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Attitude of Teachers towards ICT (Information and Communication Technologies) and Problems with its Use: Implementation of ICTs in Education in Malaysia

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Abstract

Education can be linked to a nation's growth and economic development (IIASA, 2008, United Nations Country Team Malaysia, 2005). With economic progress and rapid infrastructural development in Malaysia since her independence (31 August 1957) laying the foundation for a stronger economy education as a major contributing factor has been receiving more and more attention. In this 21st century, every aspect of our life involves computer technology (Yildirim, 2000; Look, 2005; Kay, 2007), and the contribution of Information and communication technologies (ICT) [1] in enabling education is indisputable (Frost and Sullivan, 2010). This paper is therefore discussing the role of Information Technology (IT) in the general development of Malaysia, as well as describing the role of education in this context. Apart from the technology use, teachers are one of the factors that might affect the effective use of technology in schools; (UNESCOBangkok, 2007-2008); and many believe that the involvement of teachers on technology is critical (Look, 2005), on top of that, attitudes are key factors that will influence whether teachers accept computer as a teaching tool in their teaching practices (Juanna et al., 2005; Teo, 2008; Al-Zaidiyeen et al., 2010), therefore, this paper also examines the attitude among Malaysian school teachers present use of ICT as a tool in teaching, and to find out the factors that affect their attitude on the usage of ICT in teaching as well as the problems with its use. A questionnaire comprised with demographic data such as age, education background, teachers' computer background and computer attitude scale were applied to this study. Data was examined through descriptive analysis, T-Test, Chi-Squared Test and Correlation Test. The findings indicated that only certain parts of the demographic data were significant and will affect teachers' attitude on using computers in teaching. Together with the analysis, the problems with, and the barriers related to ICTs used in schools have been addressed.

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[1] . These technologies include combinations of hardware, software, media, and delivery systems, such as computers, internet, broadcasting technologies (radio and television), and telephony used to communicate, create, disseminate, store and manage information. (http://www.unesco.org/education/educprog/lwf/dl/edict.pdf)

Abstrakt (German)

Bildung kann mit Wachstum und wirtschaftlicher Entwicklung einer Nation assoziiert werden. Mit dem wirtschaftlichen Fortschritt und der schnellen Entwicklung der Infrastruktur in Malaysia seit der Unabhängigkeit wurde mehr und mehr Aufmerksamkeit darauf gerichtet, den Grundstein für eine stärkere Wirtschaftsausbildung -als wichtigen Beitrag zu dieser Entwicklung - zu legen. In diesem 21. Jahrhundert bestimmt Computertechnologie jeden Aspekt unseres Alltags. Der Beitrag der ICT in Bildung ist unbestritten. Diese Arbeit wird deshalb sowohl die Rolle der Informationstechnik (IT) in der allgemeinen Entwicklung Malaysias als auch die Rolle der Bildung in diesem Zusammenhang beschreiben. Neben dem Einsatz von Technologie an Schulen sind Lehrer einer der Faktoren, die die Effektivität des Technologieeinsatzes ebendort stark beeinflussen kann; oft herrscht sogar die Ansicht, dass der Einsatz der Lehrer in der Technologie entscheidend ist. Darüber hinaus ist die Einstellung ein wichtiger Faktor, der die Akzeptanz der Lehrer für den Computer als Lehrmittel in der Unterrichtspraxis beeinflussen kann; daher untersucht diese Arbeit auch die Einstellung der malaysischen Lehrern zur Nutzung von ICT als Hilfsmittel im Unterricht unter und versucht herauszufinden, welche Faktoren ihre Einstellung zur Nutzung der ICT im Unterricht beeinflussen sowie welche Probleme bei der Nutzung auftreten. Für diese Studie wurde ein Fragebogen mit demografischen Daten wie Alter, höchste abgeschlossene Ausbildung, Erfahrung am Computer sowie einer „Computer Attitude Skala“ wurde in dieser Studie erstellt. Die Daten wurden durch deskriptive Analyse, T-Test, Chi-Quadrat-Test und Korrelationstest untersucht. Die Ergebnisse zeigen, dass nur bestimmte Teile der demographischen Daten signifikant waren und die Haltung der Lehrer zur Benutzung von Computern im Unterricht beeinflussen. Zusätzlich zu den Ergebnissen der Analyse werden in der Arbeit auch die im Zusammenhang mit der Informations-und Kommunikationstechnologien (ICT) in den Schulen auftretenden Probleme und die Hindernisse aufgezeigt.

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List of abbreviations

AUC	Actual usage of computer
CAS	Computer Attitude Scale
CAST	Chinese Computer Attitude Scale for Teachers
CAT	Computer Assisted Teaching
CBT	Computer-Base technology
df	degree of freedom
Email	Electronic mail
EPU	Economic Planning unit
ICTL	ICT Literacy
ICT(s)	Information Communication and Technology(ies)
IDC	International Data Corporation
IIASA	International Institute for Applied Systems Analysis Austria
IS	Information System
IT	Information Technology
ITCs	IT Coordinators
MDG	Millennium Development goals
MOE	Ministry of Education
MOHE	Ministry of Higher Education
MYR	Malaysian Ringgit
MSC	Multimedia super corridors
n.d.	No date
NAM-CSSTC	Non-Aligned Movement Centre for South-South Technical Cooperation
NITA	National Information Technology Agenda
PEOU	Perceived ease of use
PU	Perceived usefulness
RMK	Rancangan Malaysia Ke- ***(Malaysian Plan)***
SMK	Sekolah Menengah Kebangsaan (***National School***)
SMJK	Sekolah Menengah Jenis Kebangsaan (***National Type School)***
SSIS	Smart School Integrated Solution
SPM	Sijil Pelajaran Malaysia (Secondary qualifications award)
SPSS	Statistical Package for Social Sciences
TAM	Technology Acceptance model
TRA	Theory of reasoned action
TSS	Telekom Smart School
UNESCO	The United Nations, Educational, Scientific and Cultural Organization
US	United state
USM	Universiti Sains Malaysia (University science Malaysia)
WWW	World Wide Web

Chapter 1: Introduction and the background

1.1 Introduction

"Knowledge is increasingly driving growth and transforming nations and the way of life" (Mahathir, 2002, pg.I), basically, we need education in order to enhance the knowledge. Research from the International Institute for Applied Systems Analysis, Austria (IIASA) has also noted that education is an important factor which can influence a country's economic development and nation's growth, it (education) must not be 100 percent sufficient, but it is necessary for long term development growth. It has been stated in many of the recent research studies, for example, human capital (which includes education and health) plays a significant role in a country's economic development. When we have a better education, it leads not only to higher individual income but is also a necessary precondition for long-term economic growth (IIASA, 2008).

Due to that reason the education can be linked to a nation's growth and economic development (IIASA, 2008, United Nations Country Team Malaysia, 2005), Malaysian Economic Planning unit (EPU) of the Prime Minister's department has mentioned that Education is an essential aspect of the quality of life and reducing inequality in society and it also contributes sighnificantly towards alleviation. The improvement in education has a positive impact on many aspects of society, such as health, working life, environment and family. Therefore, the major portion of the development expenditure has been allocated for education (EPU, 1999) and it has been the main agenda in the contry's development. On the other hand, according to United Nations Country Team Malaysia (2005,p66), "upgrading the national education system and broadening educational opportunities have been a central part of the government's strategy to foster national unity and support economy growth" .

On the other hand, computer technologies are affecting every aspect of our life in this 21st century (Yildirim, 2000; Look, 2005; Kay, 2007), technologies involve the generation of knowledge, provide problem solving and extend human capabilities (Afshari et al., 2009), IT acceptance and use by teachers in the school is an issue

that has received the attention of researchers and practitioners for over a decade. Successful investment in technology can lead to enhanced productivity, while failed systems can lead to undesirable consequences such as financial losses and dissatisfaction (Venkatesh, 2000), therefore, ICT is today absolutely the critical enabler of a knowledge-based economy for many nations. It is doubtlessly having a distinctive impact on our education system as well. As Frost and Sullivan (2010) reported in order to build a knowledge-based economy, school education has to be transformed with ICT as an enabler to access a much wider source of information, to encourage critical thinking of problem solving and to increase innovation and creativity. Besides teaching purposes, it has also make the administration process simpler and easier, such as school records and attendance, school database maintenance has become very simple and simplifies the school system. Malaysia governments have also recognized the positive impact that ICT has on the social and economic development of its public. Malaysia saw innovations in ICT as an opportunity to review the country's public education system, and schools were identified as having a main role to increase the number of ICT-skilled people to meet the demands of industries that would be integrating ICT into their processes (UNESCOBangkok, 2007-2008). They have started to invest heavily in ICT to develop the nation's human capital as well as in education, in term of improving overall quality of education, in order to make students capable of the demands of the digital and information age (Frost and Sullivan, 2010). Implementing the Smart School project is one of the initiatives and its purpose of fulfilling Malaysia's Vision of becoming a fully developed nation by year 2020. Meanwhile, government has also realizing the important of teachers in teaching students with using ICT, Ministry of Malaysia Education (MOE) has implemented various training programs and provided facilities to teachers and schools (Kumar et al., 2008b).

In today's digitally-connected world, the contribution of ICT in enabling education is indisputable (Frost and Sullivan, 2010). The proper use of ICT tools offers students and teachers, teaching opportunities and improves teaching and learning processes (UNESCOBangkok, 2004). ICT has been essentially integrated into the primary and secondary school curriculum and instruction in order to create a knowledge-

based society, of course this integration is varied and diverse based on school curriculums and locations.

A well-planned and responsive education system provides an appropriate enabling environment for the successful implementation of ICT in an education program (UNESCOBangkok, 2004). Therefore, the ***first goal*** of this study is to provide an overall view of the Malaysian Education system and how the Malaysian government supports the overall education and development by means of Information Technology (IT) facilities, especially in ICTs. Some key elements will be describe and discussed here such as the role of the government in the IT dynamic, for example, what are the projects included in this area. In the education area, many aspects of Malaysian education should be described, discussed and some insight provided, including some history and background of the education system, overview of the current education system and policy, the government's plan: smart school, ICTs used, Malaysian Vision 2020, how Malaysia education works under the multi-culture societies[2], difference languages, and gender differences on education and IT education.

Although many research studies in education show that use of technology can help in the teaching and learning process, (Al-Zaidiyeen et al., 2010) technology use in schools sometimes is generally affected by certain barriers, such as lever of access and use. This might be due to the amount of equipment inadequately or inappropriately organized in the school, lack of available technical support, and inappropriate or lack of computer training. All of which might affect the level of confidence in using technologies, subsequently resulting in low levels of ICT use (Jones, 2004), which might indirectly affect teachers toward technology use in teaching. Therefore, it is also important to understand the ***second goal***, barriers and problems on the integration of technology in schools and into the curriculum.

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[2] The three principal ethnic groups in Malaysia are Malays, Chinese and Indians.

Revolution of technology provides the education system very good support, with the use of today´s basic learning requirements ICT. Theoretical and empirical studies have considered ICT not only to enhance and extend the teaching methods but also the learning process. For example, it should be quite common that teachers use technology for a variety of purposes nowadays, including accessing lesson plans, creating study guides, communicating with parents, record-keeping and doing presentations. It is also quite normal for students to employ technology to perform research, analyze data, compose reports and many other performances (Al-Zaidiyeen et al., 2010; Saud et al., 2010). Through more interaction between teachers and students in the classroom employing technology and digital study materials to promote more attractive instruction, the greater the students' interest in studying, collaborating, sharing knowledge and taking initiative (UNESCOBangkok2, 2011), can be found.

However, technology integration varies in different ways, individual teachers will have difference thoughts, feeling and attitudes on the adoption of technology in the classroom. Some teachers are still maintaining tight control, not using what is available, less access or use technology only for presentation purposes, some others with the same resources but given full and Comprehensive teachnology use it in a variety of activities for teaching students (Judson, 2006). In order to prepare students for the future, teachers might be pressured to use computers in the classrooms, and teachers' actual usage of computers for instruction or infrequent use have been mentioned in many research studies (Teo et al., 2008; Judson, 2006). The reasons vary from different research studies. For example instant technical factors with computer or internet infrastructure problems, personal factors with attitude or belief , how they improve teaching-learning strategies, or even environmental factors with support from school by management and administrative or computer training to provide a well trained people. Because recognizing the importance of ICT alone is not sufficient to ensure the desired outcome of education is achieved (Frost and Sullivan, 2010), it is useful for school management to understand more of the teachers' thoughts, beliefs and attitudes before and during the implementation phase. It should also include the above mentioned details.

Computers in the classroom have been an ongoing controversial topic, and also teacher computer use has been the focus of much research (Wahab, 2009), such as the effectiveness, level of use, computer skill and their attitudes. Especially when teachers play an important role, and they are the key person to the successful integration of ICT into education (Smart school project team, 1997; UNESCOBangkok, 2007-2008), their attitude and willingness to embrace the technologies have the most potential to influence the effective implementation of the information technology in the educational system (Juanna et al., 2005; Yushau, 2006;Teo, 2008; Al-Zaidiyeen et al., 2010). Without the active, enthusiastic and skilled participation of teachers, innovations to enrich education with the advantages offered by technology are doomed to fail (Smart school project team, 1997; Tinio, 2002). Therefore, to have computers widely used in the classroom, we should first help teachers develop positive attitudes toward the technologies' use (Yushau, 2006) and it´s paramount importance (Woodrow, 1991). Conversely, it is also important to know about teachers' biases and stereotypes of using a computer, if teachers accepted computers and find it useful, they might use it for their instruction. As attitudes are the key factors to consider if teachers accept computers and use them as a teaching tool in their teaching practices (Al-Zaidiyeen et al., 2010), teachers' attitude toward computer use in the classroom is the key factor that affects the successful use of computers in the classroom.

Both researchers and educators have been aware of teachers' attitudes toward computers as an important factor to the successful use of computers for instruction. (Yuen and Ma, 2001) In certain attitude studies, researchers evaluated various aspects such as teachers' age, gender, their experience and level of use as indicators of positive attitudes toward technology, other than that, some other measurements are mostly considered by researchers such as perceived usefulness, confidence, anxiety and aversion /liking (Juanna et al., 2005; Yushau, 2006). However, mixed and inconsistent results were reported in literature (Kumar et al., 2008a), therefore, it is absolutely necessary to examine what factors influence positive teacher use of computer technology in the classroom (Teo, 2008; Teo et al., 2008).

An example, a research by Kay (2007) tell us that there is a strong relationship between confidence and computer ability in older students and in adults, he has also mentioned in his research study that if teachers are not confident and competent computer users, it could have a significant impact on students' perceptions on using computers.

Some researchers have also agreed that much less research on factors might influence instruction on computer use for example on the teachers' attitude, level of anxiety, belief and perception. These factors are important since attitude and belief might impact on teachers' technology use in the classroom (Wahab, 2009).

In relation to the issues above, it is necessary to carry out a research study to gauge and assess teachers' attitudes toward technology use in teaching. Therefore, the **third and main goal** of this study is to examine teachers' attitude towards the implementation of ICT as a tool, the correlation between their attitudes and their use of technology. As for this study, attitude can be referred to a mixture of teacher's general feelings of like or dislike, having confidence or no confidence, high or low anxiety, belief for or against the usefulness of computer technology in teaching. Other factors related to teachers' computer background and basic demographic data were also examined in this study, such as the teachers' computer experience, computer ownership, frequency of computer access, use of applications, age, gender and others.

This study was done by a survey questionnaire with basic demographic data and teachers' computer background data and Computer Attitude Scale (CAS). This CAS questionnaire was modified from the Loyd/Gressard Computer Attitude Scale *(CAS)* questionnaire (Wahab, 2009). The main measurement dimensions of this CAS taken by this study were: computer liking, computer anxiety, computer confidence and computer usefulness. The data from this questionnaire was analyzed using SPSS (Statistical Package for Social Sciences) software. Descriptive statistics such as percentages and frequency counts were used to examine the demographics' section characteristics, which information is provided to give the reader an overview of teachers' basic information and their computer background.

The result on examining the teachers' attitude towards computer use in teaching are showed with the help of tables, diagrams and charts, the discussion with conclusions and suggestions is given, these might enable teachers to make successful use of ICT in education areas.

1.2 Education system background

Before we look into education in Malaysia today, it is necessary to understand the country's general background and how the early Malaysian education system was formed and running.

The federation of Malaya was formed in 1948 and it became independent from the British colony in 1957. The federation of Malaya, Singapore, Sabah and Sarawak joined to form Malaysia in 1963, however, Singapore was forced to leave the Federation in 1965. Therefore, Malaysia consists of the Malay Peninsula[3], Sabah and Sarawak [4], as it is now (UNESCOBangkok, 1973).

In general, opportunities, qualities and equalities of education in Malaysia have been expanded in the past few decades compared to some developing countries. However, it was like in uniformity and standardized education system before its independence in year 1957 - during British Malaya. Although the British government had tried to form difference communities and came up with different kinds of education reports and policy before Malaysia became independent, they were not successful. (More details are listed at appendix 1)

During that time, the education system was reorganized and was varied according to different ethnic groups (basically the different ethnic groups mentioned here are the main ethnic communities from Malays, Chinese and Indians), and there were many problems in using a common syllabus, curriculum and language, the details are shown in the following: 'Summary of the progress of the implementation of Malay as the medium of Instruction from 1957 to 1983'. Referring to appendix 1, we

[3] which consists of 11 states, and it is called West Malaysia
[4] Combination of these two states is called East Malaysia

know that education played an important role towards racial unity in Malaya. However, many problems still exist after independence; for example there is the problem, for the Ministry of Education, choosing the instruction language, so that it can get across the different races in schools.

According to Malaysian Development Experience, Changes & Challenges INTAN Kuala Lumpur (1994 cited in the Education System of Malaysia, Husni, n.d., p.g.9), the Summary of the progress of the implementation of Malay as the medium of Instruction from 1957 to 1983 shown:

"1957 Malay language was made compulsory in all government-aided primary and secondary schools
1958 Introduction of Malay-medium classes attached to selected English-medium secondary schools
1963 Establishment of the first Malay-medium fully-residential secondary school, Sekolah Menengah Kebangsaan Alam Shah
1968 First batch of Malay-medium students graduated from the University of Malaya
1968 Malay-medium classes introduced at secondary vocational schools
1968 Conversion from English to Malay as the medium of instruction for Standard 1 to 3 in national-type (English) primary schools
1973 All subjects in the Arts stream, from Form 1, in national-type secondary schools were taught in Malay
1975 The conversion program from English to Malay as the medium of instruction in all national-type (English) schools was completed
1980 University first-year Arts courses were conducted in Malay
1982 Conversion program from English to Malay as the medium of instruction in national-type (English) secondary schools was completed
1983 All university courses in arts, science, engineering, medicine and etc, were conducted in Malay"

1.3 Overview: Malaysia Education System

Education in Malaysia is the responsibility of the government according to the Ministry of Higher Education Malaysia[5]-MOHE (MOHEMal), the government's vision

[5] MOHE which was created on 27 March 2004 to take change of higher education in Malaysia.

is to make Malaysia a centre of educational excellence and the mission is to develop a quality education system which will realize the full potential of the individual and fulfill the aspiration of the Malaysian nation according to the Ministry of Education-MOE (MOE vision and Mission).

The National Education systems of Malaysia begin with pre-school and continue through university. The pre-tertiary level is from pre-school to secondary education and teacher education, under the MOE governing authority. The tertiary level or higher education Institutions is the responsibility of the Ministry of higher education-MOHE (MOHEMal).

Under Malaysian National Education system, at the age of four, children can go for ***pre-school education***. Some of the Preschools in Malaysia will provide basic computer learning to children in this level by making use of the technology to teach children learning, drawing and educational games, it is more fun and more motivational. However, not all the Preschools will have the computer facilities. After pre-school, pupils continue their six years formal education called Primary Education.

There are two types of school systems in Malaysia (United Nations Country Team Malaysia, 2005). There are National and National Type Schools, National type schools are further divided into two different types which can be referred to in appendix 2. Malay and English are compulsory subjects in all schools, with English taught as a second language. The structure of these two types of school is essentially the same aside from the instruction medium.

Basically, the Ministry of Education Malaysia provides 11 years of free basic schooling in National Schools, it consists of six years ***primary school,*** namely Standards 1 to 6, which is mandatory for all children between the ages of 7 and 12, and continues further to five years National ***secondary School*** (In Malay called Sekolah Menengah Kebangsaan, SMK), there are three years lower Secondary (Form 1 to From 3) and two years Upper Secondary. Students (Form 4 to From 5)

sit for common public examinations at the end of primary, lower secondary and upper secondary levels.

In National schools, the upper school graduates who have completed 11 years of education [6](i.e. SPM [7] leavers) can continue their Post-Secondary Education (such as the Form Sixth or Matriculation program, 'A' levels) to obtain a pre-university qualification[8] or further their education at tertiary or higher Institutions. However, there are a total of 12 years education for National Type Schools ***primary*** and ***secondary School*** [9] (in Malay is called Sekolah Menengah Jenis Kebangsaan, SMJK). It consists of six years primary school, and there are three years in lower Secondary (junior one to junior three) and three year's upper secondary for (senior one to senior three). (MOHEMal) Students sit for common public examinations at the end of primary, junior middle and senior middle secondary as well as private examinations. After six years of study with the 'Unified Examination Certificate', they can continue their higher education in local colleges or oversea universities.

Upon successful completion of 11 years of free education from National school (called SPM exam), further education is no longer automatic but is subject to the individual's academic performance and financial capability.

Post-Secondary education is provided by higher educational Institutions under MOHE (MOHEMal). It will take up to two years for completion. At the end of this study, they will sit for the Malaysian Higher School Certificate examination.

At the ***tertiary education*** level, courses offered include: awards of certificate, diploma, undergraduate which included Bachelor's degree levels and professional

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[6] 6 years primary, 3 years lower and 2 years upper secondary education.

[7] The SPM (Sijil Pelajaran Malaysia is equivalent to GCSE 'O' level) is secondary qualifications award recognized by Malaysian government examination board for further study in government-funded tertiary institutions (MOEMal)

[8] In total 12 years school education serves as the basic entry requirement into Year One of a bachelor's degree program in higher educational institutions.

[9] This is called Chinese independence high school and it is a type of private high schools in Malaysia; there is no Tamil secondary national type school. (please refer to table: type of school in Malaysia pg 10)

studies and postgraduate studies which include Master's degrees and PhD levels (MOHEMal).

There are two major groups of tertiary education, which are public (government funded, such as public universities, polytechnics, community colleges and teacher training institutes) and private (private funded, such as private universities and colleges, foreign branch campus universities and colleges) education sectors (MOHEMal). In order to get a better overview Level of Malaysia National Education System, the table is provided at appendix 3.

English is used as the primary medium of instruction at most private higher educational institutions. However, most Bachelor's degree courses offered at public universities are taught in the national language (Bahasa Malaysia), while post-graduates studies are usually conducted in English.

1.4 Current State: Overview the Malaysia Education and Information, Communication and Technologies (ICTs)

With the rapid changes in IT's challenged, the followings will look into the ICTs used in Malaysian development and education, and the impact of computers on Malaysian education goals.

The Malaysia government has emphasized that human capital is important to a country's development, and part of the objectives from Ministry of Malaysia education is to provide educational opportunities for all Malaysians. This objective was already achieved in 1990, when 99 per cent of boys and girls were enrolled, however, it is not only in terms of enrolment ratios but also in terms of the number of primary school children completing primary school education, which was above 97 per cent of whom completed primary 5, this was based on the information on the target in universal primary education in the United Nation Millennium Development goal-2 (MDG-2) target to ensure that by 2015 children everywhere, boys and girls alike and will be able to complete a full course of primary schooling (United Nations Country Team Malaysia, 2005).

