The Use of English in Learning Mathematics for Grade 7 Junior High School

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***Abstract*—There are still many people think that learning Mathematics in English causes students difficulty in obtaining a good score. Therefore, the authors conducted research related to the use of English in teaching Mathematics, for grade 7 junior high school in a private national plus school. The purpose of this study is for the reader to open up further insights related to the topic above. This research was carried out with experimental design, by doing different treatment between classes in the same level. The subjects of the study consisted of 63 students spread into 3 classes, 7 Amos, Esther 7 and 7 Jonah. Class 7 Jonah is a control group, using Bahasa Indonesia (mother tongue) in learning Mathematics. Class 7 Amos and 7 Esther is the experimental group, where 7 Amos in English and 7 Esther used bilingual (English and Indonesian). Results of the study include the following: the use of English is not detrimental to the students in score acquisition, is evident from the class treated differently, giving an average final score of Mathematics that are not significantly different. The obstacles that arise in learning Mathematics needs to be reviewed from the process, readiness, independence, motivation of students and needs to be followed up critically so that students can achieve good results. Programs of short and long term needs to be created and observed in order to support the learning process of Mathematics for students, such as training teachers to be able to speak English, training teachers to teach Mathematics, especially for young children, to support action research by teachers, managed by the school.**

Keywords—mathematics; English; learning

I. INTRODUCTION

In the current era of globalization, the use of English in all aspects, especially in the world of education in Indonesia has become more popular. Indonesia is one country that has a strategic location geographically.

The use of English in Indonesia almost covers all aspects, politics, economics, defenses, and others. Indonesia's education saw this phenomenon of globalization then immediately responded by developing new educational patterns which presented in English.

Today in Indonesia, many schools built with the status National Plus and International schools, which both use English for daily communication in school as well as the language of instruction in all learning.

The use of English as the language of instruction in the learning of Mathematics would be a challenge for both students and teachers. This research is looking at how the process of learning Mathematics in English, the measurement of learning outcomes, evaluation of the measurement results of learning, relationship with student achievement. Obstacles and possible solutions for the achievement of learning goals also have special attention in this study.

The paper is made systematically composed of: Section I. Introduction, Section II. Literature Studies, Section III. Research Methodology, Section IV. Analysis and Discussion, and Section V. Conclusions and Recommendations.

II. LITERATURE STUDIES

Throughout history, human beings continue to develop a variety of signs and symbols in developing their cognitive abilities. In a system of symbols, either when creating or using it, involves behavioral and psychological changes that lead to the development of a complex mental process [5]. Vygotsky'stheory [3] is widely applied in the United States. Thoughts on the 'next growing area' (zone of proximal development), provide additional aspects in analyzing the verbal communication skills of students. The theory also gave two implications:

- Interprets signs and symbols used in the curriculum.
- Provides inputs that each subject in the curriculum examined from the point of overall mental development.

In classroom learning, should not be assumed that non-native speakers (not a native speaker) who has achieved a high level with fluency and accuracy in spoken English daily have the appropriate academic language skills. It can help us to avoid labeling the child that the child has special educational needs, when all they need is longer time. Non-native speakers in classes, which have been out of the ESL program, in many cases still have problems in the process of communicating with their peers [2].

Cummins stated: "The concept of knowledge developed in one language helps a lot to make entries in other languages." If a child already understood the concept of "fairness" or

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"honesty" in his own language, all he had to do was get a label to the terms in English [2]. It's not easy, but students can earn a good label and concept in a second language.

Motivation is why individuals behave, think and have feelings in a way that they do, with emphasis on the activation and direction of behavior [10]. When students are motivated, they will do something, they demonstrated active behavior. For example, when a child is hungry, they will open the refrigerator for food. When students are motivated to get good scores, they will study diligently and independently. Students will strive to achieve what they aspire when properly motivated. Motivation focuses on how students behave, or in other words chosen behavior for certain situations but not other situations.

Some students have a desire achieving very high and they spend a lot of time in trying to be successful, others are not motivated to succeed and do not work hard to be successful. Both types of students are different in terms of achievement motivation (achievement motivation) [9]. Achievement motivation is the desire to accomplish goals, to achieve a standard of success and to make an effort in order to achieve success.

Bernardo, Allan BI (2002) in his research in Asia, which is associated with the use of a second language in learning Mathematics.His finding that there is no strong correlation between the use of a second language as a language of instruction in the learning of Mathematics [1]. This study was conducted to determine whether the Mathematicsproblem solving by someone Philippine-British influenced by the model of the structure of language problems. Modeling learned about the story using the paradigm of problem solving, which involves the presentation without question.

