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**BORANG PENGESAHAN
LAPORAN AKHIR PENYELIDIKAN**

TAJUK PROJEK : **SCIENTIFIC LANGUAGE AND ITS IMPLICATION ON SCIENCE**
LEARNING AMONG SCHOOL STUDENTS WHICH UNDERGO
ENGLISH MEDIUM OF INSTRUCTION

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**SCIENTIFIC LANGUAGE AND ITS IMPLICATION
ON SCIENCE LEARNING AMONG SCHOOLS STUDENTS WHICH
UNDERGO ENGLISH MEDIUM OF INSTRUCTION**

**(BAHASA SAINTIFIK DAN IMPLIKASINYA
KEPADA PEMBELAJARAN SAINS BAGI PELAJAR SEKOLAH
YANG MENGIKUTI PENGAJARAN
DALAM BAHASA INGGERIS)**

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Finally, we hope that this report can be beneficial to everyone especially education researchers, teachers, students and other interested parties.

Abstract

SCIENTIFIC LANGUAGE AND ITS IMPLICATION ON SCIENCE LEARNING AMONG SCHOOLS STUDENTS WHICH UNDERGO ENGLISH MEDIUM OF INSTRUCTION

(Keywords: Teaching and learning science and mathematics, English language, scientific terms, perceptions, understanding ability)

The present research is a preliminary attempt to investigate some current issues on teaching science and mathematics in English. Three issues have been highlighted. These are

- i) Students' perception on learning science and mathematics in English language.
- ii) Students' ability to understand basic scientific terms used in science teaching.
- iii) Teacher trainees' perception on teaching and learning science and mathematics in English language.

Studies were conducted in several schools in Johor and Universiti Teknologi Malaysia to gather information regarding students' perception and understanding of basic scientific terms as well as teacher trainees' ability to teach science and mathematics in English. Questionnaires were used in this study. The results of the study showed that students in schools are actually encountered language problems as well as contents' problems in learning science and mathematics and to overcome these problems they need help and guidance from the teachers. It is also found out that similar problems were faced by the teacher trainees regarding the use of English language in everyday life and in the classroom. The majority of teacher trainees have poor command in English and lack of confident in handling teaching activities in the classroom. Therefore, proper English language training programs should be implemented to the students and teacher trainees before they could learn and teach science and mathematics effectively.

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Abstrak

BAHASA SAINTIFIK DAN IMPLIKASINYA KEPADA PEMBELAJARAN SAINS BAGI PELAJAR SEKOLAH YANG MENGIKUTI PENGAJARAN DALAM BAHASA INGGERIS

(Kata kunci: Pengajaran dan pembelajaran sains dan matematik, Bahasa Inggeris, Istilah sains, persepsi, kebolehan, kefahaman)

Kajian ini merupakan cubaan awal untuk menyiasat isu-isu semasa dalam pengajaran sains dan matematik dalam bahasa Inggeris. Tiga isu telah diketengahkan. Isu berkenaan ialah

- i) Persepsi pelajar terhadap pengajaran dan pembelajaran sains dan matematik dalam bahasa Inggeris
- ii) Kebolehan pelajar memahami istilah saintifik asas yang digunakan dalam pengajaran
- iii) Persepsi guru pelatih terhadap pengajaran dan pembelajaran sains dan matematik dalam bahasa Inggeris

Kajian telah dijalankan di beberapa sekolah di Johor dan Universiti Teknologi Malaysia bagi mendapatkan maklumat mengenai persepsi dan pemahaman konsep saintifik asas pelajar serta kebolehan guru pelatih untuk mengajar sains dan matematik dalam bahasa Inggeris. Soal selidik telah digunakan dalam kajian ini. Keputusan kajian menunjukkan bahawa pelajar sememangnya mengalami masalah bahasa begitu juga dengan masalah penguasaan kandungan dalam mempelajari sains dan matematik dalam bahasa Inggeris. Bagi menyelesaikan permasalahan tersebut pelajar memerlukan bantuan dan bimbingan daripada guru-guru. Dapatan kajian juga menunjukkan bahawa guru pelatih menghadapi masalah penggunaan bahasa Inggeris dalam kehidupan seharian dan pengendalian bilik darjah. Majoriti guru pelatih mempunyai penguasaan bahasa Inggeris yang lemah dan kurang yakin untuk mengendalikan aktiviti pengajaran di bilik darjah. Oleh yang demikian, program latihan bahasa Inggeris yang kemas kini sepatutnya dilaksanakan kepada pelajar dan guru pelatih sebelum mereka dapat mempelajari dan mengajar sains dan matematik dalam bahasa Inggeris secara berkesan.

