

CHAPTER I

INTRODUCTION

1.1 Background of the Study

The purpose of Christian Education is to lead every student to become an active disciple of Jesus Christ who has true knowledge and faith in Jesus Christ (Wolterstoff, 2007, p. 13). This purpose should become the foundation in designing and preparing the lesson. The first thing that is needed to be done in preparing the lesson is determining the learning objectives. Kosasih (2014, p. 13) defined learning objectives as the statements of the detail and complete competences the students need to achieve by the end of the lesson. One of the three domains of learning objective is cognitive learning objective.

Cognitive learning objective related to intellectual learning outcome the students need to achieve by the end of the lesson. Christian teacher is aware that one of the ways God reveals Himself to human is through knowledge. God gives human the capacity to learn the knowledge so that they may believe in Him and awe Him for He is the source of the true knowledge. According to Van Dyk (2013, p. 31), academic ability is one of the students' equipment in doing their ministry so that the teacher is responsible to equip the students academically. As the response to this awareness, the teacher designs the lesson as well as makes the details of the competences the students should achieve after learning particular material as the cognitive learning objectives. Therefore, the achievement of cognitive learning objectives by the end of the teaching and learning activity is important.

Knight (2009, p. 9) stated that philosophy of education must enable the students to evaluate alternative purposes by relating the objectives and choosing the

appropriate methods to accomplish the purpose. It means the teacher is responsible to choose and apply the teaching method that helps the students to accomplish the cognitive learning objectives. In choosing the teaching method, the teacher has to make sure that all of the students have been facilitated during the teaching and learning activities. Facilitating the students during the teaching and learning can be done by creating conducive environment, motivating, guiding, and encouraging the students to explore their talents. There must be interaction among the students and the teacher, and interaction between the students in order to create a conducive environment for the students to learn better. According to Van Brummelen (2006, p. 85), the teacher guides and empowers the students because she understands that God calls the students to be responsible as the image of God and to open their eyes to the knowledge of righteousness and the response that has purpose. Then, a God-centered teaching that is oriented to the students will be created.

The teacher applies different kinds of strategies to design a student-oriented teaching and learning activity to help the students accomplish the cognitive learning objectives and do their tasks as responsive disciples. The researcher faced a different reality in grade X class at a school where she did her internship. The researcher observed this class from August 4th until September 26th, 2015. Based on the observation, the researcher found that the students in this class already had good attitudes and good learning behavior (see Appendix F-1). They were neither too active nor passive in following the teaching and learning process. They were active in asking questions during the class discussion and showed willingness in presenting their answers by writing the answers on the whiteboard. They were quite calm and attentive during the class so that the teacher did not have to deal with any

behavioral issues. Most of the time, the teacher used guided inquiry to teach new concepts. The teacher gave various types of problems as the examples. The students were given homework from the handbook. The seating arrangement used by the teacher was in a U shape. The students were free to choose their seats. At the end of the chapter that was taught by the researcher's mentor, the researcher was given a chance to correct the students' summative test. The results of the students' summative test was surprising because most of the students failed. Actually, the students were given a quiz before having the summative test. The quiz was meant to give the students a picture of how the summative test's problem would look like. One of the problems given in the summative test was exactly the same as the quiz problem. Some of the problems in the summative test had some solving way by different numbers with the quiz problems, and some of the problems were just the combination of two or three concepts the students had learned. From the students' work, the researcher could see that most of the students merely memorized the formula or the steps in solving particular problems without knowing what the problem required them to do. According to Piaget's cognitive stage (Santrock, 2011, pg. 45), grade X students, whose ages are 15 – 16 years old, are in the formal operational stage. In this stage, the students can think in more abstract, idealistic and logical ways. Therefore, grade X students were supposed to be able to achieve the cognitive learning objectives that were set according to the basic competences from the government which were up to the fourth domain of Bloom's revised taxonomy. In fact, grade X students in this class just memorized the formulas and could not solve the problem. From the reasons described, the researcher presumed that grade X students had low cognitive learning objectives achievement and guided

inquiry used by the mentor teacher was not enough to help the students to increase their cognitive learning objective achievement.

On one occasion, the researcher was given an opportunity to teach this class for one whole chapter, which was Quadratic Equations and Quadratic Functions. In the first meeting, the researcher taught this class by using direct teaching and inquiry methods. The students were active in asking questions during the class discussion (see Appendix F-1). Some of the students interrupted the presentation when they had questions. Most of the students enthusiastically proved the factorization formula being asked. During the guided practice time, the researcher went around to check if the students had mastered the concept being taught. The researcher found there were many students who were still confused in applying the formula that had been proven before. Some of the students did not memorize the formula because they wrote down the wrong formula. When the students were given a problem in different form, most of them could not solve the problem. They could not change the problem into the general form of a quadratic equation because some of the students wrote the formula wrongly or confused the operation symbol (+) with (\times). In the next meeting, the students were given a pop quiz. Before having the quiz, the students were guided to review solving quadratic equations. Unexpectedly, the result of the quiz was far below the expectation. Most of the students failed the quiz and the scores were far below the minimum passing grade. There were a lot of students who had difficulties in relating the material with previous concept, explaining the concept and applying the concept in solving the problems. These problems were in line with the cognitive difficulties in Mathematics skills as described by Villa University (2015) as follows:

- often have incomplete mastery of basic facts
- confuse operational symbols, such as + for x
- number reversals
- copy problems incorrectly or put numbers on the wrong line
- difficulty recalling sequence of operations
- difficulty with word problems
- difficulty in applying problem solving concepts

Based on these concerns, the researcher concluded that the major problem in this class was the low cognitive learning objectives achievement in Mathematics. Guided inquiry and direct teaching were not enough to help increase students' achievement for cognitive learning objectives. In order to overcome this major problem, the researcher chose to apply STAD (Student Teams Achievement Divisions) to increase students' cognitive learning objectives achievement. The students were active during the teaching and learning activity so the students would not have any difficulties in group discussion. It helped the students to share their ideas and helped each other to master the material so that they could improve their cognitive learning objectives.

