Failure of ETeMS: The Teaching Courseware Factor?

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ABSTRACT

This study was carried out in response to the announcement of the reversal of the ETeMS policy (English in the Teaching of Mathematics and Science) which had been practiced by teachers in Malaysia since 2003. The Ministry of Education took a drastic approach in gradually halting this controversial policy for several related reasons, namely the poor performance of students and teachers in applying the policy and also political pressure by Malay language activists. The main objective of the study is to investigate whether or not the application of CALL (Computer Assisted Language Learning), in this case is the application of teaching courseware, is one of the contributing factors to the failure of ETeMS. This study also investigated teachers' perception of the teaching courseware implementation in ETeMS. Fifty primary school key - personnel teachers of Mathematics and Science were involved in answering the questionnaire because they were experienced and fully involved in the policy implementation. The findings showed that teachers were not committed to use the courseware for several reasons. However, the teaching courseware is not the major contributing factor to the failure of ETeMS.

Keywords: *CALL (Computer Assisted Language Learning), ETeMS (English for the Teaching of Mathematics and Science).*

1. INTRODUCTION

1.1 What is ETeMS?

According to Alwis (2005), the English language has become a basic communication requirement for students and job-seekers in this increasingly globalized world where it is, for now, the undisputed lingua franca. The issue here is not the importance of English. That is self-evident and the education system must commit itself to making our students fluent in English. In fact, to become a developed country by 2020, Malaysians should not only become bilingual, but even trilingual. The real issue here is not only how we improve our children's command of English, but also how we help them get educational benefits in mastering the language compared to that of not mastering the language. Many researchers believe that it most definitely is not through a poorly conceived policy such as ETeMS (the teaching of Mathematics and Science in English) but a better comprehensive policy which enables attraction of greater public acceptance of English (Pandian, 2004)

The announcement to teach Science and Mathematics in English hogged the headlines in all the local media in 2002. The idea sparked by our former Prime Minister, Tun Dr. Mahathir Mohamad proposed ETeMS as an urgent provisional action to ensure that teachers of Mathematics and Science will have basic capacity to use English as the medium of instruction. The Ministry of Education introduced several support mechanisms not only to encourage the Mathematics and Science teachers to further develop their English language competence to a level that will engender optimal performance in and outside the classroom but also to enable them be more confident in using the language. The first batch of students involved in this pioneer project were Year 1, Form 1, Lower Six and Matriculation.

Since the policy was really new, its implementation generated much debate among the general public, parents, political parties and even teachers on the effectiveness as it is still in the transition stage. According to Alwis (2005), many people are skeptical especially those who named themselves 'language nationalists' about its success citing reasons such as poor English language proficiency of teachers in these subjects and the lack of student interest in

learning English. On the contrary, while discussions were being held with various groups, the government went ahead with its preparations to implement the policy. This is because the Ministry of Education presented the necessary infrastructure to enable teacher readiness in implementing the change. As a result, the policy was revised in 2008 (after the 12th General Election); eventually the government decided to reverse this controversial policy to its earlier language (Bahasa Malaysia) starting in January 2011. Beginning 2012, students in Year One and Year Four in primary schools, and Form One and Form Four in secondary schools, will learn Mathematics and Science in Bahasa Malaysia. The replacement of ETeMS is called MBMMBI (Empowering Malay Language, Enhancing English Language).

1.2 The Implementation of Teaching Courseware

According to Ong (2004), the aim of using English in the teaching of Mathematics and Science is to enable students to acquire and slowly master the language while learning both subjects, as if "killing two birds with one stone". However, a lot of educational issues (pertaining to teaching and learning) are important to take into consideration when the learning process takes place, especially when it involves students' second language acquisition. In Malaysia, English is normally first introduced to students when they start school, either in preschool or Year 1. Since learning in these subjects may be constrained within a complex linguistic classroom; hence, the learning process inadvertently impairs students' learning abilities. Similarly, according to Pandian (2004), other factors might also cause problems in learning Mathematics and Science through a second language, such as teachers who are not proficient in English and the lack of good Mathematics and Science textbooks in the English Language.

