field, the level of critical thinking skills of students is still low. This was revealed from a survey conducted by PPL students at one of the vocational schools in Ruteng Flores, 2017. It was found that students tended to follow teacher explanations or examples in books only, tended to use formulas mechanically. In the sense that students follow the example rigidly, changing only the calculated figures. Students also apply the formula rigidly, as if the formula is a machine repair device, whose shape and size cannot be changed anymore. Students are not able to develop formulas into other forms and find it difficult to translate them into real life problems (Fedi and friends, 2018).

A person's critical thinking ability can be done by using the right learning model. One of the appropriate learning models is the Problem Based Learning model. Problem Based Learning (problem-based learning) is a set of teaching models that use problems as a focus for developing problem-solving skills, materials, self-regulation (Hmelo-Silver, 2004). In general, in the world of education, teachers should not view learning as just a procedure for completing subject matter. Teachers must realize that learning is a process of building skills in students and learning is an exercise in thinking and acting to solve a problem. Teachers should not just require students to memorize the concepts given, with the orientation of the subject matter quickly completed. The accumulation of

information/concepts on the subject of students can be less useful even not useful at all if it is only communicated by the teacher to the student subject in one direction (students are passive, just accept and note how to solve a problem) (Fedi et.al, 2018).

So the problem-based learning model or in the problem-based learning model is a learning model that involves students in learning activities and prioritizes real problems both in the school, home, or community environment as a basis for obtaining knowledge and concepts through critical thinking and problem solving abilities.

From the results of research by Badrul Kamil et.al (2019), which is motivated by the Industrial Revolution 4.0, requires schools to produce graduates who are not only good at memorizing various materials, but also have the ability to think critically. Problem Based Learning (PBL) is a learning model that is considered good in training students' critical thinking skills, including students in Islamic boarding schools. The purpose of this study was to determine the effect of problem-based learning on students' critical thinking skills in pesantren. This type of research is a quasi-experimental with a random sampling technique. The research sample was 66 students. Data collection used an instrument in the form of a descriptive test that was adjusted to the indicators of critical thinking skills. The research analysis technique used was the t-test to determine the effect of problem-based learning models on students' critical thinking skills. The results showed that the average value of classes that applied critical thinking skills through PBL was higher than those that did not apply PBL. The results of data analysis using t-test obtained tcountbiggerttable value of 4.119>1.997 with a significance level of 5%, so it is said that the PBL model has an effect on students' critical thinking skills. It is suggested that PBL learning becomes a mandatory choice to be applied in the learning process with learning steps that have an impact on students' thinking processes.

In addition, in AgusSalim and friends' research (2018), it is said that the ability to think critically is one of the higher-order thinking skills that students must have in solving learning problems in everyday life. They made a study with

the aim of knowing the effectiveness of problems in a learning-based model, especially in improving students' critical thinking skills. Their research included quasi-experimental with a pretest-posttest control group design. The number of respondents in this study were 123 students who were divided into two classes, the experimental class and the control class. To analyze the data, this study, they used the N-Gain test. The results showed that the increase in the experimental class was much higher than the control class. Therefore, based on the research results, it can be concluded that the problem based learning model is an effective way of increasing students' critical thinking skills in the setting of the teaching and learning process.

Also research by Saut Lamhot Sitanggang et.al (2020) which aims to determine the effect of the Problem Based Learning model on students' mathematical critical thinking skills. This research is a quasi-experimental research. The population in this study were all students at SMP N 4 Lubuk Pakam for the 2020/2021 academic year, totaling 384 students. The research sample was 60 students, namely 30 students in class VII-1 and 30 students in class VII-2. The sample was selected by cluster random sampling. The instruments used were the mathematical critical thinking ability test. The data obtained were analyzed using ANAVA in the Spss 20 program. The results showed that: 1) there was an effect of the Problem-Based Learning model on students' mathematical critical thinking skills with a significance value of $0.001<0.05$.

Due to the various research results, it is necessary to synthesize research results or what is called meta synthesis. Meta synthesis is a literature review method that identifies, assesses, and interprets all findings on a research topic, in order to answer predetermined research questions. Furthermore, by definition, meta-synthesis is a technique of integrating data to obtain new theories or concepts or a deeper and more comprehensive level of understanding (Perry & Hammond, 2002). Initially, researchers will collect sources in the form of several journal articles as a comparison for data accuracy. Then the researcher synthesizes (summarizes) the results of qualitative research or what is commonly referred to

as meta synthesis by integrating data on the research results to obtain new theories or concepts or a deeper and more comprehensive understanding of the topic.

1.2. Problem Identification

As for the identification of problems in this research which is obtained from the background description are:

1. Students' critical thinking skills in learning mathematics are still low.
2. Mathematics learning is still teacher-oriented so that students are passive in learning activities.
3. The variety and differences in the results of research regarding the effect of Problem Based Learning on students' critical thinking skills, causing differences in the perceptions of researchers and readers.

1.3 Problem Limitation

Based on the problem identification above, the focus of this research problem is the result of research on the Effect of Problem Based Learning Model on Critical Thinking Ability in Mathematics Learning. The results of the research used are research journal articles for the last 10 years, namely articles from 2011-2020 at the junior high school level.

1.4 Problem Formulation

Based on the identification and problem boundaries above, the problem formulations in this study are:

1. How is the effect of Problem Based Learning on students' critical thinking skills in mathematics learning?
2. How is meta-synthesis about the effect of Problem Based Learning on students' critical thinking skills in mathematics learning?

1.5 Research Objectives

Based on the formulation of the problem above, the research objectives to be achieved are as follows:

1. Describe the effect of Problem Based Learning on students' critical thinking skills in mathematics learning carried out in previous studies.
2. Describe the meta-synthesis of the effect of Problem Based Learning on students' critical thinking skills in mathematics learning.

1.6. Research Benefits

This research is expected to:

1. For the author, this study is expected to provide benefits to increase the writer's knowledge about how the effect of Problem Based Learning on students 'critical thinking skills in mathematics learning the effect of Problem Based Learning on students' critical thinking skills in mathematics learning.
2. For readers, it is hoped that they can increase their knowledge and insight regarding the improvement of students' critical thinking skills after using the Problem Based Learning learning model.
3. For the State University of Medan, the results of this study can be used for library materials.

1.7. Operational Definition

To reduce differences or lack of clarity of meaning, the operational definitions in this study are:

1. Problem Based Learning is a classroom strategy that organizes mathematics instruction around problem solving activites and affords students more opportunities to think critically, present their own creative ideas, and communicate with peers mathematically.
2. Students' mathematical critical thinking skills are effective thinking skills that can help someone to make, evaluate, and make decisions about what to believe or do.

3. Meta-synthesis, also known as a systematic review, is a research method for identifying, evaluating and interpreting similar research results to answer research questions on a particular topic or phenomenon that is of concern.