

## CHAPTER I

### INTRODUCTION

#### 1.1 Background of Study

Christian education is one of the institutions where God works through for redemptive purposes. Christian education takes a hold of God's promises, proclaims the vision of God's Kingdom, and helps children to be citizens of the Kingdom of God (Van Brummelen, 1998). Van Brummelen (1998) also said that the overall aim of Christian education is working the redemptive purposes in all aspects so that the students can become responsive and responsible disciples of Christ. Christian teachers have to teach in a redemptive way to students so that they can be a responsive disciple of Christ. To do a redemptive teaching, teachers also need to realize the conditions of the world that they live in. As a result of Adam's sin, the world has fallen and full with all things that rebel to God. The image of God has been broken and human beings are separated from God. All aspects of humans' lives have deviated from the original purpose of the creation, which is to please Him. Christian teachers are responsible for their minds, attitudes, skills, and faith in the school. They have fallen and Christian teachers need to guide them in the light of Christ. It is the responsibility of Christian teachers to take a part in the redemptive works to restore the broken image of God in human beings.

In more specific way, Van Brummelen (1998, p.14) explains that one of the goals of Christian education is to help students learn God's world and how

humans have responded to God's mandate to take care of the earth. He mentioned that one of the ways is by exploring the concepts of number, space, and their use in solving everyday problems (Van Brummelen, 1998). God created humans with cognitive abilities to learn the concepts of number and space in mathematics and use those concepts in solving everyday problems. He gave human beings capability to think and understand the world. This world is created in order and governed by mathematical laws (Van Brummelen, 2002). It needs a good cognitive skill to understand the laws and pattern of this world. Therefore, students need to develop their cognitive ability to understand God's world.

Van Dyk (1997) clearly explains that Christian school cannot ignore the cognitive skills since for being a responsive and responsible disciple of Christ, they need mind and heart to do service in this world. By having good cognitive skills, students can relate the materials taught in the classroom with their lives. They can understand, use, shape, and enjoy God's world (Van Brummelen, 1998). They also can realize God's true intentions in their lives, which is preserving and maintaining the world. In conclusion, if students have good cognitive skills, they can fulfill God's mandate and contribute to the society by preserving and maintaining the world.

In the mathematics classroom context, students are expected to achieve their best in cognitive aspects so that they have a sufficient basis to go further in learning mathematics. As the researcher observed and taught grade VII at the international school which implements IB as its curriculum, there were many problems in one class consisting of 18 students. One serious problem was in their cognitive achievement. More than 33% of students could not pass the MYP

assessment in criterion A (Knowledge and Understanding). They were also given remedial by mentor teacher, and they still could not pass the assessment. In different assessment criteria, B (Investigation Pattern) and C (Communication in Mathematics), more than 38% of students could not pass the assessments (see Appendix A). See section 2.2 on page 18 for the explanation of MYP mathematics criterion A, B, and also C.

It is essential for beginning secondary mathematics teachers to have an awareness of the difficulties faced by students in mathematics (Yee, 2006). When the researcher observed and taught grade VII in a big unit “Number/Arithmetic”, many students had their difficulties. “Many of the arithmetical concepts covered in secondary school mathematics are an extension of those learned in primary school mathematics” (Yee, 2006, p. 13). Most of the students had difficulties in primary school mathematics so they could not study the next topics. They had diverse problems and most of them were in basic concepts that had been taught in primary school. Due to time limitation, the researcher could not cover all of those problems by repeating the basic concepts.

To confirm the problem, the researcher gave a quiz according to the MYP criterion A assessment. The researcher chose this criterion because criteria A is about solving mathematics problems and it can be adopted as a quiz within a short time duration. Due to time limitation, the other criteria could not be used. More than 33% of students could not pass this quiz. To overcome this problem, the researcher decided to choose an appropriate method to help the students improve their cognitive achievement.

The researcher tried using conventional methods, yet it did not help the students to achieve a better score. As explained before, students had different adversities in the basic concepts and most of them were the basic concepts that had been taught in primary school. In conventional methods, the teacher faces a dilemma where he only can teach in the zone of proximal development for some students only (Kagan & Kagan, 2009). “Zone of proximal development is the range of tasks that are too difficult for the child to master alone but that can be learned with guidance and assistance of adults or more-skilled children” (Santrock, 2011, p. 50). The teacher will be confused whether they will teach in the zone of proximal development for high, standard, or low achiever students. Cooperative learning is one of the convenient methods to overcome this problem. The researcher chose one of the cooperative learning methods called STAD (Student Teams Achievement Divisions) method to improve students’ cognitive achievement. In STAD method, students are assigned to a group of four or five and those groups are heterogeneous in terms of gender, ethnicity, and level of achievement (Edwards, 2005). They will contribute to their own team by giving progress to their own individual learning. Rewards will be given for those who achieve some criteria.