From other points of view, learning in a second language is seen as unbecoming when children are in the process of encountering difficulty in interpreting the meaning of Mathematics and Science discourse. At the beginning of the policy implementation, all schools received a specially designed teaching and learning courseware for Mathematics, Science and English including special courseware for computers and LCDs for teaching. To support the policy, especially in acquiring additional reference resources and materials, each school was given a launching grant of RM 5,000 to RM 15,000. And, until 2009, 80% of Mathematics, Science and English teachers have been given laptops. Students received MyCD (*Pupil's CD-ROM*) which contained interactive exercises (games, simulations and e-test) and for teachers the *Teachers' CD-ROM*) which can be considered as text book packages.

The main purposes of the teaching courseware are to be a model for pronunciation of scientific terms and act as teaching instruction especially for teachers who lack competency in English. Also, provided are a lot of interactive teaching information related to the topics. Meanwhile, a free internet access with selected vendor (e.g., Dynamic Inc.) was also available to improve teacher's self-development. The teaching coursware consists of 3,075 topics, 110 lessons for each subject (Mathematis, Science and English) and 18 special modules for teachers.

1.3 Objectives of the Study

Basically, the study focuses on two major objectives;

1.3.1. To investigate teacher's perception on several issues pertaining to the use of the ETeMS teaching courseware

1.3.2. To know the main reasons for the failure of ETeMS

The first objective of this study is to gain an understanding of the teacher's perception towards the courseware for teaching Mathematics and Science in English which is related to the content and design, the management, learning aspects and most importantly the contribution of the courseware to this policy.

Based on the objectives, the researchers came up with two research questions.

1.4 Research Questions

1.4.1 What is teacher's perception toward the courseware for teaching Mathematics and Science in English, the instructional content and design of the courseware, its ease of use, management of the courseware, motivation aspects of the courseware and learning aspects of the courseware?

1.4.2 What are the main contributing factors of the failure of ETeMS?

1.4.3 Is the ETeMS teaching courseware the primary deciding factor in the failure of ETeMS?

1.5 Limitations of Study

Terengganu was chosen as the research site due to its superb performance in UPSR since 2000 especially in terms of number of students who score straight 'As'. Therefore, the researchers would like to share Terengganu teachers' opinions on the issue. The chosen teachers were directly involved in implementing the policy both in the classroom (teaching) and outside (preparing modules for teachers). However, they were not involved in formulating the syllabus and textbooks because they were not the policy makers. On the other hand, according to Spillane (1999, p. 144) teachers are considered as the final policy makers because they are the key agents when it comes to changing classroom practice. His idea is shared with Little (1999, p. 2) who stressed that reformation in education (classroom teaching and learning environment) totally depends on teachers-- individually and collectively.

Evidently, if the teachers are able to meet the challenges, educational reform will be easily and successfully achieved. Nevertheless, the study only concentrates on the implementation of ETeMS at primary school level of Terengganu because ETeMS has completed its cycle at primary level. Furthermore, the main variable which is AKRAM (Terengganu Special Key-Personnel of Mathematics and Science) is more active at that level in ensuring that the performance of UPSR of Terengganu would be improved year by year. The focus is more on the implementation of the teaching courseware.

1.6 Statement of the problem

The crux of the problem in ETeMS has been highlighted in many recent studies such as Norhashimah (2004), Rahimi (2007) and Ishak (2008), stating that the major deciding factors of ETeMS are teachers' proficiency (it was found that one of the ways for Mathematics and Science teachers to deal with their proficiency problem in the English language was to code switch to their first language when teaching the subjects which has caused problems among students), the availability and roles of teaching courseware and the school management and teacher's motivational aspects.

