



**UNIVERSITI PUTRA MALAYSIA**

**TEACHERS' PERCEIVED READINESS TOWARDS IMPLEMENTING  
ENGLISH FOR TEACHING MATHEMATICS AND SCIENCE**

**NOR AZILAH BINTI HUSIN.**

**FPP 2005 31**



**TEACHERS' PERCEIVED READINESS TOWARDS IMPLEMENTING  
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**By**

**NOR AZILAH BINTI HUSIN**

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in  
Fulfilment of the Requirements for the Degree of Master Science**

**June 2005**



**Especially for my late father, Haji Husin Haji Idris  
and my beloved mother, Hajjah Mastura Haji Omar  
who encouraged me to excel**



Abstract of thesis presented to the Senate of Universiti Putra Malaysia in  
fulfilment of the requirement for the degree of Master of Science

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**Chairman: Professor Kamariah Abu Bakar, PhD**

**Faculty: Educational Studies**

This research was an attempt to study the readiness of secondary school teachers in Selangor in implementing English Teachings for Mathematics and Science. The main objectives of the study were to determine the level of teachers' perceived readiness and validate the Confirmatory Factor Analysis (CFA) model for the four constructs measuring teachers' readiness. There were nine research questions posed in order to achieve the objectives.

The research design was a descriptive research and the data were collected using questionnaires. The study followed a survey method which used a multi-stage sampling technique to select 210 form one and two Mathematics and Science teachers. Both descriptive and inferential statistics were used to analyze the data of the study.



The results of this study had thrown light on teachers' perceived readiness in implementing the new educational reform. It appeared all of the respondents had perceived moderate to high level of overall teachers' readiness. A majority of them had high perception level in attitude, and content knowledge. A majority of them had a moderate perception level in Information and Communication Technology (ICT) skills and English Language skills. None of the respondents was at low perception level except for the (ICT) skills construct. This result gives a scenario that though the respondents seemed to have perceived the right attitude, sufficient English Language proficiency, and high content knowledge for implementing ETeMS, they were still lacking in ICT skills especially in the web-based activities, for example sending/ receiving email, surfing the internet and chatting and the utilization of software.

For the demographic variables, it was found that school locality, subject taught, gender, ethnic groups, professional/ academic qualifications and training did not have any significant differences in the overall teachers' readiness except the age groups. The younger group, respondents' age 25 to 30 years old perceived that they performed the highest in the ICT skills and overall teachers' readiness among the older groups.

There are statistical significant differences in ethnic groups: The Malay teachers show the highest perception in new technology and ICT. The



Indian teachers are the most proficient in perceived English Language skills and the Chinese perceived themselves as the most knowledgeable towards the implementation of ETeMS.

Three indices were used to examine the goodness-of-fit of the proposed model: (a) the Chi-square (CMIN/DF); (b) baseline comparisons: Bentler-Bonnett Normed-Fit Index (NFI), Incremental Fit Index (IFI) and Comparative Fit Index (CFI); and (c) the Root Mean Square Error of Approximation (RMSEA). The data had demonstrated that the model was an acceptable model with  $2 < (CMIN/DF) < 5$ ,  $IFI$  and  $CFI > .90$  (Bentler & Bonnet, 1980), and  $RMSEA < 1.0$  and data significantly to support the model.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia  
sebagai memenuhi keperluan untuk ijazah Master Sains

**PERSEPSI KESEDIAAN GURU TERHADAP PERLAKSANAAN  
PENGAJARAN SAINS DAN MATEMATIK DI DALAM BAHASA  
INGGERIS (PSMI)**

Oleh

**NOR AZILAH BT HUSIN**

**Jun 2005**

**Pengerusi:           Profesor Kamariah Abu Bakar, PhD**

**Fakulti:             Pengajian Pendidikan**

Penyelidikan ini merupakan satu kajian terhadap kesediaan guru-guru sekolah menengah di seluruh Selangor dalam melaksanakan Pengajaran Sains dan Matematik dalam Bahasa Inggeris (PSMI). Dua objektif utama kajian adalah untuk mengetahui tahap kesediaan guru dan mengesahkan kewujudan gagasan kesediaan guru melalui model Kesahan Analisis Faktor atau *Confirmatory Factor Analysis (CFA)*. Sembilan soalan kajian dibentuk bagi mencapai objektif tersebut.

Rekabentuk kajian ini adalah penyelidikan deskriptif dan data dikumpul dengan menggunakan satu set soal-selidik. Kajian ini juga menggunakan teknik survei persampelan berlapis untuk memilih 210 guru Sains dan Matematik yang mengajar pelajar Tingkatan Satu dan Dua. Kedua-dua statistik deskriptif dan inferensi digunakan bagi menganalisis data kajian.



