

CHAPTER II

REVIEW OF RELATED TO LITERATURE

This chapter reviews the relevant theoretical foundation concerning the bilingual education, linguistic problem in the bilingual education, English for mathematics textbook, learning English for mathematics textbook, teaching and implementation in the classroom and the previous study.

2.1 Bilingual Education

Bilingual education is the teacher and the students learn in two or more than one language in teaching learning process. According by Krashen (1997), the good bilingual education program covers all these characteristics: ESL instruction, teaching the right subject, and instruction in the first language. Children of non - English-speaking initially receive main instruction in the primary language along with ESL instruction. As children grow more proficient in English, they learn subjects using more contextualize language (e.g., Math and Science). One of the advantages of education conducted in bilingual schools is that children exposed to a new culture and a new language at a young age, as well as obtaining a good academic education. Bilingual schools can impact both in terms of educational programs and certain language. The curriculum of most schools is bilingual designed for those who speak English as a second language, as in Indonesian schools that the students use English as a second language. When teaching in a second language, students gives more guidance in their first language to maximize

their academic learning. Furthermore, is to support more complex side of learning English as a second language grammar.

In terms of programs, bilingual education is limited by several factors, including curriculum, teaching methodology, the language used in classroom activities, and the domination number of students to use a particular language.

Margana (2013) stated there are some models of bilingual education, as follows:

1) Submersion

This model emphasizes the intensive use of the target language in the teaching and learning process. This means that bilingual teachers have to use the target language in communication in the classroom.

2) Sheltered instruction

The second model is often called structured immersion. This model offers the integration of second learner's subjects and other subjects that are handled by a professional teacher (native speaker) teachers teaching involving a team of L2 and other subjects. This model should give emphasis on collaboration bilingual teachers and learners as this model requires a comprehensive standard course content using a particular model and the appropriate text which meet the learners' characteristics.

3) Transition model

This model is thinking the use of the first language or local languages as a means of communication in the class when the students have a lack of the target language.

4) Immersion Model

The immersion model gives emphasis on target enrichment to deal with

building bilingualism and illiteracy on the part of the learner. Structured immersion. It can combine the aspects of English as a second language and submersion with the goal of replacing the mother tongue with English.

5) Maintaining development and the traditional language

This model offers the use of three languages, namely native language, first language and the target language. Bilingual teachers are encouraged to use the target language, but they have to use their mother tongue and first language to keep other types of language.

6) Two - way immersion

This model involves native speaker's first language and native speakers of a second language. This model aims to facilitate learners to obtain L2 and L1 as learners have different first languages.

With reference those all above, in Indonesia most of the bilingual class program use the transition model and immersion model that those model means when the teacher have a lack in target language (English), the teacher will be translated or replace the material into mother tongue (Indonesian).

2.1.1 Linguistic Problem in Bilingual Education

Most of the difficulties encountered in the language of mathematics are to describe, and explain the vocabulary for students who use English as a second language. The structure of sentences, the words and the symbols can affect the students understanding in learning mathematics. Mathematical language commonly referred as the register of mathematics. For example, in terms of vocabulary difficulty (add, sum, plus, collect, merge). Not only that, the difficulty

in understanding the concept or phrase. Just as an example, Lina is 5 years older than Andy and Sani earns 4 times as much as Andy. Mathematical language has a special meaning in certain terms; the meaning is not same as language every day. So the students give more attention to the vocabulary, terminology and interpret appropriately the sentence to understand the math concepts very well.

According to Chin and Wigglesworth (2007) in Gusti, understanding the concepts and language acquisition in learning can occur when students get clear guidance on the language problem. In other words, understanding the concept cannot be separated from an understanding the language problem. Therefore need a skill to explain the concepts and the grammar are an absolute need for bilingual teachers. Many students of second language learners who did not have knowledge of academic English and the language used in schools, thus making it more difficult for them faced the challenge of learning and use specific vocabulary.