A RM470,000 research done by 53 linguists from seven universities in December 2008, which involved 15,089 principals and headmasters and also senior assistant teachers found that ETeMS had caused multiple drawbacks among students (estimated 75%) in terms of grabbing the knowledge of Mathematics and Science besides affecting student interest and spirit in learning both subjects. Due to the above research findings, the researchers have decided to choose one of the factors that is the ETeMS teaching courseware, in order to know the validity based on Terengganu scenario with the assistance of the most reliable source- AKRAM. AKRAM is an acronym for 'Angkatan Kerja Rajin dan Mulia' (A Movement of Hardworking and Noble Teachers). They are the experienced Mathematics and Science teachers who have contributed a lot of effort in preparing educational materials to teachers and students in Terengganu. Furthermore, they are also in charge of planning for the betterment of both subjects.

Following the implementation of ETeMS, millions of ringgit has been spent to produce Mathematics and Science teaching courseware. However, did the courseware benefit the teachers to improve their standard of English and their teaching both subjects?

It is strongly believed that the teaching of Mathematics and Science would become more meaningful to the teachers and students when the use of technological tools can assist both parties in making the learning process become more relevant, enjoyable and understandable. Effective use of technology encourages a shift from teacher-centered approaches toward a more flexible student-centered environment as highlighted by SEAMEO Library (2003) which says that "A technology rich learning environment is characterized by collaborative and investigative approaches to learning, increasing integration of content across the curriculum and a significant emphasis upon concept development and understanding".

2. LITERATURE REVIEW

According to Little (1999), in shaping the education policy and then implementing it, the role of teachers should be clearly stated and evaluated. He explained that progress in educational reform rests in crucial ways on the capacity of teachers. This is to ensure that all important aspects in the planned curriculum would be achieved such as the visions of this policy, major changes in their knowledge and beliefs, as well as their instructional practices are required through the teacher's professionalism (Putnam & Borko, 1997).

Fullan and Hargreaves (1992), based on the empirical investigations of educational change in Canada, England, and the US, concluded that teacher development is central to successful change. In line with the above statement, Putnam and Borko (1997) stress that these transformations (the new teaching and learning approach) that teachers require are unlikely to occur without support (software) and guidance from experts. Therefore, to ensure the successful implementation of educational reform, the Malaysian government provided adequate support for teachers'

professional development (Ishak, 2008); one example is by providing them with the teaching courseware.

To date, the implementation of ETeMS has been widely researched and academically discussed among teachers and academics, leading to a number of research articles on the language problems faced by primary and secondary students in ETeMS implementation. These include students' language needs (Chan, 2003), lack of vocabulary and confusion with certain words (Hashimah, 2003) and difficulty in understanding non-scientific terms in the scientific context (Saidi, 2004). Studies conducted on learner English language competencies have also been compared between the two critical subjects. Isahak (2008) who conducted a large scale study involving 3 903 Year 5 pupils in their fifth year of ETeMS revealed the following: 75% do not or barely comprehend teaching in English and find it difficult to learn; 80% of teachers used code switching and the students' examination results in Science and English was poor with an average score of 4.08/14.0 and 11.87/31.0 respectively. Zarina (2009) in her qualitative study also found code switching occurring during classroom implementation of teaching Science in English.

From another point of view, Da Costa (2003) mentioned that the value of educational teaching courseware in teaching and learning can be very helpful and valuable. The courseware can give students interactive activities and immediate feedback, control over their own learning process and access to difficult or impossible experiments. Furthermore, the teaching courseware not only can be used for individual self-learning but is also able to promote collaborative or cooperative learning among the students. Therefore, various teaching and learning environments could be built and achieved. Eventually, learning would become fun and priceless to both parties**.** So, we can see that educational courseware is highly recommended in the teaching and learning process especially involving young learners (SEAMEO Library, 2003).

According to Pillay (2004), based on the growing emphasis on technology, it is crucial to strengthen pre-service teacher training and professional development in using ICT for the teaching of Mathematics and Science. By undergoing professional development courses, the Mathematics and Science teachers will upgrade their ICT knowledge and be updated on the trends and techniques of integrating ICT in Mathematics and Science teaching. More importantly, the teaching profession will be upgraded, well-respected and also become a career for the highly motivated due to well-developed strategies in preparing the Mathematics and Science teachers to a very professional level. This will make available teaching and learning resources tailored to teachers' needs.

