

CHAPTER I

INTRODUCTION

1.1 Background

This research was conducted based on the conditions of students who were learning Mathematics topic quadratic equation and function. The researcher taught students of class 10 1-3 and found some issues. The issue was that majority of students of this class were active in asking and arguing their opinion, but they tend to be individually in doing exercises given by the teacher. During the teaching and learning process, the researcher observed students and found that students of this class very obsessed to get high score in summative test. When the researcher tried to explain how come the concept gained, they neglected it. Moreover, when the researcher gave question with different type of the example given, they would be confused immediately. The researcher identified this condition as lacking conceptual understanding.

The researcher gave a test to made sure the identification and found that most students had difficulties in (1) classifying the condition of question/ problem, (2) choosing the relevant concept to solve the question/ problem, (3) comprehending mathematical sentences and (4) applying mathematical idea. The researcher identifies that the students' difficulties refer to conceptual understanding.

Conceptual understanding is one of mathematical proficiency. Conceptual understanding refers to an integrated and functional grasp of mathematical ideas, students know more than isolated facts and method and understand why a mathematical idea is important and the kinds of context in which is it useful (Kilpatrick, Swafford, & Findell, 2001, p.118). This crisis appears when the

students had difficulties to classify, infer, comprehend, and apply the concept quadratic equation and function. This inability leads students to fail in completing and solving the questions given by the teacher. Briefly, students cannot understand why and how a concept is integrated to solve questions given either real life or procedural questions.

The goal of learning Mathematics should not only exercise Mathematics problem, but more to apply and create innovation through Mathematics. The ideal condition of learning mathematics is through learning mathematics with understanding. Mathematics is “a way of thinking” and “a tool” (Reys, Lindquist, Lambdin, & Smith, 2007, p. 3). Only through deep understanding of mathematical concept students can use Mathematics as a way of thinking and tool. Mathematics is a study which underlies as a basis for students to enhance their study in another field such as sciences, social sciences, research, business, management, and government. Citizens who cannot reason mathematically are cut off from whole realms of human endeavor; not only of opportunity but also of competence in everyday tasks (Kilpatrick, Swafford, & Findell, 2001, p. 1). Therefore, students really need teaching and learning process which bring them into deep conceptual understanding.

Based on research done by Latterell & Wilson (2013), they conclude that from kindergarten through the undergraduate experience, most students do not even know what Mathematics really is, it implies narrow perspective about Mathematics and the importance of Mathematics. The researcher found that students of this class had narrow perspective about learning mathematics. Their assumption that was learning mathematics only about could solve question easily and quickly to get high

score. Learning mathematics should bring students an experience for understanding a concept so that they could know why and how a concept is important and useful in different situation. So that, students could use mathematics as a tool and a way of thinking to create innovation and solve problem as result of their understanding of a concept they learn.

“God created human beings with curiosity, a desire to know, and ability to search for understanding and truth” (Stonehouse, 2007, p. 15). God enables students to learn Mathematics with understanding rather than only construct their understanding by their own. “The fact that man is in the image of God means that man is like God in the following ways: intellectual ability, moral purity, spiritual nature, dominion over the earth, creativity, ability to make ethical choices, and immortality” (Grudem, 1994, p. 383). As a responsibility of God’s grace, students should sharpen their intellectual ability through learn Mathematics with deep understanding. So that, students can change their behavior toward God, neighbor, and created world. "A full understanding of man's likeness to God would require a full understanding of who God is in his being and in his actions and a full understanding of who man is and what he does” (Grudem, 1994, p. 383). Therefore, if students can learn Mathematics with understanding, they will understand the meaning of Mathematics itself and use it wisely for the glory of the Lord.

The researcher read some literatures and discussed with mentor teacher to overcome the problem. Some research that was conducted by Kiswandi, Soedjoko, & Hendikawati (2013), Anjum (2015), and Isnaini (2017) found that students who taught with concept attainment model had higher conceptual understanding compared to expository and traditional teaching. Through their experiences of

teaching with concept attainment method, the researcher considered to use Reception-Oriented Concept Attainment Method to overcome this problem.

