

ENGLISH AS THE MEDIUM OF INSTRUCTION FOR SCIENCE AND MATHEMATICS IN MALAYSIA

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Abstract :

The government of Malaysia has implemented immersion program to enhance the English proficiency through science and math subjects. The approach which is used in teaching and learning is Content-Based Instruction, which is, using English as the medium of instruction in teaching and learning science and mathematics. This approach is expected to be able to produce students with high achievement in those particular subjects and high English proficiency. Even English as medium of instruction for science and mathematics should be taught from the starting age in primary school.

Key words :

Medium of instruction, science, mathematics, and Immersion Program
Content-Based Instruction (CBI).

A. Introduction

English is the most important language in international world, especially in globalization era. English is used as communication medium with other people from various countries. Graddol stated that English is spread and used almost one third of world population.¹ One of countries that used English as second language is Malaysia. General description of teaching English in Malaysia will discuss in the next part.

Generally, English language proficiency for Malaysian students was realized in low level. It could be seen from their limited ability in English communication actively and passively; both written and spoken. In ability in

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¹ Graddol, *English Next*, (UK: The English Company, Ltd, 2007).

mastering English by students indicated the unsuccessful of learning English in the classroom.

In 2003, Prime Minister through Education Ministry has implemented the modern educational system. Because of inability in English proficiency on high school students, the government of Malaysia has made it compulsory in all schools for science and mathematics subjects to be taught using the English language. Even English as medium of instruction for science and mathematics should be taught from the standard one in primary school.

Formerly, the policy invited controversy and polemics among all part of society; students' parents, teachers, educators and experts, non government organization, and even government it self. Science and mathematics teachers and students are the persons that facing the trouble directly. They experience many difficulties in teaching and learning the two subjects. But, the Malaysia Prime Minister, Dr. Mahathir Mohamad confirmed that this effort was important for Malaysian students to increase their achievement and to compete in education, both in or out of the country.² It is admitted that mastering English language is a necessity for Malaysian people in order to play an important role in the world in science and technology optimally. As we know, large amount of books (science, mathematics, biology, physics and technology) are written in English. To access the information, and to obtain the knowledge and technology, it is needed high English proficiency. It is necessary to develop English learning effectively and efficiently in order to obtain high ability in English.

B. The Enhancement of Language Proficiency through Science and Math Subjects

Unsuccessful English learning in school is indicated by senior high school alumnus' low English abilities. This is caused by a few of credit hour on English classroom, and limited chance for students to interact among students to communicate their ideas, feeling and real experiences in daily life. Beside

² *Utusan Malaysia*, 2005.

that, limitation of teacher's English ability, lack of means and infrastructure in English learning and unsupported environment contribute to the unsuccessful English learning.

The government of Malaysia has implemented immersion program to enhance the English proficiency through science and math subjects. The approach which is used in teaching and learning is Content-Based Instruction, which is, using English as the medium of instruction in teaching and learning science and mathematics. This approach is expected to be able to produce students with high achievement in those particular subjects and high English proficiency. This is supported by Rodgers who also agreed that Content-Based Instruction (CBI) is the learning of language through the study of a content area, for example, history, geography, or science. In other words, the subject matter is the focus of classroom instruction; the acquisition of language is seen as a natural consequence or by-product of subject matter learning.³ This policy is seen giving positive result for society and schools that implement this program.

Therefore, the government of Malaysia assumes that teaching science and mathematics in English is important. The objectives of this policy are:

1. It is expected that the students can obtain two advantages, mastering the science and mathematics and mastering English for the outcome, in other words, the students are able to master the content of the subjects and proficiency in English language.
2. It is expected that the teachers have high potency and proficiency in teaching.

Although immersion program is assumed appropriate, in implementing this immersion classes, the government of Malaysia should analyze the facts happened in the field to achieve the goal optimally. The teachers and students' readiness in implementing the immersion program must be noticed.

³Rodgers, "Developing Content and Form: Encouraging Evidence from Italian Content-Based Instruction", *The Modern Language Journal*, 90, 373-386, 2006.

The lack of readiness for teachers and students in implementing this immersion program influences the result that will be achieved. Science and mathematics teachers in Malaysian schools can not implement this immersion program well yet because of their inability in mastering English.

Even they are able to master science and mathematics well, English as the medium of instruction in the classroom becomes a big problem for these two particular subjects, so transferring the knowledge from the teacher to the students will be blocked. It means that in running this immersion program, the science and mathematics teachers are demanded to master English beside their compulsory to master the two particular subjects.

For mastering English well for the teachers, the government of Malaysia has allocated quite big education fund, the fund is used for English training for science and mathematics teachers. Beside that, the change of curriculum forces the government itself to change or create the new blue print book for teachers in implementing the immersion program. Blue print book is the guide book that made by Malaysian government on every subjects, it is the holy book for the teachers. By the existence of that new policy, the blue print book experiences the change automatically.