3. RESEARCH METHOLOGY

The study was conducted using the survey method: Answering a questionnaire (Likert-scale and open-ended questions) and studying thoroughly recent researches done pertaining to teaching Science and Mathematics in English. The population for this study comprised a group of teachers called "AKRAM" who have been teaching Mathematics and Science in primary schools, Mathematics and Science teachers and officers from district and state education departments. The study sample consisted of 63 participants (50 teachers (27 AKRAM, 23 non-AKRAM members) and 13 state and district education officers). The officers only answered related questions in the questionnaire.

3.1 Instruments

Apart from a new syllabus with specific modules and text books, in order to facilitate teaching, teachers should be able to apply the content of the teaching to everyday or real situations (Ishak, 2008) to explain steps in solving problems. Therefore, in accomplishing all these objectives, teachers need to have a good command of the language of instruction. In addition, they would need the ability to integrate ICT (teaching courseware) in their teachings and the knowledge to apply, utilize and exploit the teaching aids supplied by the Ministry of Education to make the learning experience of the students as effective as possible. Considering these factors, all Mathematics and Science teachers underwent a series of language and ICT courses. Besides that all of them were given a laptop, teaching courseware and supported by a "buddy support system". Moreover, all districts were monitored and supervised by English Language District Officers and Course Coaches who visited schools and staged workshops.

Therefore, the researchers investigated, collected and analyzed the data pertaining to the teaching and learning approaches using the ICT (courseware) utilizing an established form. The instrument used in this study for data collection is a "Courseware Evaluation Form" modified from the CAI Evaluation Form produced by Peter Desberg from California State University (available at http://www.csudh.edu/soe/ged535/CEF.html). However, the instrument was adapted for the local environment and the objectives of this study in order to ensure it was tailored to the purposes of the research and the suitability of the respondents. The questionnaires were distributed during the annual meeting of AKRAM (December 2009) and also at the Panel of Mathematics and Science Teachers' Meeting (October 2009).

4. ANALYSIS AND FINDINGS

Based on the data analysis, the researchers found that the teachers showed favorable perception toward the courseware with an overall mean of 2.73, and standard deviation of 0.31. The courseware contents were found useful and supported their teaching process with Mean = 3.01, *SD* = 0.269. Moreover, the teachers perceived that the contents were designed properly and appropriately for the teaching and learning process (*M* = 3.00, *SD* = 0.33).

Meanwhile, 71.7% of them noted that rubrics of the teaching procedures were included, 79.1% of them felt that they were clearly written, 76.2% of the teachers agreed that the courseware was easy to customize and prepare, 88.1% of them also noticed the use of variety in displays, sound and color in the courseware really help the teachers in teaching the subject; 83.8% of them agreed that users could navigate the courseware content easily and 60.6% of the teachers felt that students were able to understand the learning topics better using the courseware. Furthermore, 98.6% of teachers in the study believed the users would be able to understand the content easily as the lessons were presented in context and related to their prior knowledge; 83.6% of the participating teachers felt that the contents were concise and well-grouped, while 94.2% of the teachers noted that the main points of the topics were emphasized to enhance student understanding. Based on the opened-ended-questions, Figure 1 shows that the respondents revealed that the failure of ETeMS was due to: Interference of political agenda 10 (16%), Teacher's factors (mastering English 37 (59%), Text books/ICT 8 (12.7%), Student's factors (weak in English 8 (12.7%)). Next, Figure 2 shows that Science teachers used the courseware more often than the Mathematics teachers; however, a large majority of both groups hardly use the courseware.

