CHAPTER I

INTRODUCTION

1.1   Background

Education has a very important role in the life of the nation and state so that through education, intelligent and competent future generations will be formed in their fields so that the quality of human resources increases and the condition of the nation can change for the better. That is, it is very important to improve the quality of education in Indonesia, so that through quality education, the Indonesian nation can have individuals who are ready to respond to changing times and can become a developed country.

Mathematics is a universal science that underlies the development of modern technology, has an important role in various disciplines and advances the power of human thought. Countries that ignore mathematics education as a top priority will be left behind from progress in all fields, especially science and technology. This is in line with what was stated by Hudoyo (1979) that the role of mathematics in the world today is very dominant, because 60% to 80% of the progress achieved by developed countries is very dependent on mathematics.

Mathematics subjects need to be given to all students starting from elementary school to equip students with the ability to think logically, analytically, systematically, critically and creatively, as well as the ability to work together. In addition, students are required to be able to develop mathematical skills in problem solving and communicating ideas using symbols, tables, diagrams, and other media.

This is in accordance with the objectives of learning mathematics in Indonesia as stated in PERMENDIKNAS No. 22 of 2006 concerning Standards for Content of Mathematics Subjects, that the purpose of learning mathematics is so that students are able to:

1. Understanding mathematical concepts, explaining the interrelationships between concepts and applying concepts or logarithms, formally, accurately, efficiently, and precisely in solving problems

2. Using reasoning on patterns and properties, doing mathematical manipulation in making generalizations, compiling evidence, or explaining mathematical ideas and statements

3. Solve problems that need to be solved, solve mathematical models, solve models and solve the solutions obtained

4. Communicating with tables, diagrams, or other media to clarify the situation or problem

5. Having an attitude towards the usefulness of mathematics in life, namely having curiosity, attention, and interest in mathematics, as well as being tenacious and confident in problem-solving.

Based on the explanation, the mathematical problem solving ability is very important for students to have. Mathematical problem solving skills are very useful for students, not only in solving mathematical problems but also in solving problems in everyday life. Problem solving ability is not something that is easily found by students so students must train to develop these abilities. To develop these abilities, the learning processes and strategies applied must be able to help students understand problems, plan problem solving, find solutions and be able to draw conclusions from solving these problems.

The same thing was conveyed by Mahanani & Murtiyasa (2016), problem solving ability is part of the goal of learning mathematics. Ulya (2016) reveals, problem solving ability is the ability to use self-understanding to solve new problems in different situations. Furthermore, Aqib (2013) revealed, problem-solving abilities, namely individual skills to reason problems, develop alternatives and apply alternatives to solve problems. A similar opinion was also expressed by Polya (in Hartono, 2014) namely, problem solving ability is a mental activity that is carried out since students understand the problem, make plans, carry out plans, and look back at problem solving. Referring to this explanation, problem-solving ability has the meaning of an ability to organize concepts, facts, and connect

previous knowledge, and to use reasoning skills to solve problems. The stages in solving the problem, namely being able to interpret the problem, develop a solution scheme, implement the scheme, and review the process that has been made. Therefore, it is important for students' mathematical problem solving abilities to be improved.

Mathematical problem solving ability has several indicators, such as: a) showing problem understanding, namely the ability to find important things from the problem, b) being able to formulate problems into mathematical language, c) determining alternative ways of solving problems, and d) being able to provide explanation of the answers made (Mawaddah & Anisah, 2015). Meanwhile, according to Sumarmo (in Mustika & Riastini, 2017) mentions several indicators of solving mathematical problems including: a) determining the main components contained in the problem, b) converting the problem into a mathematical model, c) using the knowledge possessed to choose a strategy. problem solving, d) rechecking the answers obtained, and e) applying mathematics meaningfully. Based on this description, it can be formulated indicators of solving mathematical problems, namely: a) understanding the problem, namely finding important components of the problem, b) formulating mathematical problems, namely being able to formulate it into mathematical language, c) applying solution schemes, namely being able to apply various alternatives or ways to solve the problem, and d) able to provide explanations and check the results of problem solving made.

One of the problems that teachers often encounter in the learning process in the classroom is the weak level of students' thinking. The habit of students who tend to wait, imitate, and record the way the solution is done by the teacher, if this is allowed to continue, it allows learning mathematics to be less effective to accommodate student development in problem solving. The low problem solving ability of students expressed by Napitupulu and Mansyur (2011) in their research, namely the results of the study show that students' problem solving abilities are still very weak and far from being complete because students' ability in solving mathematical problems is still below 50%. This low mathematical problem solving ability has an impact on student learning outcomes. international research results show that the mathematical problem solving ability of Indonesian students

is still low compared to other countries. This can be seen from the results of the Trend in International Mathematics and Science Study (TIMSS), a study conducted by the International Association for the Evaluation of Educational Achievement (IEA), in 2016 placing Indonesia in 46th place out of 51 countries. This is not much different from the results of the 2018 PISA survey, especially for the mathematics category, Indonesia ranked 73 out of 80 participants who took part in this program with an average score of 379. Indonesia's average score is still very far when compared to China, which is ranked first with an average score 591 (Tohir, 2019).