The relationship between education and human resource development is illustrated in Figure 1, from the right side of the diagram, people with the National Education system, and proceed to the middle, productive employees in the market with the lifelong learning and training, so that they can contribute to the development of the country and achieve the Malaysian Vision 2020. [10]

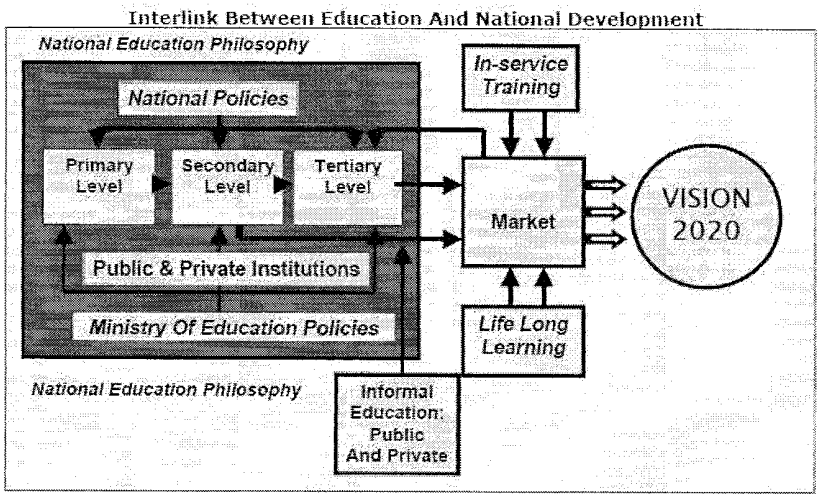

Figure 1: interlink between education and national development
(Source: The development of education, national report of Malaysia by Ministry of Education, 31 July 2004) (National Report of Malaysia, 2004, pg.18)

According to the United Nations Educational, Scientific and Cultural Organization (UNESCO), Bangkok (2007-2008, pg.10) highlighted in its Seventh National Plan (1996-2000) that:

"Malaysia outlined its strategy to develop the labor needs of the nation, particularly in the fields of science and technology. The Plan identified one of the objectives of education and training as to produce an adequate number of highly skilled workers and gave high priority to reorienting the education and training system so that by 2020 Malaysia would have workers with the knowledge, skills and expertise necessary to support a knowledge-based society and economy. Schools were identified as having a key role to increase the number of ICT-skilled people to meet the demands of industries that would be integrating ICT into their processes."

As well the Ministry of Education Malaysia has also emphasized:

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[10] *a vision that Malaysia becomes a developed nation by the year 2020.*

"The MOE and other education and training institutions in recognizing the link between developing human resources in relation to meeting the aspiration of Vision 2020 are committed to provide an education and training services that would be able to prepare its beneficiaries in the formal public or private institutions, or through informal education to meet the challenges of Vision 2020. Thus, Malaysians are continuously trained and their skills upgraded through In-service training programs at the work places so that they can be productive employees who are better able to contribute to the development of the country." (National Report Of Malaysia, 2004, pg.17)

On the other hand, technologies are involved in every aspect of our life in this 21st century (Yildirim, 2000; Look, 2005; Kay, 2007), look at the development of computer technology, mechanical calculating devices have been in existence for a long time, the first electronic computers were built during the Second World War to decode secret messages, this was the First Generation (1945-1956), follow by the first business computers, which became commercially available after 1950, the Second Generation Computers (1956-1963), affordable desktop computers became a reality in the 1970s after the invention of the integrated circuit, this was third Generation Computers (1964-1971), the power of computers has since continued to increase exponentially until the present according to Non-Aligned Movement Centre for South-South Technical Cooperation (NAM-CSSTC, online), and computer technology is changing rapidly and revolutionary in the education area as well, it has created new ways of teaching and learning methods, and ICTs have played a very important role in transforming the mode of education development in these days. As Azian (2006) has stated in his paper that Malaysia first discussed its concept and implications on the education system, ICT was identified as one of the key foundations to realizing the vision of a knowledge-based economy in 2020, and there was a need to develop a workforce capable of exploiting ICT to create new economic opportunities, therefore, it is today absolutely the critical enabler of a knowledge-based economy for many nations and giving distinctive impact on our education area as well (Frost and Sullivan, 2010).

In order to appreciate the meant of ICT integration, it is first necessary to know and define what ICT is. Based on the Malaysian Science and Technology Indicators Report (STI Report, 2008, pg.112), Malaysian National ICT Agenda (NITA) defined ICT as "both production sector and an enabler in its growth development strategy and in moving the country into knowledge society and knowledge economy".

According to the United Nation organization Bangkok in ICT education link, the Ministry of Malaysia Education sees ICTs (UNESCOBangkok,n.d, online) :

> "...*as a tool to revolutionize learning process, to produce richer curricula, enhanced pedagogies, more effective organizational structures in schools, stronger links between schools and society and empowerment of learners. "*

And also sees the concept of ICT in education, includes three main policies as:

> *"1). ICT for all students, meaning that ICT is used as an enabler to reduce the digital gap between the schools*
> *2).The role and function of ICT in education as a teaching and learning tool, as part of a subject, and as a subject in its own right*
> *3).Using ICT to increase productivity, efficiency and effectiveness of the management system"*

ICT as referred to by Buechel (2001), Communication is to exchange of information; Information and communication is how we process the information, and the technology behind the communication of information is called ICT, which is refer to the application of technology in acquisition, analysis, application, increase for potential of information distribution and better storage of information. The process of information is part of our daily activities in organization as well as in Education.

In late 2000, the Malaysian government had already recognized that technology education and hi-tech industries would have the leading role in the country's economy, especially in knowledge-based or K-economy. For these purposes, the government is focusing on education as a means of delivering the individual empowerment, at the same time, government has also emphasized, designed, developed and implemented difference types of plans in the national development goals and the area of education, in order to improve the quality of nations to the Malaysian development, such as technology infrastructure, ICT use in education, smart school project and the Vision 2020. Other than these plans, there is another concept named '1Malaysia', according to Hasnul (2010), the underlying key to this concept is the catchphrase 'unity in diversity' which means working together as one nation in a plural society. It includes in many ideas, one of these is widening the access to affordable and quality education.

A study done by Yoag et al (2006), has stated that the journey of Malaysia to go into a knowledge-base society has been one of the main motivations in integrating computers into the educational delivery system, and the IT facilities have played more exhaustive roles, used in teaching and learning processes in the Malaysian learning institutions. During the teacher training curriculum, it also includes ICT as one of the core components. The focus is on the use of ICT in teaching and learning. The teacher training colleges have made it a requirement that student teachers should be able to produce and evaluate multimedia teaching materials as part of the course work (National Report of Malaysia, 2004).

Malaysia's government has designed and implemented a variety of plans and projects in Malaysia development and education areas, especially in the use of Information technology. The necessary infrastructure and environment for the development of ICT was in place during the Seventh Plan period (7th Malaysia Plan) to enable Malaysia to move rapidly into the Information Age. The National IT Agenda (NITA) was formed in 1996 and provides the framework for the orderly development of the country into information and knowledge based Society by the year 2020 (EPU, 2001-2005).

Malaysia implemented the first computer system in the year 1966. In the early 1970s, the greater integration of ICT was introduced and facilitated by the Government in order to improve capacities in every field and every area of life which also included the enhancement of education and training programs (UNESCOBangkok, n.d.), so that computer and computer- based technology become common and an important tool for teaching and learning in some of the schools in Malaysia. [11] According to Malaysia Science and Technology indicators (STI Report, 2008), ICT is considered as a key strategic driver to support and contribute directly to the growth of the economy and to enhance the quality of life of the population in the 8th Malaysia Plan (RMK-8). In the RMK-9, it stated that ICT is regarded as a key determinant in the development process to move the economy up the value chain, and various ICT strategies have been developed in these

[11] Because not all schools can afford the new technologies, some schools are in rural areas.

regards in order to move the Malaysian society and its economy to become more competitive in the globalized market.

As mentioned earlier, Malaysia has a national ambition, namely Vision 2020, which is a Malaysian ideal introduced by the former Prime Minister of Malaysia, Tun Mahathir Mohamad during the Sixth Malaysia Plan in 1991, this Vision 2020 emphasized that Malaysia must become more of a knowledge economy in order to become globally competitive, and Malaysia's Government is preparing to meet this challenge (Mahathir, 1996). In order to prepare Malaysian students for a fast evolving knowledge based economy stated in the Vision 2020, there is a need of integrating ICT in education. As a result of this, computers and broadband access was introduced into schools.

In order to support Malaysia's ICT master plan and to achieve the Vision 2020, the education system is being transformed, taking away the rote-memory learning and fostering creative thinking skills in order to create a more creative and innovative Malaysian new generation, who are able to facilitate and use the new technologies. This process is done by the means of 'ICT-enabled Smart Schools' (UNESCOBangkok,n.d.).

Malaysia began to implement this Smart Schools Project by the Ministry of Education in 1999 through a contract with Malaysian TELEKOM under the Telekom Smart School (TSS) Sdn Bhd project. ICTs are one of the most important technology teaching tools used by this new educational project. The Malaysia Smart School was launched in 1997 by the prime Minister as one of the Multimedia super corridors (MSC) Flagship applications.
The MSC Malaysia[12] was conceptualized and initiated by the former prime Minister in 1996 with the full support of the Malaysian government. It includes a number of nationwide IT projects that are intended to transform major sectors of Malaysian

[12] MSC Malaysia, formerly known as the Multimedia Super Corridor (MSC), is a national initiative spearheaded by the Malaysian Government to promote the national ICT industry and to provide a test-bed for the global ICT industry.

society using IT. MSC Malaysia works toward building a knowledge-base economy, contributing to the growth of ICT industry and creating a pool of talent, resulting in high-value job creation, the major sectors are governance, healthcare, commerce, manufacturing and education, the Smart School Project was one of the education projects. Some others MSC Flagship applications are MyKad (multi-purpose card), Telehealth and e-Government (MSC link).

According to Fadzliaton and Kamarulzaman (2010), the main objective of this Smart School project is principally to deploy the latest information technologies to revolutionize the education system. For the purposes of the Smart School project, many teachers were trained how to use computers to teach and many schools are supplied with computers, notebooks and LCD projectors so that teachers are able to make use of the technology to teach. In this Smart School project, it is not just about ICT intervention in teaching and learning, it is a learning institution that has been systemically reinvented in terms of teaching and learning as well as the improvement of the school management processes in order to help students cope and excel in the Information Age (Smart school project team, 1997).

In recognizing the paramount importance of information technology for education, Malaysian schools have experienced a dramatic growth in the use of computer-based technology. The Malaysian Education Ministry has provided support, assistance, ICT tools, teaching course wares, and teacher training, in addition to financial incentives (Kumar et al. , 2008b).

In short, the widespread use of ICTs in Malaysian schools is just a tool to achieving larger educational goals and objectives, designed in order to help the nation achieve a developed country status by 2020 according to InfoDev (2007), the week-long National Capacity Building Seminar - Using the Online ICT in Education Toolkit for Policymakers, Planners and Practitioners, which is co-sponsored by the Ministry of Education, Universiti Sains Malaysia (USM) and UNESCO, Regional Office for Education (Bangkok), opened with an address by Dato' Hon Choon Kim, the Deputy Minister of Education.

1.5 Computer learning in Malaysian Schools

As Wong and Hanafi (2007) stated, most of the IT introduction courses are compulsory for the first year students worldwide, where students are taught to integrate IT tools and applications into their own learning experience, teachers are also encouraged to make use of IT tools for their teaching process in order to integrate IT into the leaning process.

In Malaysia, general basic computer courses such as Microsoft word, Excel, PowerPoint and graphic design courses are taught in the primary level, however, a minimum fee will be charge for having these computer courses at certain schools.

By referring to the Curriculum Development Centre by Ministry of Education Malaysia, ICT Literacy (ICTL) which is availble for Primary Schools, is a program designed to give the foundation for pupils to develop their ICT capabilities in future years. The designs of ICT literacy progam for the first three years of primary school is to use basic computer applications and devices, and for the fourth through sixth years of primary school is to master the use of basic computer applications, internet skill and webpage building. Basically, it covered computer lab management, computer hardware and computer software (such as word processing) (Bakar, 2005). Unfortunately, not all schools there have the computer facilities installed, again not all schools will provide computer courses to pupils. Computer subjects are not available in all National schools but mostly in Chinese primary school and Chinese independent high school.

Again Bakar (2006) has mentioned that introduction of ICT is an elective subject availble only in level 4 and 5 (Form 4 and 5) of the National secondary schools and it will also prepare them for the SPM examination (see Footnote 7, pg.19). It aims to provide them with the knowledge, skills and values from several designated learning areas. It contains Information and Communication Technology and Society, Computer Systems , Computer Networks and Communications , Multimedia, Programming and Information Systems.

Although government and ministry of Education has already planned and implemented ICT by building in computer labs and facilities and IT subjects in the curriculum, however, not all schools have computer labs constructed, especially in rural areas and Tamil schools are very limited, only selected National schools will use ICT to teach or learn computer subjects in schools due to the facilities and financial support. These will be further illustrated later in the following section problems and barriers with ICTs use in Malaysian Schools.

1.6 The Problems and Barriers with ICT use in Malaysian Schools

There has always been a problem with the use of languages in the curriculum and teaching due to the fact that Malaysia is a multi-cultural society. The ministry of education has strongly recommend that mathematics and science are the main subjects to learn in school due to the monopolistic of technologies in the future world; In May 2002, in order to improve English language proficiency, the government announced English use as the medium of teaching in Science and mathematics to enable future generations to keep up with developments in ICT (National Report of Malaysia, 2004). Therefore, teaching these subjects has been changed to English, instead of Malay, since English is a universal language, as the message from the Development of Education National Report of Malaysia by Ministry of Education (National Report Of Malaysia,2004, pg.10) stated that:

"Mathematics and science represent the gateway to a world of Creativity, innovations and discoveries. The MOE is striving to emphasize the learning of mathematics and science because the future of the world rests upon new breakthroughs and cutting-edge technologies. The MOE is enhancing the teaching of mathematics and science to entice more youths to be interested in these areas; especially when schools are considered the initial stage in preparing future mathematicians and sientist. The MOE is also exploring various ideas to stimulate learning in these areas. The Nobel Laureate Centennial Exhibition held in KualaLumpur in 2004 to commemorate the 100th anniversary of the Nobel Prize is testimony of Malaysia's commitment in promoting mathematics and science education." And

"In Malaysia, the delivery of mathematics and science subjects has always been in the National Language (Malay). However, in 2002, English language was made the medium of instruction for both these subjects. The decision to switch to English language as the medium of instruction was based on the rationale that a good command of English would

enable students to access the internet, read articles and research papers, and other materials published in English".

As we can see from above message, the Ministry of Malaysian Education has a problem choosing the language for teaching and learning.

On the other side, more than 50,000 science and mathematics teachers have gone through curriculum induction training, language proficiency training and ICT usage as well (National Report of Malaysia, 2004). Such training or retraining is essential in order that teachers have more confidence and the necessary skills to enable them to actually use the computer in schools (Kumar et al., 2008b).

As the trainers are being trained; laptops and incentives were given to the schools and teachers, therefore, schools have received ICT equipment in order to utilize ICT and the internet. However, some of the real situations of ICT use in schools are different from the plans, for example the non-extensive usage of computers by teachers for classroom instruction (Fluck, 2003; Kumar et al., 2008b), the major obstacles cause to this problem should be investigated and find out (Kumar et al., 2008b).

In general, ***the problem issues from ICT use in Malaysian school*** could be summarized as not enough technicians' support (some of the cases especially in remotes or rural areas of Malaysia schools, the disabled computers take months to be repaired due to lack of technical support), language issue (English language is a second language in Malaysia, as English is not widely being used in Government schools or some rural areas of Malaysia, therefore some teaching/ learning materials have been converted by the teachers themselves to national language in order to make use of ICTs in learning more effectiveness), hardware and telecommunication infrastructures with low quantity and quality access (some schools are short of computer labs, have limited computer hardware and software installed, have an unstable internet supply and electrical supply in rural areas), human resources and training. Some of these issues will indirectly influence attitudes on using computers for teaching. On the other hand, in order to make ICT more effective in the school, efficient and effective administrative and management support should not be neglected (Wahab, 2009). As Fadzliaton and Jamarulzaman

(2010, pg.2) have also highlighted in their study, *"...Efficient and effective management of educational resources and processes are required to support the teaching-learning functions"*; further literature review on this issue will be given in chapter 2.4.

Although schools are getting good support from the Malaysian government in the use of ICT in education and large amounts of money were spent (STI Report, 2008), many of the teachers and students especially in Malaysia National schools still lack support from the above mentioned issues in the ICT projects. (More details in literature review chapter 2.4)

As ICT in education projects are not just technology-driven and a long-term success of a project does not depend solely on the abilities and actions of a few individuals, it should be managed by a team composed of educators, technologists and management. As referring to the Smart school project team (1997), the smart school components are showed in figure 2. The whole process of the Smart School project is a long process and it is faster and more efficient with the use of technology, because Information technology enables the process of transforming traditional schools into Smart Schools, however, technology alone will not make a school to be smart, only with the improvement of teaching-learning strategies, management and administrative processes, capable and well trained people together can make it.

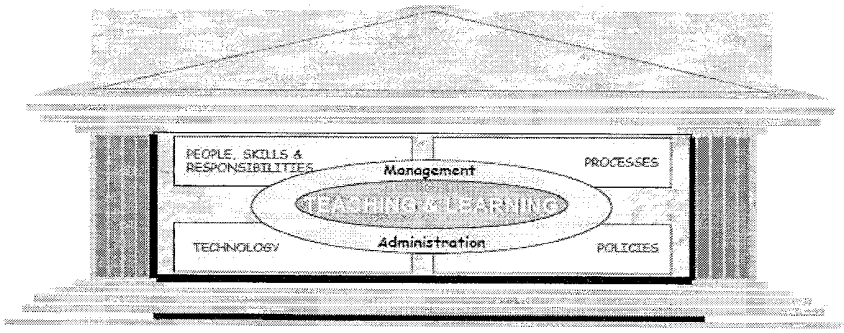

Figure 2: Smart School Components
(Source: The Malaysia Smart school, An MSC Flagship application, A conceptual blueprint from Smart school project team 1997, pg 67)

Critically, ICT is a very useful tool for making teaching and learning processes easier, more fun and effective, as well as making communication and management among the stakeholders more efficient. However, there are a lot of problems and obstacle for ICT use in education to move forward referring to the above

discussions and part of this study provides the basic understanding of the problems use of ICT in Malaysia education in general.

1.7 Thesis Overview

This thesis consists of seven chapters, the first chapter includes an introduction to the Malaysian Education system and background, current state of ICT learning, and the problems and Barriers of ICT use in Malaysian Schools; Chapter 2 is the literature review, examining and reviewing of many other documents and researches, especially on teachers' attitude toward computer use in the classroom, additionally with problems and barriers of using ICT in schools as well as the instrument tools; Chapter 3 highlights the goals, research question and the hypothesis of this research; Chapter 4 gives the research methods, how the data was accessed, questionnaire composition and descriptions of the questionnaire, working plan and the research design; Chapter 5 is the Analysis and results part, with introduction about the data collection about this study, followed by showing the analysis results from demographic section, CAS dimensions, as well as among the demographic and the CAS dimensions with SPSS software which included descriptive statistics, T-test, Chi-Squared Test and Correlation Test. The findings of Problems and barriers ICTs' use in Malaysia schools were also included; Chapter 6 is the limitation of the study, discussion with conclusion and the endnote; Chapter 7 lists all the Bibliography and the appendix.

The ICT in education area is changing and moving so quickly, therefore not all rapid change that can be included here.

Chapter 2: Literature review

One of the important steps in the research process is to review research relevant to the topic. A literature review provides us with a foundation to investigate further and due to the findings of the study will be impacted by the measurement tool being used in the study. It is important not only to understand the basic historical technology related attitude research and the trends in recent research, but also the

different instruments for measuring teachers' attitudes. There are many instruments used to measuring teachers' attitudes, however, not all are necessarily applicable to people with a different educational profile and background of the original survey group. This literature review is organized into four sections which consist of important of ICT in education, current knowledge of teachers' attitude especially on their belief and emotions toward computer use in the classroom, instrument tools and the barriers to technology integration.

2.1 Important of ICT in Education

As mentioned earlier, human capital is important to a country's development according to a research by IIASA (2008), and education is important and the foundation for producing quality human capital. Today schools especially in developing countries interested in increasing performance of its human capital on a long term basis need to deal with the environment necessary for successful use in the knowledge-based economy. On the other hand, technological change is taking place all around us (Yildirim, 2000, Look, 2005, Teo, 2008) and ICTs are not only the backbone of the Information Society, but also a tool in education to change our students into productive knowledge people (Pelgrum, 2001). ICTs are today absolutely the critical enabler of a knowledge-based economy for many nations and are having a distinctive impact on our education areas as well (Frost and Sullivan, 2010).

In general, Information technology, computer technology or ICT use in schools, whatever the phases are being used and despite the confusion of terminologies, the objective is integration of new technology into the education and facilitating these technologies in the teaching and learning process, for enhancing and improving the overall quality of education and providing a quality teaching and learning environment and accelerate student learning outcomes (Fluck, 2003).

As earlier traditional school models, where the teacher is the source of all the information come in and this has slowly been taking over by ICT Use or the IT facilitated teaching and learning through the use of relevant courseware and

software in the classroom or on the internet. Therefore, technology is the foundation for a new learning process available to anyone, anywhere and anytime (Tinio, 2002). There is an increasing trend in teacher education programs to integrate technologies into instruction and the availability of ICT has changed the nature of teaching and learning (Becta, 2003). In other words, today teachers are facing rapid changes in both knowledge-based and technology when they work with the young generation.

The key function of using ICT as a tool in education for students is to increase student learning experiences and to create a thinking and creative knowledge culture. As Al-Zaidiyeen et al. (2010) have agreed that overview of the research in the value of using ICTs in the teaching and learning process proved that the utilization of ICTs has had a major influence on the teaching and learning process. ICTs have proved to be an effective tool for educational purposes, and it has extended and transformed the way students learn and teachers teach.

ICT in the Malaysian education context, ICT integrated in education is referring to the entrenchment of ICT as part of the education during the whole process of teaching and learning across all subjects in all levels of education institutions. The most direct aim for integrating ICT in education is to enlarge student learning experience and to create students who are more creative, innovative and productive from all disciplines through the amalgamation of ICT in education in a holistic manner. Education reform and computer use in the classroom is become absolutely necessary in the education area (Frost and Sullivan, 2010). With the technology, it is not only to enhance the teaching environment, but also the learning environment (Al-Zaidiyeen et al., 2010), and this learning environment is one of the increasingly influential factors that lead to enhancing human capital thus increasing competitiveness. Significantly, the potential for increasing access and enhancing the quality of education represent a high goal for any country but in particular for developing countries such as Malaysia. Therefore, in order to sustain a growing economy, sufficient investments, a well structured educational system is essential together with using IT in education. An example, the Malaysian Ministry of Education was equipping teachers with powerful notebooks with the aim of

increasing computer literacy of teachers and providing schools with computer facilities based on the Smart school program in order to enhance the learning and teaching experience of students and teachers (Kumar et al., 2008a).

To understand how important technology in education is, we should understand that using technology based teaching to enhance the quality of teaching and learning means developing a classroom situation in which learners, including both male and female, feel comfortable with the technology (Teo, 2008) and it also provides rich and varied experience to students unbiased for male and female students if we use and teach them in a proper way. Although there are also many people or expectations concerned with using technology in education will result in access to inappropriate materials or websites. The implementation of ICT as a tool to enhance learning and teaching can make a difference in achievement, according to Azian(2006), it helps not only in making the teaching and learning processes more interesting and enriching, with the use of technology, it is able to take the smart school to its destination more quickly and efficiently.