Keputusan kajian telah memaparkan kesediaan guru di dalam satu perubahan pendidikan, PSMI. Keputusan kajian menunjukkan bahawa kesemua guru PSMI yang dikaji mempunyai persepsi di tahap yang sederhana dan tinggi di dalam keseluruhan persediaan guru. Majoriti guru-guru ini mempunyai tahap persepsi yang tinggi dari segi sikap dan pengetahuan isi kandungan subjek. Kebanyakan responden mempunyai persepsi yang sederhana dari segi kemahiran Bahasa Inggeris dan juga kemahiran *ICT*. Tiada sesiapa pun mempunyai tahap persepsi yang rendah kecuali dari segi gagasan kemahiran *ICT*. Kajian ini menggambarkan senario guru-guru PSMI in telahpun mempunyai sikap yang positif, kemahiran Bahasa Inggeris yang mencukupi, isi kandungan yang tinggi tetapi masih lagi kekurangan di dalam kemahiran *ICT* terutamanya dari segi aktiviti berasaskan pelayaran dan penerokaan *web* dan juga penggunaan perisian komputer.

Bagi bahagian demografi pula, pengkaji mendapati bahawa jenis sekolah, subjek yang diajar, jantina, kumpulan etnik, kelayakan profesional/ akademik dan kursus tidak mempunyai sebarang perbezaan yang signifikan dengan keseluruhan kesediaan guru. Kajian ini mendapati terdapat perbezaan yang signifikan dari segi umur di mana kumpulan yang muda iaitu dari 25 hingga 30 tahun mempunyai tahap tertinggi di



dalam persepsi kemahiran *ICT* dan persepsi keseluruhan kesediaan guru dibandingkan dengan kumpulan yang lebih tua.

Dapatan juga menunjukkan bahawa terdapat perbezaan yang signifikan di kalangan kumpulan etnik dari segi setiap gagasan yang dikaji di mana kumpulan Melayu mempunyai tahap tertinggi dalam persepsi kemahiran *ICT*, responden India menganggap mereka mempunyai tahap cemerlang dalam persepsi kemahiran berbahasa Inggeris dan responden Cina pula merasakan mereka mempunyai tahap terbaik dalam persepsi pengetahuan subjek yang diajar

Tiga Indeks Kebugasan Penyesuaian digunakan: a) *Chi-Square (CMIN/DF)*; (b) *Normed Fit Index (NFI)*; *Incremental Fit Index (IFI)*; *Comparative Fit Index (CFI)*; dan (c) *Root Mean Square Error Of Approximation (RMSEA)*. Data menunjukkan empat gagasan yang dicadangkan adalah jelas dan membuktikan bahawa wujud kesahan faktor gagasan kesediaan guru dalam melaksanakan PSMI dan sekali gus membuktikan bahawa data dapat menyokong model cadangan secara signifikan.

## ACKNOWLEDGEMENTS

I wish to express my heartfelt gratitude to Allah Subhanahu Wa Ta'ala for his blessing which made it this study possible. My sincerest gratitude goes to my supervisor Professor Kamariah Abu Bakar for her valuable advice and guidance through the whole process. I would also like to extend my outmost appreciation to Dr. Samsilah Roslan, Assoc. Prof. Dr. Bahaman Abu Samah and all my lecturers who have given me their valuable knowledge and insights through their lectures and daily interactions. I would like to sincerely thank the Scholarship Division, Ministry of Education for trusting and granting me a scholarship to carry out this study. I am also indebted to all my friends who have given me tremendous support and guidance throughout my studies, specially to Sarimah, Rodiah, Hajar, Aliah, Hairi and Dana. Not forgetting special thanks to all principals and teachers involved in the pilot test and the actual study for their kind cooperation and participation. My deepest appreciation goes to my mother, Hajjah Mastura and my family members, specially my beloved husband, Mohd Noor Azhar, my children: Siti Hawa, Siti Hajar, Siti Hanis, Siti Huda and Mohamad Arif and last but not least my faithful helper, Cik Mas for their unconditional moral support, sacrifice, patience and tolerance throughout the duration of my study.



I certify that an Examination Committee met on 17<sup>th</sup> June 2005 to conduct the final examination of Nor Azilah Husin on her Master of Science thesis entitled "Teachers' Perceived Readiness Towards Implementing English for Teaching Mathematics and Science" in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulations 1981. The Committee recommends that the candidate be awarded the relevant degree. Members of the Examination Committee are as follows:

**ROHANI AHMAD TARMIZI, PhD**

Associate Professor  
Faculty of Educational Studies  
Universiti Putra Malaysia  
(Chairman)

**NOREEN NOORDIN, PhD**


Lecturer  
Faculty of Educational Studies  
Universiti Putra Malaysia  
(Internal Examiner)

**AIDA SURAYA MD. YUNUS, PhD**

Associate Professor  
Faculty of Educational Studies  
Universiti Putra Malaysia  
(Internal Examiner)

**ZURIDA HJ. ISMAIL, PhD**

Associate Professor  
School of Educational Studies  
Universiti Sains Malaysia  
(External Examiner)


  
\_\_\_\_\_  
**ZAKARIAH ABD RASHID, PhD**  
Professor/Deputy Dean  
School of Graduate Studies  
Universiti Putra Malaysia

Date: **22 AUG 2005**

This thesis submitted to the Senate of Universiti Putra Malaysia has been accepted as fulfilment of the requirement for the degree of Master of Science. The members of the Supervisory Committee are as follows:

**KAMARIAH ABU BAKAR, PhD**  
Professor  
Faculty of Educational Studies  
Universiti Putra Malaysia  
(Chairman)

**SAMSILAH ROSLAN, PhD**  
Lecturer  
Faculty of Educational Studies  
Universiti Putra Malaysia  
(Member)



---

**AINI IDERIS, PhD**  
Professor/Deputy Dean  
School of Graduate Studies  
Universiti Putra Malaysia

Date: **08 SEP 2005**



## DECLARATION

I hereby declare that the thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UPM or other institutions.