By using STAD method, students will be engaged to improve their cognitive achievement. The only way to contribute to their team is by improving their own cognitive achievement. They will focus on improving group member’s achievement by improving their own achievement. There will be positive dependence, where students facilitate and encourage their teammates’ effort to learn (Johnson, Johnson, & Smith, 1995). They will support each other to achieve

their best. In their own group, they can adjust their level of help to their friends' level of need (Kagan & Kagan, 2009). The difference in difficulties can be solved through STAD so that students can be helped to overcome their weaknesses for achieving better scores. A group will achieve "Great team" or "Super Team" title if all of the group members contribute their best in the quiz.

One of the cooperative learning which is STAD is also supported by Christian worldview. In Ecclesiastes 4:9-12, God reminds us to work together so that if one falls down, others can empower them. In Christian education, students are encouraged to contribute to others' learning success and create a learning community that works and prays together (Van Brummelen, 1998). Christ's body has to be built in the community, as Paul has stated in Rome 12:5. If one suffers, others will feel the pain. If one succeed, others will feel the happiness. STAD lets students learn how to care, show empathy and have compassion for their friends. They have the responsibility to teach their friends as the member of their group. In Christ's community, students must know that others' affairs are most important than theirs. Therefore, the school can build learning communities where students can contribute with their unique gifts and serve each other (Van Brummelen, 1998).

In conclusion, the researcher chose STAD method to improve students' cognitive achievement. Through this method, the researcher expected students to achieve better scores and pass the standard score set by the school, which is 4 out of 8.

## 1.2 Statement of the Problem

Through the background of the research, the researcher identifies the problem found in grade VII. The research questions for this study are:

1. Does STAD (Student Teams Achievement Divisions) improve students' cognitive achievement in MYP mathematics assessment criterion A?
2. How does STAD (Student Teams Achievement Divisions) improve students' cognitive achievement in MYP mathematics assessment criterion A?

### 1.3 Purposes of Study

Through the research questions above, purposes of study for this research are:

1. To know the effects of using STAD method in improving student's cognitive achievement in MYP mathematics assessment criterion A.
2. To analyze the effects of using STAD method in improving student's cognitive achievement in MYP mathematics assessment criterion A.

### 1.4 Benefits of Study

There are benefits of this research, which are:

#### 1.4.1 For School

1. This study can be used as a reference for the suitable method to improve students' cognitive achievement in MYP mathematics assessment criterion A.

#### 1.4.2 For Mathematics Teacher

1. This study can be used as a reference for mathematics teachers to select the appropriate method for teaching middle school mathematics.

2. This study can be used as a reference for mathematics teachers to know the strengths and weaknesses when implementing STAD method
3. This study can be used as a reference for mathematics teachers to improve students' cognitive achievement.
4. This study can be used as a reference for mathematics teachers to know the effect of using STAD methods to improve students' cognitive achievement.

#### 1.4.3 For The Researcher

1. The researcher can gain experiences and knowledge about how to overcome the problem found in the classroom regarding cognitive achievement.
2. The researcher can understand the relationship between STAD method and cognitive achievement, and their integration with Christian perspective.
3. The researcher can improve his own teaching in his mathematics classroom.

#### 1.5 Definition of Terms

Terms used in this study are defined as:

##### 1.5.1 Students' Cognitive Achievement

“Cognitive achievement is 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 study, the researcher determines the first three level of cognitive domain in Bloom's taxonomy as indicators, which are C1 (remembering), C2 (understanding), and C3 (applying) and they are integrated with MYP mathematics assessment criterion A.

### 1.5.2 STAD (Student Teams Achievement Divisions)

STAD is one of the cooperative learning methods, where students are assigned to a group of four or five that consists of students with different gender, ethnic, and level of achievement and work on a certain task (Edwards, 2005). Indicators for this method are steps of STAD, which are teachers' explanation, group discussion, individual quiz, and team recognition (Slavin, 2005).

### 1.5.3 MYP (Middle Years Program)

MYP (Middle Years Program) is one of the programs in IB curriculum for ages 11 to 16. "The MYP has been designed as a coherent and comprehensive curriculum framework that provides academic challenge and develops the life skills of students from the ages of 11 to 16" (IB, 2014, p. 3).

### 1.5.4 MYP Mathematics Assessment Criterion A

Criterion A (Knowledge and Understanding) is one of four main assessments in MYP mathematics, where they have to solve problems with variety of level difficulties. "Students are assessed the extent to which students can select and apply mathematics to solve problems in both familiar and unfamiliar situations in a variety of contexts" (IB, 2014, p. 8).

### 1.5.5 Number

Number is one of four main topics in MYP mathematics program. "Students should understand that the use of numbers to express patterns and to describe real-life situations goes back to humankind's earliest beginnings, and that mathematics has multicultural roots" (IB, 2014, p. 24).

### 1.5.6 Grade VII Students



In this research, the subjects are grade VII B students. 33.33% of students have difficulties in achieving standard score or higher in cognitive domain. There are 18 students, 11 boys and 7 girls in grade VII B class.