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Dekan,
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Assalamualaikum wmt. Wbt.

Saudara,

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“BERKHIDMAT UNTUK NEGARA”

Yang benar

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CHAPTER 1

INTRODUCTION

1.1 Medium of instruction changes in Malaysia

One of the major innovations in Malaysia Education Systems was the change of medium of instruction from English to the Malay language and back to English again. Malaysia is a country where the population is made up of various races speaking different languages and with different cultures. Therefore, previously the main purpose of education was to promote national unity and to establish national system of education acceptable to the population of multiracial ethnics. The implementation of Malay language as a medium of instruction was taken gradually since the establishment of the Federation of Malaya in 1948. However the major movement has been made only in 1970 when all standard one pupils in the National English Primary Schools would be taught all subjects, except English and pupils' own language through the medium of the Malay language. Since then the pupils have continued to be taught through this medium. Even though the medium of instruction has changed, the structure and content of the comprehensive education system has remained unchanged (Abdul Aziz, 1971).

As a result, in 1975, all National English Primary Schools were fully converted to National schools. This process continued into Secondary Schools in which all form fives from the English schools were fully converted to National Schools in 1980. The policy of making the Malay language the medium had been fully implemented up to sixth form at secondary level, in Peninsular Malaysia and Sabah by 1982. In Sarawak, the change started in 1977 and become fully implemented to secondary level in 1990.

However, with the rapidity of the general advancement of science and technology worldwide, the government began to revise its education policies especially in science and mathematics education. The revisions were made in an attempt to prepare future generation with global challenges especially in science & technology and ICT (Information Computer Technology). Since the demand of English language globally, especially in science and technology area is very high, therefore, Malaysian Government has redirected its education system with more emphasis being place on teaching of science and mathematics in English. As a consequence all standard one pupils and all form one secondary schools students were introduced to English language as a medium of instruction in science and mathematics in 2003.

1.2 Learning science and mathematics in English

Language plays an important role in communication, thinking and is a tool for exchanging ideas and concepts between individuals. Science and mathematical knowledge and skills can only be delivered through language. However, recently science and mathematics have been taught in English. This may create unfamiliarity to those concepts taught to them and may slow down or retard their science and mathematics learning.

The change of the current science and mathematic medium of instruction may also cause cultural shock to the students. Usually, students' conceptions of prior experience and knowledge influence students' learning in science and mathematics. Students prior knowledge and experience can be amazingly tenacious and resistance to change (Gilbert, 1982).

It is therefore essential for this research to explore student's viewpoints and perceptions on teaching and learning science and mathematics in English in order to gather information and to get the clearer picture on what have happening in schools.

Besides, with the change in the medium of instruction in the teaching of science and mathematics, teachers' competency in delivering and disseminating knowledge in the subjects is also put to test. Teachers play important role and influence students learning, excellent teachers could give more impact on student's positive learning and so vice versa.

1.3 Objectives of the study

With regard of the above issues, the objectives of the study are

- i) To identify students' perception on learning science and mathematics in English language.
- ii) To determine students ability to understand basic scientific terms used in science teaching.
- iii) To identify teacher trainees' perception on teaching and learning science and mathematics in English language.

CHAPTER 2

STUDENTS' PERCEPTION ON TEACHING AND LEARNING SCIENCE AND MATHEMATICS IN ENGLISH

2.0 Introduction

In learning science, students frequently encounter science problems involving calculations, understanding of concepts and chemical reactions. Several studies on students' perceptions in learning chemistry at Universiti Teknologi Malaysia and some schools in Johor Bahru have been carried out and the results showed that science subject was one of the interesting subject to learn but it was difficult one to learn (Aziz, 1990 and 1992). Several researchers also reported that some topics in chemistry were difficult to comprehend, such as; mole (Duncan and Johnstone, 1971; Aziz et. al, (1990), stoichiometry, ionic reactions, oxidation and reduction, energetic and electronic configuration, acid and bases, chemical bonding (Aziz, 1992) and ideas of motion (Eckstein et. al, 1993).

