CHAPTER I

INTRODUCTION

1.1 Background

People are living in the century where globalization and technology are developing so fast. The growth makes the world is changing in a wink of the eye and compelling human to be active and mastering many skills to be able to survive. There are seven survival skills people need in this century. They are (1) Critical Thinking and Problem Solving, (2) Collaboration and Leadership, (3) Agility and Adaptability, (4) Initiative and Entrepreneurialism, (5) Effective Oral and Written Communication, (6) Accessing and Analyzing Information, (7) Curiosity and Imagination (Wagner, 2008). Those skills can be learned by formal or informal education.

The skill that researcher wants to emphasize is the first skill which are critical thinking and problem solving. "Critical thinking means thinking about thinking in order to decide what to believe and how to behave" (Marks-Beale, 2002). **"**Problem solving involves finding an appropriate way to attain a goal" (Santrock, 2011, pp.316). In this research the researcher will focus on problem solving skill because "problem solving is not a single skill, but rather an overlapping of a number of thinking skill. Likely to be involved in it are logical thinking, lateral thinking, synthesis, analysis, evaluation, sequencing, decision making, research and prediction" (Teare, 2006, pp.16). Problem solving skill covers many skills and also practices many skills. Improving the problem solving skill will improve the other skills.

Mathematics is an important subject which is learnt by students in every school around the world. Mathematics is a way of organizing our experience of the world. Mathematics enriches our understanding from the experience in this world. Organizing our experience is an ability that needs critical thinking and problem solving to do it. Mathematics builds up the technologies used at home, school or workplace. It proves that mathematics is near with our daily activities.

One of the standards of mathematics based on the National Council of Teacher of Mathematics (NCTM) is an ability of solving problem. "Their idea is that problem solving ought to constitute a vehicle for the construction, evaluation, and refinement of students' own theories about mathematics, and the development of their confidence in their own ability to think mathematically" (Ben-Hur, 2006, pp.74). Mathematics is one subject that helps the students to develop themselves and to think mathematically. Think mathematically means be able to think in the structural steps and make the problem meets the mathematics concept.

Nowadays, mathematics learning in the school mostly only focuses on teaching to remember but not to think. Students just copied what their teacher showed or demonstrated in front of the class. Especially in mathematics, most of the students see mathematics more as a matter of memorizing than understanding. Mathematics is not doing its function to make those students be able to solve the problems in their daily life.

During the observation of the internship period, researcher observed a group of students grade VII in a school from 24th of August until 25th of September 2015. Those students only expected themselves to do some easy problem that did not make their thinking skill improved. Students also expected that teacher would give

them a shortcut way to solve a problem in the class. Shortcut way means answering the problem without reorganizing the problem and seeing some part of the problem only. The impact of this expectation is the students become lazy while the teacher asked them to show the process in finding the solution of a mathematics problem, especially for the mathematics word problem. Students were lazy to think more about the problem and the concept needed to solve the new word problem in the same topic.

Some of the students could answer the word problem by guessing the answer and putting it into the problem for checking. If the answer was not true, they tried to find another answer. Guessing the answer did not train the students become a good problem solver. "Good problem solver tends to work on problem from beginning to end in small, careful steps" (Whimbey, Lochhead, & Narode, 2013, pp.27). Solving the problem without using the steps tends to be a poor problem solver. This situation did not fulfill the seven survival skill in this century and the standard of NCTM.

Based on the Mathematics National Curriculum Standard for grade Seven, the expected skill is applying the algebraic concept in purpose to solve the word problem. The researcher had done a test for the students grade VII. The test result showed that the students were able to simplify the algebra expression well and make word statement into algebraic expressions. Based on the Bloom's taxonomy, students are able to remember the algebraic concept (C1) and are able to explain the concept (C2). The result also showed that most of the students were not able to apply the algebraic concept well to solve the word problem step by step connecting

with the algebraic problem. Based on the Bloom's taxonomy, students have not reached the ability to apply the algebraic concept to solve a problem (C3).

The conclusions above come from the result of the test. The test includes two parts such as algorithm problem and word problem. Algorithm problems expect the students to remember the concept in purpose to answer the problem. For example, students are asked to determine the part of one algebraic expression. Algorithm problems also expect students to simplify the concept to their own words. For example change the word mathematics problem into algebraic expression and another example to simplify the algebraic expressions.