On the other side, Perceived Usefulness (PU) is very important. Most of the teacher educators perceived computers to be an important component of the teaching and learning experience, when they perceive ICT as a tool to meet the curricular goals, they are more likely to integrate ICT in their lessons (UNESCOBangkok, 2004; Cox et al., 1999). In respect of the teaching experience, the use of computers was perceived as improving the efficiency in preparing teaching materials, saving time and improving the process of delivering instruction (Ahmad Ridzuan et al., 2001), as well as increasing collaboration and sharing of resources, expertise and experiences among teachers (UNESCOBangkok, 2004); on the learning experience side, it is not a surprise that the benefits of technology in the school and classroom have opened up a whole new technology learning environment, a research from the paper 'Impact Assessment Studies on the Smart School Integrated Solution (SSIS) and other ICT Initiatives' has also shown that about 83.5% of the teachers agree, use of ICT has improved students learning experience (Frost and Sullivan, 2006). According to the case study by UNESCOBangkok (2004), many studies demonstrate that ICT tools have helped to

improve greater autonomy in learning, stimulate students' sensory and cognitive curiosity, develop life skills, boost self-confidence and facilitate the learning of abstract ideas and theories.

Based on the study by UNESCOBangkok2 (2011), an evaluation compared results from students in the participating schools to the results of non-participating schools, (in Hortolandia and Sao Paulo, Brazil) in which the way technology was introduced in alignment with pedagogical programs, interactive content development and teacher training. The results showed that middle school students improved their performance by 34 percent in Portuguese and 20 percent in Math, results that are two to seven times better than the results obtained by the non-participating student control group. High school students also achieved better results as well. In addition, it became clear that the more interaction in the classroom the teacher provided, the greater the student's interest in studying.

Several authors have also recognized the benefits of using ICT in the classroom (Becta, 2003; Look, 2005; Kellenberger and Hendricks, 2003; Dogra, 2010; Frost and Sullivan, 2010), by facilitating ICT Infrastructure into education as an enabler for quality education and quality teaching and learning, improving students' motivation and skills, accelerating improving student outcomes because knowledge can be easily procured with the help of internet technology, in depth knowledge increases motivation and active participation. Studies have shown that students using technology show improvement in their writing, reading and mathematics skills. It improves and enhances their learning abilities (Dogra, 2010), due to the reason that students often employ technology to perform research, analyze data, and compose reports and many other activities, it is clear that ICT should not be used only as a basic operational tool, for instance, as a critical enabler for education which promotes the development of creativity, collaborative learning, critical thinking and problem-solving (Frost and Sullivan, 2010).

Becta (2003) has identified some benefits of using ICT in research such as ability to provide fast and accurate feedback to pupils, increase motivation amongst pupils

and greater collaboration between pupils. Look (2005, pg.4) has also mentioned a positive feedback on using technology in the classroom from his study that

"...a *review of 219 studies on the effects of technology on learning, consistently found that students in technology rich environments experienced positive effects on achievement in all subject areas*".

However, questions are still being asked: Can ICTs really help extend the access to education and improve the quality of education in general? Do ICTs works for everyone, everywhere in the same way? The answer might be giving as: It mostly depends on the effectiveness of ICTs use in education, how are they being used and for what purpose. It is like any other educational tool, it will not work the same for everyone (Tinio, 2002), if we do not use it in a proper way with a good support and attitude.

According to ICT in Education by Tinio (2002), it is not just technology involvement; there is a complex process for effective ICTs integration into an educational system. Eventually, it is much easier for getting the technology part compared to others factors such as initial investment cost, curriculum and pedagogy, institutional readiness, administration and technical support, long term financing/ maintenance and teacher competencies. Teacher development is the most critical component to the success of ICTs integration, on the other hand, teachers should be computer literate, therefore, teachers should have intensive training on IT skills to enhance thinking and creativity, understand more of its relevant, usefulness and usability, and be confident in the use of ICTs in order to make the best use of the ICTs (Smart school project team, 1997). Thus, the following will look into the teachers' attitude factors that might influence their use of computers for instruction for more details.

2.2 Teachers' attitude toward technology use in the classroom

Over the past years, there have been a series of programs in the development of ICT in education and there have been research studies of the ICT in education, these include studies of the importance and effects of teacher training (Yildirim, 2000), Teacher Pedagogical Beliefs (Ertmer, 2005), factors influence (Wahab, 2009) and teachers attitudes (Loyd and Gressard, 1984,1985 ; Woodrow, 1991). Many studies have shown that teachers' computer training, the increase of ICT resource

and support and many others have been slowly up-taking teachers ICT use in school. However, Cox et al. (1999), have pointed out that once teaches have finished their initial training if they do not expect to need much further training, which means, they do not take the initiative to improve their practice and learn new skills, consequently, if teachers see no need to change or question their current professional practice, they may not accept the use of ICTs in their teaching. Similarly, the study from Abd Mukti (2000) has shown that teachers' background characteristics, attitudes and concerns showed a great significance in the degree of classroom computer usage. Thus, the purpose of this literature review is focusing on examining many of the factors which might influence teachers and their attitudes towards technology use of teaching in the classroom, in order to understand more about implementation of ICTs in schools and effectively use and help to improve the teaching and learning process, and quality learning output.

Although using ICTs in teaching is important and have many benefits, a literature review by Fluck (2003) on ICT effectiveness has shown that the ICT has so far proven only as effective as other innovations based on the Experimental studies typified by meta-studies, and for the descriptive studies have found ICT has potential for improving learning outcome but providing it is safely applied in appropriate areas and teachers are adequately trained; therefore, we know that apart from the benefits received from the technology use, teachers are one of the important factors which we need to consider that might affect the effective use of technology in schools. As Blignaut (2006) has mentioned, a person's attitude towards computers and technology could determine his or her performance with the technology and the satisfaction he/she draws from the experience. As teachers are the key to the successful integration of ICTs into education (UNESCOBangkok, 2007-2008; Smart school project team, 1997) because they eventually determine how they are used in the classroom (Albirini, 2006), It is clear that accepting computers as a teaching and learning tool is an important factor to the successful use of computers in education (Kumar et al., 2008b) and many believe that teachers input on technology decision are critical (Look, 2005; Teo, 2008; Saud et al., 2010) in the success of teaching and learning process between the learner and technology. Kumar et al. (2008b) has also shown in their study that there have

been studies carried out around the world in developed, industrialized and information based countries showing that teachers' use application of technology is the key determining factor for improved student performance in knowledge acquisition and skills development enabled by technology. Therefore, the target might not be achieved without the pioneer teachers who see ICT as a tool that can help them to accomplish the teaching and learning process more efficiency. Another study by Yushau (2006) also recognized that the role of teachers toward information technology plays a crucial role in the successful use of computers in the teaching and the learning of mathematics. Additionally, teacher attitude toward computers is central to any successful use of computers in education (Yuen, A. H.K. et al., 2001; Albirini, 2006).

Indeed, teachers play an important role and have the most potential to influence the effective implementation of the information technology in the educational system. A positive teacher attitude towards computer use is critical if computers are to be effectively integrated into the school curriculum (Look, 2005; Albirini, 2006; Teo, 2008; Al-Zaidiyeen et al., 2010). It is important to develop teacher support in order to promote interest, and once it is achieved, maintaining implementation in the classroom is essential, and their willingness to embrace the technology is a central aim (Teo, 2006)

Basically, the research literature on the implementation and meaningful use of ICT shows that it involves a large number of influencing factors (Al-Zaidiyeen et al., 2010), such as Afshari et al. (2009) have defined between non-manipulative and manipulative school and teacher factors, for example factors cannot be influenced directly by the school, such as age, teaching experience, computer experience of the teacher or governmental policy, attitudes of teachers towards teaching and ICT, knowledge and skills of teachers or School Vision and plan, ICT infrastructure and support. Also, Ertmer (1999) has identified them as first order (External) and second order (Internal) barriers. External barriers include inadequate training, insufficient technical support, lack of resources as well as lack of time. Internal barriers include teachers' beliefs, visions concerning technology integration, and views about teaching, learning, and knowledge. In other words, meaningful use of computer technology in education can be influenced by many factors and one of

these factors is teacher's attitudes and their emotions and belief (how their feelings influence their thoughts), these can be measured by different dimensions such as usefulness, computer liking, computer confidence and anxiety. Indeed, there has already been some research done to explore potential factors associated with attitudes toward computers (Al-Khaldi and Al-Jabri, 1998; Yildirim, 2000; Yuen, et al., 2001; Juanna et al., 2005; Deniz, 2007; Hung et al., 2007; Olu Jegede et al., 2007; Wahab, 2009). However, some researchers have agreed that there is much less research on factors such as level of anxiety, belief and perception, which are important factors since these might impact on teachers' computer use for instruction (Wahab, 2009).

2.2.1 Teachers' belief

Beliefs have been explored by many philosophers, psychologists, sociologists and researchers in the fields of study such as education, business, and nursing. Beliefs can easily influence our behaviors and thought, for instance, some believe girls are not good in math and computers and it seems this also has a strong influence on our teachers thinking and their practice, so that some teachers might concentrate more on boys in math and computer subjects or revise. According to Fishbein and Ajzen (1975) conceptual framework, a person's intentions are a function of certain beliefs and some of these beliefs influence the person's attitude toward the behavior.

It is important to consider teachers' own perceptions in the relationship with their content knowledge and actual behavior, therefore teachers' beliefs can be viewed as a direct influence upon their classroom behavior and these beliefs will follow teachers into their classrooms, as a result, teachers might be using the computer by acting upon their beliefs in their teaching (Kellenberger and Hendricks, 2003). Similar to Ertmer (2005), who has mentioned that although all the external supplies are improved, for example schools continue obtaining support and better hardware and software supply from the government, but teachers' belief has to be considered and resolved due to the benefit to students learning is still dependent on the skill and willingness of teachers to use this teachnolgy. However, he has suggested that it is important to build teachers' confidence and competence and reducing their

anxiety before their belief, and it is not necessary to change their beliefs before introducting various technology skills, so that higher level uses become more plausible and credible. Still, as he has mentioned, this has not yet been borne out by the literature.

Similar to the study by Teo et al.(2008), they have argured that the ways teachers integrate technology can be in different, some teachers use technology mainly for presentation purposes, while others allow students a full reign of technology resources. I It is possible that how teachers use technology for instructional purposes is influenced by their beliefs about teaching and learning, as he has mentioned that beliefs about teaching are referred to as preferred ways of teaching by teachers.

Hermans et al. (2008) have shown that teachers' beliefs are significant determinants of why teachers adopted computer use in the classroom. Their study was focusing on teachers' educational belief (constructivist and traditional beliefs) of computer use, the control variables of computer experience, general computer attitude, age and gender. Their computer attitude was measured by the name of 'Van Braak and Goeman' General Attitude toward computer, which included items related to Computer Liking, Computer Anxiety and Computer Confidence. Beside the impact of computer experience, general computer attitude and gender, the results show a positive effect of constructivist beliefs on classroom use of computer, and traditional beliefs have a negative effect on classroom use of computer.

Teachers' beliefs about the technology in this study of computer usefulness in their teaching and learning process, such as: computers make things easy to organize the instruction plans, improve effectiveness and make learning more interesting and fun for example.

2.2.2 Teachers' Emotions

According to Sutton and Wheatley (2003), many literature reviews have suggested that teachers' emotions might influence teachers' and students' cognitions,

motivation, and behaviors. There are positive (such as love, happiness, well-being, strength, satisfaction, ease, confident and involves pleasure when well progress to the goal) and negative Emotions (such as anger, discomfort, scared, unfortune, unease, irritation, sadness, weakness, disgust and the goal was thwarted) of people making progress toward a goal and concerns (Sutton, 2005). However, sometimes, emotions are often thought of as out of control, destructive and primitive rather than thoughtful and civilized. The goal and concerns are different from individual to individual, for example, when teachers are having problem using a computer in the classroom, some teachers will become angery, while some teachers will feel challeged when facing problems.

According to the learning classroom: Emotion and learning, emotions are important in the classroom in two major ways, firstly, emotion influences our ability to process information and to accurately understand what we encounter. It has an impact on learning and also affects our learning process. Secondly, learning how to manage feelings and relationships constitutes a kind of emotional intelligence that enables people to be successful. For these reasons, it is important for teachers to create a positive, emotionally safe classroom environment to provide for the optimal learning of students (Hammond et.al, 2003).

People will sometimes be frustrated or anxious when they try to learn something that is difficult, and these people, who are depressed or anxious about learning, often do not feel competent and do not trust themselves. When emotions interfere with competency beliefs, people might withdraw from classroom activities in order to avoid appearing incompetent in the classroom (Hammond et.al, 2003). In addition, other emotions such as anger, frustration, challenge and disappointment, are more likely to eventually feel burned out.

The teachers' emotions in this study included teacher computer anxiety, liking and confidence.

2.2.3 Attitudes

Referring to the attitude, Olson and Kendrick (2008) described attitudes encapsulate positive and negative feelings, beliefs, and behavioral information on any object, such as people, events, activities or anything in the environment. Agreement with other researchers on 'Attitude', Fishbein and Ajzen (1975) have pointed out that there are three basic features on the notion that, attitudes is learned, it predisposes action and such actions are consistently favorable or unfavorable toward the object. Once a person's predisposition (i.e. attitude) has been established, it is expected that the person will (or will not) perform the behavior. Additionally, in the discussion on the notion of response consistency, they noted that the major characteristic that distinguishes attitude from other concepts is the affective nature, since affect is the most essential part of the attitude concept as widely recognized. In fact, Al-Khaldi and Al-Jabri (1998) have recognized that the overall attitude has affected the actual utilization of computers; their study on the result on the effect of computer attitudes on computer utilization has indicated that the significant effects on utilization are computer liking and computer confidence.

2.2.4 Teachers' Attitude

As for this study, teachers' attitude can be referred to a mixture of teacher's general feeling of like or dislike, confidence or no confidence, high or low anxiety, believe in or not on the usefulness toward computers technology in teaching. An example, computer anxiety has been shown to have a significant impact on attitude, intentional behaviour and performance based on their specific knowledge and experience, the computer confidence will have influence on their perceived ease of use (Fishbein and Ajzen,1975). It is important to take into account the influence of attitude toward the use of computers, since teachers demonstrate proficiency in integrating computer technology in the process of teaching and learning (Kumar et al. 2008b) and according to them; previous literature suggested that numerous studies have shown the impact of attitude in predicting the use of computer use. Based on their study, they also suggested that it can be construed that teachers who viewed computer technology as positive were able to demonstrate greater

usage of computers while those who viewed technology from a negative perspective did not acquire and integrate knowledge and skills on computer technology in their classrooms. For example, the findings of their study showed that there was a significant positive relationship between perceived usefulness and use of computer, which means if teachers find the application of computer technology to be more useful, they would be determined to make full use of it; it is not surprising that it could be influenced by several other factors.

The study by Juanna et al.(2005) found out that 83.1% of teachers found IT to be useful, they believed that using computers would actually enhance their job Performance. Thus teachers' attitudes towards IT were high and this indicated that most of them (80%) had very positive attitudes toward the technology.

In general, the study results from Yushau (2006) also suggested that mathematics professors have fairly positive attitudes toward computers; the attitude of the teachers towards the pedagogical usefulness of computers is far above average with a mean more than 19 out of 24.

Some others factors that might influence attitudes of students and teachers toward technology use considered by researchers are age, gender, computer ownership, level of education, years of experience and computer experience, level of use, and computer training (Yildirim, 2000; Ahmad Ridzuan et al., 2001; Kay, 2007; Kumar et al., 2008a; Hermans et al., 2008). The only factor repeatedly found to have a positive effect on computer attitude by many authors, was years of computer experience (Loyd and Gressard, 1984; Ridzuan, 2001, Yuen and Ma, 2001; McLeod, 2008; Teo, 2008; Wahab, 2009).

2.2.5 Attitude and Factors

The following section will look into more literature with respect to teachers' attitude with emotion and belief , as well as demograhic data and computer related experience.

Attitude and level of use

Research studies on attitudes toward computer use in Malaysia have been conducted among students and teachers (Ahmad Ridzuan et al., 2001; T.Ariffin, 2005; Juanna et al., 2005, Wong et at., 2007; Kumar et al., 2008a,b). A previous study by Ahmad Ridzuan et al. (2001), found out the level of computer use (based on selected demographic data such as age, gender, computer ownership, and experience) and attitude towards computer (using CAS three subscales of Gressard and Lody(1984)) among 224 teacher educators at three teacher training colleges in the state of Johor Malaysia, have shown that teacher educators have positive attitudes and low anxiety toward computer use for teaching and learning in general, the three domain of CAS test namely computer liking, confidence and anxiety were significantly related to computer use as well. As mentioned in his study that most of the local studies reported findings of low computer anxiety levels and positive attitudes toward Computers.

A finding from Al-Zaidiyeen et al.(2010), has revealed that there was a significant positive correlation between teachers' level of ICT use and their attitudes; it indicated that the teachers' attitudes towards the use of ICT had a direct relation with the use of ICT for teaching.

As Juanna et al.(2005) measured teachers' attitudes toward IT in term of usefulness, confidence, anxiety and aversion, has shown in their analysis result that the majority of participants had very little aversion (75.6%) towards IT, which suggested that they did not have any dislike or negative feelings and reactions towards using computers. They also indicated that all of the factor usefulness, confidence, anxiety and aversion toward teachers' use of IT were significant.

Other research, such as a study of Becta by Jones (2004, pg.3) has indicated the key finding of the study,

"A very significant determinant of teachers' levels of engagement in ICT is their level of confidence in using the technology. Teachers who have little or no confidence in using computers in their work will try to avoid them altogether".

In other words, there is a close relationship between levels of confidence and many other issues which can be considered as barriers to ICT use in the classroom.

In the context of implementation of the IT in the educational system, Brush and Hew (2006) mentioned that teacher attitudes toward technology may be conceptualized as teachers like or dislike of using technology. Nevertheless, it is important to take note that the influence of attitude toward the use of computer technology if they do not like or do not believe or even know about computer technology, they might not be open to using computers in the classroom for example.

Research by Deniz (2007) also indicated that significant differences were found between the general attitude towards computers and computer liking attitudes of teachers. There seems to be a strong association between use and competence.

Yuen and Ma (2001) in their examination on the Chinese Computer Attitude Scale for Teachers (CAST) in Hong Kong reported the use of computers for instruction and the result revealed that affective attitudes, general usefulness, behavioural control and pedagogical use are significant in determining the implementation of ICT. According to their results effective and general usefulness were significant to influencing the usage of computer in their study, but only has a standardized coefficient beta of around 0.16 of the overall model, therefore they suggested that teachers tend not to focus too much on the general usefulness of a computer itself, as well as liking of computers in usage since they do not contribute much to the usage. However, in the study of Yushau (2006), the teachers' attitude towards the usefulness of computers is far above the average; this is an indication that the perception of the professor toward computers is more of a positive tool that can enhance the teaching and learning process.

Gressard and Loyd (1985), found that the perceived computer usefulness can influence attitudes towards computers, and teachers' confidence in using computers may influence their implementation in the classroom as well. However, the study from Al-Khaldi and Al-Jabri (1998) has shown that anxiety and perceived usefulness were found to be an insignificant determinant of computer utilization.

There is some research based on the AUC for the measurement of the factors influencing Malaysian teachers use of teachnology in the classroom, for example

Kumar et al. (2008a,b) have shown in their study results on teachers use of technolgies in the classroom are at the moderate level.

Attitude, Age, Gender and teaching experience (Computer Liking, Confidence, Anxiety and Usefulness)

"Little evidence was found in the literature to support the view that age affects levels of teachers' ICT use" (Jones, 2004, pg.4).

Although there is extensive computer education research that provides evidence on the gender differences in computer technology adoption and usage (Yuen and Ma, 2002), the results regarding gender differences have not been consistent, especially from the aspect of attitudes towards computer since 1980s (Ariffin, 2005).

In relation to **gender** differences, some studies provided evidence and show that gender differences in computer technology use mostly in favor of males, they found that males were more confident and have greater usage of computers compared to females, (Jones, 2004; Kay, 2007; Hung and Hsu, 2007), however some are reverse.

A study by Tahira and Sadia (2011) examined **gender**, type of school, mathematics anxiety and mathematics achievement on attitude toward computers by using the Computer Attitude Scale, Math Anxiety Scale and Math Achievement Test with 863 male and 789 females' students from 15 secondary schools from India. The results showed that females have less anxiety, more comfort, confidence and positive attitude toward computer than males. Similarly the study by Ariffin (2005) on **gender** differences in attitudes and skills found that students have positve attitudes toward computers, female students have more confidence and postitive attitudes toward the importance of computers.

Another Study by Yuen and Ma (2002) also showed that there is a relationship between **gender** and actual usage of computers. Perceived usefulness will influence intention to use computers more strongly for females than males, but

perceived ease of use will influence perceived usefulness more strongly for males than females.

The following section has shown that **age and gender do not affect** teachers' perception of information technology and its usage.

According to the previous study from Ahmad Ridzuan et al.(2001), the results showed that there was no difference in computer use level based on **gender** ($t = 0.872$, $df = 224$, $p = 0.38$), and **age** ($F = 1.448$, $df = 3/220$, $p = 0.23$). Similarly the study by Wong and Hanafi (2007) on examining gender differences in attitude toward the usage of IT related tools and applications among student teachers (73 female and 29 male) at a university, the study found that there were no significant differences based on **gender** of female and male teachers.

Another study by Kumar et al. (2008a) examined the factors influencing the effective use of technology among Malaysian teachers with a self-administered questionnaire. The research instrument consisted of two sections, namely socio-demographic section by investigating age, gender, teaching subject, experience and training. The Actual usage of computer (AUC) measurement, was developed by Kellenberger and Hendricks, was used to measure the actual usage of computers by teachers. The AUC consisted of forty three items of Likert scale from '1' equivalent to 'never' to '5' with 'always' with three subscales of areas: 1) teaching and learning, 2) administration and 3) personal needs. The study included 318 MSE secondary school teachers from the state of Selangor. It was analysed by using SPSS with the Cronbach alpha between 0.80 to 0.92. There was no significant difference in the actual usage of computer based on the **gender** of teachers. There was also no significant diffence in **age** althought their results shown that overall AUC of the teachers decrease as their age increases for teaching/ learning and administration, but personal needs increases with the increase in age.

In order to support the importance of teachers' attitudes towards computer use, Teo (2008) studied the assessment of 139 pre-service teachers for their computer attitudes by using a Likert type questionnaire with four factors: affective (liking),

perceived usefulness, perceived control, and behavioral intention to use the computer, his results shown that there are no significant relationship of **gender** and **age** among pre-service teachers on computer attitudes.

Loyd and Gressard (1984) in their study examined the effects of computer experience, age, and sex on attitudes toward computers among 142 high school language arts students, 107 community college mathematics students and 105 students living in dormitories at a small liberal arts college on Computer attitudes Scale (Loyd and Gressard) of computer anxiety, computer confidence, and computer liking, and the results shown that significant age effects were found for the subscale 'computer liking', but no clear trend for **age**. **Sex** was not significantly related to computer attitudes on any of the three subscales (Computer Liking, Confidence and Anxiety).

Some study such as Deniz (2007) has also found that there is no significant difference between attitude and **gender** and computer based instruction. Yushau (2006) has also shown that age shows no significant influence of attitudes in any of the subscales.

However, some studies have proven ***the opposite,*** a study by Hung and Hsu (2007) based on their 'integration of Computer-Base technology (CBT) into Instruction Questionnaire' indicated that the teachers surveyed had a very positive attitude towards computers, and their attitude was significantly correlated with their **age** and **teaching seniority**. In their study, middle-aged and middle-teaching experienced teachers tended to integrate more Computer-base technology into their instruction than younger and novice teachers, even thought the latter group held more positive attitude toward computers. However, some other research has suggested that younger teachers have a greater tendency to use computer compared to their older and more experienced colleagues. A study by Darus and Ho (2008), has shown about 78% of teacher in the younger **age** range (29-38) disagree that using the computer made their lessons more difficult. On the contrary, about 89%of the older age range (39-47) agreed that preparing for lessons had become more difficult.