The factor causing the low ranking of Indonesian students in PISA is the weakness of non-routine or high-level problem solving skills. Because the questions tested in PISA start from level 1 to level 6. While most Indonesian students are only used to routine questions at level 1 and 2 only (Inayah, 2018). This is also expressed by Oktaviana, et al (2018) that problem solving abilities are found in the questions tested by PISA. With the low PISA results of Indonesian students, it can be said that the problem solving abilities of Indonesian students are also low. Therefore, it can be concluded that the mathematical problem solving ability of Indonesian students is still relatively low. This can also be seen from previous research showing that out of 36 students only 8 students were able to solve problem solving problems correctly (Imron, Somakin & Susanti, 2015).

This is in line with the reality on the ground that it is clear that mathematics learning has not been able to be achieved optimally. Students assume that mathematics is a difficult subject to understand because the learning process does not arouse students' creativity so that students still think and feel lazy to learn mathematics. This is a factor why learning mathematics is still relatively low.

The results of the initial test conducted by Jessenia (2019) also showed that the problem-solving ability of the seventh-grade students of SMP Negeri 37 Medan, amounting to 32 people were still low. The initial test results obtained by the researchers showed that 56,25% of students have not been understood the problem or the conditionthe presented by the problem, 50% of students have not been devised a plan to solve the problem, 62,5% of students have not been carried

out the plan and could not see clearly that the step is correct, 78,125% of students have not been looked back.

The low problem solving ability is caused by several things, one of which is the model used in the mathematics learning process (Ariska, 2016). The same thing was also expressed by Afifah (2016). The selection of the right learning model according to the situation and conditions will have an impact on student achievement. The low problem solving ability of students indicates that there is something that has not been optimal in the mathematics learning process that has been carried out so far, students only accept the learning delivered by the teacher without any exploration, causing students to become passive in the learning process. As a result of this kind of learning process, problem solving skills cannot develop properly (Effendi, 2012).

Not only mathematical problem solving skills are very important in learning but there are several psychological aspects that also contribute to a person's success in completing tasks well, one of which is student learning independence. Independent learning requires students to start their own learning business without depending on teachers, parents or other people in their environment. This self-study process provides students with a wonderful opportunity to sharpen their awareness of their environment. Self-study allows students to make positive choices about how they will cope with the anxiety and chaos of everyday life. This pattern allows students to act on their own initiative to shape the environment.

Bandura (Heris Hendriana, Euis Eti Rohaeti and Utari Sumarmo, 2017) defines learning independence as the ability to monitor one's own behavior, and is the hard work of the human personality. The learning independence strategy contains activities, namely self-evaluating, organizing and transforming, setting goals and designs, seeking information, recording and monitoring, compiling the environment, seeking social assistance, and reviewing notes.

Self-regulated is a learning skill which in the individual learning process is encouraged, controlled, and assessed by the individual self in learning mathematics because of the curriculum demands so that students can face problems in the classroom and outside the classroom which are increasingly

complex and reduce students' dependence on other people in everyday life (Fauzi, 2011: 111). However, currently the reality is that learning independence has not been socialized and developed among students, they assume that teachers are the only source of knowledge, causing students to have dependence on other people, especially teachers.

Based on research conducted by Febriyanti & Imami (2021) it was found that the self-regulated learning of junior high school students in mathematics is still very low. This can be seen from the results of the analysis and proof of the value of self-regulated learning in mathematics learning, the results obtained for the planning phase (27.47%), the implementation phase (33.02%), and the evaluation phase (24.80%). And overall obtained an average of 28.97%.

Students who have high learning independence will try to complete all exercises or tasks given by the teacher with their own abilities. If students have difficulty then the student will ask or discuss with friends, teachers or other parties who are more competent in overcoming these difficulties.

Referring to these problems, it is necessary to create a more innovative learning atmosphere. This is deemed necessary because if the issue is not addressed, it will result in low student learning outcomes, such as the results of the 2018 PISA survey described above. Alternative handling of these problems, namely the implementation of the learning model optimally. The learning model is a learning theory that contains learning steps that must be carried out systematically during the learning process. Kusniasih & Berlin (2016) states, the learning model is the phases that are carried out sequentially in order to achieve the goals set. According to Sundari (2015), the learning model is a series of learning activities based on theory and research results and carried out to achieve learning objectives. Furthermore, Min (2017) explained, the learning model is a scheme in implementing the learning process so that it can run well. The appropriate model is used to optimize students' ability to solve mathematical problems, one of which is the blended learning model.

The Blended Learning model is a learning activity that combines face-to-face learning in class with learning activities using the internet (Rosmiati et al., 2013: 295). According to Sjukur (Aprilia, 2015: 41) said that Blended Learning is

a combination of traditional learning and an electronic learning environment. Blended Learning combines aspects of web/internet-based learning, video streaming, synchronous and asynchronous audio communication with traditional or face-to-face learning. Blended Learning is basically a combination of the advantages of learning that is carried out face to face (face to face learning) and virtually (e-learning).

