Impact on the Implementation of bilingualism in science and mathematics teaching in Malaysian school system

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Abstract
Understanding bilingualism in mathematics education and developing a principled instruction is a pressing issue in Malaysian system of education. With the implementation of government policy of teaching science and mathematics in English starting from year 2003, an increasing number of students are affected with this policy. It is vital to examine the view of instructors from tertiary level, who are bilingual themselves, about their views in the implementation of this policy. An initial study has been undertaken to examine the view of instructors from two public universities in Malaysia. A total of 175 respondents comprise of professors, associate professors and lecturers from eleven faculties participated in the research. It is important to gather theoretical and practical information from a variety of societal context in order to empower teachers and educators to see possibilities beyond their own constraints and to be able to perform their role appropriately. In the context of Malaysia, even though the dilemma was due to governmental initiatives, it is important to raise the consciousness of the bilingual educator and to liberate their view of bilingual education beyond a simple governmental definition or a single societal perspective.

Introduction

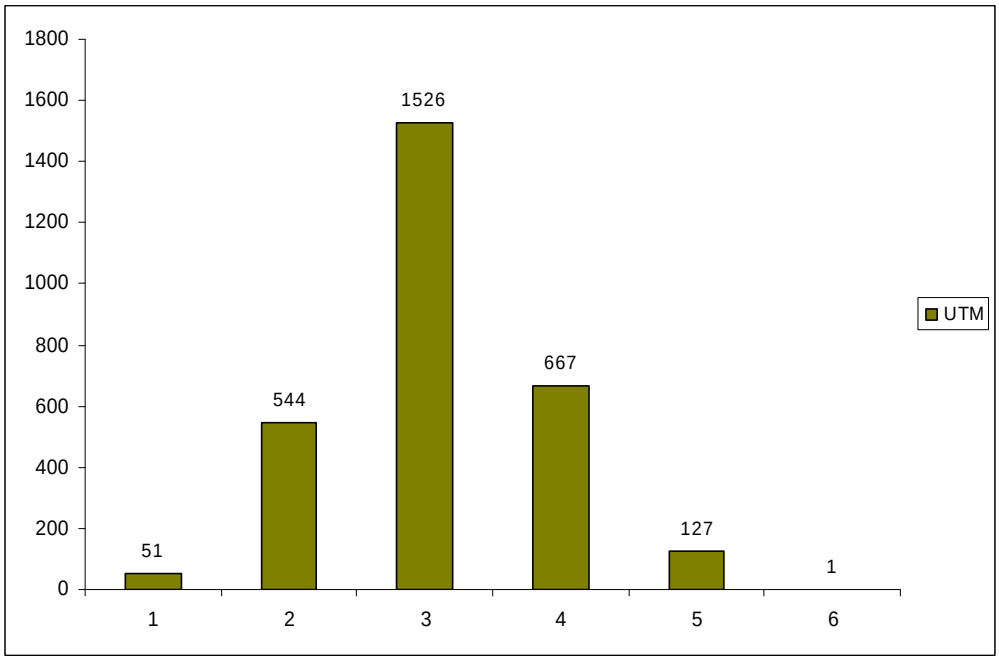
Globalization is impacting on education system in many countries throughout the world. One aspect of this process is the language usage in the teaching of science and mathematics. This is particularly true in the context of Malaysia. The phenomenon where knowledge, value, principles and curricular developed in a local context gaining a global adherence is perceived as being an inevitable outcome. (Clarkson, P.C. 2004)

At the beginning of the 1970's, the main medium of instruction of Malaysian school system was change from English to Malay, the national language. This was done in some way for political reason and motivated by the call of patriotism and moving away from colonial influence. However from 2003 onwards, the government has launched a reform in education system where all first year primary, secondary and Malaysian matriculation college has to use English in teaching science and mathematics as well as related subjects. The level that started to be affected with this policy were year 1 in primary school, form 1 in lower secondary schools and form 6 for higher secondary and matriculation level. The level that were affected increased gradually and culminated to all level affected by year 2008 including the tertiary level. Public university in Malaysia has mandated that English is to be used as a medium of instruction for all science and mathematics related courses starting from semester 1 for 2005/6 session and all first year courses beginning 2006/7 session. The implementation of this policy brings obvious ramification in the teaching of mathematics in higher education.