Science and mathematics teaching method before 2003 have to be changed as well, here; science and mathematics teachers have to master them well, because the lack of mastering the new teaching method is as one factor that will influence the unsuccessful of the immersion program.

In assessing students' examination results, science and mathematics teacher have to have ability to assess not only the content of the lessons, but they also have to have ability to assess the students' English ability that they acquire.

Because of the close of relationship between content area teaching and target language acquisition and Content-Based Instruction (CBI) approach, so cooperation between science and mathematics teachers and English teachers is quite needed like happened in Malaysia.

Since starting the immersion program in 2003 up to now, the government of Malaysia still does the improvement and maximum efforts for agent of education, especially regarding to science and mathematics to achieve the best result in that both fields and producing the alumni that have high English proficiency.

Looking at it from students' point of view, they do not ready yet to receive the two different sciences in immersion program. The students still experience the difficulties in understanding the medium of instruction used, so understanding science and mathematics for them is blocked.

Because immersion program is considered appropriate, the program has been being implemented in Indonesia since 2007. Indonesian National Education Department published Guiding of Quality Guarantee for International Standard School/ Islamic School in Elementary and Intermediate Educational Level in 2007. This guiding book is generally to give explanation and determination for educational stake holder in central, province, regency/city, and school/ Islamic school in running International Standard School based on legislation regulation. International standard school means that the standard is received globally in various educational aspects and management. It includes physical aspect, namely school's facilities; and non-physical aspects as like mental, ability, and professionalism of educators in the school that standards internationally. Because many aspects or factors and readiness for teachers and students must be fulfilled in implementing the immersion program, not all schools/Islamic schools in elementary and intermediate and even though in high educational level are able to implement the program.

One characteristic of International school is using English as medium instruction. English places the main position as success parameter in International standard school.

It is similar with immersion program that implemented in Malaysia, in Indonesia English as medium instruction is used in nature science, mathematics, and vocational essence lessons. The purpose of this program is

to produce students with high achievement in those lessons and high English proficiency. And the used approach in teaching and learning is Content-Based Instruction, which is, using English as the medium of instruction in teaching and learning science and mathematics, and vocational essence lessons.

Because the immersion program is a new thing in Indonesia, it is expected that will be many research for the implemented program in order to know the program's efficiency and effectiveness for Indonesian students.

C. The Efficiency and Effectiveness of the Use of English as the Medium of Instruction for Science and Math Classes

Huang & Morgan wrote that "Learning about the world or the acquisition of knowledge or skills thus can not be separated from language development".⁴ This statement confirms that to learn certain knowledge, people are necessary to master the certain language. This statement also supports the educational policy used in Malaysia, it is the use of English as the medium instruction for science and mathematics.

Looking at it from efficiency and effectiveness point of view, the use of English as the medium instruction for science and math is appropriate. By implementing this immersion program, two goals (to produce students with high achievement in science and mathematics subjects and high English proficiency) might be achieved. It is efficient in time and effective in learning the contents and language.

In fact, although the use of English in teaching and learning science and math is assumed appropriate, one study which is conducted by Nurdin on 279 lower secondary school students from three schools in rural area of Johor, Malaysia to gather information and to get the clearer picture on what have happened regarding the teaching and learning science and mathematics in schools, found out that the students agreed to the importance of English

⁴Huang & Morgan, "A Functional Approach to Evaluating Content Knowledge and Language Development in ESL Student's Science Classification Texts", *International Journal of Applied Linguistics*, 13, 234-262, 2003, p.235.

language in everyday life as well as career opportunity however they felt that learning science and mathematics was very difficult in English.⁵ This is as a challenge for the science and mathematics teachers to work wisely in order to overcome students' learning difficulties and to promote effective learning among students.

Spanos conducted a math case study and a science case study in Virginia schools concluded that the students could learn to apply learning strategies and tactics in learning language and content. This study proved that learning language through content area (immersion program) is appropriate and effective.⁶

Reyhner & Davison conducted a learning language through content area experiment on 7th and 8th grade Crow Indian students.⁷ The integration of mathematics, reading, writing, speaking, and listening activities includes the journal writing, descriptions, explanations of procedures used, and creation of problems. Their performance in both language and mathematics improved—in language because they were writing more and in mathematics because they showed some understanding of the processes they were studying. This experiment also proved the efficiency and effectiveness of immersion program learning the content area and target language acquisition.

⁵Aziz Nurdin, *Students' Perception on Teaching and Learning Mathematics in English* 2005, Retrieved March 27th, 2008 from <http://eprints.utm.my/1507/1/KERTASINT.pdf>

⁶Spanos, "ESL Math and Science for High School Students: Two Case Studies", *Third National Research Symposium on Limited English Proficient Student Issues: Focus on Middle and High School Issues*, Vol. 1, 1992.

