



**UNIVERSITI PUTRA MALAYSIA**

**DETERMINANTS OF ACTUAL USAGE OF COMPUTER AMONG  
MATHEMATICS, SCIENCE AND ENGLISH LANGUAGE TEACHERS IN  
SECONDARY SCHOOLS IN SELANGOR, MALAYSIA**

**JEFFREY LAWRENCE D'SILVA**

**FPP 2007 17**



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By

JEFFREY LAWRENCE D'SILVA

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

**March 2007**



Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfillment of the requirement for the degree of Doctor of Philosophy

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**Faculty : Educational Studies**

As we are heading towards achieving the goal of Vision 2020, numerous changes have been implemented in the system of education. Among them would be the paradigm shift from the traditional mode of teaching to one that is of the information technology based especially among the Mathematics, Science and English language (MSE) teachers. Numerous incentives were given to the MSE teachers to use the computer in schools but preliminary observations found that they are not fully utilizing these facilities.

The aim of this study is to identify factors influencing the actual usage of computer (AUC) among secondary school MSE teachers. The factors



investigated were attitude, perceived usefulness, perceived ease of use, computer self-efficacy, job relevance, computer compatibility, subjective norm and teachers' demography.

A self-administered survey questionnaire was sent to MSE secondary school teachers in 65 schools in the district of Petaling, in Selangor. Out of the 358 questionnaires, a total of 318 (88.9%) valid responses were used. The data collected were analyzed using exploratory data analysis, statistical descriptive and inferential statistics (*t*-test, One-way ANOVA, Pearson correlation, and multiple regression) using the SPSS.

Overall, the study found that the AUC among MSE secondary school teachers were at the moderate level. Meanwhile, the socio-demographic factors of main subjects taught and training in computer usage showed significant differences in means of AUC. Besides, the constructs of attitude, perceived usefulness, perceived ease of use, job relevance, and computer compatibility showed significant positive relationship with AUC.

The study too identified the best-fit model using the step-wise multiple regression and the best model explained 54.5% of variance in AUC. The most significant predictors of AUC were perceived ease of use, followed by perceived usefulness, job relevance, computer compatibility, and attitude.

It is recommended that for MSE teachers to enhance on their level of AUC would need a concrete effort from the policy makers, school administrators, and teachers themselves. Future research is recommended to encompass a wider scope of constructs pertaining to AUC that incorporate among others financial incentives and type of school.



Abstrak tesis yang dikemukakan kepada Senat Univesiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

**FAKTOR-FAKTOR YANG MEMPENGARUHI  
PENGUNAAN KOMPUTER YANG SEBENAR OLEH GURU-GURU  
MATAPELAJARAN MATEMATIK, SAINS DAN BAHASA INGGERIS DI  
SEKOLAH-SEKOLAH MENENGAH SEKITAR NEGERI SELANGOR,  
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Dalam kita menuju ke arah mencapai matlamat Wawasan 2020 pelbagai perubahan telah dilaksanakan di dalam sistem pendidikan. Di antaranya ialah anjakan paradigma daripada penggunaan cara pengajaran tradisional kepada suatu yang berunsurkan penggunaan teknologi maklumat khususnya di kalangan guru-guru yang mengajar Sains, Matematik dan Bahasa Inggeris. Pelbagai insentif telah diberi kepada guru-guru ini untuk menggalakkan mereka menggunakan komputer di sekolah tetapi pemerhatian awal mendapati yang mereka tidak menggunakan kemudahan yang disediakan dengan berkesan.

Matlamat kajian ini ialah untuk menentukan faktor-faktor yang mempengaruhi penggunaan komputer yang sebenar di kalangan guru-guru Sains, Matematik dan Bahasa Inggeris. Faktor-faktor yang ingin dikenalpasti ialah sikap, menyedari manfaat komputer, menyedari kemudahan komputer, efikas-kendiri guru terhadap komputer, kepentingan untuk kerja, kesesuaian komputer, faktor luaran, dan latar belakang guru.

Borang soal selidik telah diedarkan secara rawak kepada guru-guru Sains, Matematik dan Bahasa Inggeris di 65 sekolah menengah di daerah Petaling, di Selangor. Daripada 358 borang soal selidik yang diedarkan, sebanyak 318 (88.9%) borang dapat diterima pakai. Dengan menggunakan SPSS, statistik deskriptif dan inferensi (ujian-*t*, ANOVA Satu Hala, Korelasi Pearson *r* dan regresi berganda) digunakan untuk menganalisis data dan membentangkan dapatan kajian

Secara keseluruhan, dapatan menunjukkan bahawa penggunaan komputer di kalangan guru-guru Sains, Matematik dan Bahasa Inggeris adalah pada paras sederhana. Sementara itu, faktor-faktor matapelajaran utama yang diajar dan latihan dalam penggunaan komputer menunjukkan hubungan yang signifikan dengan penggunaan komputer. Di samping itu, konstruk sikap, menyedari manfaat komputer, menyedari kemudahan penggunaan komputer, kepentingan untuk kerja, dan kesesuaian komputer menunjuk perhubungan positif yang signifikan dengan AUC.

Kajian ini juga mengenalpasti model terbaik dan model ini dapat menyumbang sebanyak 54.5% terhadap variasi dalam penggunaan komputer. Peramal penggunaan komputer di kalangan guru ialah menyedari manfaat komputer, menyedari kemudahan penggunaan komputer, kepentingan untuk kerja, kesesuaian komputer dan sikap.