In English language learners and Mathematics Journal discussed that there are some linguistic challenges in the learning of mathematics include:

- 1) Learning mathematics vocabulary, so many of the terms in mathematics are difficult to interpret in technical language. Such as algebraic, equation, set and others that in everyday they have a different meaning. Many words in mathematics difficult to interpret in the technical language which is essential for learning mathematics. Vocabulary in mathematics has a special word for mathematics, such as equations, algebra, etc., As well as everyday vocabulary which has a different meaning when used in the context of mathematics. However, some mathematical terms may not translate well and make the students

difficult. They should more understand the content of the material that being taught.

- 2) Students must learn to be able to interpret the mathematical symbols with concepts and language used to express the concepts. Example: symbol / express that is ' divided by '.
- 3) Mathematics also uses words to create complex phrases with specific meaning, such as a square root.

An English text always uses linguistic symbols that show a relationship between concepts with each other. Students who cannot understand a concept caused by the language of the teachers who have problems in mastery the English. In bilingual class, the skills to understand linguistic symbols need taught to understand certain information, such as understanding the example, classification, descriptions, conclusions, terms, instructions and so on.

2.2 Textbook

The textbook is an established set of specific material or subject which will be taught. Textbooks are made to help students understanding and learn from the things that are read and to understand the world. Textbooks have enormous power to change students' brains. Textbooks can affect the child's knowledge and specific values. Hutchinson and Waters (1987) define six goals for instructional materials: i.e., They must (a) give a stimulus for learning, (b) helping to organize the learning process, (c) the nature of language and vision of creating a learning, (d) reflects the nature of learning task, (e) has a very useful function in developing teacher training, and (f) provides a model of correct language usage and proper.

From the explanation above, it concluded textbooks are bringing very influential in teaching and learning in the classroom. Moreover, the textbook for study should suitable to devote the needs of students in what they learn.

2.2.1 English for Mathematics Textbook

Learn mathematics using mother tongue is very easy, but if the mathematics textbook in English language considers to extra understand. Seen from the use in the bilingual classroom learning, English for mathematics textbook is very necessary. The textbook will support children in understanding some terms in the context of academic English. Some texts on mathematics using pictorial illustrations, and some are not. Such as words and images that require careful study. Every line, every symbol is there for a reason and the students have to spend time to understand the detail of the picture. This applies into graphs and diagrams, which often contain a lot of information.

Mathematics uses multiple semiotic or meaning systems. A semiotic systems; such as language, using signs, symbols, and images to create meaning and affect behavior by making meaningful choices in a particular context (Eggin, 2004).

2.3 Learning English for Mathematics

Learning mathematics in English is where the material of mathematics in English, the language of instruction in learning the English language as well as the opinion delivered in the English language. Learning mathematics in English is to apply the essence of learning mathematics itself, namely that mathematics learning is not only about delivering the content in the form of numbers and

formulas. Learning mathematics is also conducted to train students able to communicate, ideas and information correctly and appropriately. Thus, the purpose of learning mathematics in English is to help to make student competence in mathematics and English. The both achievements are facilitated in proper competencies.

According to Gilberto J. Cuevas (1984), by seeing from some existing research, it seems clear that students who speak the mother language must learn to make some extra skills in English if they want to help learning of mathematics. Students who come from a region where English is the only language, they're speaking will be familiar with many of the linguistic structures that will be met in the mathematics classroom. Otherwise, if someone using English as a second language, it assumed that the student requires a deeper understanding the meaning of language, symbols, terms and instructions in mathematics learning.

2.4 Teaching Implementation in the Classroom

According to Yusra, (2011) that in the implements of teaching learning process, there are three steps activities carried out, those steps are: pre-teaching, whilst-teaching, and post-teaching.

