

CHAPTER I

INTRODUCTION

1.1 Background

In this modern era, every country is trying their best to develop their own country. The development of a country is certainly influenced by particular factors. It is undeniable that one of the factors that play an important role in the development of a country is human resources. Every country is trying various ways to increase their human resources. One way to improve human resources is by improving the quality of education. The higher the quality of education, the higher the quality of human resources in a country. Budiningsih (2005) also agrees that education is the key in building and developing a country, and without education all efforts will fail (p. 1).

The good education will certainly give a good impact for human resources in a country. The school is one part of education institutions that can help to increase human resources. The most important component of a school is the students (Knight, 2009, p. 246). It means that the students must be prepared well by the teacher to be able to develop the country. In order to reach this purpose, the student must be equipped with the skills and competencies that can answer the needs of the world.

There are many subjects that required being given for students in school in order to increase their skills and competencies. One of the subjects is mathematics. Mathematics holds an important role in all aspects of human life, especially in the job market. The United States Department of Education, based on their survey, reported: The workers potentially employed and earn more money

are those who have strong mathematics skills. Society for Industrial and Applied Mathematics (SIAM, 1998), in their report, stated that mathematics skill could effect the United States performance in global markets and maintain the United States' international competitiveness (pp. 9-10). From this report, it can be seen in general that mathematics as a subject in school is one of the factors that affect human resources of a country, even the country's performance to compete internationally. Students can be effective human resources if they can do better in mathematics during their school, starting with mastering the basic mathematics such as algebra. Therefore, in order to produce good human resources, one of the factors that a country needs to pay attention to is the quality of learning mathematics.

There are some proficiencies that must be owned by students to reach the quality standard of mathematics learning. According to National Research Council (NRC, 2001), the mathematical proficiency consists of five strands: conceptual understanding, procedural fluency, strategic competence, adaptive reasoning, and productive disposition (p. 116). Conceptual understanding is one of the important aspects in learning mathematics. The National Council for Teachers of Mathematics (NCTM, 2000) also claims that conceptual understanding in learning mathematics solidly established the important role of making students become effective learners who competently and confidently solve problems(p. 2). A good conceptual understanding of students also can effect students to become good human resources as well. Conceptual understanding is needed for students because by understanding the concept, students can apply it in different problem situations. Procedural efficiency is

needed when students solve the problem that need steps. In the real world, people deal with mathematics without realizing it, for example, when they use a calculator or computer. They need procedural efficiency to use it accurately, efficiently, and flexibly (NRC, 2001, p. 121). The good conceptual understanding will help them to solve the problem. Good human resources are ones who can solve the problem in their job world.

If conceptual understanding is the important aspect in learning mathematics, it is also important in Christianity. Man as the image and likeness of God (Genesis 1:26) is also equipped with the knowledge and understanding of God with a purpose. God wants all understanding and knowledge in man used to run the cultural mandate of God. It's written in Genesis 1:28 to "be fruitful and increase in number; fill the earth and subdue it. Rule over the fish in the sea and the birds in the sky and over every living creature that moves on the ground." God wants human beings to be a good human resource and to subdue the world with the knowledge and understanding that we have for God's glory.

A different reality was faced by the researcher when she taught and observed students in a grade VIII class at the school she did her internship. On one occasion, the researcher was given the opportunity to teach the manipulation of algebra operation for grade VIII students. During her experiences for one month, the researcher found a problem that occurred in that class. When the researcher explained the materials, the students showed good behavior during the class. At the end of the explanation, the teacher usually gave time for them to ask if they still did not understand. Usually, the students showed a response that they understood what the researcher explained. However, at the end of the class, when

the students were given a formative test, many of them failed the test. Most of the students did not achieve the minimum pass grade that is set by the school which is ≥ 72 (see Appendix E-3).

Based on students' work results, the researcher found out that many of them faced difficulty in applying the concept of algebra operation in new questions, but still the same level as what they had done in their previous exercise. Many of them tended to remember the steps of how to do manipulation of algebra without considering the law of algebra operation that they had learned. The students also applied the formula and the steps that they remembered without understanding what they were asked in the problem. NRC (2001) stated, “a significant indicator of conceptual knowledge is being able to represent mathematical situations in different ways and knowing how different representations can be useful for different purposes” (p. 119). It showed that the problem faced by grade VIII students is about understanding the concept of material that they learned about.