Similarly, in learning mathematics, students frequently encounter mathematics problems involving calculations, understanding of concepts, principles and mathematical relationship with others subjects. Study on engineering students' perceptions in learning mathematics at Universiti Teknologi Malaysia and some schools in Johor has been carried out and the results showed that mathematics subject was an important and interesting subject, even though it was one of the difficult subject to learn (Aziz, 1992). The reasons why science and mathematics subject are difficult to learn is that the concepts in science and mathematics are abstract and difficult to understand, and also the students have alternative meaning of certain science and mathematical words before any science and mathematics teaching take place (Aziz, 2003). According to Ihejieta (1995),

there are factors other than academic standing on the students' side which could explain the performance trend. These factors are;

- i. Students' dislike for mathematics that may stem from psychological incidences such as fear, endurance, perseverance and associated factors.
- ii. The mathematics curriculum may have not much relevance to real life situation.
- iii. Mathematics teachers were not interested in the subject and did not help their students by way of catering for individual differences.
- iv. Other resources material such as text books seemed lacking in both in school and at home.

Since the scientific and mathematical knowledge and skills can only be delivered through language therefore this study will only focus on students' understanding in science and mathematics that experience English medium of instruction. This is necessary because language plays an important role in communication, thinking and is a tool for exchanging ideas and concepts between individuals (Aziz, 2003). However, recently science and mathematics have been taught in English. This may create unfamiliarity to those concepts taught to them and may slow down or retard their science and mathematics learning. Sudden change to the current science and mathematic medium of instruction may also cause cultural shock to the students. Normally, students' conceptions of prior experience and knowledge influence students' learning in science and mathematics. Students prior knowledge and experience can be amazingly tenacious and resistance to change (Gilbert, 1982). It is therefore essential for this research to explore student's viewpoints and perceptions on teaching and learning science and mathematics in English in order to gather information and to get the clearer picture on what have happening in schools.

2.1 Research problems

Language influences students' thought by molding perception and structuring ideas. In learning science and mathematics students use language to communicate and to understand scientific and mathematical facts, concepts, principles and problem solving. However these knowledge and skills are new, unfamiliar and different from the language used in everyday life (Osborne, et al., 1983). This may cause a problem in the understanding of the science and mathematics concepts. To investigate this problem, the following questions are to be highlighted:

1. Do the students have problems in learning science and mathematics in English?
2. What are the factors that contribute to the learning problems?
3. Is that any relationship between the factors that contribute to the learning problems?

2.2 Research methodology

A survey was conducted in several secondary schools in rural area of one district in Johor to gather information regarding students' perception on teaching and learning mathematics in English. The instrument used for this study was a set of questionnaire that comprised of two parts. Part one elicited information on the students' background. Part two of the questionnaire comprised sixteen items regarding students perception on teaching and learning science and mathematic in English. The questionnaire was administered to 279 form one and two students of several secondary schools. The respondents were given 40 minutes to complete the questionnaire. The data were analyzed statistically by using SPSSPC software program. The statistical analyses used are frequency, percentage, reliability index and correlation coefficient. The reliability index (Cronbach α) of the study for all the 279 respondents was 0.70. For the qualitative

analysis, written responses of the students were analyzed by listing the problems encountered by each student in his explanation.

2.3 Results of the study

Malay language previously has been used as a medium of instruction for learning science and mathematics in schools. However with the change of a medium of instruction to English, the study revealed that some students do have problems in learning science and mathematics. For the purpose of this paper the findings on students' performance and background that may contribute to the problems in learning science and mathematics, students' understanding of English language used in teaching science and mathematics and the correlations among factors that related to the learning problems will be discussed. The general picture will be presented first, and this will be followed by more detailed discussion of data.

i. Students background and problem in learning mathematics in English.

The findings of this study indicated that students have encountered problems in understanding of the teachers' teaching in English language (Appendix A). Table 2.1 showed that students performance in English language can be categorized as satisfactory because only 9.4% of the respondents have an A grade in UPSR examination while most of them (40%) are in a C grade group. It is also very clear that the distribution patterns of the science, mathematics and English results in Primary School Assessment Test (UPSR) are differently distributed. However, the most interesting part in this finding is the drastic drop of science monthly test results when compared to UPSR science result, where 19.9 respondents obtained an A grade in UPSR but only 4.6% of the respondents obtained an A grade in their monthly test. This is probably due to the science contents which are more advanced than before or the respondents do not understand the lesson which is conducted in English.