⁷Reyhner & Davison, "Improving Mathematics and Science Instruction for LEP Middle and High School Students Through Language Activity", *Third National Research Symposium on Limited English Proficient Student Issues: Focus on Middle and High School Issues*, Vol. 2, 1992.

Hampton & Rodriguez⁸ conducted a research to determine the value of implementing an inquiry science curriculum in classrooms where elementary children are developing second language skills along with their first language skills. About half of the children were taught in English and about half in Spanish. This was determined by the classroom teachers' perceptions of their students' English-speaking ability. The data were gathered to provide information about the children's concept development and vocabulary development. The result of the study showed that the students' understanding on science is good and target language vocabulary acquiring is approved increased, so this study supported the statement that immersion program is appropriate and effective.

D. The Appropriateness of the Starting Age (Standard One) For This Kind of Immersion Classes

The age at which children start learning English has been lowering across the world, it means that formerly English learning is started in high education level, nowadays teaching English is started since primary school, even though in Malaysia and countries that apply English as second language implement teaching English in kindergarten level. It shows that age to start learning English is younger and younger.

Graddol⁹ stated that English learners are getting younger. Across the world, from Chile to Mongolia, from China to Portugal, English is being introduced in primary schools, with greater compulsion, and at steady lowering ages, it happens in Malaysia as well. One of many reasons teaching English at the starting age is to ensure that students will have a longer time to master English. Based on that reason, the government of Malaysia implements the new education system.

⁸Hampton & Rodriguez, "Inquiry Science in Bilingual Classrooms", *Bilingual Research Journal*, 25, 4, 2001.

⁹Graddol, *op. cit.*

Government of Malaysia adopts the functional reorganization hypothesis in implementing the new education system. The functional reorganization hypothesis is the system for detecting foreign contrasts seems to be reactivated in young learners, at least up to a certain language. This is supported by Fledge who stated that late learners are less proficient in discriminating the phonemic contrasts of the second language than early learners. It shows that the ability to discriminate foreign contrasts can be reactivated at least in young learners.¹⁰ Therefore, Government of Malaysia has applied English as the medium of instruction for science and mathematics since 2003 from the Standard One in order to the students be able to have high English proficiency in the future.

English teaching potential in the primary school to support the students' successfulness in studying this international language in advanced education is very big. It is expected that studying English in starting age will be easier to master the English in the future.

Scientist suggests that when it comes to ease of learning and proficiency in a foreign language, earlier is better. Hence second language should be taught in every preschool and primary grade to take advantage of young children's natural capacity to pick the target language up.

Guasti quoted Lenneberg suggested that language can develop fully only if it is acquired before puberty.¹¹ The statement shows that a human being will acquire the language well since infancy until or before puberty, in other words, acquiring a language is natural achievement for children and becomes more difficult when one gets older. When language input is not present in critical period, it will be hard to acquire the language and the result may be in low quality. The critical period hypothesis is a rationale for the government of Malaysia to implement the immersion program. By introducing

¹⁰Fledge, "Production and Perception of A Novel Second Language Phonetics Contrast", *Journal of the Acoustical Society of America*, 93, 1589-1608, 1993.

¹¹Guasti, *Language Acquisition: The Growth of Grammar*, (London: The MIT Press, 2002).

English earlier for primary school students (during critical period) in science and math, it is expected that they can acquire English well as basic for them to develop that particular language in the upper education. And it is hope they are able to master the subject contents and proficient in English.

Early immersion students will feel more confident about their language skills and less anxious in applying the target language studied than the students do their late immersion program. This is caused by the students that study the second language in early age will use that particular language longer and worry less about making mistakes, as time has shown them that they are well understood in spite of their errors. Like Swain and Lapkin stated that children acquire a second language more easily than adults.¹² This statement also supports one proverb stated that giving lessons to the children in the early ages equals painting or carving on the stone, it means that knowledge acquiring in early ages will give strong impression for the children until they grow adult. It happens on second language teaching through immersion program from the starting age.

By mastering English, we will be able to access the information and to obtain the knowledge and technology. By introducing English in the primary school, the students will know and understand the language earlier. Therefore, they will have better basic knowledge before continuing to the advanced education level.

E. Conclusion

The government of Malaysia puts the policy into effect. English has been used as the medium of instruction for science and mathematics in all level of education from elementary to high education. The government of Malaysia has implemented immersion program to enhance the English proficiency through science and math subjects. The approach which is used in teaching and learning is Content-Based Instruction (CBI), which is, using

¹²Swain & Lapkin, "Canadian Immersion and Adult Second Language Teaching: What's the Connection", *The Modern Language Journal*, 73, 150-159, 1989.

English as the medium of instruction in teaching and learning science and mathematics. This approach is expected to be able to produce students with high achievement in those particular subjects and high English proficiency.

It is expected that the immersion program implemented from elementary school (starting age) can bring the better change in education in order to achieve high achievement in science and mathematics and proficient in English for all Malaysian students.

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