Based on observation and teaching, the researcher found some characteristics of the students. Most of students in grade VIII were passive, especially the less able students. During the learning process, when the teacher asked a question there would be just some high-performing students who becoming the volunteer to answer the teacher's question. It also happened when teacher gave time for the students to ask a question after explanation. Even if the less able students did not understand and confused, they would remain silent.

The less able students tended to ask the researcher personally during the exercise time. However, because the limited of time, the researcher was not able

to help them all. Some of them tried to ask their friends, but not all of their friends were able to give help. Because of this situation, the less able student usually gave up and would not solve the exercise problems. Those who did not understand would stay with the misconception of the materials. When the exam came, they certainly were not able to answer the questions because, during the learning process in class, they do not optimize their ability entirely.

Besides, it was also found that most of the students in the grade VIII class were competitive and selfish, especially the higher-performing students. The fact was when the researcher asked questions directly during her explanation, then the high-performing students would be scrambling to answer. If the researcher chose one of them, then the others would feel sad. Whereas, when the researcher gave the question, sometimes she wanted the less able students to answer it so that she could know their level of understanding. But, the fact was the high-performing students always would be the one to answer and they did not give the chance for the less able students to try it.

In order to overcome this problem, a teacher must consider a method that is suitable to be implemented in the class. A method is an activity set by a teacher to achieve learning objectives (Sudjana, 2010, p. 13). Thus, a teacher needs to consider all aspects before choosing a method for their teaching because if not, it will affect all students in the classroom. In order to choose the method, the teacher must consider students affectiveness, cognitive level, learning style, and characteristics, and others. Students' diversity is one of the aspects that make every teacher feel that there is no single method that is suitable for their students.

Numbered Head Together (NHT) is one of the cooperative methods developed by Spencer Kagan (1992). NHT is very effective in increasing students' conceptual understanding. It is proven by the research conducted by A. Ilyasari, G. Suyadi, and R. Asnawati, comparing the effectiveness of using the NHT method with a conventional method. It showed that after using the NHT method, students' conceptual understanding is higher than using conventional methods (2013, pp. 1078-1087). Another research also conducted by Hadiyanti and Tim in grade 10 to see the effectiveness of NHT towards students' conceptual understanding. Based on the research it was found that students who learned by a cooperative learning model, NHT, gained higher learning outcomes of conceptual understanding ability than the students who studied with an expository learning model (Hadiyanti, Suhito, & Kusni, 2014, p. 63). From both types of research, it can be seen that NHT is a good method that can be used by a teacher to increase students' conceptual understanding.

NHT is one of the methods that enhance student's conceptual understanding during the learning process directly. Hunter and friends also support this statement, in his journal stated that using NHT method teacher can be informed about all students responses (Hunter, et al., 2015, p. 355). By their responses, the teacher will be helped to analyze students' level of understanding about the materials they have learned.

Besides, NHT is a method that can help students gain access to credible information (Hunter, et al., 2015, p. 355). Students who still do not understand or are unsure about their answer will be given time to discuss and get more information from their friends. It also will help to prevent students from any

misconceptions during learning, because during the discussion they all will participate together and come up with the best answer from their discussion. Using the NHT method, students cannot predict either who will be chosen to present the answer for the team. This condition will impose that “team discussions stay focused on improving everyone’s understanding”(Hunter, et al., 2015, p. 356).

From the data of the researcher’s observation and teaching, the researcher thinks that NHT is one of the best methods that can be used to increase students’ conceptual understanding. Besides, this method also can be used to shape students’ character during the learning process. Using NHT, all students in the class will get the chance to give their answer during presentation time. The students who were competitive, selfish and did not want to help others will be shaped during discussion time. They will learn to help others that needed their help. They will not just think of the success of themselves, but they will learn to help others with their ability to achieve success together. The less able students also will be given the same opportunity with the higher performing students to be active during the learning process. Therefore, based on the theories of Numbered Heads Together, it is suitable with the character of these students to use this method to teach function for grade VIII students.