Table 2.1: Students' result of UPSR and Monthly Test in English, Mathematics and Science subjects in percentage.

Subject	English		Mathematics		Science	
	UPSR	Monthly test	UPSR	Monthly test	UPSR	Monthly test
A	9.4	7.8	31.8	27.8	19.9	4.6
B	28.3	20.2	30.7	26.6	37.9	14.4
C	40.2	25.7	30.7	19.8	31.8	28.1
D	14.9	19.5	3.6	16.3	4.3	27.4
E	7.2	26.8	3.2	3.2	9.5	6.1

ii. *Students interest in Science, Mathematics and English subjects.*

Table 2.2: The distribution of students' interest in English, Mathematics and Science.

Subject Rank order	English	Mathematics	Science
High	21.6	55.2	25.9
Medium	34.4	26.0	47.1
Low	44.0	18.8	27.0

Interest closely related to motivation, and motivation is one the learning factors that influences and stimulates students to learn (Bloom, 1976). As a result motivation leads someone to learn effectively and successfully. Table 2.2 shows that mathematics is one of the most interesting subjects to learn compared to science and English subjects, where 55.2% of the respondents rated mathematics as high interesting subject to learn. This finding seems to be consistent with the mathematics' monthly test result as illustrated in Table 1 where high percentage of respondent scores grade A in monthly mathematics test. Table 1 and 2 are also indicated that mathematics is less influenced by the used of English language as a medium of instruction compared to science subject.

iii. *Understanding of science and mathematics in English language.*

According to the Psychology Dictionary, *understand* is defined as the process of becoming aware of the relationship between thing or their meaning (Evans, 1978). To learn effectively, someone has to understand what he/she had learned. Nevertheless, the

study has found that the respondents were really having problems in learning science and mathematics but the problems were more obvious in learning science. This was possibly due to the nature of science that comprises a lot of factors, concepts and principles as well as problem solving processes in its content.

Table 2.3: Students' opinion of understanding science and mathematics in English language.

Items	Statements	Disagree(1)	Not Sure(2)	Agree(3)
S1	I could speak English very well and fluently	19.9	73.6	6.5
S2	I could answer questions asked by my teacher very well	21.9	71.7	6.5
S4	I speak English with my friends in science and mathematics classes	50.4	40.3	9.4
S5	My teachers teach science and mathematics in English	26.8	49.3	23.9
S6	I always speak to my teacher in English	51.3	41.8	7.0
S7	I could understand English very well when reading science text books	28.3	58.7	13.0
S8	When my teacher asks a question, I will think in Malay language before giving the answer in English	6.1	30.3	63.5
S10	I think it is difficult to learn science and mathematics in English	21.0	30.8	48.2
S11	Learning science in English is harder than learning mathematics in English	18.3	38.1	43.6

When English language has been used as a medium of instruction in schools, the proficiency of English language is a must for respondents to understand what their teacher's teach. Unfortunately, the findings (Table 2.3) showed that students' competency in English are at low level as only 6.5% agreed that they could speak English very well and fluently (Item S1), majority of them could not speak very well.

The findings also revealed that majority of the respondents have not taken part in many learning activities, such as questions and answers activities with their teachers and fellow friends (Item S2 and S8), teacher teaching activities (Item S5), and to speak English with teacher and friend in classroom (Item S4 and S6), and these are among several reasons

why they could not improve their English language and so forth related to their problems in understanding science and mathematics in English.

The respondents were also likely influenced by their daily spoken language as majority of them will think in Malay language before giving the answer in English (Item S8). This could be the reason why their teachers do not fully teach science and mathematics in English (Item S5).

iv Students attitude towards the usage of English language

Language is an important part of social culture (Lawton, 1989). Learning process will be effective if teachers know how to make use and describe appropriate examples of everyday life phenomena in their teaching. Simple and appropriate level of language should be used to explain the everyday life phenomena which related to scientific and mathematical concepts, in order to motivate students to understand better. However, as indicated in Table 2.4 revealed that majority of the respondents either hardly or seldom use English language at home (Item S3) and they used to speak their mother tongue language at home. This was supported by the facts that they like to read the Malay subtitle when watching television of English program to understand better (Item S13) and they also like to read the Malay story books rather than English story books (Item S14).

