UNIVERSITI PUTRA MALAYSIA

CONDITIONS FACILITATING THE IMPLEMENTATION OF INFORMATION COMMUNICATION TECHNOLOGY INTEGRATION IN THE MALAYSIAN SMART SCHOOL

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UPM

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By

HAJAR BINTI MOHD NOR

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

January 2005

UPM

DEDICATION

For my mum, Kamisah binti Salim
and my late father, Mohd Nor bin Talif

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirements for the degree of Doctor of Philosophy

CONDITIONS FACILITATING THE IMPLEMENTATION OF INFORMATION COMMUNICATION TECHNOLOGY (ICT) INTEGRATION IN THE MALAYSIAN SMART SCHOOL

By

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January 2005

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This study reports on the implementation of Information Communication Technology (ICT) integration in the Malaysian Smart School locally known as *Sekolah Bestari*, specifically in the classroom environment. The main purpose of this study is to look at conditions that facilitated the implementation of ICT integration in the Smart School. At large it asks the question of "Why do teachers in the schools have minimal use of ICT integration in the Smart School" rather than why they do not use them. The study also attempts to discover problems that emerge during the process of integrating ICT in the schools.

A qualitative methodology was employed to explore the informants at its natural setting. The data generated by interviews, classroom observations and document reviews were able to capture the teaching and learning process using ICT integration in the classroom situation. Three technology-rich Malaysian secondary schools, the Smart Schools, of different technology levels were carried out to identify the conditions.

A total of twenty-one informants, who comprised of twelve teachers, three principals, three heads of curriculum department and three ICT coordinators were interviewed. The teachers formed the primary informants. These teachers represented the four subjects, which had been revised by the curriculum to implement ICT integration in the teaching and learning process. The subjects concerned were English Language, Bahasa Melayu, Mathematics and Science. These teachers had reported different experiences and perceptions in implementing ICT integration in the schools, hence, enriching the data for this study. The data from primary informants were triangulated with the secondary informants, the principals, heads of curriculum department and ICT coordinators.

The data was facilitated by the use of Qualitative N6 data analysis software. The data was coded and categorized relating to common conditions arising from the data. The study had identified the conditions that facilitated the implementation of ICT integration in

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the Malaysian Smart School. The common conditions that emerged from the data formed the basis guideline for the implementation of ICT in schools. The study confirmed some of the conditions mentioned in the literature, but this study found the depth of those conditions. Two sets of conditions were revealed. They were the essential conditions and the supporting conditions. The essential conditions identified were availability of ICT resources and acquisition of ICT knowledge. The present of these conditions see the possibility of the implementation of ICT integration in the Smart School. If one of these conditions was not present then implementation of ICT integration would not take place.

The next set of conditions was the supporting conditions. The supporting conditions comprised of the accessibility to ICT resources, existence of support, desire to change, school practices, influence of external forces and teacher's commitment to the innovation determined continuous implementation of ICT integration in the schools. The findings demonstrated a relationship between the presence of these conditions and the continuation of implementation of ICT integration. It was found that the presence of these conditions in schools enabled them to continue with the implementation of ICT integration. However, the lack or absence of these conditions resulted in the slow down or discontinuation of the integration of ICT in the schools.

The findings also revealed that teachers in the study employed four levels of approaches in integrating ICT in the schools. These teachers integrated ICT as verbal resources at level one, as printed resources at level two, as hands-on experience at level three and a combination of all the approaches at level four. It seemed that the levels of approach were influenced by the presence and absence of the conditions that facilitated the implementation of ICT integration in the Smart School.

The study also discovered problems that the teachers faced during the process of integrating ICT in the schools. The issues that emerged in the implementation of ICT integration in the Malaysian technology-rich school, the Smart School were time factor, course content and technical malfunction.

Recommendations were made and implication for theory and practice were also proposed for possible course of actions for the practitioners in implementing ICT integration in the schools.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk Ijazah Doktor Falsafah

SYARAT-SYARAT YANG DIPERLUKAN UNTUK MEMUDAHKAN PELAKSANAAN INTEGRASI ICT DALAM SEKOLAH BESTARI DI MALAYSIA

Oleh

HAJAR BINTI MOHD NOR

Januari 2005

Pengerusi **Profesor Madya Wan Zah Wan, PhD**

Fakulti **Pengajian Pendidikan**

Kajian ini bertujuan untuk melaporkan pelaksanaan integrasi ICT di Sekolah Bestari, khususnya di dalam bilik darjah. Tujuan utama kajian ini adalah untuk melihat keadaan yang melancarkan pelaksanaan integrasi ICT dalam Sekolah Bestari. Kajian ini menyahut soalan, "Mengapa pengintegrasian ICT dalam pengajaran dan pembelajaran amat minimum di kalangan guru-guru di Sekolah Bestari?" dan bukannya mengkaji mengapa guru-guru tidak menggunakan ICT dalam pengajaran dan pembelajaran. Kajian ini juga dilaksanakan untuk meneroka masalah yang dihadapi oleh guru semasa melaksanakan integrasi ICT dalam sekolah tersebut.

Pendekatan kaedah kualitatif telah digunakan dalam kajian ini untuk mendapat gambaran sebenar apa yang berlaku di tempat kajian. Penjanaan maklumat adalah berdasarkan teknik sesi temu bual, pemerhatian bilik darjah dan analisis dokumen telah dapat merakamkan pengajaran dan pembelajaran yang menggunakan integrasi ICT di dalam bilik darjah. Tiga buah sekolah berteknologi tinggi, Sekolah Bestari, di Malaysia yang berbeza tahap teknologinya telah dipilih untuk menjawab persoalan kajian ini.