1) Pre – Teaching

It can be interpreted as the initial step or activity conducted by the teacher in the learning process, such as preparing lesson plans, repeating the lessons that have previously been described, and explain what lessons will be taught on that day. The first step is absolutely main role of the entire step that will be done later. First, when teachers make a good

impression or apply good technique for the pre - teaching, he / she may be forming relationships with students to determine how the learning process will run. Second, pre - teaching will also build the good atmosphere or the readiness of students to receive instruction or the next topic. The activities that can make students ready, there are: a) The teacher makes a brainstorming; he can link between the materials that have been known by the material presented. b) The teacher explains the goals achieved or material points that must consider. c) The teacher can use some relevant tools to deliver the material.

2) Whilst – teaching

In this step, the teacher usually refers to a lesson plan they have prepared. This section is a series of activities centered on to explain the material which is the main aim to achieve the indicators. However, sometimes it becomes difficult the situation requires teachers to be sensitive to the needs of the students. This step of teaching requires teachers to be adaptive and creative. However, students have one particular thing that is expected of teachers in every classroom or meeting. This means that teachers must hold onto some strategies or approaches that students can count on having certain. In addition, teachers can also act as a facilitator; it means that the teacher makes the lesson easy to understand by the students. Therefore, in the teaching process, the teacher's role will be guiding the learning, help students develop their ability and more to learn. The teachers were extracting information to the

students so that students can answer the questions as well, according to the material that's being taught.

3) Post-teaching

Post - teaching is the end of the teaching process. This step is usually marked by the teacher doing the review, summarize, giving a task and assess their learning and conclude the important material that has been studied. These activities carried out to find the overall material which learns during the learning process.

The proper ways can affect the teacher and the students are successful in achieving the indicators. Therefore, the use of strategy or a good step and the use of some tools in a class such as: information computer technology (ICT) or textbook are playing an important role in achieving the success of the learning process.

2.5 Previous Study

A research done by JuditMoschkovich, in California. His research purpose is to examine three perspectives on bilingual mathematics learners, how socio cultural perspective can inform students' understanding of the underlying processes of learning mathematics when learning English. His subject is a bilingual teacher (primarily in Spanish) and monolingual teacher. The result of his study is that emphasizes the acquisition of vocabulary used to describe how students solve the problems and understand mathematical texts, and suggests that instruction should focus on vocabulary. A perspective that emphasizes building multiple meanings in the register has discovered the source of misunderstanding

the conversation in the classroom. The second perspective suggests that instruction can support bilingual learners in communicating mathematically by clarifying some sense, to resolve conflicts between the two languages explicitly, and students can discuss the different meanings and link it to mathematical terms in their language.

In other research was done by Bill Barton and Pip Beville-Barton, 2003. In his research, the purpose is investigating the mathematical learning of undergraduate students for whom English is a second language. His subject is first year mathematics students in a New Zealand University. The result of his research is indicating that L2 learners have larger than expected difficulties with the text, and they mistakenly rely more on symbolic modes of working.

Once more about research were done by Alfred Ampah- Mensah, 2009. His subject is mathematics teacher classes four and six. The result of his study is showing that English is the preferred language of choice for students in the classroom interaction despite the ability of the student in the language is limited. This is largely due to the perception of teachers that English is the language of mathematics and the school in general.

In other research were done by Suzanne Irujo, 2007. Her research title is Teaching Math to English Language Learners. His Subject is mathematics teacher and students in bilingual classes. The result of his study is shown that the mathematics teachers used very few words or phrases from the register of mathematics. So, the teacher must understand the math that they are teaching, and must know the academic language as well.

The all research above focuses on bilingual learning mathematics which English as a second language. The similarity between those journals and this research is same in concern about the use of English in bilingual learning mathematics. The differences between those previous studies with this research are this research focus on how the way teacher implements English for mathematics textbook 1A published by Erlangga in a bilingual class at seven grades Junior High school, and the problem faced by the students in understanding the language, the terms, and the instruction of English for mathematics textbook.