Oviedo, Gloria CB in her research, found that the learning process at school in a language that is not a first language (L1) has become a reality in many parts of the world due to socio-political reasons, advances in technology are better and faster in communication systems [7]. Understanding the psychological dimensions of bilingualism in the context of the class is very important for educational policy makers who make decisions about curriculum development, instructional practices, and evaluation. From a cognitive perspective, examine the process of understanding of subjects in the second language (L2) is important to address learning issues. The impact of bilingual education in the teaching and learning process is complex, especially since one of its goals is to make the process of teaching and learning in a second language as first language, without sacrificing the knowledge, competence and performance.

Woo, HyungWhang conducted research in Korea about learning Mathematics in English [12]. Woo also found that students' difficulties in learning Mathematics lies not in the language, but the thinking skills of students who are less well honed [12]. Language problems in Mathematics education appear today, although many scholars have been struggling to understand the relationship between language and thought, (Vygotsky, 1962; Piaget, 1959; Whorf, 1956). Laborde (1990) discuss the important role of language as a medium in Mathematics Education. When learning Mathematics in school, students are faced with a formulation that was written by textbooks or teachers, as well as oral discourse of teachers in the classroom, and with discussions with their classmates. The function of language in the context of Mathematics in the classroom is a development mindset. Language serves both as a means of representation and as a means of communication. Therefore, its role in Mathematics education can not be ignored.

Lessons are conducted by human beings since childhood related to three conditions that support each other, to produce a good performance in the form of skills [11]. Students will learn well when there is sufficient prior knowledge, according to his mental development and then continued to a higher level. Education / teaching provided excess rather than readiness in terms of mental development will lead to an imbalance of mental development and cognition. Having regard to the three factors mentioned above, academic values will appear satisfactorily [8]. In this study, the focus was the cognitive abilities of students in English for learning Mathematics. Therefore, it needs sufficient English skills to understand Mathematics eventually.

III. Research Methodology

This study was an experimental study, in which researchers performed experiments in the learning process in the classroom, where given different treatment in terms of the language of instruction. Experiment is selected and used in the classroom setting. The experimental research is an objective study, systematic, and controlled to predict or control the phenomenon. The data then was analyzed using the Wilcoxon Test Theory [4].

The study was conducted in the learning of Mathematics in the sub-topic of Polygon, and the same methodology applied directly to the learning process in the classroom 7. Learning activities include the beginning (examples of the application), the main activities concerning explanations of topics, discussions, discussion examples of questions, exercises and discussion. The ending activities was involving small tests, quizzes, homework and school assignments given continuously with instructional design that has been designed previously. With a structured and comprehensive learning, students are expected to absorb the learning material well that it can be seen the effect of the use of the language of instruction in the classroom with student achievement.

The duration of study in this research is 8 x 45 minutes, face-to-face with students. In addition to face to face meeting in the classroom, questionnaire is given to each class. For the qualitative data, will be done at the next meeting and will take a maximum of 10 minutes.

The learning process is performed as follows: 7 Amos will be given in English, grade 7 Esther is given in English and Bahasa Indonesia (bilingual), while the 7 Jonah is given in Bahasa Indonesia. The evaluation in grade 7 Amos will be provided in English, grade 7 Esther in English and Bahasa Indonesia, as well as the 7 Jonah in Bahasa Indonesia.

The data collection using the instrument in the form of Pre Test and Post Test, questions in the forms of drawings in

which students calculate the angle of the unknown in the picture. Application of the concept of angles in polygons needs to be properly applied in calculating the unknown angle.

IV. Analysis and Discussion

Based on the achievement of the final test (post test) of those three classes, it is concluded that the use of English in teaching has no significant effect on student achievement. It was shown in all three classes, which were treated differently in terms of the language of instruction, but student achievement is good enough. There is no significant difference. Data from the English entrance test from the school, which shows the student's readiness to learn, does not guarantee for students to understand Mathematics well.

Table I. Class Analysis

Class	Avr Pre	AvrPost	% increment	Class Analysis
7 Amos	24	59	145.8 %	The use of English in learning Mathematics is showing a significant students' score improvement.
7 Esther	18	62	244.4 %	The use of bilingual language in learning Mathematics is increasing the average of students' score.
7 Jonah	15	63	320 %	The students seemed to be able to understand easily so giving a significant improvement.

V. Conclusion and Recommendations

Scores achievement for students in learning Mathematics in English is not detrimental to students. There might be very good tools for improving students' endurance using the technology, such as the use of applications for smartphones in regards to the discrepancy in language. In the future, the use and evaluation of the visualization system will continue, and will improve the system as described above. The next consideration is to support students who are studying for the JLPT by having them use the system to enhance their Japanese language skills [6]. This could be the goals for the continuing of this research.

Recommendations.

1. This research can be used as a source for further research to develop on other factors that support or impede learning Mathematics in foreign language.
2. Research can be developed in some schools and for moresubjects and involved more teachers to get more accurate results.
3. Research can be developed to measure the English proficiency of students' in learning Mathematics.
4. Research can be developed with other subject areas such as science, social studies and other skills.
5. Research can be developed in a longer period of time (one semester or one academic year) and can involve more students in the classroom and school.

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