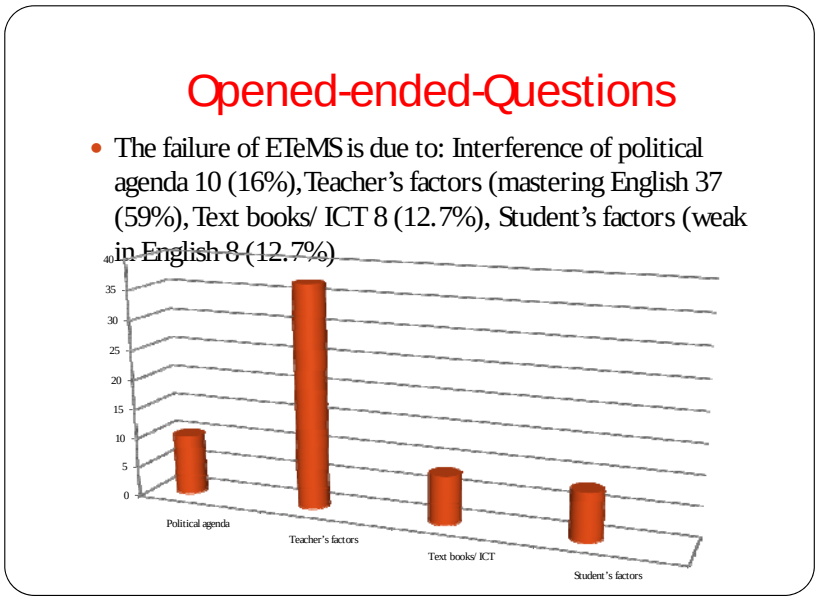

Figure 1. Reasons for failure of ETeMS.

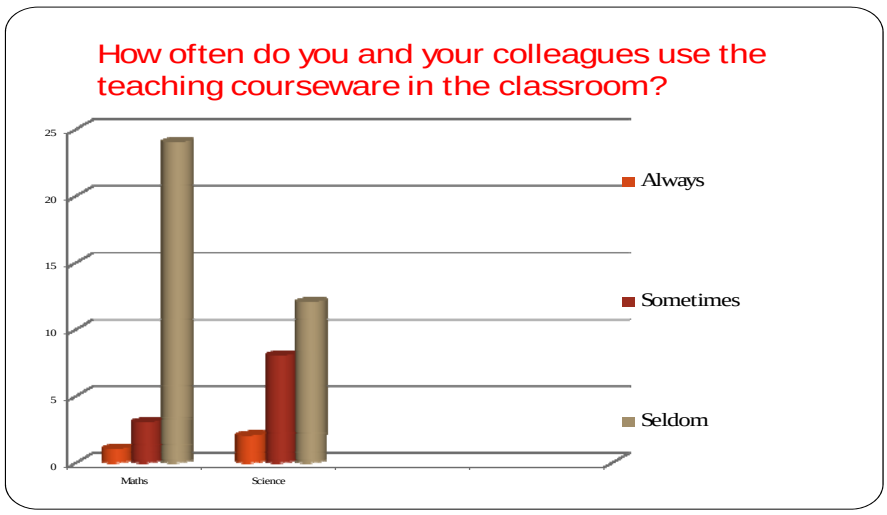

Figure 2. Usage of the ETeMS teaching courseware in the classroom.

The teaching courseware which consists of Mathematics and Science topics (according to textbooks and workbooks) and English topics were used according to the weekly and monthly timetable. The courseware is full of animation and presented in exciting ways incorporating games, sound effects and integrative question-answer responses. The teachers also give various perceptions on other related matters; in terms of courseware management aspect they found it less impressive with Mean = 2.59, *SD* = 0.39. Some 72.1% of the teachers believed that users could utilize the courseware independently; it proves that it might be one of the reasons teachers were reluctant to use the teaching courseware; 39.2% of the teachers felt that the courseware cannot be used effectively in groups while 44.1% of teachers commented that the courseware could not hold student attention and keep them on task. Nearly 80% of the teachers admitted that they practiced 'code switching' throughout the lessons due to their poor standard of English. Besides that, 73% of the teachers said that the courseware was unsuitable for LEP (Limited English Proficiency) students, as they were unable to understand the language used to deliver the content. Finally, 50% of the teachers expressed concerned over issues of maintenance and security because these, to them, have not yet been adequately addressed by the authorities. They were also worried about equipment malfunctioning.