Table 2.4: Students' opinion of English usage in everyday life

Items	Statements	Disagree(1)	Not Sure(2)	Agree(3)
S3	I always speak English at home	61.9	33.1	5.0
S13	I like to read the Malay subtitle when watching television of English programs to understand better	5.0	13.3	81.7
S14	I like to read the Malay story books rather than English story books	6.1	28.7	65.2

From the above examples, it is clear that the respondents prefer to use Malay language as a medium of instruction. These practices may become obstacles to the respondents in learning and understanding the contents of science and mathematics in English language.

Students attitude towards an academic discipline are recognized as being significant in determining success in learning. Table 2.5 indicates a statement of students' motivation with regards to the important of English language in learning and in everyday life. Majority of the students felt that English language is very important for their future careers (Item S12), however they still preferred to learn science and mathematics in Malay language (Item S9) as majority of the respondents agreed to the statement that learning science and mathematics in Malay language is easier and more likely to be understood (Item S16).

The choice of Malay as a medium of instruction in learning science probably due to their own everyday language that make them easier to understand better of the subjects. In spite of preferring to learn science and mathematics in Malay, they showed positive attitude towards the important of English language as majority of the respondents (83.9% of Item S15) agreed to the statement that they will refer to dictionary if they do not understand English words or terms.

Table 2.5: Students' felt needs for English

Items	Statements	Disagree(1)	Not Sure(2)	Agree(3)
S9	I like to learn science and mathematics in Malay language	7.9	17.1	75.0
S12	English is important in career path	6.5	20.1	73.4
S14	I like to read Malay story books rather than English story books	6.1	28.7	65.7
S15	I will refer to the dictionary if there is any word(s) in English that I didn't comprehend	2.9	13.2	83.9
S16	Learning science and mathematics in Malay language is easier and more likely to be understood	3.6	14.7	81.7

v *Correlations among students' test performance of English, Mathematics and Science subjects*

The results in Table 2.6 show that the correlations between UPSR English language and English, Mathematics and Science monthly test are 0.62, 0.48 and 0.35 respectively, while the correlations between English monthly test results and Mathematics and Science monthly test are 0.52 and 0.42 respectively. These results seem to indicate that respondents who were high in English were more likely to achieve high scores in their English, Mathematics and Science tests. In other words, the findings reveal that English language is one of several factors that contribute to the respondents' performance of science and mathematics.

Table 2.6: Correlation of students examination results for English, Mathematics and Science subjects

	UPSRMAT	UPSRSC	MTING	MTMAT	MTSC
UPSRING	0.57*	0.57*	0.62*	0.48*	0.35*
UPSRMAT		0.76*	0.51*	0.60*	0.34*
UPSRSC			0.42*	0.52*	0.40*
MTING				0.52*	0.42*
MTMAT					0.43*

Note:

* indicates the significant (p) level at 0.01

- UPSRING:** UPSR English Result
- UPSRMAT:** UPSR Mathematics Result
- UPSRSC:** UPSR Science Result
- MTING:** English Monthly Test Result
- MTMAT:** Mathematical Monthly Test Result
- MTSC:** Science Monthly Test Result

2.4 Summing up

The study has established the following:

- i. The students considered English as an important subject to learn and it was useful for everyday communications and as a tool for learning science and mathematics.
- ii. The students felt that learning science and mathematics in English were difficult, however to learn science was more difficult compared to learn mathematics in English
- iii. The study showed that there was a significant correlation between UPSR English result and other subjects monthly test results, such as English, Mathematics and Science.
- iv. Science subject has been found to be more affected by the implementing of teaching science and mathematics in English.

The results of this study described what have happening in the schools regarding the implementation of English language in learning science and mathematics. Students have encountered language problems as well as contents' problems and to overcome these problems they need help and guidance from the teachers. Emphasized should be given more on building up students proficiency in English before they could learn science and mathematics effectively.

CHAPTER 3

STUDENTS' ABILITY TO UNDERSTAND BASIC SCIENTIFIC TERMS USED IN SCIENCE TEACHING

3.0 Introduction

Understanding is the process of becoming aware of the relationship between things or of their meaning (Evans, 1978). It is a second level of learning hierarchy of Bloom taxonomy. According to learning theory, consequence learning can easily take place if the student has prior understanding of that particular subject. Since science subject was taught in English, therefore there is a high possibility for the student to face problems in understanding some basic scientific terms. In order to examine this matter a survey has been conducted.

