

# CHAPTER I

## INTRODUCTION

### 1.1 Background of Study

All students who are God's children, have infinite potential. They are also individuals whose greatest need is to know Jesus Christ as Lord and Savior (Knight, 2006, p. 207). Paul said that in Christ are hidden all the treasures of wisdom and knowledge (Colossians 2:3). Thus, Christ is the source of understanding and learning. All students as his disciples are the intended recipients of that wisdom and knowledge (Opitz & Meleby, 2007, p. 11). Therefore, students also have to use their minds maximally, since men are created unique by God and are not like other creatures. Men are equipped with minds while other creatures do not. In other words, using the mind maximally is one of the actions of being God's children and his disciples. One of the ways to maximize the use of our minds is to maximize the cognitive skills through studying.

Unfortunately, in Genesis 3 we learn that the first time men fell into sin was caused by men who wanted to be like God who learned good and evil. Thus, sin has destroyed everything, including knowledge. Men exploit the knowledge to gain their own benefits and it deflects the main purpose why God gave minds to men. Education is one arm of God's restorative and reconciling effort (Knight, 2006, p. 207). Therefore, Knight (2006) added that from the Christian viewpoint, the goal of education is the restoration of God's image in each person (p. 258). In order to pursue that through education, the teacher has an important role. The teacher's role as facilitator is to provide the right environment and motivation for learning (Van

Brummelen, 2009, p. 35). Tong (2005) supported this by stating that good teachers are those who care for each person and can find every difference in each person (p. 52). Moreover, in his older book, Van Brummelen (1998) added, that “Teachers are guides who share insights and stimulate students to use their gifts. Such guidance enables them to serve God in responsive and responsible ways.” (p. 31). It means that teachers need to help students maximize their gifts given by God through students’ cognitive skills, which also holds the important role in education.

The importance of cognitive skills in the Christian’s point of view comes along with the importance of cognitive skills in education. Savage, Savage, & Armstrong (2006) stated that for some years now, educational outcomes have been divided into three basic categories or domains, which are the cognitive domain, the affective domain, and the psychomotor domain (p.136). Therefore, cognitive is also one of the most important aspects of education. Lefrancois (2000) also supported that cognitive competence and helping students achieve success academically is the major goal of education (p. 41). Meanwhile, cognitive domain is the area of learning that focuses on memory and higher processes such as applying and analyzing (Eggen & Kauchak, 2007, p. 407). Therefore, the importance of cognitive domain cannot be separated from education itself.

Based on Piaget’s cognitive development theory, children who are 11 years old or 12 years old and above are in the formal operational stage (Suparno, 2001, p. 88). In this stage, the child becomes able to reason not only about tangible objects and events, but also about hypothetical or abstract ones (Seifert & Sutton, 2011, p. 47). Therefore, according to the cognitive process dimension of Bloom’s revised taxonomy of educational objectives, students who are either 11 years or 12 years

old are able to reach the first three cognitive dimension levels, which are Remember, Understand, and Apply.

The situation faced by the researcher was different as expected when the researcher had an opportunity to teach grade IX students at ABC Middle School located in West Jakarta. The researcher was given an opportunity to teach Sequences and Series (The explanation about this topic will be explained in the Definition of Terms) in grade 9. In the class, during the teaching and learning process, most students could participate well when the researcher used lecturing and discussion as the teaching methods (See Appendix A – 1 and Appendix A – 2). Sometimes there were still some misbehaviors, but overall, the students still could follow the procedures given by the researcher. Moreover, from the earlier observation, when the researcher's mentor was teaching in the class, students had tendency to learn in groups when they were given worksheet to do (See Appendix E – 1) even though the teacher did not instruct to make groups, since the mentor teacher gave students freedom to decide whether they want to do it by themselves. After some meetings, the researcher gave a quiz (See Appendix A – 14) to students of grade IX to check whether they had mastered the material. The researcher had set the quiz according to the learning objectives classified into the first three cognitive process dimensions according to the Bloom's revised taxonomy educational objectives, which are Remember, Understand, and Apply.

As explained in some previous paragraphs above, based on Piaget's cognitive development, at least students can achieve the third cognitive process dimension (C3), which is Apply. But the situation was different as expected by the researcher. As the quiz results came out, the researcher found that there were 12

students out of 24 students did not pass the standard set by the school (See Appendix A – 9). Moreover, after analyzing the students' quiz results based on the percentage of each cognitive dimension, the researcher found that 33% of the students could identify types of number sequences in the C1, which is Remember. Meanwhile, about 64.2% of the students who could understand in generalizing the terms and predict the next  $n$ th term. Moreover, 54% of the students could find the  $n$ th term by using the formula. In other words, none of the cognitive dimension was achieved at least 75% by students. According to Djamarah & Zain (2002), the learning process can continue to the next topic if 75% of the number of students pass the minimum passing grade (KKM) (p. 122). Thus, the researcher found that students had difficulties in remembering the concept, understanding the concept, and applying the concept in the Sequences and Series topic.