Adalah dicadangkan untuk meningkatkan penggunaan komputer di kalangan guru memerlukan usaha yang bersungguh-sungguh daripada penggubal polisi, pentadbir sekolah dan guru-guru. Turut dicadangkan kajian masa depan perlu merangkumi skop yang lebih luas daripada konstruk yang mempengaruhi penggunaan komputer dan dikaitkan dengan insentif kewangan dan dengan jenis sekolah dapat memperoleh input tambahan yang membolehkan kita lebih memahami penggunaan komputer di kalangan guru.



## ACKNOWLEDGEMENTS

I wish to express my deepest gratitude to God for giving me the wisdom and courage to complete this study. This study was also accomplished with the help and assistance of many people to whom I am indebted to and they are as follows:

To Associate Professor Dr. Azizan Asmuni, chairperson of the supervisory committee, my utmost appreciation for his valued assistance, comments, and guidance throughout the progress of this study.

To Associate Professor Dr. Jegak Uli and Dr. Khairuddin Idris, my sincere gratitude for giving me constructive advice, encouragement and suggestions during the research process.

To the principals, teachers, and participants of the study who had helped in one way or another during the data collection.

To Dr. Naresh Kumar, Mr. William Samuel, Mr. Eustace Pereira, and Dr. Gunaseelan Rethinam, for their moral support, concern, and assistance throughout the study.



To my family, especially my wife and daughters, and parents for their patience, inspiration and support.



I certify that an Examination Committee met on 16 March 2007 to conduct the final examination of Jeffrey Lawrence D'Silva on his Doctor of Philosophy thesis entitled "Selected Determinants of Actual Usage of Computer Among Secondary School Mathematics, Science, and English Language Teachers in Selangor, Malaysia" in accordance with University Pertanian Malaysia (Higher Degree) Act 1980 and University 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:

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## 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 degree at Universiti Putra Malaysia or other institution.

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**JEFFREY LAWRENCE D'SILVA**

Date: 16 JUNE 2007



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**LIST OF ABBREVIATIONS**

ANOVA	Analysis of Variances
AUC	Actual Usage of Computer
CLPP	Computer Literacy Pilot Project
ICT	Information and Communication Technology
IDT	Innovation Diffusion Theory
IT	Information Technology
EDA	Exploratory Data Analysis
MIS	Management Information System
MSC	Multimedia Super Corridor
MSE	Mathematics, Science and English Language
NAEYC	National Association for the Education of Young Children
PEOU	Perceived Ease of Use
PU	Perceived Usefulness
TA	Technology Acceptance
TAM	Technology Acceptance Model
TPB	Theory of Planned Behavior
TRA	Theory of Reasoned Action
SGT	Social-Cognitive Theory
SPSS	Statistical Package for Social Sciences

# CHAPTER I

## INTRODUCTION

### **Information Technology in Today's World**

Information technology (IT) is an important element to open up huge potential for increased efficiency through the internet, e-commerce and the instantaneous delivery of information anywhere in the world, and at any time (Jung, 2001). Acknowledging the impressive developments in the information technology, Malaysia has implemented the Multimedia Super Corridor (MSC) Project to boost IT to the forefront, and as one of the steps to transform the nation from an industrial economy to a knowledge-based one. On top of it, in the Eighth Malaysia Plan (2001-2005), a total of RM5.2 billion had been allocated for information communication technology (IT) related programmes and projects so as to achieve a wider diffusion of IT knowledge among the people in the country (Government of Malaysia, 2001).

A revolutionizing transition like this would require a fundamental shift among the people whereby it would lean towards creating a more technologically literate workforce that is capable to face challenges of a global economy, and a work environment that is characterized by intensive usage of technology and innovation.



Over the past decades, the roles of IT in modern education have also increased significantly (Hu, Clark and Ma, 2003). To achieve this transition, the school education system is required to face a revamp, so that it would prepare students for challenges in a knowledge-centric economy.

### **Importance of Information Technology in Education**

Information technology (IT) has opened wide opportunities for educators to integrate technology-supported materials in the teaching-learning process and to improve the achievement of students (Jonassen, 1995). The use of computer-aided technology in the classroom will, no doubt, inspire the teachers to approach their tasks with a greater sense of purpose and, more importantly, a sense of play to make the learning process fun for students.

Using computer-based technology such as data-logging and simulations is important for modeling subjects such as science and mathematics. Modeling is an important part of science and computers are good for modeling things such as nuclear testing and molecules calculations. Furthermore, the availability of vast amounts of up-to-date information in the teaching and learning of different subjects are found on the World Wide Web. The internet provides far more up-to-date information than text books. Besides, looking for books and go in search for them and then discovering that it is not the one that has the kind of information





you want can be time consuming and frustrating. The Net, on the other hand is very efficient. Up and above that, textbook can become obsolete with out off date information that could misguide students into believing that there is no further development after that discovery.

It is also an undeniable fact that the multimedia and interactive nature of software programmes on CD-roms and on the World Wide Web assist with students' learning. The computer motivates and caters for different learning abilities. Students generally enjoy using the computer and with enjoyment come motivation. In particular, the presence of computer-based technology changes the way subjects such as science and mathematics is being taught. It is believed that the current era relate to computers as part of their up-bringing and being relevant in a technologically oriented society. In the homes of increasing number of students, computers play an essential role in students' recreation and learning. It changes the way different subjects such as science is taught as IT tends to accord more closely with the way students think (Dywer, 2000).

### **Teachers' Usage of Information Technology**

In this era of information technology in order to carry out their new roles effectively, teachers need to have the capabilities and skills to use technology, and be prepared to adopt and use computers to enhance teaching and learning for students, and the subject area they will teach.