3.1 Research Methodology

Study on students' understanding of basic scientific concepts has been conducted to eighty five form two students of several schools in Batu Pahat. Questionnaire was administered to obtain information regarding students understanding of basic concepts that have been taught in form one and two science lessons and their background of scientific knowledge and English language based on their UPSR examination.

3.2 Result and discussion

Respondents comprise 67.1% of A grade students, 24.7% B grade and 8.2% C grade in UPSR science examination, whereas in UPSR English language examination 25.9% are

A grade students followed by 50.6% B grade, 21.2% C grade and 2.4% D grade. This shows that generally, respondents are categorized as good in science but satisfactory in English language.

According to Table 3.1, it has clearly shown that respondents like to learn science (72.9% agree on Item 1) but when come to learn science with experimental works and conducted in English, the respondents' agreement score drops to 48.2% (Item 3). This seems to indicate that English is one of the hindrance factors for students to learn science.

Table 3.1: Respondents' interest in science and English subjects

No.	Item	Agree	Not Sure	Disagree
1	I like science subject	72.9%	23.5%	3.6%
2	I like English language subject	63.5%	25.9%	10.6%
3	I like to learn science and science laboratory work in English	48.2%	31.8%	20.0%

Mastering of basic scientific terms is very important to students in order them to proceed to the next topics. However, majority of the students are still not mastering and understanding some basic scientific terms, such as flame, force, accurate, mass, variables and so on, as described in Table 3.2. In this respect teacher should be aware of this problem and keep on helping students continuously.

Table 3.2: Respondents' translation of scientific terms from English to Bahasa Melayu and vice versa

No.	Terms	Correct Answers	Terms	Correct Answers
1	Mass	56.5%	Jirim	48.2%
2	Weight	88.2%	Suhu	89.4%
3	Laboratory	91.8%	Graviti	89.4%
4	Apparatus	80.0%	Tabung uji	87.1%
5	Poisonous	58.8%	Asid	87.1%
6	Variables	61.2%	Alkali	70.6%
7	Length	87.1%	Bahan kimia	65.9%
8	Time	94.1%	Sel saraf	67.1%
9	Earth	91.8%	Purata	48.2%
10	Force	50.6%	Cecair	85.9%
11	Accurate	49.4%	Kaki retot	70.6%
12	Cell	88.2%	Mudah meletop	48.2%
13	Air Bubbles	60.0%	Daya	57.6%
14	Flame	45.9%	Berat	76.5%
15	Wire gauze	52.9%	Alat radas	74.1%

3.3 Summing up

The study reveals that certain terms which have been translated whether from English or Bahasa Melayu, are found to be difficult for them to translate and understand. Teacher should be aware of this problem and emphasis more in giving clear explanation regarding particular scientific terms and concepts. Teacher must also use various technique and interesting methods of teaching to attract students' attention to learn science subject especially during laboratory works.

CHAPTER 4

TEACHER TRAINEES' PERCEPTION ON TEACHING AND LEARNING SCIENCE AND MATHEMATICS IN ENGLISH

4.0 Introduction

Research conducted by Hamidah et al. (2005) discussed the change in the medium of instruction in the teaching of science and mathematics in primary and secondary schools in Malaysia from Bahasa Melayu to English language introduced in 2003, and, with the integration of Information and Computer Technology (ICT) in the teaching of the subject, teachers' competency in delivering and disseminating knowledge in the subject is put to test. This is so because in many cases, many of the teachers who have been assigned the task to deliver their teachings in the English language, have had little exposure to the English language itself both in their learning of the subject during their primary and secondary education, and in the process on learning how to teach the subject during their tertiary education. As a result of this, many teachers who have been entrusted with the responsibility to teach science and mathematics in English language in schools using ICT are faced with a dilemma. First of all, they lack the language to deliver the content to the students for reasons stated above. Secondly, they are not familiar with the terminologies and science and mathematical terms in the English language due to minimal exposure to learning and teaching science and mathematics in the English language. Thirdly, many have had little exposure, if any, in integrating ICT in their teaching and last but not least, although the software for teaching the subject is being supplied by the ministry, using these teaching aids effectively in the classroom may

become a big problem to many who have had very little experience of even handling the hardware. This is so because, in the teaching of Science and Mathematics, it is not as simple as just starting the program and letting it play to the end but it involves stopping and pausing the program at the right places and elaborating the steps in solving the science and mathematical problems and equations. Apart from that, to make the teaching more effective teachers should be able to apply the content of the teaching to everyday situations, to explain steps in solving the problems, and to do these, teachers need none other than a good command of the language of instruction, in this respect, the English language, the ability to integrate ICT in their teachings and the knowledge to apply, utilize and exploit the teaching aids