Language as global issues for mathematics learning

Students are required to take English exam as a compulsory requirement for entrance to public university. MUET (Malaysian undergraduate English Test) result for new entry student for the 2007/8 intake at one public university which can be considered as a typical sample for other public university indicated that most students scored below the satisfactory level in English

competency. From the population of 2916 new students intake at a public university, about 72.7% has a score of band 1, 2 and 3. (See graph 1.0)



GRAPH 1.0: MUET score for 2007/8 student's intake

Courtesy: Centre for Teaching & Learning, Universiti Teknologi Malaysia (2007)

After four years of implementation of the policy, it is obvious that the incoming students that were admitted to university and other higher institution still have low proficiency in English. This scenario sends alarming signal and brings the Malaysian education system in great turmoil. The greatest dilemma of Malaysian education system has been its inability to understand the ethno linguistic complexity of bilingual education and its impact on students, classrooms and society in such a way as to enable teacher and instructors to make informed decisions about practice in classroom setting. There is a need in Malaysian education system for information about sociolinguistic and psycholinguistic issues that surround bilingualism in science and mathematics education. It is important to gather theoretical and practical information from a variety of societal context in order to empower teachers and educators to see possibilities beyond their own constraints and to be able to perform their role appropriately. In the context of Malaysia, even though the dilemma was due to governmental initiatives, it is important to raise the consciousness of the bilingual educator and to liberate their view of bilingual education beyond a simple governmental definition or a single societal perspective. (Baker, 1996).
A study by Aziz et al (2000) showed that there is a strong correlation between test score in science and mathematics with English test score. The result indicated that student with high proficiency in English were more likely to achieve high scores in their science and mathematics test. In other word, the findings revealed that students with low proficiency in English are somewhat deprive of achieving high score in science and mathematics. This raise the issues of equity and language gap which is tantamount to creating performance gap in education.

Research Methodology

The data for the research were collected from two public universities in Malaysia. A total of 175 respondents comprise of professors, associate professors and lecturers from eleven faculties participated in the research. Questionnaires were used as the instrument for data collection and

later analyzed using SPSS (Statistical Package for social science) software. The statistics used in the research were frequencies and percentages.

Findings

The study indicated that some of the reasons behind the use of English in classroom setting for most of the respondent in order of importance were as below:

1. contributes to the internationalization of the university
2. is necessary for competition in the job market
3. is meaningful for Malaysian students, since it provides training in an internationalized context
4. makes it possible for students from many cultures to learn together

There is an innate wish among the respondents to contribute to the internationalization of their university by conducting their courses in English. By doing so, the respondents feel that they can provide platform in enhancing the proficiency of English among their student. The reason for using English can be seen as utilitarian in nature because they hope by acquiring and mastering English among their students can improve their prospect in the job market. The government is exerting effort to make Malaysia as the center of learning in the world map. In line with this aspiration, public university has received enrollment from international students from various countries especially from the Middle East and Africa. The respondents feel that it is important to conduct their course in English in order to facilitate the students from different country and cultures to learn together with the local students.

Positive views	**M**	**Disag**	**Ag**
1. contributes to the internationalization of the university	2.81	10 (6.17)	152 (93.83)
2. makes it possible for students from many cultures to learn together	2.73	18 (11.39)	140 (88.61)
6. is meaningful for Malaysian students, since it provides training in an internationalized context	2.73	11 (7.43)	137 (92.57)
8. is unavoidable given the prevalence of the English language	2.21	32 (30.48)	73 (69.52)
10. is necessary to compete with the world	2.69	16 (10.60)	135 (89.40)
11. is necessary for competition in the job market	2.80	11 (6.79)	151 (93.21)

TABLE 1.0

Despite the low English proficiency among Malaysian university students, their instructors strongly feel that Malaysian students are able to compete internationally. However, there are negative arguments as well, such as, Malaysian students are more passive than other international students namely Africans, Bosnian or other Asian students. (See Table 1.1 and