According to Hasbullah (2014: 66) Blended Learning is a process of uniting various learning methods that can be achieved by combining virtual and physical resources. By combining virtual and physical resources, it is hoped that learning will be more effective and efficient. In addition, this learning offers several conveniences because learning with computers (Online) does not completely eliminate face-to-face learning.

Graham (2005) said that blended learning has advantages, including: (1) Flexibility, meaning that students can contribute to discussions at a time and place that they choose individually. (2) Participation, meaning that all students can participate in the learning process because they can arrange the time and place to participate. (3) Learning has more time so that it can be more careful in arguing and reflecting more on its views and opinions.

According to Carman (2005) there are five keys to implementing blended learning, namely: (1) Live Event, direct or face-to-face learning; (2) Self-Paced Learning, which combines with independent learning which allows participants to learn anytime and anywhere online; (3) Collaboration, collaborating, namely both teacher collaboration and collaboration between learning participants; (4) Assessment, assessment is feedback on the learning process (5) Performance Support Materials, ensure that the material can be accessed by students both offline and online. The implementation of blended learning applies a composition of 50% face-to-face, 25% offline (through independent learning with interactive media), and 25% online (learning using the web), the composition is applied taking into account the characteristics of students who have never applied this learning before.

Blended learning integrates innovative learning by utilizing technological advances in the form of online learning and increasing student positive

participation than ordinary learning. Where they are possible to be in a different world, but can give each other feedback, ask questions, answer, interact between students and educators or between students and students. Among the advantages of Blended learning is being able to make a positive contribution to students.

Based on the background described above, the researchers to conducting a study entitled **"Analysis of The Effect of Blended Learning Models Towards Mathematical Student's Problem Solving Abilities And Self-Regulated".**

1.2 Identification of Problem

Based on the background of the problems that have been stated above, several problems can be identified as follows:

1. Students' mathematical problem solving ability in learning mathematics is still low.
2. Students are less active in the learning process.
3. Lack of student self-regulated in learning mathematics.
4. The applied learning models and strategies are still less effective.

1.3 Scope of Problem

Based on the background and identification of the problem above, the scope of the problem is quite broad, the researcher defines the problem so that this research is more focused. The limitation of the problem in this research is the analysis of the effect of the Blended Learning Model on Student's Mathematical Problem Solving Abilities and Self-Regulated Learning.

With the above problems, it is necessary to limit the problem so that this research is more focused and directed. The limitations of the problem in this study are as follows:

1. The articles used are articles that have been published nationally and internationally that have been accredited by the Ministry of Research, Technology and Higher Education of the Republic of Indonesia in Sinta Indonesia.
2. Data collection begins with searching for journal articles through the Google Scholar page using the keyword "The effect of Blended Learning

on students' mathematical problem solving abilities and self-regulated learning."

3. The research focuses on research articles that have been published from 2016 to 2021.

1.4 Formulation of Problem

Based on the identification and limitations of the problem above, the problem formulation in this research are:

1. How is the effect of blended learning model on student's mathematical problem solving and self-regulated learning ?

2. How is the improvement on student's mathematical problem solving and self regulated learning ?

3. What are the advantages and disadvantages of blended learning model ?

1.5 Objective of Research

The objectives in this research are :

1. To determine the effect of blended learning model on student's mathematical problem solving abilities and self-regulated learning.

2. To know the improvement of on student's problem solving and self-regulated taught through blended learning models.

3. To find out the advantages and disadvantages of blended learning model.

1.6 Benefits of Research

This research is expected will give the benefit as follow :

1. For students, through the blended learning learning model, it is expected that students can more easily understand the material in mathematics lessons and solve math problems so that they can improve student's mathematical problem solving abilities and self-regulated learning.

2. For teachers, through the blended learning model, information can be used to expand knowledge, especially in helping learning to be more interesting and to further improve student's mathematical problem solving abilities and self-regulated learning.

3. For schools, as a consideration in the development and improvement of mathematics teaching programs in schools.

4. For researchers, as information material as well as a guide for researchers in carrying out teaching duties as prospective teaching staff in the future.

5. For readers, as information material for readers or other researchers who want to do similar research.

1.7   Operational Defenition

The operational definitions in this study are :

1. Analysis is the activity of outlining, distinguishing, sorting things out to be regrouped according to certain criteria and looking for the relation and then interpreting the meaning.

2. Blended Learning is a learning model that combines direct learning (face to face) direct learning.

3. Mathematical Problem Solving Ability is an ability in the process used to solve the problems he faces until the problem is no longer a problem for him which can be in the form of solving story problems, solving non-routine problems, applying mathematics in everyday life or other circumstances, and proving or creating or testing conjectures that appear to be activities for developing mathematical skills for students to improve their analytical skills and can help them apply these skills to various situations.

4. Self-Regulated is the ability to monitor, regulate, control aspects of one's own cognition, motivation, and behavior in learning. Learning independence is defined as the nature and ability of students to carry out active learning activities, which are driven by a motive to master a competency, and are built with the knowledge or competencies they already have.