On the other side, according to Kumar et al. (2008a), the study revealed that there is no significant difference in AUC between MSE secondary school teachers with different **teaching experience**, whereby the distribution of the majority respondents in this study are from the group of very experienced teachers, (32.1%) respondents were between 16-20 years of teaching experience, (30.8%) respondents were between 10-15 years of teaching experience, (22.0%) respondents with 6-10 years of teaching experience

Attitude, computer experience (computer confidence, computer anxiety, computer liking and computer usefulness)

Some research found that there is no significant gender difference with respect to teachers. The most significant finding was the correlation of computer experience and comfort with computers, which means the use of computers. Of particular significance was the finding that showed computer experience is associated with confident use in the classroom (Wahab, 2009).

Malaysian studies by Ahmad Ridzuan et al.(2001) has shown that a significant difference in computer use level was detected for teacher educators with varying experience in using computers ($F = 3.580$, $df = 3/220$, $p = 0.015$), teachers who have more computing experience were found to have lower anxiety and more positive attitudes.

Another study by Juanna et al. (2005), where the dimensions of teachers' attitude was measured by usefulness, confidence, anxiety and aversion with independent variables IT competent and IT incompetent teachers; which means teachers with computing experience and able to perform a task by using computer or no computing experience and unable to perform a task, there was a statistically significant difference between competent and incompetent teachers on the dimension measurement. The results suggest that teachers who have computing experience and are competent in using computers, will find IT more useful and approach it with greater confidence and linking, and show low anxiety towards using it. On the other side, if teachers have confidence and posses good skills in using the

technology, they might have a possitive attitude toward technology use in teaching and learning. Similar to other, a study by Wong and Hanafi (2007) supported that IT experience can improve the attitudes of both genders towards computers particularly in computer confidence dimension.

Loyd and Gressard have(1984) also revealed that Computer experience was significantly related to more positive attitudes on all three subscales (computer anxiety, computer confidence, and computer liking). Besides that, Blignaut (2006) has also mentioned in his paper that attitude can be determined by experience and impacts upon the individual behavior, and Loyd and Gressard (1985) also found that computer experience has a significant differentiate among the groups.

The results of correlation analyses by Teo (2008), also revealed significant associations between years of computer use (computer experience) and level of confidence and computer attitudes. This means although many teachers believe computers are an important component for students' education, their lack of knowledge and experience might just cause them lack of confidence on their attitudes toward computers, and therefore this will influence not only the acceptance of computers, but also future behaviors, such as using a computer as a professional tool or introducing computer applications into the classroom. Indeed, Ajzen and Fishbein (1975) have argued that this lack of confidence will lead to anxiety and reluctance to use technology, because attitudes, beliefs and intentions have long played a role in the social psychology literature as predictors of behavior.

A study by Kellenberger and Hendricks (2003), predicted teachers' use of computers for their own needs, teaching, and student learning from five groups of factors (demographics, self-confidence, self-competence, value, and computer-related experience) with a sample of 80 teachers, has indicated that self-confidence played an important role in predicting teachers' computer use and also being the most important predictor of computer use for teaching and a significant predictor of own use.

Basically, mentioned above, a lot of studies have shown that computer experience positively correlated with attitudes toward using computers (Loyd and Gressard, 1984; Ridzuan, 2001, Yuen and Ma, 2001; Teo, 2008; McLeod, 2008; Wahab, 2009;) besides Yushau (2006), although his studies also recognized the importance of computer experience, which many researchers have intensively investigated and found a statistically significant factor that, will affect the use of computer in teaching, his results showed that computer experience did not affect attitudes towards computers and their pedagogical usefulness. This might be due to the reason that the ranges of computer experience of the participants are high.

In his study, two instruments were used in examining 41 samples of teachers (professors), which are Computer Attitude Scale (CAS) by Loyd and Gressard as well as the pedagogical usefulness (PU) unit of the Computer Attitude Scale for Teachers (CAST) by Yuen and Ma. The CAS consists of four subscales with the reliability coefficient of: Computer Anxiety (0.90), Computer Confidence (0.89), Computer Usefulness (0.89), and Computer Liking (0.82).

Many researchers in attitude studies evaluated areas in teachers' age, gender (Loyd and Gressard,1984; Yushau, 2006; Deniz, 2007; Hung and Hsu, 2007; Teo, 2008;) and their experience as indicators of positive attitudes toward technology (Loyd and Gressard, 1984; Yuen and Ma, 2001; Teo, 2008; Wahab, 2009). The trends remains however, more areas are to be considered such as computer ownership, teachers' computer training and support, which are shown to have an influence on teachers' attitudes as well.

Attitude and computer ownership (computer Usefulness and Confidence)

Teachers who owned computers were found to have a lower anxiety and more positive attitudes in the study from Ridzuan (2001). Similarly, the research by Becta (2003) has also shown that issuing teachers their own laptop or computer has increased positive attitudes and teachers' confidence in using ICT in education. Yildirim (2000) has also indicated in his study teachers reported that having a home computer and the current use of technology in the school also influenced their attitudes toward the use of computers. However, Deniz (2007) and Yushau (2006), have found out that there is no significant difference between attitude with

computer ownership and computer based instruction. Although Yushau also recognized computer ownership might affect the use of computer in teaching, his results on computer ownership did not affect attitudes towards computers and their pedagogical usefulness, this might be due to the reason that all professors have their own computer in school.

Attitudes and Training (computer confidence, computer usefulness, computer anxiety and computer liking)

Some of the existing literatures on technology integration show that teachers need assistance in learning to use computers as tools for teaching. Teacher training may play a decisive role thus making it necessary to provide opportunities for teachers to acquire the skills necessary to use ICT as a tool in the classroom, therefore, adequate training is one of the requirements to enhance school teachers' actual usages of computer (Kumar et al., 2008a), because this training enables teachers to develop confidence in their perception of the use of computers in education in order to encourage teachers to introduce more innovative methods in teaching (Smart school project team, 1997; Yildirim and Kiraz, 1999; Yildirim, 2000; Yuen and Ma, 2001). However, Yildirim and Kiraz(1999), revealed that most techer education programs fail to provide appropriate technology training for preservice teachers.

Researchers have shown that computer training positively impacts teachers' attitudes toward technology and one who attends more computer training and believes in the benefits of computer technology, is more ready to use it in the classroom. Studies have showed that teachers' attitudes are significantly related to the computer literacy course and their attitudes are significantly improved after the training. The perception of computers has changed after attending the course and it helped them to develop positive attitudes and gain more confidence toward computer use (Yildirim and Kiraz, 1999; Yildirim, 2000).

As the study data from Kumar et al. (2008a), also showed that there is a significant difference in the overall AUC levels between teachers based on the training in computer usage ($F=7.082$, $p=.001$), teachers with formal computer training, which

involved how to operate a computer, feel more at ease with computers and increase their AUC. Yildirim (2000) has also found out that teachers' attitudes in term of anxiety, confidence and liking significantly improved after they have taken the computer literacy course.

Another training seminar conducted by UNESCOBangkok (2011), which included teachers gathering and sharing ideas from the speakers and among the participants on their innovative teaching and learning practices and experiences through ICT during the seminar. The participants highly appreciated the seminar, because they could directly and immediately apply practices to their classes rather than theoretical discussions, they got inspired and motivated to practice what they learned. They are able to get good ideas that they can replicate or try out in their respective schools, they also agreed that ICT make the classroom an open sky. In general, they found the training seminar very useful (3.62 out of a total score 4)

However, there was no positive correlation between usage of computer to teach and the duration of computer training by Darus and Ho(2008). Further they explained that there might, due to the reason of inappropriate training style according to the teachers' feedback, 45.5% of teachers who have attended training responded that the courses they had attended so far were not adequate to equip them with the necessary knowledge on how to use ICT. Yildirim (2000) has also mentioned in his study that those who had prior computer experience reported that the training did not contribute a great deal, while inexperienced students found that the training contributed sighnificantly to their professional development. Training will contribute to teachers professional development for experienced teachers only if the contents of the training is detemined according to their need.

A study by Wong and Hanafi (2007), also sugessted that no significant difference in attitude was detected between female and male participants after they were exposed to the IT course.

Attitude and subjects

According to Teo (2008), there were significant differences for computer attitudes by subjects. Subjects taught in schools might just influence the usage of computers in schools, whereby science and technology teachers tend to use the computers more in classrooms compared with other subjects. Similarly, Kumar et al. (2008a), also revealed that there is a significant difference in the overall AUC levels between teachers based on their main subject that they teach in school ($F=3.111$, $p=.016$). The highest mean scores of the overall AUC was from the teachers who teach Science ($M=3.53$, $SD=.26$), followed by Mathematics ($M=3.22$, $SD=.31$), and eventually English language ($M=3.19$, $SD=.27$).

2.3 Instrument tools

There are plenty of instruments that may be used in assessing computer-related attitudes among users. Different instruments to assess computer-related attitudes may in fact be measuring somehow in different constructs. They are mostly useful, however, it may be designed for specific intentions and purposes, and the measurement tool used in a study might impact the findings of the study. Therefore, it is important to understand the historical basis for technology related attitude research as well as the trends in the recent research (McLeod, 2008).

There are many tools or instruments that have been proposed and used by researchers for the purpose of examining teachers' attitude towards technology use (Woodrow, 1991). Such as Technology Acceptance Model (TAM), by measuring the Actual Usage of Computer (AUC), which means the intensity of teachers' computer usage by measuring job related and personal tasks. Another instrument tool such as Computer Attitude Scale (CAS) is also widely used by many researchers (Ahmad Ridzuan et al., 2001; Wahab, 2009).

TAM has been used by Malaysia researchers to understand the actual usage of computers by teachers, such as Kumar et al. (2008b). In their study, they have agreed with other researchers that teachers are not only using computers in teaching, but there is a steady increase in many administrative works nowadays. For example, it is common for teachers to use technology to perform their job with various kinds of tasks such as creating lesson plans and study guides, communicating with parents, record-keeping, examination and many others.

Studies have shown that one of the important factors, which might influence the use of computer technologies as a teaching tool in the classroom as well as the successful implementation of computers in the classroom, is users' acceptance. User acceptance of technology has been an important field of study for over two decades (Chuttur, 2009), therefore, it is very useful to examine teachers' personal characteristics and technology acceptance constructs to understand the AUC among teachers, since teachers' own perceptions and self-schemas are important to consider in relation to their knowledge and actual behavior (Kellenberger and Hendricks, 2003). However, some studies showed that users' acceptance and use in turn might be greatly influenced by users' attitudes (Yuen and Ma, 2001, Woodrow, 1991).

TAM and CAS tools

As Woodrow (1991) noted in her comparison of four computer attitudes scales, that fast and effective measures of computer attitudes are crucial. Instruments must be reliable, factorial stable, valid and extensively tested. Following are two literature reviews on instruments tools for reference:

According to the historical overview of Technology Acceptance Model (TAM) provided by Chuttur (2009), TAM refined and proposed by Fred Davis, who relying on prior work by Fishbein and Ajzen, who formulated the TRA, has became the most widely applied model of user acceptance and usage. He propsosed that the attitude of users might be influenced by the two factors which are Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). Further, TAM posits that perceived usefulness will be influenced by perceived ease of use because, the easier a technology is to use, the more useful it can be (Chuttur, 2009; Venkatesh, 2000). For Stefl-Mabry (1999), TAM is a management information system model from the theory of reasoned action (TRA), to predict user technology acceptance, and TAM, PU and PEOU have a significant impact on a user's attitude toward using the system, which defined as feelings of favorableness or unfavorableness toward the system.

Meanwhile, TAM stands out as one of the most prominent used models in IS research because of its understandability and simplicity with beliefs (the usefulness of a system and ease of use of a system) and users' attitudes, intentions, and the actual usage of the system. However, Chutter (2009) stated that TAM lacks sufficient rigor and relevance that would make it a well established theory for the IS community. There is skepticism shared regarding the application and theoretical accuracy of the model, while several confirmatory results were obtained. Moreover, technology acceptance research has been relatively limited in its application to the public sector as well (Dadayan and Ferro, 2005; Teo, Wong and Chai, 2008). Venkatesh (2000) added that the TAM is a good model but it does not help to understand and explain the acceptance of a technology in the way of promoting the development of a strategy in having a real impact on the usability and acceptance of the technology. On the other side, computer anxiety has been shown to have significant impact on attitudes, and peceived ease of use can be influenced by their computer confidence (Fishbein and Ajzen, 1975), therefore, Chuttur (2009) has suggested that it is necessary to develop new models discarding its weakneses in future research. Some researches have suggested reconsidering the TAM model (Chuttur, 2009; Venkatesh, 2000), such as a proposed model by Venkatesh (2000) with additional construct elements related to control and intrinsic motivation, emotion are proposed as general anchors for the formation of perceived ease of use in regarding a new system. Since this model is specific in only two key beliefs, another model was considered to be used in this study, which is the CAS.

With the growing technology needs in the 1970's, and the failure of system adoption caused the researchers interested in the new area of predicting system use, to measure attitudes toward computer related behavior (Chuttur, 2009; Kay, 1989). As mentioned by McLeod (2008), early in technology attitude research, several pioneers created, tested, and validated a variety of attitude instruments. Each instrument is slightly different in terms of the construction, to measure teachers' and students' general attitudes toward technology, such as Loyd and Gressand (1984,1985) and Kay (1989). For example, researchers evaluated more factors such as the factorial anxiety, confidence, liking and usefulness; others included also

teachers' age, gender and prior experience as indicators of positive or negative attitudes toward technology.

A computer Attitude Scale study investigation by Kluever et al. (1992), suggested that the CAS is a reliable instrument concerning the attitudes and impressions of teachers about the educational applications of computers. Their CAS consists of four factors which are Computer Anxiety, Liking, Usefulness and Efficiency (confidence) and these are similar to the factors identified by Loyd and Loyd.

According to Woodrow (1991), a CAS analysis of attitudes toward computers may encompass many dimensions distributed between two domains, namely affective and cognitive, for example, anxiety, confidence, liking and usefulness.

For CAS by Loyd and Gressard, in measuring teachers' attitude toward technology use emphasizes the measurement similar to these two domains, which are computer usefulness and the affective dimensions with computer anxiety, confidence and liking. This is the most extensively used and tested scale and it is an effective, reliable, convenient, and valid measure of computer attitudes (Loyd and Gressard, 1984s; Loyd and Gressard, 1985; Woodrow, 1991).

The initial CAS by Loyd and Gressard, develop in 1984, was a Likert-type instrument with thirty items, which was divided into three subscales namely Computer Anxiety, Confidence and Liking. It was used to investigate the relation with high school students, it has been widely use by researchers. For example, a previous study by Ahmad Ridzuan et al. (2001), used it for their study to examine teachers educators. Later in the year 1985, the CAS revised version was used with teachers with an additional subscale called Usefulness. The four highly correlated subscales with subscales reliabilities ranging from 0.82 to 0.90, the total score reliability was 0.95 (Loyd and Gressard, 1984s; 1985). Compared to the previous study with only three dimensions, the revised version with four dimensions (additional with cognitive domain: usefulness) was selected for the use in this study.

2.4 Barriers on computer technology use

In spite of increasing computer integration in the school, educators' use of technology in the classroom has still not significantly increased (Fluck, 2003; Wahab, 2009). Many teachers are using technology for numerous low-level tasks, for example word processing and Internet research. Higher level uses for high-tech tools such as spreadsheets, presentation software or digital imaging to enhance their lessons is still very much in the minority (Ertmer, 2005).

There is always a gap between theoretical ICT integration and the actual implementation (Frost and Sullivan, 2006, 2010). A numbers of studies have shown that there are a wide range of factors which influence ICT integration in the schools as well as educators' utilization of ICT in their teaching (Pelgrum, 2001; Jones, 2004; Afshari et al., 2009; Saud et al., 2010). Some examples, besides teachers' attitude, the efficient and effective use of technology depends on the availability of hardware and software, equity of resource assessment and some countries face the technological challenges of buying appropriate hardware and courseware, getting adequate bandwidth for online learning and ICT learning and teaching tools (UNESCOBangkok, 2004). Some others are limited equipment and support, training, knowledge and skill, time, belief about the teaching and learning process and financial barriers (Yildirim and Kiraz, 1999; Cox et al., 1999; Yildirim, 2000; Pelgrum, 2001; Tinio, 2002; Jones, 2004; Look, 2005; Hamzah, Ismail and Embi, 2009; Saud et al., 2010; Frost and Sullivan, 2006, 2010). There is often a difficulty for teachers who might have had some training and ability to use ICT, however, there are insufficient ICT resources in the school or there is not enough time to review and plan lessons incorporating their use (Cox et al., 1999).

According to UNESCOBangkok (2004), although many researchers have pointed out the most frequently mentioned problem in integrating ICT in education is the insufficient numbers of computers. Countries with adequate budgets for ICT in education have overcome budget problems and tend to have enough technological infrastructures installed; they might just lack the expertise to identify appropriate hardware and software to purchase and support the adequate infrastructure.

Tinio (2002) has also identified in his research paper on the use of ICTs in different educational settings over the years, has found out that a barrier to success is due to the inability of teachers to understand why they should use ICTs to teach and if ICTs can help them to teach better. It also stated that most of the teacher professional developments in ICTs are heavy on 'teaching the tools' and light on 'using the tools to teach'. Teacher might have anxiety over being replaced by technology or losing their authority in the classroom as the learning process becomes more learner centered with the use of technology. This barrier can be reduced only if the teachers understand their changing role (Tinio, 2002).

The following section from the researches and literature reviews shows that ICTs' use generally having many benefits; however, they are not widely used due to some of the barriers and problems caused.

A research study, was performed in 33 selected schools (out of 88 pilot schools from the Smart school project) nationwide[13] with the key stakeholders from students, teachers and administrators, has found out that ICT use has generally saved their time in teaching and improved their work productivity, however, there are several problems and barriers of using ICT in teaching (Frost and Sullivan, 2006).

In general, about 83.5% of the teachers agree that use of ICT has improved students learning experience, 16.5% disagree and they have given the reasons due to poor quality of facilities, poor realiabiliy of facilites, and insufficient access to facilities as the top three reasons in Figure 3. A view expressed by teachers, is that it is important to have an adequate maintenance and support plan in order to make the ICT work properly (Frost and Sullivan, 2006).

[13] which included residential and non-residential schools located in both rural and urban area.

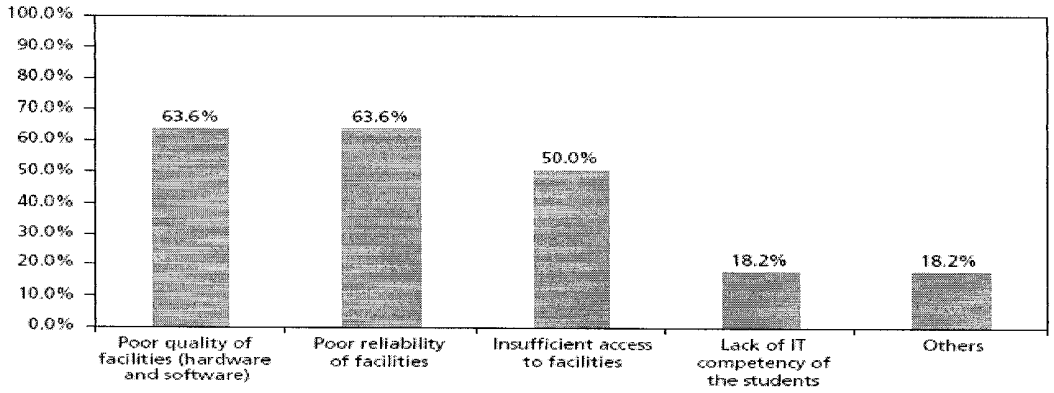

Figure 3: The reasons of not improve students' learning experience by using ICT in teaching

The most significant reason for teachers, who were having difficulties and problems using ICT for teaching, was insufficient time for preparing the lessons with a rating 3.2 out of 4.0 (Frost and Sullivan, 2006) (in Figure 4). This is similar to the research by Saud et al. (2010), although the finding of his study showed that application of ICT was widely used in teaching and learning in the school. The two major barriers of ICT use are lack of time for preparing the teaching materials and lack of knowledge and skills for producing advanced ICT teaching materials. Meantime, Jones (2004) also highlighted that teachers are sometimes unable to make full use of technology due to lack of time, and time is also needed for teachers to become better acquainted with hardware and software. As studies showed that teachers usage of computers are not only in teaching but also involved in many clerical tasks, and also on job related work such as adminstrative job. The Administration includes many obligatory works that teachers need to be involved in for their teaching process, such as keying in students' personal data, student's work progress, examinination papers and some other reports (Kumar et al., 2008b).

The ITCs (IT Coordinators)[14] are important in order to keep the smart school or use of ICT in schools going smoothly and efficiently in this context. Therefore, the skills of these people from the ITCs group are very critical because they provide solutions to the schools. Based on their report, the major issues affecting ITCs was general lack of training to perform their jobs, this is because the ministry provides inadequate support and training for these people. The statistics have shown that the amount of pre-service training was inadequate, about 90% of the ITCs people learned their ICT knowledge on the job, 84.8% learned by themselves (books or online etc.) and 54.5 % attended private training (Frost and Sullivan, 2006). This shows that training provided by MOE is not enough, it needs to be improved to compare with other type of training. As inappropriate training styles might result in low levels of ICT use by teachers, for example courses which lack elements of pedagogical aspects, as well as ICT skills training are likely to be unsuccessful (Jones, 2004).

The following chart by Frost and Sullivan (2006), shows that the type of training needs to be improved:

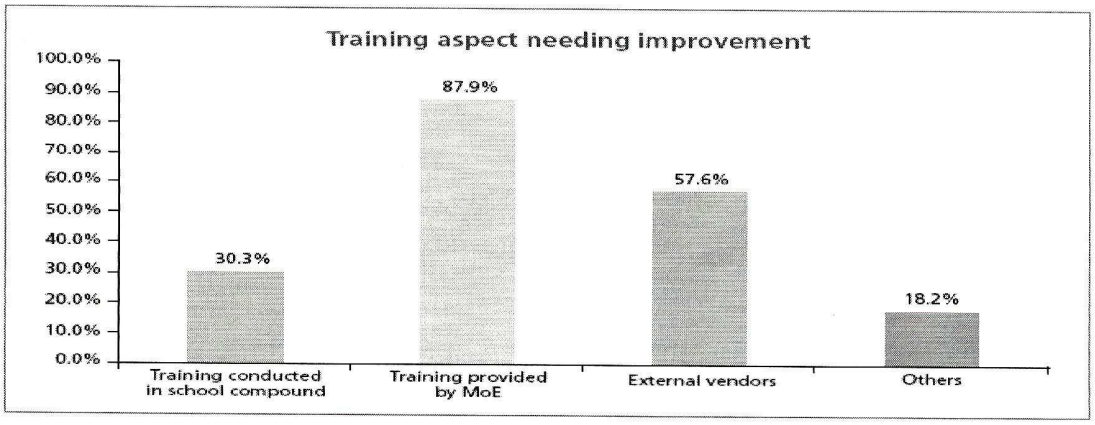

Figure 5: Areas of Training requiring improvement

Basically, Malaysia has spent quite large amount of money on ICT in education according to the International Data Corporation (IDC) on Malaysian ICT spending from 2005 to 2007, as well as ICT spending as predicted by IDC from 2008 to 2010,

[14] Is one of the key stakeholders from whom Frost and Sullivan gathered the feedback from schools.

the figure also provides the total amount of expenditure on ICT per US million dollars for each year (Figure 6) (STI Report, 2008, pg.113). Other information which has been stated in the paper from Azian(2006), is that funding for the Malaysia Smart School Project was provided by the government with an allocation of Malaysian Ringgit (MYR) 400* million, of which MYR100* million was for the training of administrators and teachers on the Smart School concept and MYR300* million was for the implementation of the Smart School Integrated Solution (SSIS) in the 87 pilot schools in 1999. Again by UNESCOBangkok (2004), government has a budget allocation of MYR50* Million in year 2002 for the basic infrastructure which including electricity, telephone lines, internet access, computers, telephones and other related equipment in east Malaysia. [* 1 USD=3.16 MYR][15]

We can see that the Malaysian government has spent a lot of money and provided very good support in ICT for use in education; they allocated a large budget for the development of teaching and learning materials and initiated a national thrust to bring about accelerated improvement in the application of ICT in education (UNESCOBangkok, 2007-2008). Nevertheless, there are still a lot of problems with ICT use in schools, and ICT is not being extensively or well used in school classrooms (Fluck, 2003).