Inability to deliver the content effectively due to lack of expertise in the language and lack of skills in using the technology may have detrimental effects on the students. These may lead to some multiple effects, which may include testing the students' endurance leading to lack of concentration among them thus resulting in lack of interest in the subject which will eventually cause poor performance in the subject. Given time, the good ones will no doubt become better but the not-so-good-ones or the poor learners will suffer. As a result of this, parents' trust too may diminish.

The above are the questions we wish to unveil the answers to in this study in order to prepare our teacher trainees to make the teaching of science and mathematics in Malaysian schools as effective as it should be for the betterment of the future generation.

4.1 Research Methodology

Study on teacher trainees' perception on teaching and learning science and mathematics in English language has been conducted in UTM. 94 teacher trainees were involved in this study to gather information regarding the usage of English language in teaching science and mathematics and in everyday life.

4.2 Result and discussion

The results were discussed based on six language aspects below.

i. The usage of English language in everyday life

Table 4.1 shows that majority of the respondents do not use English to communicate at home (Item 3 and 8). They prefer to use their mother tongue language in many everyday life activities, as stated by Item 2, 14, 15 and 16.

Table 4.1: Percentage distribution of the teacher trainees' usage of English in daily life

Item	Statement	Disagree	Not sure	Agree
2	When I am watching English programmed, I like to read the Malay subtitle to understand the story	9.6	7.4	83.0
3	At home, I usually speak in English with my family	78.7	12.8	8.5
8	I use my mother tongue language when I'm at home (Malay, Tamil or Mandarin)	6.4	1.1	92.5
13	I read Malay newspaper everyday	38.3	26.6	35.1
14	I seldom read English newspaper	19.4	18.3	62.3
15	Usually, I think in Malay before translating it to English	24.5	18.1	57.4
16	I like to read English storybooks in my past time	51.6	32.3	16.1

ii. *Attitude on self improvement in English language*

Attitude is very important factor in learning. Positive attitude can motivate students to learn without forcing them to do so. Research finding (Table 4.2) shows that some of the respondents have tried to improve their command in English (Item 12) but as a whole many respondents still do not show good attitude in improving their English language (Item 1 and 25). As a consequence, majority of the respondents do not have confident to present their works in English (Item 20) and given a chance they still preferring to teach science and mathematics in Malay (Item 25).

Table 4.2: Percentage distribution of the teacher trainees' attitude to improve their English

Item	Statement	Disagree	Not sure	Agree
1	I like to read English books/novels	32.3	38.7	29.0
12	I have attended English courses	45.6	9.8	44.6
20	I am not confident to present my presentation in English	22.3	24.5	53.2
25	If I were given a chance, I prefer to teach in Malay	9.7	21.5	68.8

iii. *Skills to use English language in teaching.*

Table 4.3: Percentage distribution of the teacher trainees' skills and command of English language

Item	Statement	Disagree	Not sure	Agree
22	I can answer verbal questions in English but slowly and not spontaneously	10.6	24.5	64.9
24	When I get question in English, I will read it for many times to comprehend it	10.6	16.0	73.4
26	I can speak English with the right pronunciation	26.9	52.7	20.4
27	I can explain science better in English	47.9	42.6	9.5
29	I can asks questions in English very well	29.8	50.0	20.2

Good command and mastering of English language could help teachers to teach their students effectively. From the result of this research as shown in Table 4.3, majority of the respondents are still lacking of good command of English language as indicated by several teaching and learning activities. They are unable to ask questions in English very well (Item 29), answer students' questions spontaneously and smoothly (Item 22 and 24), could not speak English with the right pronunciation (Item 26) and could not explain their science topics effectively (Item 27).