Numbered Heads Together is one of the cooperative learning methods that emphasizes learning in a group. Cooperative learning is a development of the constructivism learning theory (Budiningsih, 2005, p. 54). In the constructivism theory, students construct and build their knowledge individually through social interactions (Van Brummelen, 2009, p. 115). The knowledge constructed by

individuals is different from each other. This lead to the emergence of relativism, which is no absolute truth (Van Brummelen, 2009, p. 117). In addition, the learning done by students is also self-centered. Constructivism hopes that through the learning process, students are able to recognize themselves and be themselves. This will certainly lead students to become a human centered person (Budiningsih, 2005, p. 55).

The view above is certainly very contrary to the views of Christianity. Christianity believe that the truth is absolute and that absolute truth only exists in the person of Jesus Christ. The human-centered learning also cannot be accepted in Christianity. This is because the learning must be centered on Jesus Christ. Even so, it is possible for Christianity to keep using cooperative learning (NHT). Even though some aspects of constructivism are incompatible with biblical principles, Christian teachers are still able to use this method. In learning, the Christian teacher should not let the students construct their own knowledge freely. However, the Christian teachers must keep facilitating and guiding by providing the right basic concepts and basic skills to the students before they construct their understanding (Van Brummelen, 2009, p. 119). These basic concepts and skills are what will help students to construct a right understanding. In conclusion, Numbered Heads Together is an appropriate method to be implemented to overcome the problem that happened in the class.

Therefore , according to those reasons described above, the researcher intended to conduct the research for “The Implementation of Numbered Heads Together in increasing Grade VIII students’ Conceptual Understanding In Learning Function at SMP Kristen ABC Makassar”

1.2 Research Question

1. Does the implementation of using the Numbered Heads Together method increase grade VIII students' conceptual understanding in learning function at SMP Kristen ABC Makassar?
2. How does the implementation of the Numbered Heads Together method increase grade VIII students' conceptual understanding in learning function at SMP Kristen ABC Makassar??

1.3 Purposes of Study

Based on the two research questions above, the purpose of this study can be defined as:

1. To recognize the implementation of using the Numbered Heads Together method increase grade VIII students' conceptual understanding in learning function at SMP Kristen ABC Makassar
2. To investigate how the implementation of the Numbered Heads Together method increases grade VIII students' conceptual understanding in learning function at SMP Kristen ABC Makassar.

1.4 Benefits of Study

1.4.1 Theoretical Benefit

By doing the research, it is expected that it will provide beneficial knowledge about students' conceptual understanding and the Numbered Heads Together method.

1.4.2 Practical Benefit

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

1.4.2.1 For the School

The school can use this research as a reference to use the Numbered Heads Together in mathematics learning.

1.4.2.2 For the Mathematics Teacher

1. The mathematics teacher will get information about the effectiveness of the Numbered Heads Together method in increasing students' conceptual understanding.
2. The mathematics teacher can use the NHT method as an alternative in teaching to overcome the problem that occurred in the classroom related to students' conceptual understanding in learning function.

1.4.2.3 For the Researcher

1. The researcher will get experience in evaluating the strengths and weaknesses of applying the Numbered Heads Together method.
2. The researcher can improve her skills in methodology of teaching mathematics through this research.

1.5 Definition of Terms

1.5.1 Conceptual Understanding

Bloom, as cited in Hamdani, Kurniati, & Sakti (2012, p. 82), defined conceptual understanding as the ability to capture notions like being able to express the material presented into a form that is more understandable, able to provide interpretations, and able to apply the information.

1.5.2 Numbered Heads Together

Numbered Heads Together (NHT) is one of the cooperative learning methods. In this method, students will be divided into small heterogeneous groups consisting of 4-5 members, and every group member will get a number. Then, the teacher will give the assignment for every group and they will do that assignment. The group will discuss to get the correct answer and ensure that all members of a group know the answer. The teacher will pick one number, and the students that get that number will present their answer (Lie, 2010, p. 60).