Evidently, the findings show the teachers' inability to deliver the content effectively due to lack of expertise (in terms of terminology) and proficiency in the language. The lack of skills in using the technology may have negative effects on the students. These may lead to multiple effects, which may include testing the students' endurance leading to lack of concentration among them. And this might result in lack of interest in the subject which will eventually cause poor performance in the subject. Within the limited time for implementation, the good students will no doubt become better but the low-motivated and slow or poor learners will face a lot of problems not only in comprehending the subject content but also to score in the examinations. As a result of this, parents' trust in the teachers or school too may diminish as many parents might conclude that the teaching of Mathematics and Science in English has caused their children's poor performance in these subjects.

In the open-ended questions, the researchers found that the majority of respondents believed that the change in teaching practice was the consequence of change in the language of instruction. The teachers agreed that in order to compensate for students' weakness in the English language, they had to take the role of a translator in class. So much so, the teaching environment moved toward bilingual delivery; eventually it defeated the purpose of using English as the medium of instruction for both subjects. They described their teaching in the class as using first the second language (English), and then they have to repeat and give the explanation again in Malay for the benefit of students with limited English proficiency. So, more time will be needed to convey the same concept compared to when Malay language was used as the medium of instruction. The respondents also shared their opinion that they still need more training in preparing themselves to teach Science and Mathematics in English especially in delivering instruction of Mathematics and Science in English and conducting question and answer sessions with students in English or in devising new strategies for teaching the two subjects.

The respondents also agreed that teaching time for Science and Mathematics may need to be increased in view of the ETeMS. It is recommended that teachers continue to carry out code switching when conducting their Science and Mathematics lessons. This has to be carried out due to the teacher's lack of proficiency in English. In addition, teaching strategies may need to be modified so that students will not be denied a quality Science and Mathematics education; at the same time, the interest of learning both subjects can be sustained.

In summary, the findings shows that the respondents agreed on the importance of English Language in everyday life as well as career opportunity; however they felt that learning Science and Mathematics was very difficult and demanding due to their lack of ability in understanding the subject matter and the language of instruction. The findings also indicate that learning Science is more difficult than learning Mathematics; there are challenges for the Science and Mathematics teachers to work wisely in order to overcome students' learning difficulties and to promote effective learning among students. Due to many teachers' factors such as unable to comprehend the English terminologies and rubrics, refusal to get involved in the Buddy Support System, low language motivation and being reluctant readers (to read English prepared texts), teachers' factors seem to contribute more to this problem compared to that of the teaching courseware.

5. CONCLUSIONS

The respondents agreed that courseware evaluation (upgrading and the use of latest software) is considered a crucial activity in evaluating the use of information technology for educational purposes. Teachers generally exhibited positive reactions towards the instructional content and courseware design. The sophisticated and latest technology which is portrayed in different elements of content and design are able to present stimulating information to motivate and assist the learners for information retention and recall. However, the other arising problems such as code switching and teachers' perceptions on using their first language when teaching Mathematics and Science should be put into

consideration in the first place during the initial years of ETeMS implementation.

Analysis also revealed that most of the teachers involved in this study agreed that the courseware is useful for teaching and learning. However, some of them thought that certain courseware aspects and components need to be improved. Based on the findings from this study, there is room for improvement to fulfill the student needs throughout the ETeMS policy implementation; therefore, it is essential to note that the teaching courseware needed to be revised. Overall, some identified weaknesses of the courseware are the technical problem, late delivery of the courseware to schools and less variety of teaching and learning levels BUT the failure of ETeMS is not due to teaching courseware provided by MOE; it is attributed more to human (teacher) factors. In other words, as shown by this study, the teachers were not competent enough to shoulder the responsibilities and also lacked self-confidence in carrying out this monumental task.

The findings of this study may be useful for policy makers and implementers to continue planning and monitoring the future of critical subjects such as Mathematics and Science. This is to ensure that the Malaysian education system will not be left behind and that Vision 2020 aimed at making Malaysia a developed nation by 2020 will be successfully achieved.

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