STAD (Student Teams Achievement Divisions) is one of the methods that allows the students to work or study in small heterogenic groups because there are only 4 – 5 students with different levels of cognitive, gender and culture. When the students are working in their groups, there will be a positive interaction between the students that helps them to increase not only their cognitive achievement but also their social skill in team work (Rusman, 2012, p. 227). STAD is a cooperative learning method that fits in Mathematics learning (Li & Lam, 2005, pg. 16). Quadratic Equations and Functions has a lot of formulas that have to be memorized and applied. Sometimes, the students have difficulties in determining which formula that is needed to be applied because the formulas are somewhat similar. If

the students just memorize the formulas, there will be a possibility that the students will apply the wrong formula. The small and heterogeneous group in level of cognitive, gender and culture allows the students to share and help each other to understand and be able to distinguish one formula from the other formulas when the students work in the group. The positive interaction in the small group helps the students to be secure to discussing the material. This condition enables the students to gain more information, whether it is a new information such as short formulas that might not be taught by the teacher in the class or it is the part the students missed during the teacher's presentation. This idea is supported by Slavin's statement, saying: "The main idea behind Students Teams-Achievement Divisions is to motivate students to encourage and help each other master skills presented by the teacher" (Slavin, 1996, p. 21)

For the reasons described above, the researcher decided to conduct this research entitled "The Application of Student Team Achievement Division (STAD) to Increase Grade X Students' Achievement in Learning the Cognitive Objectives for Quadratic Equations and Functions at SMA ABC".

1.2 Statements of the Problem

The research wanted to know the answers to the following questions:

1. Can the application of Student Team Achievement Division (STAD) increase grade X students' achievement in learning the cognitive objectives for Quadratic Equations and Functions at SMA ABC?
2. How does the implementation of Students Team Achievement Division (STAD) increase grade X students' achievement in learning the cognitive objectives for Quadratic Equations and Functions at SMA ABC?

1.3 Purposes of Study

Based on the two research questions above, the purposes of this study are:

1. To find out if Student Team Achievement Division (STAD) can increase grade X students' achievement in learning the cognitive objectives for Quadratic Equations and Functions at SMA ABC.
2. To know how the application of Student Team Achievement Division (STAD) increases the students' achievement in learning the cognitive objectives for Quadratic Equations and Functions for grade X students at SMA ABC.

1.4 Benefits of the Research

By doing the research, it is expected that it will provide beneficial contribution to the students, teachers, the researcher and other researchers.

1) For Teachers

Teachers will have an alternative teaching method in increasing students' cognitive learning objectives achievement in Mathematics, especially in teaching Quadratic Equations and Functions.

2) For The Researcher

- a) The researcher will get an experience in running a classroom action research an in evaluating strengths and weaknesses of applying STAD.
- b) The researcher will be able to improve her teaching skill, especially in teaching Mathematics.

3) For Other Researchers

This research is useful for the other researchers as a reference for the next research.

1.5 Definition of the Terms

The following are the definitions of terms that are used in this study, which are:

1. Cognitive Learning Objective

Cognitive learning objectives is intellectual outcome in mastering the content as the result of learning (Sudjana, 2009, pp. 22-23). Cognitive learning objectives are related to students' ability in thinking, understanding, and problem solving (Suprihatiningrum, 2013, p. 38). The teacher determines the cognitive learning objectives based on the basic competences in the curriculum (Kosasih, 2014, p.13).

2. STAD

STAD is a cooperative learning method that divides the students into small heterogeneous groups consist of 4 – 5 students based on level of cognitive, gender, and culture (Rusman, 2012). STAD is done by explaining the learning objectives, presenting the material, group study, quiz, and appreciating the group (Trianto, 2009, p. 68).

3. Quadratic Equations and Functions

Quadratic equations and functions are two topics in one chapter of grade X Mathematics. A quadratic equation is defined as an equation in the form of $ax^2 + bx + c = 0$, where a , b , and c are constants and $a \neq 0$. A quadratic function is expressed as $f(x) = ax^2 + bx + c$, where $a \neq 0$ (Seng & Yee, 2010, p. 32). In this chapter, the students will deal with variables, coefficients, constant, equations, roots of quadratic equations and graph.

4. Grade X Students

The research subjects in the study were grade X students, particularly the students who had difficulties in Mathematics cognitive achievement. According to Piaget's theory about cognitive achievement, grade X students, whose ages are in the range of 14-16 years old should have the ability to think more abstract, idealistic, and logical ways (Santrock, 2011, p. 45).