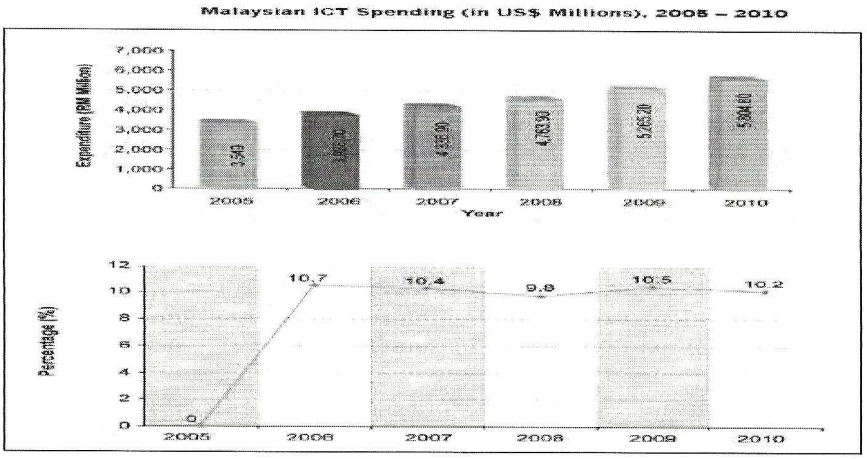

Figure 6: Malaysia ICT spending (2005-2010)

[15] Currency exchange data was from 'The world's Favorite currency site (Xe), www.xe.com/ucc/convert/?amount=1&From=USD&To=MYR (on 2 July 2011)

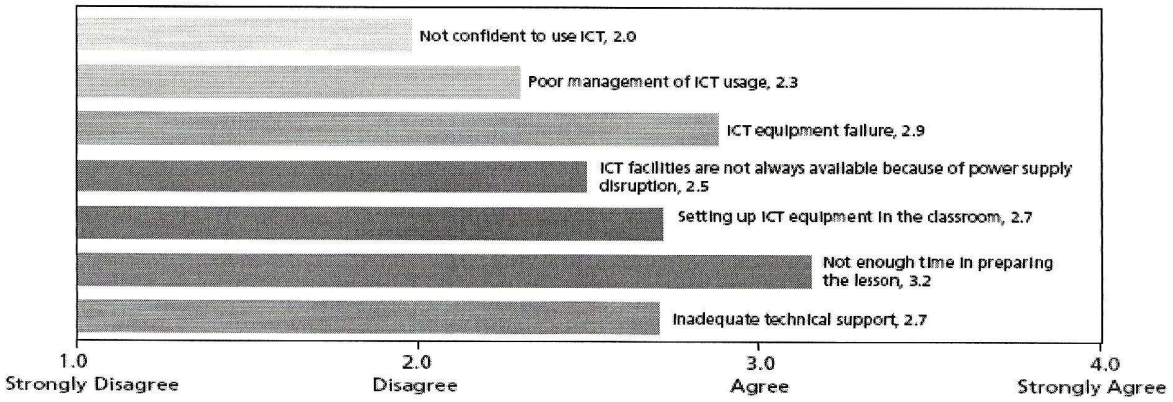

Figure 4: Difficulties in using ICT for teaching

Referring to figure 4, their study has shown that about 48.9% agreed or strongly agreed with this reason, follow by ICT equipment failure with rating of 2.9 out of 4.0. Teachers have mentioned that it is important to have adequate maintenance and a support plan in order to make the ICT work properly. The ICTs use did not meet the teachers' expectation due to a high percentage of disatisfaction with the performance of ICT equipment (60%), and their suport provider 50% came from the school or IT Coordinators- ITCs (Frost and Sullivan, 2006). Technical faults with ICT equipment are likely to lead to lower levels of ICT use by teachers and also likely to reduce teacher confidence and cause teachers to avoid using the technology in future lessons (Jones, 2004).

In fact, it took weeks or longer for the vendors' helpdesk to solve the hardware problems but it was a little bit faster when referring to a software problem. The information also showed that the schools located in rural areas took longer time than schools in town areas for getting help on ICT problems. The study showed that 45.5% of the people mentioned the performances of ICT facilities do not meet their expectation and this is mainly caused by 80% hardware failure follow by 66.7% inadequate technical support (Frost and Sullivan, 2006). Therefore, the lack of available technical support is also likely to lead to teachers avoiding use of ICT, due to a fear of a fault occurring during teaching which cannot be rectified and as a result lessons being unsuccessfully delivered (Jones, 2004).

The barriers and problems of ICTs use in schools as we referred to the literature, it can be summarized as:

1) Not enough technicians: Teachers need help and support when things go wrong or technology does not function. The lack of available technical support is likely to lead to teachers avoiding ICT in the classroom. If ICTs will extend the access to education as we said with the use of ICTs, study will no longer only depend on hard printing materials, both teachers and students are able to access remote learning through the internet, consequently, this kind of computer break down will lead to many issues and problems; such technical faults with ICT equipment will indirectly lead to lower levels of ICT use by teachers. The expectation of faults occurring during teaching will likely reduce teacher confidence and cause teachers to avoid using the technology in future lessons (Jones, 2004).

2) The Language issue: The existing ICT-based educational materials are mostly in English, as English is the dominant language of the internet and most of the IT study materials and software products worldwide (Tinio, 2002). Some of the teachers and students might have difficulty teaching and learning in a language other than their mother tough. If teachers are not willing to learn and change, and this kind of resistance to change is also one of the factors that prevents the full integration of ICT in the classroom (Jones, 2004) and because this will cause a barrier on expanding the access into the education area, it will be unable to maximize the educational benefits of using the World Wide Web (www) (Tinio,2002).

3) The Infrastructure:

a).Hardware installation issue: Lack of computer laboratories and limited computer hardware and software installed in schools, some of the computers in schools are even outdated.

b).Lack of telecommunication infrastructure and networking problems with unstable internet supply and unstable electrical supply in rural areas. The low quality of connectivity in rural schools has threatened the rural learners. The integration system (inclusive web-based courseware, on-line tools and support) by the Smart Schools project is not accessible by rural schools due to the infrastructure and connectivity (UNESCOBangkok, 2007-2008). Due to insufficient hardware,

software and telecommunication infrastructure, teachers might be short of time to make full use of technology to prepare their teaching materials, online search information and multimedia (Jones, 2004).

4) The human resource or ICTs training programs in teaching: Inappropriate training styles will result in low levels of ICT use by teachers (Jones, 2004). Teachers might not have confidence in using the latest technologies, although they are good in a particular subject or topic. Therefore appropriate and up-to-date training is necessary to give all teachers in order to ensure that teachers are made aware of the benefits of using ICT (Yildirim and Kiraz, 1999; Yildirim, 2000).

5) Lack of time: Teachers have insufficient time for preparing the lesson and the teaching materials, because they are involved in many clerical tasks as well as on job related work such as adminstrative jobs (Frost and Sullivan, 2006; Hamzah, Ismail and Embi, 2009; Saud et al., 2010).

2.5 Summary

Integration of computer technology in the classroom curriculum is not an easy task (Ertmer et.al., 1999). It is not a matter of just having a number of computers and lab facility in schools. Although many research studies have identified that limited equipment, access time to hardware and software, support and training will affect using technology in teaching, in fact, teachers´ technology use in schools sometimes is generally affected by many barriers and it varies from in different reseach studies, as well as teachers' preferred instructional methods and teachers beliefs. Several studies have divided it into two catergories, basically, it can be grouped as external and internal factors. Ertmer et al.(1999) name it as first order barriers and second order barriers. As mentioned earlier reasons such as technical factors with computer or internet infrastructure problems, the availability of the amount of equipment or equipment inappropriately organized in the school, will affect teachers on their level of access and use. Environmental factors with support from the school by management, administrative or technical support , inappropriate or lack of computer training in order to provide a well trained people, for example,

and these might also affect their confidence in using technologies. All these technical and environmental factors can be grouped as external factors, and the personal factors with their attitudes, beliefs/percptions and emotions (as belief and perception put a higher value on computers, they might also have higher and different levels of uses) are grouped as internal factors. Teachers' computer attitudes influence not only the acceptance of computers, but also the use as teaching/ learning tools, how they improve teaching-learning strategies. Therefore, sufficient support from the external factors such as support from adequate environment, like school, government, technical support (Malaysian Science and Technology indicators Report, 2008), are the central to any successful use of computers in education and students learning with information technology are strongly dependent on the internal factor of teachers' attitudes (Yuen and Ma, 2001; Al-Zaidiyeen et al., 2010). Teachers' acceptance, adoption and integration of technology is very commonly described as stages of development from a non-computer user to an expert user, along with these steps, their computer use are more frequent, more familiar, more creative, and more application use.

Clearly, we need to consider that teachers accept computer technologies as teaching and learning tools, as well as their attitude, as one of the important factors that might influence the effective and successful implementation of computer technology in the educational system and schools (Juanna et al., 2005; UNESCOBangkok, 2007-2008; Kumar et al., 2008b; Yushau, 2006;Teo, 2008; Al-Zaidiyeen et al., 2010) in order to achieve ICT use in the classroom and the target of quality student learning outcomes. In short, beside the support from the school and government, the attitude of the teachers is very critical in the success of students learning with information technology (Look, 2005; Teo, 2008; Saud et al., 2010). Several reasons that might influence teachers' attitude on ICT use and teaching are unreliability, and lack of training. Therefore, it is absolutely essential to understand the biases, prejudices, and impressions that teachers may have in using computer and we should examine and find out what are the factors that can actually influence teachers and their attitude on using computer technology in the classroom (Teo, 2008; Teo et al., 2008; Kumar et al., 2008b) because it is essential in the success of technology integration in education.

Chapter 3: Research goals, Research Questions and Hypothesis

3.1 Aims and goals of the research

Many people as well as educators widely recognize and agree that computers are useful overall in education, and emphasized the need for expanding curricula to include computer instruction (Saud et al., 2010). One of the rationales is that computerized knowledge is an essential element for assisting students to function in a technological society (Kellenberger and Hendricks, 2003), as ICT continues growing in Malaysia. It was shown that

"Growth in the computer services industry was 21.3 per cent and in telecommunication services, 6.6 per cent in 2007. The main drivers to the expansion in the computer services were hardware consultancy, RM2.9 billion or 55.1 per cent increase and software consultancy and supply services, RM7.3 billion or 12.1 per cent increase. As for telecommunication services, data communication services posted RM8.5 billion or 20.0 per cent increase and television and radio transmission services, RM3.2 billion or 13.4 per cent ".

Additionally, employment in ICT industry also showed an increasing trend.

"In 2007, employment in the ICT industry showed an increasing trend with 91,660 persons (10.2 per cent) as compared to 83,159 persons employed in 2006. Employment in computer services increased 47,357 persons (21.0 per cent) as compared to 39,146 persons employed in 2006 while employment in telecommunication services increased marginally by 0.7 percent, i.e. 44,303 persons in 2007 as compared to 44,013 persons in 2006", according to the recent Statistical releases from Malaysia Department of Statistics (Mal_Dept_Statistic, 2010, *online*).

On the other hand, referring to chapter 1.4, Government has noted that the objectives of education and training to produce an adequate highly skilled people in order for Malaysia to achieve a fully developed nation by year 2020 in having enough people with the knowledge, skills and expertise necessary to support a knowledge-based society and economy. Schools were identified as having a key role to increase the number of ICT-skilled to meet the demands of industries that would be integrating ICT into the processes, one such project is the Smart School

project, the expected change in this project is the wide use of computers and ICTs in the classroom (Ahmad Ridzuan et al., 2001; National Report of Malaysia, 2004).

As ICTs have made a great impact on the way knowledge is produced and shared, which in turn has called for a paradigm shift in educational practices from teachers-centered to student-centered. In this student-centered pedagogy, the teachers' role and capacity has become more critical than ever (UNESCOBangkok, 2011), at the same time, evaluation also indicated that student achievement is enabled by the adoption of classroom technology which included digital content, combined with professional learning activities to the teachers and community support according to the UNESCOBangkok2's (2011) research. Based on their Interactive Class project results, when technology integrated with interactive digital content, teacher training and community involvement (which included parents and educational decision-makers e.g. principal) which will have a positive impact on student learning and performance. Hence, teachers play a pivotal role in this situation, as well as integration of ICT in the school curriculum and assessment (UNESCOBangkok, 2004); therefore, it is important for teachers to be computer literate, so that they are prepared to use information technology in the classroom (Kumar et al. , 2008b). According to Ertmer (2005), the conditions for succcesful technology integration finally appear to be in place which include ready acess to technology and increased training for teachers. However, high-levels of technoloy use is still surprisingly low, indeed, the decision on whether and how to use technology for instruction depends very much on teachers. If educators are to achieve fundamental changes of classroom teaching practices, we need to examine teachers themselves and the beliefs they hold about teaching, learning, and technology (Ertmer, 2005). Meanwhile, literature reviews also reveal that teachers' attitude is an important issue, which might influence ICT use in the teaching and learning process (Yuen, A. H.K. et al., 2001; Albirini, 2006) in order to achieve the Malaysian target of 2020 apart from the adequate environment and technical support. Overall, additonal barriers and teachers related barriers such as attitude and belief should not be neglected.

Moreover, Woodrow (1991) has also noted that to promote and maintain positive attitudes toward computers is of paramount importance in computerize instruction, because she has agreed that attitudes toward computers are thought to influence not only the acceptance of computers, but also future behaviors such as using a computer as a tool or introducing computer applications into the classroom. For the purpose of maximizing the computers utilization as learning and teaching tool, attitudes toward computer must be continuously monitored in order to enable teachers not only to overcome the technology barriers but also to empower them to integrate appropriate technology into the learning process. Therefore, to achieve effective ICT use in the classroom, the research goals, research questions and hypothesis are recommended to obtain relevant results and discover the influencing factors for the future development of educational plans, as well as after overseeing the literature review and the analysis models, the research goals are defined as:

1) Due to varied cultural, social and economic contexts, different countries have formulated different education systems and ICT education. The first goal of this study is to explore the general situation of education systems and IT education of Malaysia;

2) To identify the problems and barriers in association with ICT and teachers use of ICT in Malaysian Schools.

3) To examine the implementation of ICT as a tool in the relationship between teachers' attitudes, emotions (this term usually is distinguished from feelings, mood, and affect. It functions to influence learning and memory, increase, decrease, or regulate arousal, organize and motivate behavior, direct perception and attention, communicate with others (Dess, 2010)), beliefs and use of technology, at the same time this study also examined whether the use of computers is affected by some demographic data for example, age and other non-attitudinal variables, in order to find out if the overall attitude has affected the actual use of computers as well as any difference within the two types of schools.

4) To describe the finding of the study on general data of teachers through the descriptive statistical data, examples are distribution of gender, age, race, education background, computer experience, working experience, training and the current computer usage in the classroom and at home of the participants. As well as teachers perception of computers to be an important the component of teaching and learning experience through the CAS questions analysis. When teachers perceive ICT as a tool to meet curricular goals, they are more likely to integrate ICT in their lessons (Cox et al., 1999; UNESCOBangkok, 2004).

The examination factors are base on the four dimensions on the Computer Attitude Scale that might influence the teachers' use of technology to teach which include computer liking, anxiety, confidence and usefulness. An examination was also made among the teachers' demographics' section which included data such as teachers' characteristics with individual age, gender, working experience, training, computer experience as well as computer related use by teachers such as frequency use, teachers' computer usage, owning a computer at home and in school, support and many other items (e.g. time to get the support and type of school).

All these factors are interrelated, since there are close relationships between many identified barriers to ICT use, any factors influencing a barrier are likely also to influence several other barriers (Jones, 2004; Ertmer, 2005). An examaple is of teachers confidence or anxiety to low or high levels of ICT use might just be directly affected by their levels of access to ICT and training available; the readiness of adapting to ICT, the technical faults with ICT equipment occurring during teaching sessions or normal working hours and the availability of technical support might just lead to teachers avoiding ICT use. Similarly, Darus and Ho (2008) have also suggested in their study result that there must be a strong support on both the instructional and administrative aspects of IT in the school so that teachers will be able to embrace IT fully in teaching English in their classroom.

However, the availability of technical support and duration of getting support factors have not be examined as factors influencing teachers' attitude since it has been

emphasized by researchers as one of the important factors. Some teachers are confident in using computers for example, but they did not use the computer in the classroom very frequently, and it is important to find out further what influenced such teachers' attitudes. Therefore, this thesis will additionally examine factors such as hardware and software support services and duration of getting support, besides examining their age, gender, teaching/computer experience, computer ownership, teaching subject and training.

3.2 Research Questions

The ICT program implementation in schools is the integration of new technologies into education (Fluck, 2003), it can be ultilized in the schools curiculum or to provide computer based information resources for teaching and learning in order to improve and enhance quality in education especially in teaching and the learning outcome (Tinio, 2002).

As mentioned ealier in the introduction chapter, certain teachers might just maintain tight control, not using, less access or use technology only for presentation purposes (Judson, 2006). According to Cox et al.(1999), there is a genuine fear amongst many teachers about ICT, the majority of teachers first priority is to maintain order in the classroom and to have a controlled learning environment, therefore, any suggestion of adopting innovative teaching techniques such as using ICT was seen as threatening this orderly pattern and therefore not desirable. However, some other teachers with the same resources but given full and comprehensive technologies used various activities for teaching students (Judson, 2006). All of their attitudes might indirectly affect teachers toward low levels of technologies use in teaching and student learning with technologies (Jones, 2004).

Studies have also shown that the measurements mostly considered by researchers, such as lack of confidence, perceived usefulness, computer anxiety and computer liking/ aversion influenced both the acceptance of computers and their use as teaching and learning tools (Juanna et al., 2005; Yushau, 2006). A few other important items, which have also been considered in many researches and might have also positively contributed in teachers' computer attitudes, are the issue of the

computer ownership, computer/ internet access, computer experience, education, age and gender, however, some of the previous studies' outcomes have shown inconsistent results (Ariffin, 2005; Kumar et al., 2008a), additionally, factors such as duration of the support should also be considered, since they are important and would influence the usage of computers by teachers in the school.

The available researches are mostly focusing on teachers' attitude and their level of ICT use such as the study by Ahmad Ridzuan et al.(2001), it is important that teachers acquire the knowledge to use computers (Abd Mukti, 2000), but also must have the confidence and willingness to explore computer technology and implement the new models for instruction. Therefore, it is critical to understand the factors that facilitate and those that act as barriers to teachers' use of technology in schools as well.

In order to achieve the above mentioned goals in chapter 3.1, several aspects regarding the conditions of ICTs' use in schools, teachers' attitude and problems with its use will be analyzed and the answers can be found to these research questions:

1) What are the actual barriers and challenges of using ICT teaching in Malaysian Schools?
2) Teachers' attitude:
    a) Whether teachers are holding the right or positive computer attitude?
    b) What is the teacher's attitude toward computer use within two groups of Malaysia teachers and
    c) Whether the teachers attitude (which included also teachers' emotions and beliefs) influence teachers use of technology?
    d) What other factors affect their attitude?
    e) How significantly different are the influence values?

The first research question is concerning the barriers and challenges with ICT use in education through the first to fourth goals of this study. As these problems might probably be due to some reasons such as training, financial, poor administrative support or technical support provided to teachers by the school, and these might be

the barriers that caused them to reduce their interest in the use of computers for teaching and learning (Abd Mukti, 2000).

In relation to Malaysian proposed plans and implementation, the aspect of barriers using ICT teaching in Malaysian Schools was found out through the questionnaires by looking into their computer usages and any problems when they are using computer facilities in school during or outside of the school, language issues, training issues, in different type/ different district of schools and many others.

Therefore, the answer from the first research question was obtained through email based on the first (main) questionnaire by examining if they get any support on ICT use; how long do they get a feedback; any training provided; questions are also posted such as how often do they use the computer facilities for instruction; why are they not using or use less for instruction; are they allowed to access computer facilities after school hours; can they access teaching/ learning material anytime during the school hours, since the availability of classroom-ready digital content is a determining factor in a teacher's ability to integrate interactive learning methods into their curricula (UNESCOBangkok2, 2011), as well as from the second questionnaire 'what are the problems and barriers of using Computer technologies teaching in Malaysian school?' Teachers have the options from one to ten to indicate their problems and barriers of using ICT in the classroom, there are (1) Short of technical support (2) Internet problem e.g. line too slow, (3) Short of time e.g. too many additional administrative tasks & regular classes, (4) Short of computer hardware and software facilities set up in the classroom, (5) Language problem e.g. since most of the original materials are in English, (6) Computer equipment failure, (7) Short computer training, (8) Power supply disruption, (9) Poor management support (e.g. the principal) and (10) Others.

After getting more details from the first question which might be one of the many influencing factors on ICT use in school, the second question comes to examine more factors which might influence teachers' attitude toward the use of ICT for instruction in the first sub-question (a) by checking out if Malaysian teachers are having positive and right attitude by examining through the four dimensions namely Computer anxiety, liking, confidence and usefulness, to find out if there is a higher means in order to show more positive attitude on their computer usages, find more

usefulness, have greater confidence and linking as well as lower levels of anxiety toward using computers, for example.

It is also to understand if teachers are aware of the importance of IT and found it to be useful in their teaching and learning experience. Such as perceived use of computers can improve their job performance which included efficiency in preparing teaching materials, saving time and improving the process of delivering instruction (Ahmad Ridzuan et al., 2001), as well as their computer usage so that to know if they have a right attitude toward the use of computers through the CAS questions analysis, for example questions such as: If teachers use computer facilities for preparing their work and teaching in the classroom; if teachers find Computer/IT more useful; computer makes learning more interesting and fun; negative questions such as: Computers take up too much time to prepare the lessons; computers are too complicated to use and so on.

In relation to find out factors that influence teachers' attitude and their significant level, question (b) (c) (d) and (e) are being examined.

Question (b) referring to teachers who teach between two different types of school since there are two major types of schools attended by Malaysian pupils. As ICT is considered as part of the school culture in certain school, therefore, teachers across different type of school on the culture of computer use might be different as well, as teachers might be willing to use, but they might be facing some problems in relation to accessibility to ICT that affects the use of ICT in different types of school. Thus, it is important for educator, who are concerned with the ICT use in education, to know of any difference on teachers' attitude within these two types of school, especially the control variables focusing on their ICT facilities and assessments, training and support so that these two type of school might improve from their weaknesses, and this is new to the field.

Question (c), considering teachers' emotion and educational beliefs of computer use influencing their attitude, these were examined by different factors in computer

attitude scale (CAS) to evaluate their adoption of ICT use such as computer anxiety, liking, confidence and usefulness; are they significant related to ICT use?

