CHAPTER I

INTRODUCTION

1.1 Background

Education helps children in providing the environment and materials for them to learn. Learning according to Gagne is “a process where an organization changes its behavior as a result of experience” (as cited by Dahar, 1988, p.2). Christian education understand that teaching is not only about knowledge, instead there are enduring understand that students can learn. Christian education always lead the students to use their understanding of the world that God had created and become more responsible with it (Van Brummelen, 2009, p.14). Moreover, Van Brummelen mention that “Ideally the education must educate based on The Great Commission to love God and their neighbor” (2009, p. 11). Learning should lead the students to understand how this world works and to glorify God through their knowledge and wisdom. Through acquiring new knowledge, they get more perception on how this world works and they get to know themselves better.

God gives human the cognitive ability to take care of the earth, capacity to think, plan and execute the plan so they are able to maximize what they have in order to achieve the purpose. Mathematics is one of subjects as a result of human capacity to think. By learning mathematics, it helps students to construct their logic and gaining some insight on how this world works. Cline with Gulliford & Birch mentions that “mathematics is one of subject that help the student to see how the world formed” (2015, p. 179). Christian educator understand that by knowing more about world, it can lead students to be more responsible. Mathematics is one of

many subjects that will helps students to become a better person in terms of preserving and fulfilling God's mandate to maintain the world.

One of the actions to become more responsible in order to preserve and maintain the world is to improve students' cognitive performance. By improving their cognitive performances, they learn to become responsible with themselves by maximizing their potentials and abilities. To measure the students' improvements, their grades are measured and compared with the minimum passing score. Ideally, when they are able to fully use their ability, they are able to pass the minimum passing score. Unfortunately, this is not always the case as each student has his own progress in terms of improving himself. The researcher faced this condition while teaching grade tenth science students at a Christian school in Sangihe.

The researcher had observed grade tenth science students for several months. When there is group work, most of them are actively walking around while working the assessment. The other thing is that they are able to work together cooperatively even though some still find it difficult. Most of the time, their seating arrangement is pair by pair but sometimes they form into one big table. Generally, they are able to work cooperatively, only two students that tend to work individually.

In terms of their behavior, most of them are deftly give quick explanation about something that their peer doesn't understand. When the teacher give them a guided practice, they are discussing the material and answer the problem together. If there is something that they don't understand, they will ask the teacher without hesitation. There is only one student that are too active to answer even though the

teacher is on explaining the material, while the rest of them obey the rules and procedures that had been determined.

The researcher found that most of them struggle with their grades. Despite the fact that they work the problems together on guided practice, when they are separated and work the problem individually most of them cannot pass the minimum passing score. Furthermore, when they are given an individual test, only 30% or 3 out of 10 students are able to achieve the standard score that has been determined. The individual test to measure their cognitive performance was assessing their C1 (remembering) and C2 (understanding). This problem was discussed with mentor teacher and she agree that there must be some way to improve their cognitive performance.

The researcher reflect and seeing that there is discrepancy between high-achieving students and low-achieving students. When working the guided practice, they tend to discuss the answer together and when they are unable to answer it, they ask to the teacher instead discussing with other. The downside with this seating arrangement is when both students is not high-achieving students, they will more likely to give up and didn't work the guided practice. Even though they are seating pair by pair and working problems together with their pair, their cognitive performance on quiz is not as what have been expected

The researcher then ask opinion from mentor teacher and other teachers regarding the cognitive performance and suitable teaching methods of grade tenth science students. To check the dependent variable even further, the researcher gave the students some quizzes after some teaching and learning sessions. It showed that the students' cognitive performances need to be improved and the learning method

need to be changed. On the other side, the quiz gives idea that high-achieving students should be in one group with those who need to teach with their friend. They learn more when they are discussing with their friend, the researcher decides to facilitate it and made them with one group. When teaching with this method, researcher can only teach in the zone proximal development for some students only. According to Santrock "Zone of proximal development (ZPD) is Vygotsky's term for 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" (2011, p. 50). To ensure all of the students get the same opportunity, mentor teacher suggest to use a method that form a heterogeneous group. Therefore, the researcher decided to use method that facilitate the students such as building positive interdependence, become responsible with their own grade and motivate them to do better. With those consideration, the researcher decided to implement few learning methods such as direct teaching with peer tutoring, whole brain teaching method and STAD. The researcher found that STAD (Student Teams Achievement Division) is the most suitable method to improve students' cognitive performance. STAD has teams that facilitates the positive interdependence and the team recognition that motivates the students to improve themselves on each meetings. In STAD method, Kagan & Kagan mention that students are assigned with four or five students with different gender, race and performance (heterogeneous). Each students will contribute their individual progress into group score. There will be reward which is team recognition for each group that reach certain score (2009, pp. 17.20-17.21). The recognitions are "Good Team", "Great Team" and "Excellent Team".

STAD method will help the low-achieving students to overcome their struggle and motivate them to do their best to contribute for their team. The high-achieving students will get benefit by teaching what they learn so they understand it even more. All students will get benefit of helping each other which is improving their social skills. The team recognition are there to "emphasize the idea that doing well as a team is important" (Kagan & Kagan, 2009, p. 17.21).

There might be other factors that influence the students' cognitive performance such as students' behavior and the interaction between students and teacher. To make this research more realistic and achievable, this research is limited only to measure the implementation of learning method toward students' cognitive performances improvement.

1.2 Research Question

The formulation of problems for this research are:

1. How does the improvement of students' cognitive performance of grade tenth science student with Student Teams Achievement Division (STAD) implementation?
2. How does Student Teams Achievement Division (STAD) improve students' cognitive performance of grade tenth science student?

1.3 Research Purposes

The purposes of this research based on the formulation of the problems are:

1. To know the effects of Student Teams Achievement Division in improving students' cognitive performance of grade tenth science student.
2. To explain the implementation of Student Teams Achievement Division of grade tenth science student.

1.4 Explanation of Terms

There are several terms used in this research, those are:

1.4.1. Cognitive Performance

Cognitive performance basically has the same meaning with the cognitive achievement. The researcher prefer use the performance because to see the class improvement rather than comparing with certain standard. Cognitive performance according to Sudjana is "intellectual result that contain remembering, understanding, applying, analysis, synthesize and evaluate" (2009, p. 22). Bloom's taxonomy group it into C1-C6. The researcher use the C1 (remembering), C2 (understanding) and C3 (applying) problems as the indicators for this research.

1.4.2. Student Teams Achievement Division (STAD)

Kagan & Kagan mention that STAD has positive impact on students' cognitive performance because it provide high motivation with contribution team score system. The motivation works across ability levels of performance either high-achieving or low-achieving. The STAD consists of few steps, those are presentation of material, teams, quizzes, evaluation and team recognition (2009, p. 17.20).

1.4.3. System of Linear Equations

System of linear equations can consists any number of variables as long as it has exactly one solution (Sterling, 2014, p. 39). Finding solution when it has two or more variables is called system while for three variables need three equations (Kuang & Kase, 2012, p. 291). Moreover, System of linear equations in three variables has close relation with the real life situation (Sinaga, et al., 2017, p. 43).