Word problems expect students to remember the concept, write the concept, and connect the concept to the new situation in the problem. Word problem usually, but not all of them, contains the problem that students have in the daily life that they are familiar with. For example calculating the price, calculating the age, and calculating the time and many other examples. Problem solving is crucial to the success of students as they work to find solutions of problems in everyday life because the word problems connect with their daily life problem (Frei, 2007). In accordance with the statement above, researcher concludes that the lack of ability to solve that word problem in steps will represent their ability to solve the problem in their daily life that are more various and complicated.

What significant is this problem solving skill for those who claim that they are a Christian educator? Van Brummelen wrote some Biblically based premises as the model for meaningful learning(Van Brummelen, 1998, pp.119) such as:

a. Students are responsive and unique images of God

b. Knowledge entails far more than learning concepts. Knowledge involves dispositions and commitment. It intends to lead to service.

c. The dimensions of teaching embody guidance through unfolding, structuring, and enabling.

As we see the students as the image of God, Christian educators are responsible to guide those students to realize their role in this world. The role that reach overall aim of Christian education which is guiding and helping students be and become a responsible disciples of Jesus Christ (H. Van Brummelen, 1998). Jesus Christ has commanded His disciple to be salt and light of the world. Light shines the darkness; salt gives meaning to the world.

The school's mission states "engage in the redemption creation through the Christian education". This mission supported by Ridderbos (1962) who said that "the vision of the Kingdom of God points Christians not only to the redemption of God's people but also to the realization of God's intents and promises for His whole creation and for His people" (cited in Van Brummelen, 1998, pp.8).

Students are commanded to engage with the redemption of the world and had been stated that one skill that needed in this century is problem solving skill. Christian educators cannot let the students come into the world unequipped, but being responsible to practice them to be persistent to find and to practice the truth in the learning and in the daily life. One of the way is by training them walk in many process to improve their problem solving skill. The process to improve the problem solving skill consciously will make them become persistent to find the truth. The good problem solving skill will equip the students in bringing the truth into the world and participating actively in the restoration of the creation. Christian

educators believe that the students are able to master the skill since we believe students are the image God that imitates the omniscience God.

Learning can be defined as an experiential process resulting in a relatively permanent change in behavior that cannot be explained by temporary states, maturation, or innate response tendencies (Klein, 1996, pp.2 as cited in Mowrer & Klein, 2000, pp. 2). Based on the definition, teachers need to set the learning in the class, to make the learning become more meaningful for students.

Christian's educators are living in the 21 century which needs people who have strong skill in the problem solving. Christian's educators who are serving in the Christians school prepare the students to be actively participating to the redemption of the world. We have seen the reality that there are a number of students who need to learn more the about problem solving. Based on those three things, the researcher will change the way of teaching and choose the Polya problem solving steps in the mathematics learning. The researcher will do a research to evaluate whether the Polya problem solving is able to improve students' problem solving skill

The title of this research is "The Use of Polya Problem-Solving Steps to Improve the Students' Problem Solving Skill in the Mathematics Word Problem in the SMP ABC, Lippo Village Karawaci"

1.2 Statement of Problem

The statements problem that will be explored through this research are:

1. Are Polya problem-solving steps able to improve the students' problem-solving skill?
2. How could the implementation of Polya problem-solving steps could improve the students' problem solving skill?

1.3 Objectives Research

1. Finding out whether the Polya problem-solving steps are able to improve the students' problem solving skill.
2. Finding out how the Polya problem-solving could improve the students' problem-solving skill.

1.4 Benefits of the Research

1. For The Teacher

   As the input about the advantage of the Problem-Solving method to improve the skill of applying concept so that teacher can apply various teaching method in the class.

2. For The Next Research

   As the reference for another researcher who want to develop the Problem-Solving method to improve the skill of applying concept.

1.5 Definition of Term

a. Polya Problem-Solving Steps

Problem Solving Steps is a heuristic model to find the solution of a problem. Polya in (George Pólya, Polya, Conway, & Polya, 2004, pp.xvi), described the four steps as (1) understanding the problem (C1&C2); (2) devising the plan (C2); (3) carrying out the plan (C2&C3); (4) looking back (C3).

b. Problem Solving Skill

Problem solving is an integral part of all mathematics learning (Martin, Mathematics, & Mathemat, 2000, pp.52). Problem solving involve applying—transferring—previously learned knowledge or skills to a new situation. Solving the problem is begin by manipulate the information in a problem; It is required to

understand its meaning and plan a way to solve it. Therefore, students need to learn about problem solving as a process and the strategies they can apply to find solutions. (Committee et al., 2001)

c. Word Problem

Word problem means “each problem describes a situation involving numerical relationships. The situation and relationships must first be interpreted and grasped. Then simple arithmetic computations need to be performed to get the answer” (Whimbey et al., 2013, pp.241)