Table 1.2 below) Given their low English proficiency, 81.25% of the respondent viewed that Malaysian students have insufficient training in stating their opinion in English.
Naturally, the students whose first language is English tend to dominate the class discussion. However, this seem to be an elite group because less than 10 percent of Malaysian population has good command of English and are comfortable in using it as a form of communication.(Johari et al, 2006)

Thoughts on courses taught in English and National - Positive views	**M**	**Disag**	**Ag**
1. It is livelier than a regular course	1.84	30 (44.12)	38 (55.88)
5. It is exciting since there are many different opinions	2.07	13 (15.48)	71 (84.52)
12. Malaysian students can compete internationally	2.50	6 (4.58)	125 (95.42)

TABLE 1.1

Thoughts on courses taught in English and National - Negative views	**M**	**Disag**	**Ag**
2. Malaysian students are more passive than other Asian students	1.87	37 (41.57)	52 (58.43)
3. Malaysian students are more passive than other non-Asian foreign students (Africans, Bosnians, etc)	1.84	35 (38.46)	56 (61.54)
4. It is difficult since the needs of the students are diverse	1.64	34 (36.96)	58 (63.04)
5. It is exciting since there are many different opinions	2.07	13 (15.48)	71 (84.52)
6. It is difficult to find teaching material since there are few English publications that share your viewpoint	1.16	122 (91.73)	11 (8.27)
7. The students whose first language is English tend to dominate the discussions	2.16	26 (22.61)	89 (77.39)
10. Malaysian students have insufficient training in stating their opinion in English	2.24	24 (18.75)	104 (81.25)
11. Malaysian students have insufficient training in explaining about their country to non-Malaysians	1.87	39 (40.21)	58 (59.79)

TABLE 1.2

The study also give evidence that university instructor prefers to write papers in English. The main reason is because they perceived that the paper written in English will be read more widely in the world. Writing in English for bilingual instructor is of course not without its hurdle.

Admittedly, they have difficulties in writing articles in correct grammatical sentences and it became a common challenge for most English learner.

Q15. Writing and publishing papers	**Freq**	**%**
1. I write almost all of my papers in English but I also try to publish in Malay	117	66.86
2. I write mostly in Malay, but I also try to publish in English	32	18.29
3. It is not necessary to publish in English in my area	4	2.29
4. Other (Please explain: _____)	19	10.86

TABLE 1.3

Q16 Reasons for preference to write in English	**Freq**	**%**
1. The paper will be read more widely in the world that way	125	71.43
2. There are not that many academic journals in the national language in which I can publish	55	31.43
3. People that write in English are more highly considered even within the country	35	20.00
4. Other (Please explain: _____)	67	38.29

TABLE 1.4

Challenge

This initial study emphasize that the implementation of bilingualism in science and mathematics raise several dilemmas and issues. The instructors need to cope in situations where they will not have full control of their situation. Intake of students to public university who are low proficiency in English compelled instructors to switch back and forth from their mother tongue to English. Instead of being frown upon, this practice could create opportunities for bilingual learners to flourish. There is a need to shift to other socio cultural perspective in countering the obstacles of bilingualism in mathematics learning. A socio cultural perspective shift away from deficiency models of bilingual learner and instead focuses on describing the resources bilingual students use to communicate mathematically (Moschkovich). By refusing to shift to socio cultural perspective, may result in designing instructional policy that neglects the experiences and competencies of student that they bring to mathematics classroom. If all we see are students,

who don't speak English, mispronounce English words, incapable to discuss in English, instruction will focus on this deficiencies. If, instead, we learn to recognize the mathematical ideas this student express in spite of their accents, code-switching, or missing vocabulary, then instruction can build on students' competencies and resources. How to implement socio cultural perspective in order to better understand the processes underlying bilingualism in learning mathematics needs further exploration.

Concluding remark

Understanding the complexity of bilingual mathematics education and developing a framework for bilingual education in mathematics instruction is a pressing practical issue in Malaysia. When the government mandated the policy of using English in teaching and learning mathematics, there followed an unquestioned aggressiveness on the part of some administrator of schools and higher education institutions in implementing the rule. An increasing number of students who enter public university will have to face the dilemma of learning mathematics and other related courses entirely in English. It is crucial for teachers and educators to make an informed decision and performed an appropriate role in supporting bilingualism in a changing classroom setting.

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