These factors consist of positive and negative factors toward ICT use (in statement) to which teachers indicated their agreement and disagreement, examples of positive factors (in statement) influence their usefulness are 'computers are useful instructional tools, it improves my effectiveness and instructional quality, it make learning more interesting and fun', some example of negative factors are 'computers cause more problems on my teaching and make my lessons more difficult, it takes up too much of my time to prepare the lessons'. In this case, if they perceive ICT to be useful to their teaching and learning, then according to the empirical evidence of previous studies, they are more likely to have a positive attitude to the use of ICT for example (Loyd and Gressard, 1985). Additionally, many items in teachers demographics' section data such as age, gender, training, type of school, working experience, computer experience and computer related use by teachers such as frequency use, owning a computer at home and in school, technical support and duration of the support will be examined as well, (Ariffin, 2005; Kumar et al., 2008a) due to the reason that there are factors inconsistent in some other previous researches referring to the literature reviews. There is some evidence to suggest that teachers' gender has an effect on their degree of ICT use; male teachers make more use of ICT than female teachers, and female teachers reporting greater levels of computer anxiety than male teachers; little evidence was found in the literature to suppport the view of age in affecting teachers' ICT use, or younger teachers are more likely to make use of ICT in their teaching and work than their senior. Inappropriate traning might just result in low leverls of ICT use by teachers (Jones, 2004), as it was showed in the aims of this thesis, the technical faults of ICT equipment with lack of support (Jones, 2004) and duration of getting support are important factors to consider as a barrier of ICT use, however, this has not been examined by previous researchers as important factors in influencing teachers' attitude toward ICT use for instruction. Therefore, this study will evaluate and examine the above mentioned factors, as well as other important factors to take note in order to improve and enhance teachers ICTs' use for instruction as answering question (d), of course, there will also show the significant level in

response to the question (e), if they are closely correlated or strong indicators factors influence classroom use of technology. This question was divided into a total of five sub questions.

3.3 Hypothesis of the research

Based on the current research information, the following hypothesis for the use of ICT in schools can be postulated:

One of the core issues, which people believe might determine the effective use of ICT in teaching, is the teachers' attitude (Juanna et al., 2005; Yushau, 2006;Teo, 2008; Al-Zaidiyeen et al., 2010); the attitudes of the teachers might be considered to be influenced by teachers' emotions and beliefs, such as Computer Liking, Computer Anxiety, Computer Confidence and Computer Usefulness, some other factors to consider such as experience, age, gender, training, type of school, support and so on, these might also be an influence on their attitudes as well. This will be corresponded to Research questions two.

In developing countries, not all schools are equipped with the infrastructure to conduct ICT for teaching and learning, and this might be the reason that there is still not so much research in this area especially in Malaysia and some developing countries. However, positive teacher attitudes towards technologies teaching are critical as mentioned in the literature review, if technologies are to be integrated into the school curriculum as well as for the future implementation for all schools. Therefore, further research on teachers' attitude toward computer is still necessary.

Chapter 4: Research Methods

In order to provide valuable insights to teachers' attitudes on computer use for teaching, questionnaires were designed and used to obtain the research data and to collect evidence from school teachers to find out the perceptions and status of school teachers' attitude toward computers use in teaching, their usages and some personal characteristics which including background of their experience, training

and others, because questionnaires can provide a standardized form of collecting data and objective responses from the participants.

The questionnaires, which were used to obtain data in this research, were further identified as the first (main) questionnaire, of demographic questionnaire with teachers' computer background data and a Computer Attitude Scale (CAS) and second questionnaire of teachers' problems and barriers of using computer technologies teaching in Malaysian schools. Detailed descriptions are shown in chapter 4.2 and 4.3.

After data collection, all data from the main questionnaire were entered into SPSS 18 for Windows, an interpretation and a variety of statistical analyses with the help of table, diagrams, and charts as well as with Microsoft Excel throw light on the issues.

4.1 Data collection

In order to know more about the actual situation of ICT use in the schools and get more areas of teachers involved in this research, the schools' teacher samples included different areas from the north, middle and south parts of Malaysian Schools, which also included rural and town areas. Therefore, these samples are purposeful sample and have a maximum opportunity to learn more about the phenomenon.

All data collection process was gathered via personal friends and their contacts with the channel through Electronic Mail (email). Some of the personal friends were contacted through internet messaging services like facebook.com.

The research activity has also been supported by the schools' IT department personnel and teachers' trainer, who help to distribute the questionnaire to teachers via email and the teachers or personnel in charger will return them to me.

Basically, the participants came from two types of school, National Schools and National Type Schools. (Please refer to Appendix 2 for details, Types of Schools in Malaysia). They were from twenty schools and covered school areas throughout

Malaysia. Sometimes one teacher represented a school; sometimes several teachers are from a school.

4.2 Description of the questionnaire composition

Two questionnaires were used to obtain data for this study. The first one is the ***main questionnaire*** of this study, it is called Computer Attitude Scale (CAS), which consists of demographic and computer usage related questions as well as the CAS dimensions measuring questions. Along with the main questionnaire, the **second questionnaire** about the problems and barriers that teachers are facing in using computer facilities in the school and classroom was sent through email to teachers and teachers' trainers at the same time in order to know their majority problems and barriers using computers in the school.

The first questionnaire (main)

The questions from the demographic section and computer usage related questions are obtained from some other questionnaire such as the Smart School Integrated Solution (SSIS) Implementation Impact Assessment Questionnaire: ICT (Frost and Sullivan, 2006). Since the questions are more general in context, some questions have been slightly modified in order to be specific to the research of this study, such as where did they receive their training, how long does it take to solve any computer problem and so on. Duration of the examination are subdivided into few categories, such as by years (less than 1 year, 1-2 years, 2-5 years, 5-10 years, 10-15 years, 15-20 years, 20 years and more), by months to years (less than 6 months ago, 6-12 months ago, 1-2 years ago, 2-4 years ago, 4 years ago and more) and by time duration from hours to months (1hour , 2-6 hours, 1 day, 1-2 days, 3-7 days, 1-4 weeks, until 2 months and more).

Since computers are widely used as teaching and learning tools in education, many researchers have carried out studies to access educators' attitudes toward computer technology use in teaching. Most of the attitudes can be measured by basic demographic data or teachers' computer background data such as years of experience, education qualification, training, age, gender, computer experience and also by some other factors such as perceived usefulness, perceived ease of use,

computer confidence, computer anxiety, computer confidence and computer liking. These are the most frequently investigated factors (Hung, Yi Wen et al., 2007). An example, computer anxiety subscale includes statement such as 'working with computer would make me nervous'.

There have been many instrument tools developed for the purposes of computer attitude measurement, for example Computer-Base Technology (CBT), Computer Assisted Teaching (CAT), Technology Acceptance Model (TAM)/ Actual Usage of Computer (AUC) and Computer Attitude Scale (CAS), which has been mentioned in the literature review of Instrument tools in chapter 2.3. This Composite questionnaire is referenced to several standard questionnaires, which are available in English, and most of the research assessments used an established developed Computer Attitude Scale (CAS), and some of the Computer attitudes scales primarily target generic computer users, thus it sometimes fails to capture attitudes for specific users such as teachers who might be engaged in computer use for special purposes like doing lesson plans, students' work, curriculum presentation, preparing examination papers and marking, etc. and to show the special links to their attitude or some examine only very narrow specific factors such as TAM by measuring two factors: perceived usefulness and ease of use.

On the other side, as there are many factors or dimensions used in the computer attitudes scales by different researchers, those factors/ dimensions used most widely are assessed, four of the most important factors among other researches were chosen for the purpose of examining the teachers' attitudes on technology use in this study, namely Computer liking, Computer anxiety, Computer confidence and Computer usefulness and they are called the four dimensions computer attitude scale in this study (Details in chapter 4.3: Description of the questionnaire), therefore, the CAS research questionnaire with four subscales from Loyd and Gressard, which is designed and capable to examine educators' attitudes toward computer use in the school, was selected to be used in this research, it is also due to the reasons that the CAS by Gressard and Loyd has been tested repeatedly for reliability and validity (Woodrow, 1991; Loyd and Gressard, 1984/1985) as well as its previous use for examining teachers as similar group as well, since reliability and

validity stated in the literature review showed that as traits, validity and reliability need to be examined in order to reduce error in the questonnaires or to the whole study.

As above mentioned, the main part of the questionnaire was modified from the Loyd and Gressard Computer Attitude Scale (CAS), which is designed to assess teachers' attitudes towards computers; this instrument was found to be reliable, effective and a convenient instrument means for researchers to measure the attitude of teachers or students towards the implementation of computers in the classroom (Loyd and Gressard, 1984s,1985). The CAS questionnaire was originally used for the purpose of measuring the computer attitudes of students, which involved 155 eighth-through twelfth-grade students with 30 questions and with four point Likert-scale measurements; they are Strongly Agree, Slightly Agree, Slightly Disagree and Strongly Disagree. The three subscales of alpha coefficient reliabilities of Computer Liking 0.91, Computer Confidence 0.91 and Computer Anxiety 0.86, and the overall reliability for the CAS was 0.95 (Loyd and Gressard,1984s). Later, it was used to measure 114 teachers who enrolled in a microcomputer staff development course with 40 questions and they are four subscales (with additional: usefulness) with the alpha coefficient reliabilities of Computer Liking 0.89, Computer Confidence 0.89 and Computer Anxiety 0.90, Computer Usefulness 0.82, the overall reliability for the CAS was 0.95 (Loyd and Gressard, 1985; Rainey et al., 2008; Wahab, 2009).

Due to the above given reasons and the literature review comparing the previous study with only three dimensions, the revised version of Loyd and Gressard (1985) CAS (for teachers) consists of a 40 item, Likert–type questionnaire which presents positively–and negatively–statements of attitudes toward various aspects of computers, was selected for the use in this study and it has been slightly modified with additional questions so that it can adapt to get desired information for the study, questions being asked such as 'computers make things easy to organize my instruction plans'; 'teaching with computers captures my students' attention and motivates them to learn' and so on in order to get agreement or disagreement on computer usefulness for example.

The second questionnaire:

The question of this questionnaire was designed to ascertain the problems and barriers of teachers in Malaysian schools based on some previous studies. Nine main problems and barriers were selected for this questionnaire. This second questionnaire was sent out to teachers along with the main questionnaire.

The question is given as: What are the problems and barriers of using Computer technologies teaching in Malaysian schools? With ten options, teachers need to select which are the points out of nine points that best describe of their problems and barriers, any additional problems can be added in option ten.

The ten options are: short of time [e.g. with the regularly scheduled classes, they may not have enough opportunities to practice using computers in the classes, too much additional administrative work] (Jones, 2004; Chong et al., 2005; Yushau, 2006; Saud et al., 2010; Frost and Sullivan, 2010), short of technical support (Jones, 2004;Chong et al., 2005), short of computer hardware and software facilities set up in the classroom or office (Jones, 2004;Chong et al., 2005, Hamzah, Ismail and Embi, 2009), short of computer training (Yildirim, 2000; Jones, 2004; Chong et al., 2005; Yushau, 2006; Saud et al., 2010, power supply disruption (UNESCOBangkok, 2007-2008), internet access problems (Hamzah, Ismail and Embi, 2009), computer equipment failure (Hamzah, Ismail and Embi, 2009), language problems [e.g. since most of the original resources and materials are in English] (Tinio, 2002; Jones, 2004), poor management support [e.g. the Principal] (Frost and Sullivan, 2006; Wahab, 2009) and others, problems which can be added by teachers.

The Questionnaire for this research:

The data privacy guidelines used has been placed at the top of the questionnaire.

Dear Participants,

This questionnaire is dealing with Educators' attitude towards the use of ICT (Information and Communication Technology) in teaching. It consists of two sections (Section1: Demographics and Section 2: Computer Attitude Scale). As participants of this study, the

data that you provide will be used exclusively for scientific purposes and handled with absolute secrecy. All your data will be deleted after the end of study. Please fill in the questionnaire frankly and spontaneously. Many thanks for your participation and corporation.

WONG Mei Yih

University of Technology Vienna
April 2011

The beginning of the questionnaire was given the title, without personal name follow by school name, location and the position of the participants

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Questionnaire:

Educators' attitude towards the use of ICT (Information and Communication Technology) in Teaching

School/Institute Name:
Location: (e.g. KL, Kluang etc.)
Position: (e.g. Teacher, Trainer etc.)

4.3 Description of the Questionnaire

First questionnaire:

The main questionnaire consists of two parts. **First part of the questionnaire (Section one)** is the demographics data and teachers' computer background data, which consists of 29 questions (In Table 1). The basic demographics data such as Age, Gender, Teachers' Education background, and a list of questions relating to teachers' computer usages, applications used, frequency of computer use such as how many hours teachers are using computer to do their work, internet access, and computer related questions such as computer ownership and support are also provided.

Section1: Demographics

1) . Gender: (1)☐ Male (2)☐ Female

2) . Race: (1)☐ Malay (2)☐ Chinese (3)☐ Indian (4)☐ others:

3) . Age: (1)☐ 21 or less (2)☐ 22-25 (3)☐ 26-30 (4)☐ 31-35 (5)☐ 36-40
(6)☐ 40-45 (7)☐ 46-50 (8)☐ 50-55 (9)☐ 56-60 (10)☐ 60+

4) . Education background: (check all that apply)
(1)☐ High school (2)☐Teachers training (3)☐ College (4)☐ Bachelor
(5) ☐ Master (6)☐ Doctorate (7)☐ Others please state:

5) . Study Major(s):

6) . Teaching subject(s):

7) . School / Institute: (1)☐ Public (2)☐ Private

8) . Teaching experience:
(1)☐ less than 1 year (2)☐ 1- 2 years (3)☐ 2-5 years (4)☐ 5-10 years
(5)☐ 10 -15 years (6)☐ 15 -20 years (7)☐ 20 years and more

9) . Computer experience:
(1)☐ less than 1 year (2)☐ 1- 2 years (3)☐ 2-5 years (4)☐ 5-10 years
(5)☐ 10 -15 years (6)☐ 15 -20 years (7)☐ 20 years and more

10) . Kinds of computer experience: (check all that apply)
(1)☐ Microsoft application, please state:
(2)☐ Programming, please state:
(3)☐ Others please state:

11) . Do you obtain any training in using computer for teaching?
(1)☐ Yes (2)☐ No (If no, please proceed to question 14)

12) Referring to question 11, if yes, where did you receive your training?
(Check all that apply)
(1)☐ Pre-service training (E.g. Training provided before undertaking any teaching)
(2)☐ Self-taught (online, books, hands-on etc)
(3)☐ Training conducted on school premises
(4)☐ In-service training (eg. training during break in work schedule)
(5)☐ College or University
(6)☐ Private training centers
(7)☐ Others, please state:

13) . Referring to question 11, if yes, when was your most recent training after your first computer training?
(1)☐ Less than 6 months ago (2)☐ 6 – 12 months ago (3)☐ 1-2 years ago
(4)☐ 2-4 years ago (5)☐ 4 years ago and more (6)☐ No more training

14) . Do you get any support on ICT (Information and Communication Technology) /Computer facilities when there is something wrong with the facilities?
(1)☐ Yes (2)☐ No (If no, please proceed to question 16)

15) . Referring to question 14, if yes, normally how quickly will you get a feedback from them when you have problems on ICT facilities (included computers, LCD projectors and etc.)? Within

(1)☐ 1 hour (2)☐ 2-6 hours (3)☐ 1 day (4)☐ 1-2 days
(5)☐ 3-7 days (6)☐ 1-4 weeks (7)☐ 2 moths and more

16) . Do you have access at home

a) **a computer?** (1)☐ Yes (2)☐ No
b) **the World Wide Web (WWW)/ Internet?** (1)☐ Yes (2)☐ No

17) . Do you have your own computer

a) **at home?** (1)☐ Yes (2)☐ No
b) **in school/Institution?** (1)☐ Yes (2)☐ No

18) . Do you have access in school/ Institute

a) **a computer**? ☐ Yes ☐ No (If no, please proceed to 23)
b) **the world wide web (WWW)/ Internet**?☐ Yes ☐ No (If no, please proceed to20)

19) . Can you access the internet anytime during the school hours? (1)☐ Yes (2)☐ No

20) . Are you sharing computers among the teachers in school/Institution?

(1)☐ Yes (2)☐ No

21) . The computer lab is available during school hours for me to access learning materials. (1)☐ Yes (2)☐ No

22) . How much time are you allowed to access school computer facilities after school hours (after your working hours) **weekly?**

(1)☐ Not allowed (2)☐ less than 1 hours (3)☐ 1-3 hours
(4)☐ 3-6 hours (5)☐6 hours and more

23) . Do you use ICT (Information and Communication Technology) facilities in your teaching?

(1)☐ Yes (If yes, please proceed to question 25) (2)☐ No

24) . Referring to question 23, if no, why? (check all that apply)

(1)☐ No hardware/ software facilities (2)☐ No support people (3)☐ No budget
(4)☐ Use alternative methods (5)☐ I do not need the facilities
(6)☐ Others, please state:

25) . How often do you use computers for instruction in the classroom?

(1)☐ Daily (2)☐ Weekly (3)☐ Occasionally (4)☐ Never

26) . How many hours a week approximately do you use a computer

- in the classroom?

(1)☐ never (2)☐ 1-5 hours (3)☐ 5-10 hours (4)☐ 10-15 hours
(5)☐15-20 hours (6)☐ 20 hours and more

- outside the classroom?

(1)☐ never (2)☐ 1-5 hours (3)☐ 5-10 hours (4)☐ 10-15 hours
(5)☐15-20 hours (6)☐ 20 hours and more

27) . I use computers mostly for: (Check all that apply)
(1)☐ Internet (2)☐ Email (3)☐ Chat (4)☐ Games
(5)☐ Word processing (6)☐ Spreadsheet (7)☐ Database (E.g. Access)
(8)☐ Presentations (E.g. PowerPoint)
(9)☐ Search information that is related to teaching
(10)☐ Search information that is NOT related to teaching
(11)☐ Prepare teaching materials and learning materials
(12)☐ Prepare lesson plan
(13)☐ Prepare exercise and examination
(14)☐ Analysis of examination results
(15)☐ Communication with parents
(16)☐ Others, please state:

28) . Outside of the school compound, I use computers mostly for: (Check all that apply)
(1)☐ Internet (2)☐ Email (3)☐ Chat (4)☐ Games
(5)☐ Word processing (6)☐ Spreadsheet (7)☐ Database (E.g. Access)
(8)☐ Presentations (E.g. PowerPoint)
(9)☐ Search information that is related to teaching
(10)☐ Search information that is NOT related to teaching
(11)☐ Prepare teaching materials and learning materials
(12)☐ Prepare lesson plan
(13)☐ Prepare exercise and examination
(14)☐ Analysis of examination results
(15)☐ Communication with parents
(16)☐ Search information that is NOT accessible from school/ Institution
(17)☐ Others, please state:

29) . Where do you live in the last five years? (1)☐ In a big town (2)☐ In a small town

Table 1: Demographic data and teachers' computer background data Questionnaire

Second part (Section Two) of the first questionnaire is the computer attitude scale (Table 2). In order to evaluate the teachers' attitude toward the use of ICT in teaching, the Loyd/Gressard Computer Attitude Scale (CAS) questionnaire with four subscales was modified and applied.

This study included all the four dimensions (the subscale) for the measurement; each dimension consists of an average of 10 questions. The dimensions are Computer liking (10 questions): questions were asking if teachers actually like to use computers; anxiety (10 questions): questions involved if teachers have anxiety when using computers; confidence (9 questions): showed how confident the teachers are with using computers and the last dimension is usefulness (14 questions): how teachers feel about the computer usage, total of 43 questions.

The questions within each dimension consist of positive and negative questions with similar questions but asked in different ways; an example on computer liking, positive questions: 'I enjoy doing things on a computer'; 'I enjoy teaching with a computer'. Negative questions: 'I will do as little work with computer as possible'; 'I would try to use alternative instructional methods, instead of using computers', they are not arranged in sequence among the different dimensions and the questions for each dimensions are distributed evenly throughout the questionnaire. This arrangement was intentionally chosen in order to get more accurate answers from the participants and to maximize the trustworthiness of the data.

The questionnaire was constructed by using Likert type 4-point scale ranging from 1= Strongly Agree, 2= Slightly Agree, 3= Slightly Disagree and 4= Strongly Disagree. Teachers were required to indicate their level of agreement or disagreement with the statements. These types of scales are commonly used instead of the answer reply being only 'Yes' or 'No'.

The modified CAS Questionnaire is as follow:

Section 2: Computer Attitude Scale

Instructions: Please read each statement and check what best describes (**only one answer for each question**) how you feel about that statement. There is no right or wrong answers to these statements.

	Strongly Agree	Slightly Agree	Slightly Disagree	Strongly Disagree
1. I enjoy doing things on a computer.	☐	☐	☐	☐
2. I would feel comfortable working with a computer.	☐	☐	☐	☐
3. I can do a lot of thing when I use a computer.	☐	☐	☐	☐
4. It is very important for me to know and learn computers.	☐	☐	☐	☐
5. I can't think of any way that I will use computers in my career.	☐	☐	☐	☐
6. Working with a computer would make me nervous.	☐	☐	☐	☐
7. I do not think that I could handle a computer course.	☐	☐	☐	☐
8. Learning about computers is a waste of time.	☐	☐	☐	☐

9. Computers do not scare me at all.	☐	☐	☐	☐
10. I enjoy teaching with a computer.	☐	☐	☐	☐
11. I can do well with a computer without others' guidance.	☐	☐	☐	☐
12. I think that teachers should be computer literate.	☐	☐	☐	☐
13. I don' think I would do advanced computer work.	☐	☐	☐	☐
14. Using a computer is very frustrating.	☐	☐	☐	☐
15. I think that I will take a long time to finish my work when I use a computer.	☐	☐	☐	☐
16. Working with computers will not be important to me in my work.	☐	☐	☐	☐
17. I will use computers many ways in my life.	☐	☐	☐	☐
18. I do not feel threatened when others talk about computers.	☐	☐	☐	☐
19. I think that computers are very easy to use.	☐	☐	☐	☐
20. Computers are useful instructional tools.	☐	☐	☐	☐
21. I will do as little work with computers as possible.	☐	☐	☐	☐
22. Computers make me feel uneasy and confused.	☐	☐	☐	☐
23. I am not the type of person who can do very well with computers.	☐	☐	☐	☐
24. Computers are very useful.	☐	☐	☐	☐
25. Computers cause more problems on my teaching and make my lessons more difficult.	☐	☐	☐	☐
26. If a problem is left unsolved in a computer lab, I would continue to think about it afterward.	☐	☐	☐	☐
27. I would feel comfortable using computers to teach.	☐	☐	☐	☐
28. I know how to access and use teaching/ learning materials with computers facilities.	☐	☐	☐	☐
29. Computers improve my effectiveness.	☐	☐	☐	☐
30. I think computers are too expensive to use.	☐	☐	☐	☐

31. Using a computer would be very hard for me.	☐	☐	☐	☐
32. I am not good with computers.	☐	☐	☐	☐
33. Computers are too complicated to use.	☐	☐	☐	☐
34. Once I start to work with a computer, I would find it hard to stop.	☐	☐	☐	☐
35. I am comfortable using IT equipments to prepare my teaching materials.	☐	☐	☐	☐
36. I have a lot of self-confidence when I work with computers.	☐	☐	☐	☐
37. Computers improve my instructional quality.	☐	☐	☐	☐
38. I would try to use alternative instructional methods, instead of using computers.	☐	☐	☐	☐
39. I get a sinking feeling when I think of using a computer to teach.	☐	☐	☐	☐
40. Computers make things easy to organize my instruction plans.	☐	☐	☐	☐
41. Computers take up too much of my time to prepare the lessons.	☐	☐	☐	☐
42. Teaching with computers captures my students' attention and motivates them to learn.	☐	☐	☐	☐
43. Computers make learning more interesting and fun.	☐	☐	☐	☐

Now you have completed the questionnaire,

please do not forget to save it and send it as attachment back to

wongmeiyih@yahoo.co.uk

Many thanks for your participation to this questionnaire

and

wish you have a good day!