Sejumlah dua puluh satu orang informan telah ditemubual. Mereka terdiri daripada dua belas orang guru, tiga orang pengetua, tiga orang ketua kurikulum dan tiga orang penyelaras ICT. Guru-guru ini merupakan informan utama. Mereka mewakili empat mata pelajaran iaitu Bahasa Inggeris, Bahasa Melayu, Matematik, dan Sains. Mereka telah melaporkan pengalaman dan persepsi yang berlainan dalam mengintegrasikan ICT dalam sekolah. Data daripada informan utama telah ditrangulasikan dengan informan sokongan iaitu pengetua, ketua kurikulum dan penyelaras ICT.

Perisian penganalisisan data kualitatif N6 telah memudahkan proses penyenggaraan maklumat. Maklumat telah dikod dan dikategorikan berdasarkan kategori yang muncul. Kajian ini telah dapat mengenal pasti syarat-syarat yang perlu ada dalam pelaksanaan ICT dalam sekolah. Syarat-syarat tersebut telah dapat membentuk satu garis panduan untuk pelaksanaan ICT di Sekolah Bestari. Kajian ini

bukan sahaja mengesahkan syarat-syarat seperti yang terdapat dalam sorotan kajian tetapi telah melihat syarat tersebut dengan lebih mendalam lagi. Terdapat dua set syarat yang telah di kenal pasti iaitu syarat wajib dan syarat sokongan. Syarat wajib terdiri daripada kesediaan perkakasan ICT di sekolah dan guru berpengetahuan menggunakan komputer. Dengan adanya syarat-syarat ini telah dapat memperlihatkan pelaksanaan integrasi ICT di dalam sekolah. Jika salah satu daripada syarat ini tidak ada, pelaksanaannya tidak dapat dilaksanakan.

Syarat sokongan pula merupakan syarat yang dapat memastikan pelaksanaan ini berjalan secara berterusan. Syarat sokongan terdiri dari akses kepada perkakasan, wujudnya sokongan, inginkan perubahan, amalan di sekolah, pengaruh luaran dan komitmen guru terhadap inovasi itu sendiri. Syarat-syarat tersebut nampaknya mempengaruhi pelaksanaanya, jika syarat-syarat tersebut tiada atau berkurangan, maka pelaksanaannya lambat atau terhenti.

Dapatan juga menunjukkan guru-guru menggunakan empat tahap pendekatan dalam mengintegrasi ICT dalam Sekolah Bestari. Guru menggunakan ICT sebagai sumber lisan pada tahap pertama, ICT sebagai sumber cetak pada tahap kedua, ICT sebagai pengalaman "hands-on" pada tahap ketiga dan merangkumi semua pendekatan pada tahap keempat. Tahap-tahap pendekatan ini nampaknya

dipengaruhi oleh kehadiran syarat-syarat yang perlu ada dalam pelaksanaan integrasi ICT dalam sekolah.

Kajian juga mendapati masalah yang dihadapi oleh guru-guru dalam mengintegrasikan ICT dalam sekolah adalah faktor masa, kandungan kursus dan masalah teknikal. Cadangan dan implikasi kepada teori dan amalan telah dibentangkan supaya tindakan sewajarnya dapat diambil.

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I certify that an Examination Committee met on 17th January 2005 to conduct the final examination of Hajar binti Mohd Nor on her Doctor of Philosophy thesis entitled "Conditions Facilitating the Implementation of Information and Communication Technology Integration in the Malaysian Smart Schools" 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:

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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 other degree at UPM or other institutions.

HAJAR BINTI MOHD NOR

Date 20/4/07

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LIST OF ABBREVIATIONS

CAIL	Computer Assisted Instruction and Learning project
CBAM	Concern-Based Adoption Model
CDC	Malaysian Curriculum Development Center
CIE	Computer In Education
EPU	Economic Planning Unit
ICT	Information and Communication Technology
IT	Information technology
LAN	Local Area Network
LoU	Levels of Use
MIMOS	Malaysian Institute of Microelectronics
MoE	Malaysian Ministry of Education
MSC	Multimedia Super Corridor
NPE	National Philosophy of Education
SoC	Stages of Concerns
SSIS	Smart School Integration Solution
SSMS	Smart School Management System
TLM	Teacher Learning Materials
N6	Nudist 6 Qualitative Software
ETeMS	Teaching and Learning of Science and Mathematics in English

CHAPTER I

THE PROBLEM AND ITS CONTEXT

Introduction

Information and Communication Technology (ICT) has a dramatic impact on every facet of our lives. Many of the industrialized worlds are using Personal Computers (PC) and information or web appliances at home and at work. The number of world Internet users surpassed 400 million in year 2000 and will continue to grow strongly in the next five years. Most of the growths are in Asia, Latin America and parts of Europe. By the end of the year 2005 the number of worldwide Internet users will triple to 1.17 billion. The worldwide scenario for the year 2010 will be over 1.8 billion Internet users and over 1.4 billion PCs in use. There will be over 20 percent of the office workers using PCs at home and at work as well as over 2.5 billion web appliances in use. Over 25 percent of office workers will also use web appliances at home and at work (Juliussen, 2001). Thus, it can be concluded that the impact of ICT plays a very important role in today's world.

Subsequently, Malaysians' participation in the use of Internet by the end of the year 2005 is said to increase to 25 percent. Datuk Tan Chai Ho, the former Deputy Minister of Energy, Communications and Multimedia Ministry (2001) stated that computer ownership in Malaysia was eigh people per 100 population in 2001 and is