**NOR AZILAH HUSIN**

Date: 15/08/05

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## LIST OF ABBREVIATIONS

AMOS	Analysis of Moment Structures
ANOVA	Analysis of Variance
CCSSO	Council of Chief State School Officers
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CR	<i>Critical Ratio</i>
df	Degree of Freedom
DV	Dependent Variable
EDA	Exploratory Data Analysis
EPRD	Educational Planning and Research Department
ES	Effect Size
ETeMS	English for Teaching Mathematics and Science
FID	The International Federation on Documentation
ICT	Information and Communication Technology
IFI	Incremental Fit Index
IT	Information Technology
IV	Independent Variables
KBSM	Integrated Curriculum for Secondary Schools
KBSR	Integrated Curriculum for Primary School
MLE	Maximum Likelihood Estimates
LCD	Liquid Crystai Dispiay
MoE	Ministry of Education
MST	Mathematics and Science teachers
MUET	Malaysian University English Test
NCP	Non-Centrality Parameter
NFI	Normed Fit Index
NPE	National Philosophy of Education
PMR	<i>Penilaian Menengah Rendah</i>
RMSEA	Root Mean Square Error of Approximation
SE	Standard Error
S&T	Science and Technology
SD	Standard Deviation
SPM	<i>Sijil Persekolahan Malaysia</i>
SPSS	Statistical Package for Social Science
TAM	Technology Acceptance Model
TED	Teachers' Education Division
WWW	World Wide Web



# CHAPTER 1

## INTRODUCTION

### Background of the Study

In the current era of economic globalization, the competitiveness of governments, industries and corporations, both national and multinational, for technological progress need an understanding of the English Language. The International Federation on Documentation (FID), a world body which keeps track of information distribution, reports that 85 percent of all the scientific and technological information in the world today is written in English (Hazita Azman, 2003).

Therefore, mastery of the English Language is an indispensable tool for technological development, international communication and access to career. Apart from the vehicular knowledge in science and technology, the English Language is instrumental in the development of knowledgeable workers in Malaysia. Furthermore, the rapid rate of innovations in information technology has hastened the rise and spread of the English language as a global language for international communication. The ability for our nation to participate actively and significantly is highly depending on our ability to articulate the language effectively.



Navigating new tracks for the future would mean accepting the existing realities. The Malaysian government recognizes the importance of the new world driven by trade and commerce. With globalization and the so-called *borderless world* and the advent of communications and information technology, it is becoming increasingly clear that the demand for proficiency in English as an important medium of communication in the world is fully accepted and recognized.

On 8<sup>th</sup> May 2002, the Malaysian government has announced a bold change in Science and Mathematics education by changing the medium of instruction of these subjects in Standard One, Form One and Lower Six from Bahasa Melayu to the English Language after thirty years of using Bahasa Melayu as the medium of instruction (Rohani Abdul Hamid & Rosliza Rosli, 2003). The program has been given the official nomenclature, English for Teaching Mathematics and Science (ETeMS). The purpose is to help arrest what everyone knows to be a steady deterioration in the standards of the English language among students in Malaysia.

Thus, the change of medium of instruction and the integration of Information and Communication Technology (ICT) pose a real challenge to Mathematics and Science teachers (MST). The question of teachers' readiness to deliver the teaching and learning process in English and at





the same time using computer as teaching aids in classrooms is a national concern. The teachers' abilities to integrate technology that can enhance critical and creative thinking skills is also equally important. Hence, teachers' readiness towards English for Teaching Mathematics and Science needs to be investigated as it is a key factor that determines the success of this educational change. For teachers to be ready for this program they need to be prepared in terms of attitudes, skills and knowledge towards implementing English teaching for Mathematics and Science.

The reforms may mean a true and increasingly profound change in how learning takes place in schools and how teachers do their work, or it may mean little more than new terminology to describe old processes and assumptions. Some issues for question and concern are raised out, but two points need to be underlined: first, the reform is clearly in the direction of coherence, adaptation, participation, flexibility and diversity, and every effort should be made to encourage these qualities. Second, the reform is a work in progress and its strengths and weaknesses will be the outcome of the intelligence and initiative of those who participate in its development and implementation.

According to Fullan (2001), there are at least three components or dimensions at stake in implementing any new program or policy: (1) the