End of the questionnaire

Table 2: Computer Attitude Scale Questionnaire

Along with the main questionnaire, an additional question is used to find out the problems and barriers of using computers in the schools and classroom were sent out to teachers. Teachers need to select which are the points that best describe their problems and barriers of using ICT in their teaching.

Second Questionnaire

What are the problems and barriers of using Computer technologies teaching in Malaysian schools?

(Please select all that apply to indicate your problems and barriers in the following points, any additional feedback can be added at point number ten)

1. Short of time [e.g. with the regularly scheduled classes, I may not have enough opportunities to practice using computers in the classes, too much additional administrative work] ☐
2. Short of technical support ☐
3. Short of computer hardware and software facilities set up in the classroom or office ☐
4. Short of computer training ☐
5. Power supply disruption ☐
6. Internet access problems ☐
7. Computer equipment failure ☐
8. Language problems [e.g. since most of the original resources and materials are in English] ☐
9. Poor management support [e.g. the Principal] ☐
10. Others:

4.4 CAS questionnaires: Calculations of the score

The scores of the 43 CAS questions from section two were calculated and entered into SPSS[16] based on the following:

[16] SPSS stand for Statistical Package for the Social Sciences which is a computer program that provide for statistical analysis.

The Likert type 4-point scale is ranging from Strongly Agree with 1 point, Slightly Agree with 2 points, Slightly Disagree with 3 points and Strongly Disagree with 4 points, this calculation rule is applied for inverted items (An example on Negative statement: 'I can't think of any way that I will use computers in my career'.

Opposing, the following rule for all non inverted items is applied, 4= Strongly Agree, 3= Slightly Agree, 2= Slightly Disagree and 1= Strongly Disagree (An example on Positive statement: 'I enjoy doing things on a computer'). So that an answer with higher number represents a higher agreement or positive response (or a higher confidence score means more confidence and higher anxiety score means less anxiety).

4.5 Working plan

According to the hypothesis and the research goals, the questionnaires are prepared and described in chapter 4.2 and 4.3.

A few of my ex-schoolmates (IT department administrative staff in schools) and friends were supporting and helping to contact some of the schools, teachers and administrative staff, therefore, questionnaires one and two were distributed to a few teachers and administrative staff to fill out, and I have a small group of teachers that filled out the first draft CAS questionnaire version. From the feedback, a revised questionnaire has been made (in term of formulation of the questions and answers etc) and distributed further to teachers for executing of the main research.

The collected data have been entered into the SPSS database. Data evaluation and analysis have been made.

4.6 Research design

This section describes how to verify the hypothesis and achieve the research goals.
1) The alpha reliability coefficient was tested for the four CAS dimensions;
2) The descriptive statistics were used to investigate the general data of teachers in order to provide simple summaries about the sample;

3) The CAS questions analysis was used to examine the degree of teachers' perceived computers use for teaching and learning experience;
4) Additionally, the comparison on T-Test, Chi-Squared Test and Correlation analysis were used:

1) To examine among the demographic data, as well as to compare between Public and Private school, and small and big town.

2) To examine the relationship within demographic data and the CAS dimensions,

3) To examine among the CAS dimensions (computer liking, usefulness, anxiety and confident) as well.

Chapter 5: Analysis and results

5.1 Introduction

A variety of statistical analyses were pursued in this study by using SPSS and Excel in order to examine and compare their relationship, detailed information can be found in chapter 4.6 Research design.

The findings presented in this chapter consist of the demographic section and computer attitude scale. Only a few of the demographic section's data are showing significance ($p<0.05$) associated with the computer attitude scale.

Descriptive statistics on basic demographic data and computer related issues and some other analyses regarding the relationship between the teachers' emotions and beliefs with computer use are highlighted as well.

There were a total of 70 questionnaires sent out through email. A total of 52 questionnaires were received with about a 74% return rate, but only 49 questionnaires can be actually used in this study. Due to irrelevant or incomplete questionnaires, would invalidate the findings of the study.

5.2 Detail Analysis and Results

5.2.1 Demographic Section Questionnaire

This part of the analysis data consists of general demographic data such as age, gender, race, education background, years of teaching and computer experience and some other computer related questions analysis, such as computer training, computer access and the hours of access, support and computer usages, which were obtained from the questionnaire. This information is to give an overview of the type of teachers and the source of information that were included in the sample for the CAS dimensions.

5.2.1.1 Descriptive statistics

The participants in this study were distributed as 24% Male and 76% Female. They were approximately 38% from big towns and 62% from small towns.

All schools were drawn from the Malaysians Schools, 40% of Primary and Secondary National Schools, as well as Primary National Type Schools namely Public Schools and 60% of National Type Secondary which are from Chinese Independent High Schools, namely Private Schools. The detail gender distribution within Public/ Private schools and Big/ Small towns is listed in appendix 4, the diagram can be found in Figure 7.

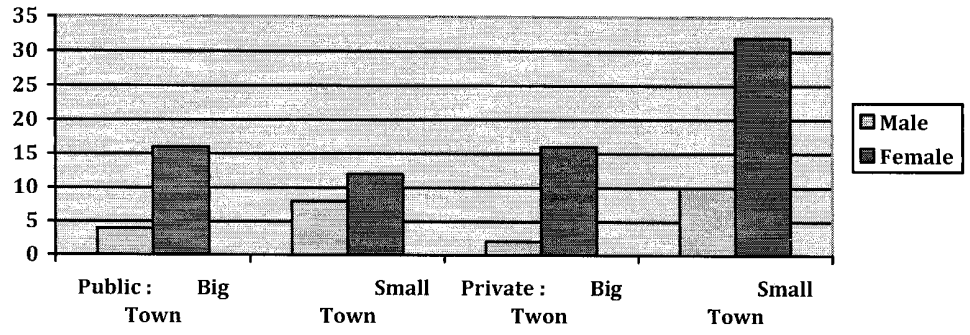

Figure 7: Gender distribution within Public/ Private Schools in Big/ Small Town (%)

They were only 2% each for Malay and Indian, the rest of 96% were Chinese.

The participants came from different age ranges (Figure 8) and a majority of the teachers have bachelor degrees, followed by master degrees in their basic

education background. There are only 2% of them with high school certificates and Doctorate degrees respectively (Figure 9).

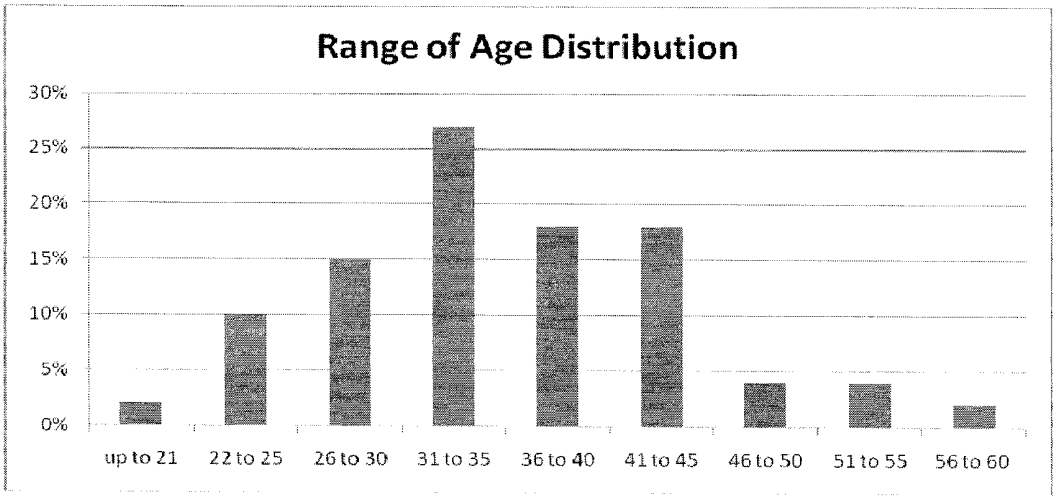

Figure 8: Range of Age distribution

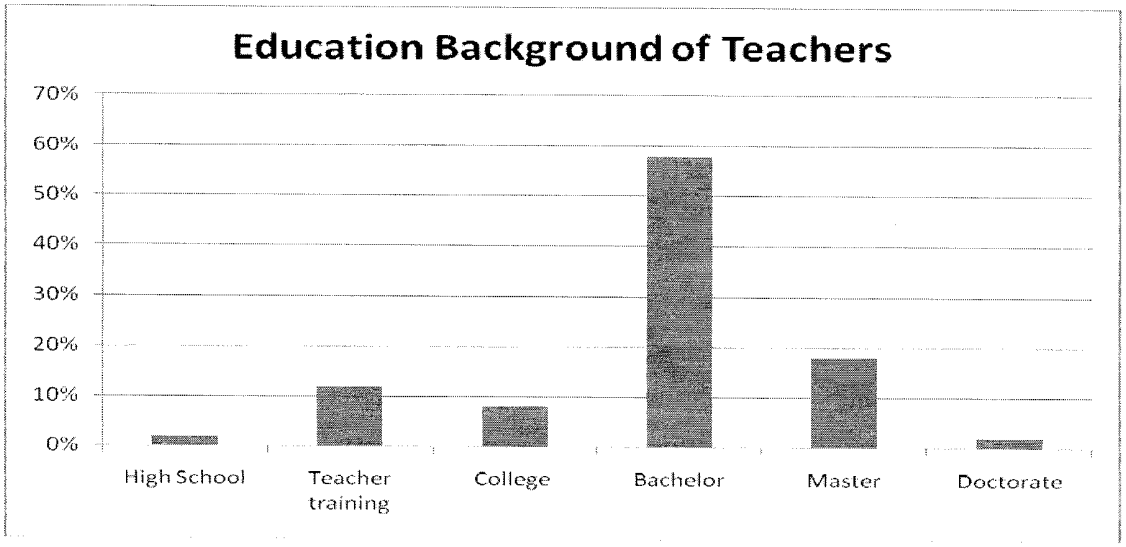

Figure 9: Education Background of Teachers

Detailed data on the number of teachers with the education background and age distribution is listed in appendix 5 and the diagram can be found in Figure 10.

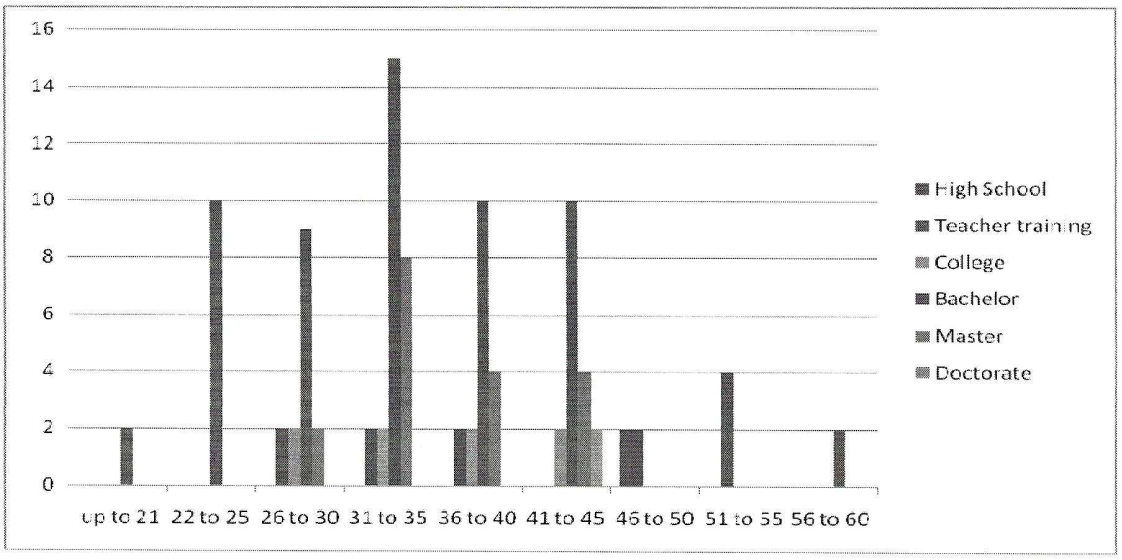

Figure 10 : Age distribution with Education background

The teaching subjects of the participants were distributed in different areas, which included English, Chinese, mathematics, computers, Malay, science, Art and other.

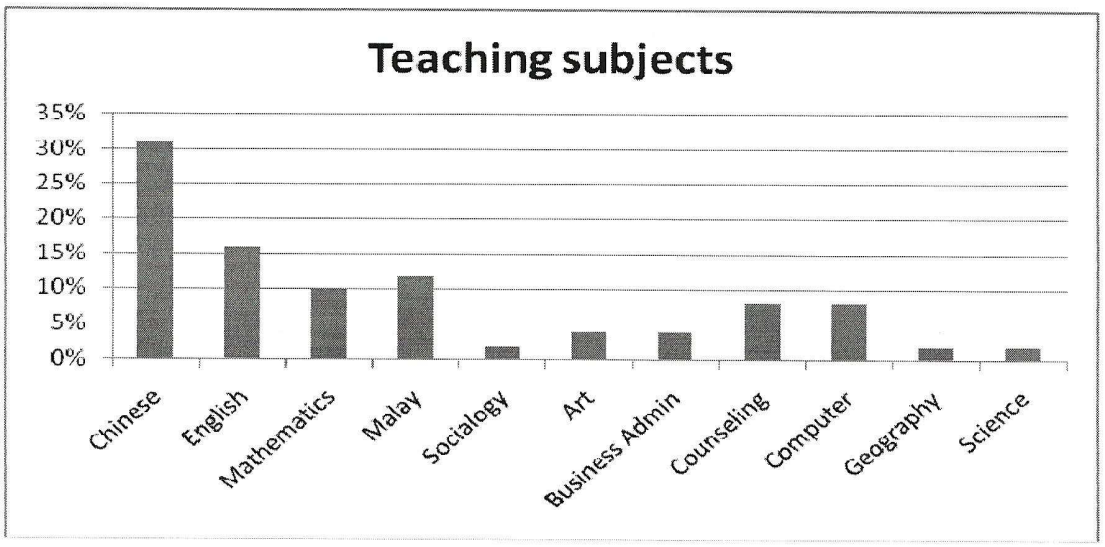

Figure 11: Teaching subjects of the participants

The following figure shows the percentage of teachers who used ICT in their teaching based on the teaching subject.

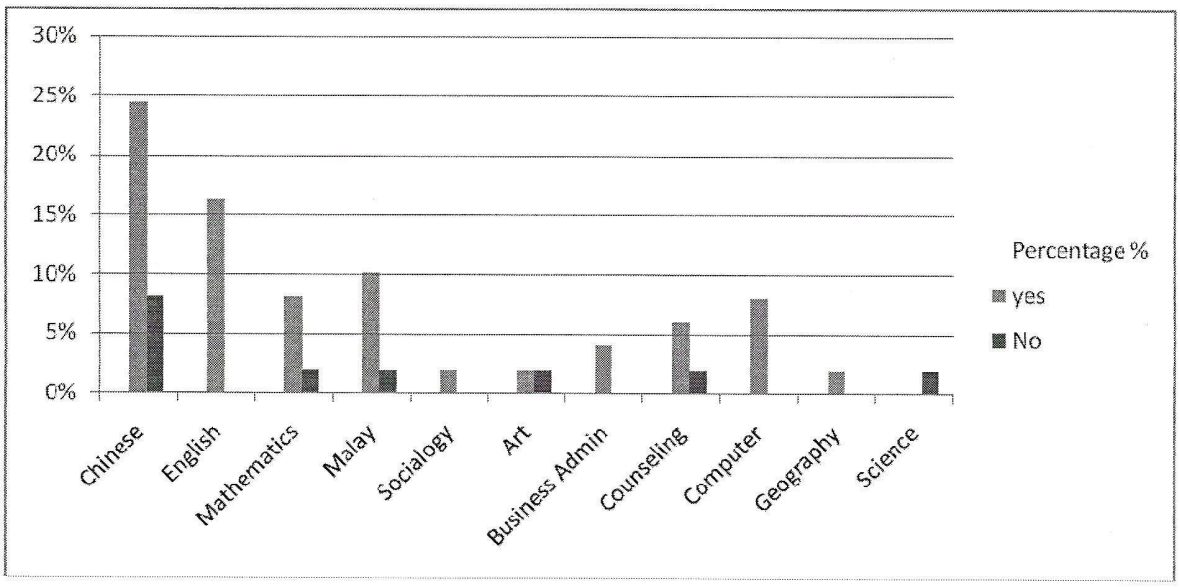

Figure 12: Teachers who use of ICT in their teaching based on the teaching subjects

The following diagram shows the year(s) of teaching experience is distributed mostly within the range from 2 to 15 years. Details distribution is listed in appendix 6.

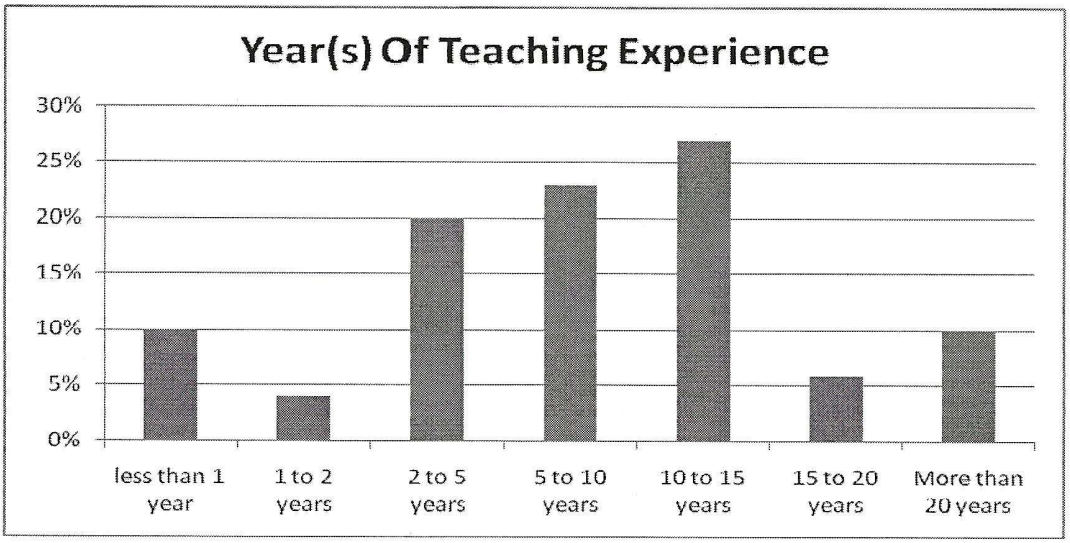

Figure 13: Year(s) of Teaching Experience

The year(s) of Computer experience from this group of teachers is distributed mainly within 2 to 20 years, referring to the following figure. Detailed information is listed in appendix 7.

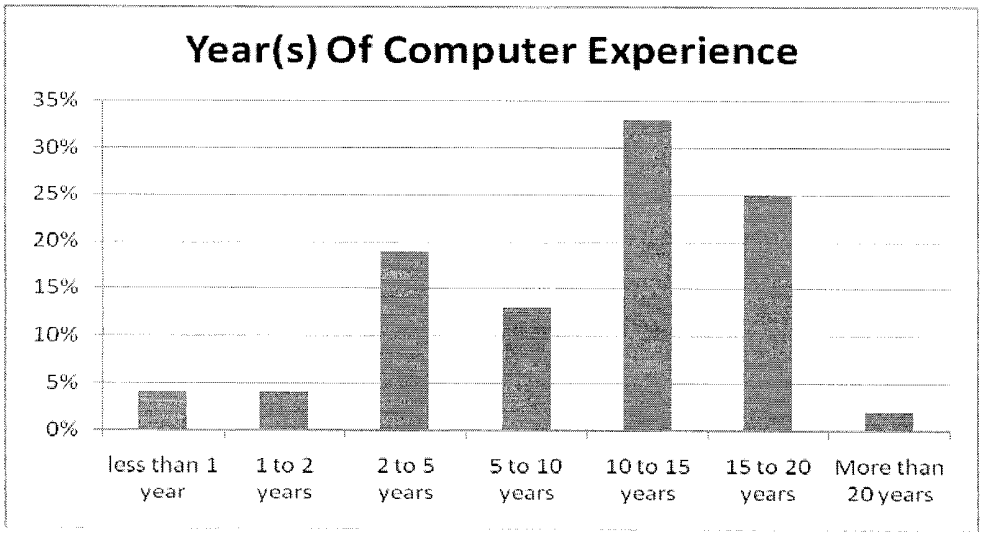

Figure 14: Year(s) of Computer Experience

According to the survey results in table 3 Computer training for teachers, 71% of the teachers have obtained computer training before and during their teaching. The training is mainly conducted on the school premises (34%) and 29% of them had their training less than six months ago, during their teaching period.

However, only 14% of the teachers had the pre-service computer training, which means a majority of teachers fail to have computer training before they teach with technology facilities. 30% of them were self-taught, such as computer learning through books, hands-on, online and etc. Indeed, about 37% of them have had no additional training after their first computer training.

Descriptions	Percentage (%)
Having computer training	71
Training	
Pre-service training	14
Self-taught	30
Training in school premises	34

Re-Training	
Less than 6 Months ago	29
6 Months to 1Year ago	6
1 to 2 Years ago	14
2 to 4 Years ago	4
More than 4 Years ago	10
No more Training	37

Table 3: Computer Training for Teachers

Only 57% among the teacher participants from this research have obtained ICT support from the school when they have problems using the facilities.

Based on this research, there is a high percentage of computer and internet access available at home and in the schools. Averages of 72% of the labs are available after school hours for them to access teaching materials and available online anytime. However, the access is only for the teachers, students have no permission to access the computer labs after their classes.

Descriptions	Percentage (%)
Computer Access	
At Home	96
In Schools	96
WWW Access	
At Home	90
In Schools	90
Labs availability after School hours	
To access teaching materials	67
To access WWW anytime	77

Hours allowed for Computer access after School Hours	
Not allowed	12
Less than 1 hour	10
1 to 3 hours	16
3 to 6 hours	17
More than 6 hours	45
Hours a week computer use outside of the class room	
1 to 5 hours	37
5 to 10 hours	20
10 to 15 hours	16
15 to 20 hours	4
More than 20 hours	14

Table 4: Computer and WWW access

The current status regarding using computer in the classroom based on this research study is showing that the majority of the teachers (82%) used ICT facilities in their teaching. However, in terms of frequency computer use in teaching in table 5 showed that only 28% are using the facilities daily, 18% are using weekly, and most of them with 38% are using only occasionally. When we come to the question 'How many hours a week, approximately, do you use a computer in the class room', 61% of them were using computer mostly within one to five hours per week.

Response to this answer was that they only use it once in a while to show some interesting or important teaching materials to students, which means; they are basically still not using the facilities frequently.

Descriptions	Percentage (%)
Using ICT facilities for teaching	82
ICT use in the classroom	
Daily	28
Weekly	18
Occasionally	38
Hours a week ICT use in the class room	
1 to 5 hours	61
5 to 10 hours	8
10 to 15 hours	8
15 to 20 hours	6
More than 20 hours	2

Table 5: ICT use in the classroom

The detailed information of computer usages for teachers is listed in appendix 8. The diagram for the overview information of teachers' computer usages can be found in figures 15 and 16.

The overall distribution of using computer in the school is shown in the following figure. The actual usage in the classroom is basically not too high although teachers use computer technology in their teaching according to the table 5: 'ICT use in the classroom'. For those teachers who use computers in their teaching based on this research figure, used them mostly for Internet searches for information related to teaching and preparing their teaching materials. Additionally they used email, Word processing for preparing documents, teaching materials, exercises and examination papers, followed by the Microsoft PowerPoint for presentation in the schools.