Therefore, the researcher considered this problem as an important thing that needed to be fixed. Thus, in order to overcome the problem of students' cognitive achievement, the researcher realized there were many factors affecting this. But in this research, the researcher considered that an appropriate teaching method might help to improve the students' cognitive achievement. Because the ability expected from students will be determined by the relevance of the using of teaching method which is suitable with the objectives (Djamarah & Zain, 2006, p. 3). In other words, the appropriate teaching method might help to meet the students' need in achieving the learning objectives, especially in the cognitive domain. Based on the observation explained in the some previous paragraphs above, all students could participate actively and preferred to learn in groups during teaching and learning process, then the researcher decided to use cooperative learning. Partin (2009)

stated that “Cooperative learning consists of a variety of techniques that require students to collaborate in mixed-ability groups, helping each other learn the material” (p. 231). The interaction among students in learning tasks will happen by itself to develop students’ achievement (Slavin, 2010, p. 38). Thus, by using cooperative learning, all students are expected to help with each other in learning, so that all students can improve their cognitive achievement.

One of the cooperative learning methods is Student Teams-Achieved Division (STAD). STAD is the method where students will learn together and help each other in groups after class presentations by the teacher. Then students are given quizzes afterwards. The researcher chose the STAD method because STAD is the simplest of the cooperative learning methods and is the most suitable method for the beginner teachers in using the cooperative learning (Slavin, 2010, p. 143). STAD is also known as the most evaluated method of all cooperative learning methods. The more STAD is evaluated, the more accurate people will know the effectiveness of this method if it is implemented in the class. In the research of study of the implementation of STAD at John Hopkins University, from all Student Team Learning, twenty out of 29 study of STAD (69%) found significant positive effects and there were no negative effects (Slavin, 2010, p. 46). This research is also supported by Kagan & Kagan (2009) who stated that “STAD is an extremely well-researched, effective approach to mastery of basic facts and information” (p. 17.20). Therefore, STAD is expected by the researcher as one of the most suitable teaching methods to improve students’ cognitive achievement of grade IX in learning Sequences and Series at ABC Middle School in Jakarta.

## 1.2 Research Questions

From the description above, there are two research questions that used in this investigation:

- 1) Can the implementation of Student Teams-Achievement Division (STAD) improve grade IX students' cognitive achievement in learning Sequences and Series?
- 2) If so, how can the implementation of Student Teams-Achievement Division (STAD) improve grade IX students' cognitive achievement in learning Sequences and Series?

### 1.3 Purposes of Study

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

- 1) To know whether Student Teams-Achievement Division (STAD) can improve grade IX students' cognitive achievement in learning Sequences and Series.
- 2) To know how Student Teams-Achievement Division (STAD) can improve grade IX students' cognitive achievement in learning Sequences and Series.

### 1.4 Benefits of Study

#### 1.4.1 Theoretical Benefits

By doing this research, it is expected that it will provide beneficial knowledge about students' cognitive achievement and the implementation of Student Teams-Achievement Division (STAD) method for the teachers and researchers who will implement STAD in their classroom to improve the students' cognitive achievement.

#### 1.4.2 Practical Benefits

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

#### 1.4.2.1 For Students

- a. Students can improve their cognitive achievement in learning Sequences and Series.

#### 1.4.2.2 For Teachers

- a. Teachers who have problems with students' cognitive achievement in learning Sequences and Series, can use this research as the reference to dwell with the problem by implementing Student Teams-Achievement Division (STAD).
- b. Teachers can use Student Teams-Achievement Division (STAD) as one of the alternative teachings in teaching Sequences and Series.

#### 1.4.2.3 For Researchers

- a. The researcher will get experiences in running a classroom action research and in evaluating strengths and weaknesses of implementing Student Teams-Achievement Division (STAD).
- b. The researcher will able to improve their teaching skills, especially in teaching mathematics.

### 1.5 Definition of Terms

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

#### 1.5.1 Student Teams-Achievement Division (STAD)

Student Teams-Achievement Division (STAD) is one of the cooperative learning methods using small groups consisting of 4 – 5 students heterogeneously. This method begins with delivering the learning objectives, and delivering the material. After the teacher delivers the material, students work in their groups to

make sure that all members have mastered the material. Then students individually take a quiz (Trianto, 2009, p. 68; Burden & Byrd, 2010, p. 153 – 154).

### 1.5.2 Cognitive Achievement

Cognitive achievement refers to “the learner’s ability to master a set of skills or to acquire basic information enabling him or her to thoroughly grasp the subject being studied (Galyean, 1979, p. 122). In this research, considering the students’ capacity according to the Piaget’s cognitive development theory, the cognitive achievement of students is limited up to the third cognitive process dimension (C3) according to the Bloom’s revised taxonomy educational objectives, which is Apply. Objectives at this level are related to the use of abstractions in particular situations. (Anderson & Krathwohl, 2001, p. 67; Burden & Byrd, 2010, p. 71).

### 1.5.3 Sequences and Series

Sequences and Series is a topic of grade IX Mathematics, which contains number patterns, Arithmetic Progression and Geometric Progression.