The Concept Attainment Model was uniquely designed to help students to enhance and enrich their understanding about concepts of their experiences and give students experience to train their critical thinking especially in testing hypotheses (Eggen & Kauchack, 2012, p. 251). The Reception-Oriented CAM is one of Concept Attainment method which provides steps to improve students' conceptual understanding through identify, testing attained concept by making hypotheses, and analyzing problem. This method provides many chances for students to share their thoughts and questions. So that, this method should suitable for students' context of this research. Therefore, students should gain a deep understanding of the concept they are learning during the teaching and learning process.

In conclusion, the researcher chose Reception-Oriented Concept Attainment Method (CAM) to overcome students' conceptual understanding. The title of this research is "The Implementation of Reception-Oriented (CAM) with Worksheets to Improve Tenth Grade Students' Conceptual Understanding in Topic Quadratic Equation and Function in One of Christian School Tangerang". Through the implementation of this method, the researcher expects students could improve their conceptual understanding.

1.2 Research Questions

1. Can Reception-Oriented CAM with worksheets improve students' conceptual understanding in topic quadratic equation and function?
2. What is the effective way of applying Reception-Oriented CAM with worksheets to improve students' conceptual understanding in topic quadratic equation and function?

1.3 Research Purpose

1. To know whether reception-oriented CAM with worksheets can improve students' conceptual understanding in topic quadratic equation and function.
2. To find an effective way of applying reception-oriented CAM with worksheets in improving students' conceptual understanding in topic quadratic equation and function.

1.4 Benefits

1.4.1 For Teacher

As additional resources in improving and increasing the teaching and learning process which has similar conditions of this research.

1.4.2 For Teacher Candidate

As a point of references in improving teaching and skill with similar conditions.

1.4.3 For Development Theory

As another reference to enrich the theory about conceptual understanding and Reception-Oriented Concept Attainment Method.

1.5 Explanation of Terms

There are terms used in this research which are,

1.5.1 Conceptual Understanding

Conceptual understanding is a comprehension about being able to analyze, integrate, and apply a concept in different situations in which knowing why and how the concept is used. Students who understand the concept can explain why and how the concept applied with specific conditions or situations. The indicator of conceptual understanding used of this research as follows (1) classifying different mathematical situation based on the concept, (2) inferring relevant concepts to solve the problem, (3) comprehending mathematical sentence or representation, and (4) applying a mathematical concept.

1.5.2 Reception-Oriented Concept Attainment Method (CAM)

Reception-Oriented Concept Attainment Method (CAM) is one of Concept Attainment Model (CAM) method in which focusing on attaining concept by identifying, testing, and analyzing concept through unlabeled example presented that is done by the students. Below are the steps that the researcher used in this research.

Table 1 Reception-Oriented CAM Steps

Phase one: Presentation of Data and Identification of Attributes	Phase two: Testing the Attainment of Concept.	Phase three: Analysis of Thinking Strategy
1. Teacher presents the concept by labeled example	1. Teacher asks students to identify unlabeled example given	1. Teacher asks students to discuss the given problem
2. Students select the example and inquiries whether it is positive or negative.	2. Teacher confirms students' hypothesis	2. Teacher asks students to analyze and explain the problem
3. Teacher asks students to state the rule of the concept according to the essential attributes	3. Teacher asks students to restate the attributes of the concept	3. Teacher evaluates the strategies

1.5.3 Quadratic Equation and Quadratic Function

Quadratic equation and function are Mathematics topic for grade 10, where students are challenged to understand factorizing and arranging quadratic function. The quadratic equation is algebraic equation with its maximum degree of the variable is two. Whereas, quadratic function can be defined as, if x and y are two variables quantities, and if there is a rule which assigns a unique value of y to a given value of x , then we call y a function of x , and use of notation, $y = f(x)$, (Bronshtein, Semenyayev, Musiol, & Muehlig, 2007), where $f(x)$ is quadratic form. In this research, the material topic used is arranging quadratic equation and function with different conditions and applying the quadratic equation in the daily problem.