This finding reveals that teacher trainees should be exposed more on teaching and learning activities in English in order to improve their skills and command of the language. Activities such as group discussion, question and answer, public speaking, report presentation and debating should be encouraged in the class teaching.

iv. Ability to use English language in science learning.

Table 4.4: Percentage distribution of the teachers trainee' ability to use English in learning

Item	Statement	Disagree	Not sure	Agree
4	I always use English when discussing with my friends in class	68.1	25.5	6.4
5	It is easier for me to give opinion in Malay rather than in English	10.9	9.8	79.3
6	I am not confident to give opinions in English	14.0	30.1	55.9
7	I am not comfortable when questions are asked in English	31.5	26.1	42.4
9	I don't have to refer English books because Malay books are easily available	41.5	23.4	35.1
10	I like to answer questions in written English rather than orally	16.0	26.6	57.4
11	I usually answer questions in English by thinking the answer in Malay and translate it to English	22.3	40.4	37.3
19	English terms are seldom used in school and university	31.9	35.1	33.0

Data in Table 4.4 shows that respondents did not use much of English language in their learning activities. They use to answer question in English by thinking the answer in Malay and then translate it into English (Item 11). They are also preferred to answer question in written form rather than orally (Item 10). Majority of the respondents also did not use English when discussing science subjects with friends in class (Item 4), instead they prefer to give opinion in Malay (Item 5). Respondents' reluctance to use English in class may be due to the limitation usage of English scientific terms in schools and university (Item 19). Majority of the respondents prefer to use Malay books (Item 9) for acquiring more scientific information. As a result the respondents feel that they are not comfortable to answer question in English and lack of confident to give opinion in English (Item 6).

v. *Ability to use English language in planning a lesson.*

Result of the research reveals that majority of the students unable to master English language effectively. They are agreed that they have taken a lot of time in preparing a report in English. They are also having difficulty in constructing sentences (Item 17) and to prepare short notes on science topic before they do the teaching (Item 28). This finding indicates that teacher trainees need exposure and practice in English communication skills in order to overcome English language problems.

Table 4.5: Percentage distribution of the teachers trainee' ability to use English to plan a teaching lesson

Item	Statement	Disagree	Not sure	Agree
17	I have difficulty in constructing sentences in English	51.6	32.3	16.1
18	When writing reports in English, I take a lot of time to find out the suitable words	11.7	20.2	68.1
28	I make short notes on topics before I begin teaching	8.5	17.0	74.5

vi. *Level of confidents in teaching science in English.*

Teachers must show their competent in teaching of their subject area in order to attract and inculcate students' confident towards them. Table 4.6 shows that majority of the teacher trainees agreed that they found difficult to explain the everyday life examples related to the topics taught in English (Item 30). However majority of the respondents agreed that they are confident to teach in English, even though some previous finding revealed that they have encountered some difficulties in delivering a lesson in English especially in teaching science subject that they felt harder to teach compared to teach mathematics (Item 21).

Table 4.6: Percentage distribution of the teachers trainee' level of confidence in teaching science and mathematics in English

Item	Statement	Disagree	Not sure	Agree
21	Teaching mathematics in English is easier than teaching science in English	16.0	33.0	51.0
23	I am confident to teach in English	15.1	29.0	55.9
30	I think it is difficult to explain the everyday life examples related to the topics taught in English	19.1	35.1	45.7

4.3 Summing up

The study has established the following:

- i. The teacher trainees considered English as an important tool for teaching science and mathematics, but they do not have a good command of English.

ii. The majority of teacher trainees do not have confidence to teach science and mathematics in English.

iii. The teacher trainees have problems in classroom activities, such as question and answers activities, elaborating facts and figures, presenting lesson, explanation mathematics and science knowledge, and writing and preparing notes, lesson plan and teaching materials.

CHAPTER 5

CONCLUSIONS

The results of this study described what have happening to students in the schools regarding the implementation of English language in learning science and mathematics. The research' finding also showed that the students have actually encountered language problems as well as contents' problems in learning science and mathematics and to overcome these problems they need help and guidance from the teachers.

The similar problems have also occurred to the teacher trainees regarding the use of English language in everyday life and in the classroom. The majority of teacher trainees have poor command in English and lack of confident in handling teaching activities in the classroom. Therefore, proper English language training programs should be implemented to the students and teacher trainees before they could learn and teach science and mathematics effectively.

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