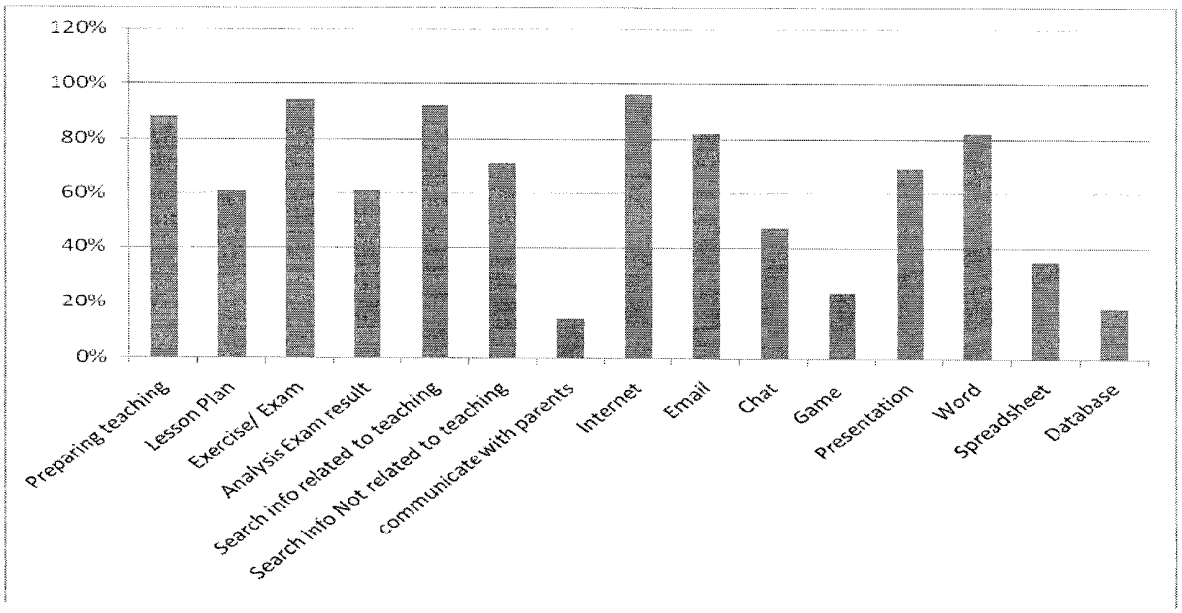

Figure 15: The overall distribution of Computer Usages for Teachers in the Schools

Referring to the figure below, the highest usage for teachers outside of schools was also the internet. The figure shows that they still use Word processing and presentation for their work; however, it was reduce to preparing teaching materials, searching information related to teaching, preparing exercises and examination in general compared to usage in the classroom. The E-mail and chat were increased.

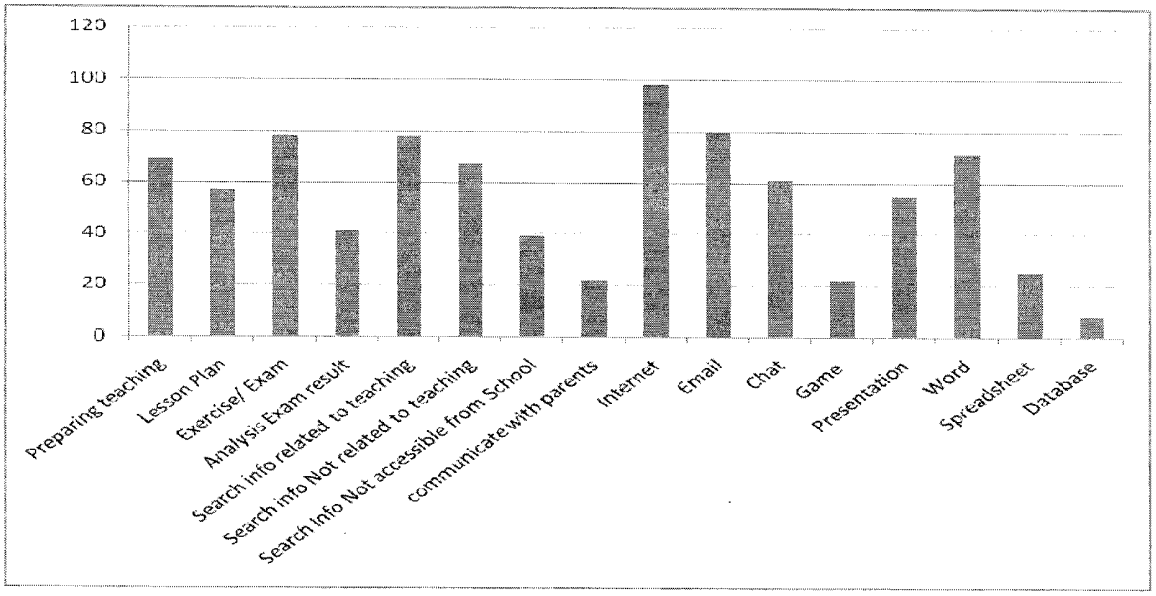

Figure 16: The overall distribution of Computer Usages for Teacher Outside of Schools

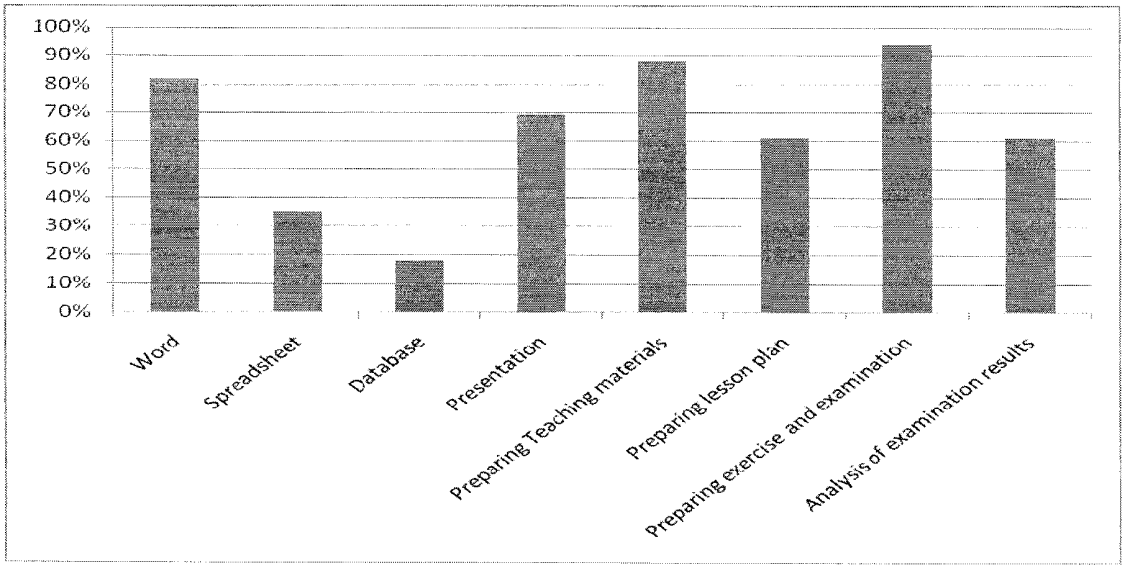

Figure 17: Application of computers for teachers in the schools

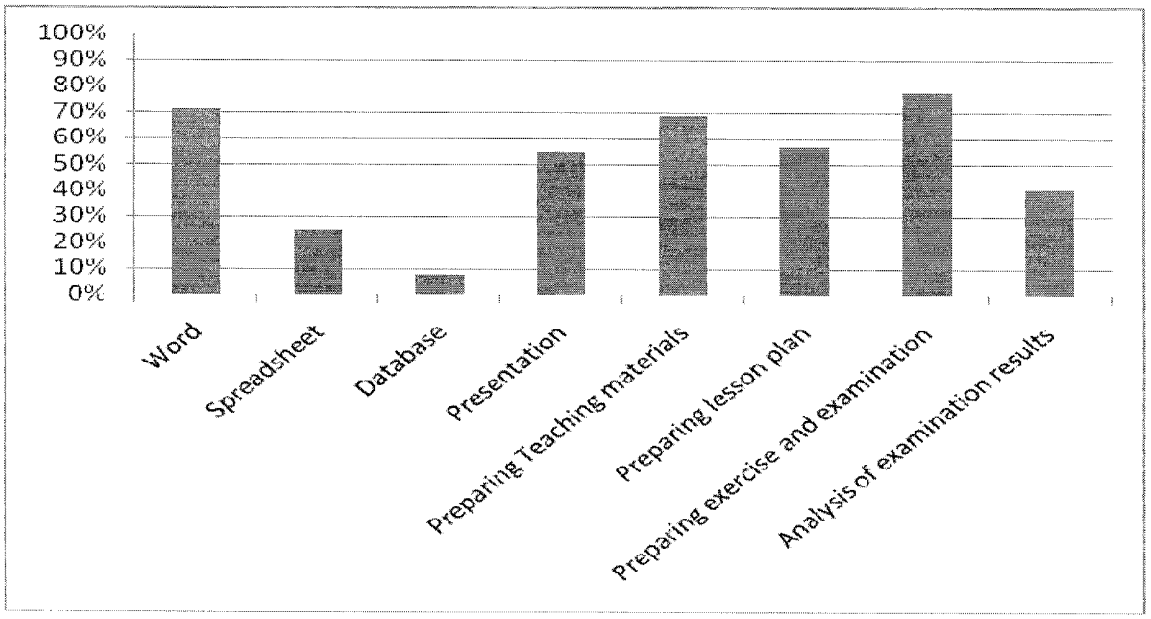

Figure 18: Application of computers for teachers outside of the Schools

According to the above figure 'Application of computer for teachers', a relative high percentage of those teachers used computers for Word applications to prepare for exercises and teaching materials overall (beside using of spreadsheet and databse applications).

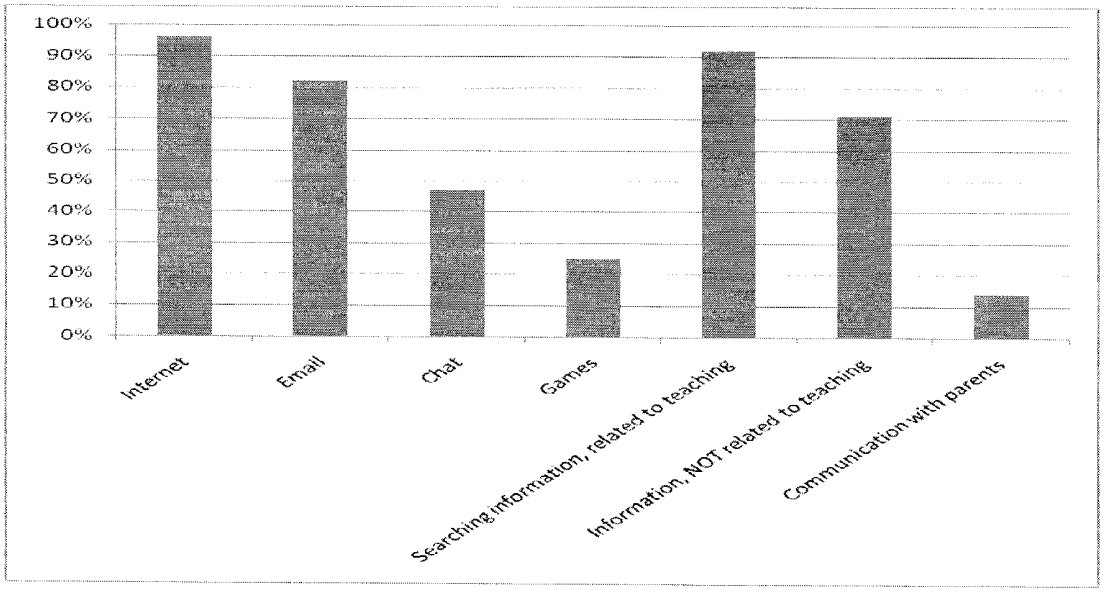

Figure 19: Online information for teachers in the school

Based on the above figure, 'Online information for teachers', 96% of the teachers are using computers for the Internet and 82% for Email in the school. Among these, 92% of them are using them for seaching information related to teaching, 88% are using them for preparing teaching/ learning materials, 71% are searching information not related to reaching.

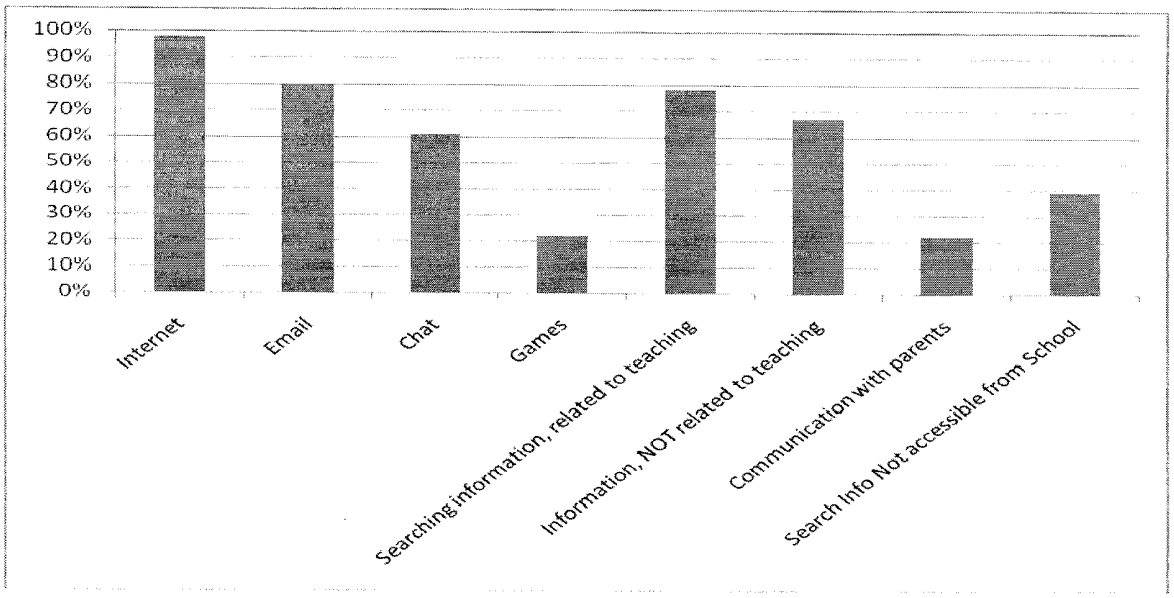

Figure 20: Online information for teachers outside of the schools

Look at the teachers' online information, there was relative high rate (61%) on chat outside of school. As normal, 98% of them were using internet, 80% were using Email, and searching information related to teaching (78%) is lower when they are outside of the school.

The figures and tables above reflect the fact that teachers' use of computer in or outside the classroom were almost the same, which were high percentage in using the internet, Email and search engines related to teaching in the school, whereby correlated to the fact that it was slightly more on chat and communication with parents outside of the school.

5.2.1.2 Analysis among the demographic section

This section of study showed a significant relationship among the demographic data. 'Teaching subject' has been tested; however, it has shown no significant difference if teachers use ICT facilities in their teaching ('do you use ICT facilities in your teaching').

Correlation Test:

Based on the correlation test among demographic section, only three significant items were found.

1) As expected, the years of teaching experience has a very high significance (p=0.000) correlation (r=0.85) with the age distribution.

		Age of the participants	Year(s) of Teaching Experience
Year(s) of Teaching Experience	Correlation Pearson	0.848**	1
	Significance (2-tailed)	0.000	
	N	49	49
Age of the participants	Correlation Pearson	1	0.848**
	Significance (2-tailed)		0.000
	N	49	49

N. = Number of samples (Teachers)
**p<0.001 very high significant
Table 6: Correlation (Pearson) between Age and Year(s) of Teaching experience

2) According to the correlation analysis, the test has found that '*How often do you use computers for instruction in the classroom?*' has a significant level of p=0.02 correlation (r=0.43) on '*The time frame to get the ICT support*'.

		The time frame to get the ICT support	How often do you use computers for instruction in the classroom
The time frame to get the ICT support	Correlation Pearson	1	0.431*
	Significance (2-tailed)		0.022
	N	28	28
How often do you use computers for instruction in the classroom	Correlation Pearson	0.431*	1
	Significance (2-tailed)	0.022	
	N	28	49

N. = Number of samples (Teachers)
*p<0.05 significant

Table 7: Correlation (Pearson) between 'the time frame to get ICT support' and 'how often do you use computer for instruction in the classroom'

3) Another significant difference was found between 'how much time are you allowed to access school computer facilities after school hours weekly' and 'how many hours a week approximately do you use computers in the classroom?' Surprisingly, the result has been found that 'how many hours a week teachers use computers in the classroom' is significant correlated (p=0.03, r=0.30) to 'how much time are they allowed to access school computing after school hours weekly'.

		How much time are you allowed to access school computer facilities after school hours weekly?	How many hours a week approximately do you use a computer in the classroom?
How much time are you allowed to access school computer facilities after school hours weekly?	Correlation Pearson	1	0.303*
	Significance (2-tailed)		0.034
	N	28	49
How many hours a week approximately do you use a computer in the classroom?	Correlation Pearson	0.303*	1
	Significance (2-tailed)	0.034	
	N	49	49

N. = Number of samples (Teachers)
*p<0.05 significant

Table 8: Correlation (Pearson) between 'How much time are allowed to access computer after school hours' and 'the use of a computer in the classroom'

T-TEST: Comparison within Public and Private Schools

T-Test was applied in order to find out if there were any differences within public and private schools in this study?

The results showed that there was not much difference between public and private schools, tests were applied on 'teachers' training', 'ICT support from the school', 'if the computer lab available during school hours', 'use ICT facilities for instruction' and 'how many hours a week approximately that teachers use a computer in the classroom and outside of the classroom', only three significant tests were found in this study. They are:

1) The time frame to get support from the schools.

There is a significant difference on the time frame getting support from the school. There were 28 out of 49 teachers getting support from the school and a significant (p=0.04) difference from public school with the mean of M=3.9 and private school with the mean of M=2.11. (Remark: The maximum available score is 7 which means the higher value, the longer waiting time or duration of getting support)

The time frame to get ICT support		Yes Numbers	Mean	Significance
Teachers in	Public	10	3.90	0.043
	private	18	2.11	
Total		28		

Table 9: Numbers of teachers and the time frame to get ICT support

2) The result shown on 'how much time are teachers allowed to access internet after school hours' at significant level of p=0.02 from the Public school with the Mean M=3.10 and private school with the Mean of M=4.14. (Remark: The maximum score available is 5, the higher score, the more time is allowed to access school computer facilities after school hours weekly.

How much time are you allowed to access school computing facilities after school hours weekly		Yes Numbers	Mean	Significance
Teachers in	Public	20	3.10	0.018
	private	29	4.14	
Total		49		

Table 10: Time are allowed to access computer facilities after school hours

3) The third test done was a Chi-Squared Test (Chi^2) which indicates the level of significant difference on teachers' access to www anytime during school hours between two schools. According to table 12, the type of schools and teachers access to internet during school hours were significant, associated ($P< 0.05$), the significant level p=0.04, N=49, df =1 and Chi-Square value=4.430. This result means significantly that teachers can have more access anytime during school hours for private schools (fewer teachers have no access to internet anytime during schools hours in private schools) since the no access for private schools has the highest individual chi-square value.

Teachers in	'Can Teachers access to WWW anytime during schools hours? '		Total
	Yes	No	
Public School	13	7	20
Private School	26	3	29
Total	39	10	49

Table 11: Cross table ' can you access to internet anytime during the school hours?

	Value	Degree of freedom (df)	Asymptotic Significance (2-tailed)
Chi-Squared with Pearson	4.430[a]	1	0.035
Likelihood-ratio	4.401	1	0.036
N	49		

a 1 cells (.25%) have expected count less than 5. The minimum expected count is 4.08
N. = Number of samples (Teachers)

Table 12: Chi-Squared Test:' Can Teachers access to internet anytime during school hours?'

5.2.2 Computer Attitude Scale (CAS) Questionnaire

5.2.2.1 CAS questions distribution

As mentioned in chapter 4.3, the CAS Questions included positive and negative questions totaling 43 questions. The positive and negative questions with the dimensions are listed as the following:

Dimension 1: Computer Liking

Positive:
1. I enjoy doing things on a computer.
10. I enjoy teaching with a computer.
17. I will use computers many ways in my life.
26. If a problem is left unsolved in a computer lab, I would continue to think about it afterward.
34. Once I start to work with a computer, I would find it hard to stop.

Negative:
5. I can't think of any way that I will use computers in my career.
13. I don' think I would do advanced computer work.
21. I will do as little work with computers as possible.
30. I think computers are too expensive to use.
38. I would try to use alternative instructional methods, instead of using computers.

Dimension 2: Computer Anxiety

Positive:
2. I would feel comfortable working with a computer.
9. Computers do not scare me at all.
18. I do not feel threatened when others talk about computers.
27. I would feel comfortable using computer to teach.
35. I am comfortable using IT equipments to prepare my teaching materials.

Negative:
6. Working with a computer would make me nervous.
14. Using a computer is very frustrating.
22. Computers make me feel uneasy and confused.

31. Using a computer would be very hard for me.
39. I get a sinking feeling when I think of using a computer to teach.

Dimension 3: Computer Confidence

Positive:
3. I can do a lot of thing when I use a computer.
11. I can do well with a computer without others' guidance
19. I think that computers are very easy to use.
28. I know how to access and use teaching/ learning materials with computers facilities.
36. I have a lot of self-confidence when I work with computers.

Negative:
7. I do not think that I could handle a computer course.
15. I think that I will take a long time to finish my work when I use a computer.
23. I am not the type of person who can do very well with computers.
32. I am not good with computers.

Dimension 4: Computer Usefulness

Positive:
4. It is very important for me to know and learn computers.
12. I think that teachers should be computer literate.
20. Computers are useful instructional tools.
24. Computers are very useful.
29. Computers improve my effectiveness.
37. Computers improve my instructional quality.
40. Computers make things easy to organize my instruction plans.
42. Teaching with computers captures my students' attention and motivates them to learn.
43. Computers make learning more interesting and fun.

Negative:
8. Learning about computers is a waste of time.
16. Working with computers will not be important to me in my work.
25. Computers cause more problems on my teaching and make my lessons more difficult.
33. Computers are too complicated to use.
41. Computers take up too much of my time to prepare the lessons

5.2.2.2 CAS Questions analysis

There are statements with100% agreements based on the table below, it showed that a majority of the teachers expressed positive feelings about using computers and it is important for them to know and learn about computer. Moreover, there is a high rate of 90% (49% slightly agree and 41% strongly agreed) on 'Teachers should be computer literate".

The positive form of statements which have rated the most (> 50%), as strongly Agree and slightly Agree are showed in the following table:

Positive statements	Strongly Agree	Slightly Agree	Total
4 "It is very important for me to know and learn computers"	*75%*	*25%*	*100%*
24 "Computers are very useful"	*69%*	*31%*	*100%*
3 "I can do a lot of thing when I use a computer"	*55%*	*45%*	*100%*
1 "I enjoy doing things on a computer"	*53%*	*47%*	*100%*
2 "I would feel comfortable working with a computer"	*47%*	*53%*	*100%*
29 "Computers improve my effectiveness"	*39%*	*61%*	*100%*
27 "I would feel comfortable using computers to teach"	*37%*	*63%*	*100%*
20 "Computers are useful instructional tools"	47%	51%	98%
17 "I will use computers many ways in my life"	39%	57%	96%
35 "I am comfortable using IT equipments to prepare my teaching materials"	27%	67%	94%
37 "Computers improve my instructional quality"	35%	59%	94%
40 "Computers make things easy to organize my instruction plans"	31%	63%	94%
43 "Computers make learning more interesting and fun"	49%	43%	92%
12 "I think that teachers should be computer literate"	41%	49%	90%
28 "I know how to access and use teaching/ learning materials with computers facilities"	27%	63%	90%
10 "I enjoy teaching with a computer"	39%	49%	88%
42 "Teaching with computer captures my students' attention and motivates them to learn"	41%	47%	87%
18 "I do not feel threatened when others talk about	33%	53%	86%

computers"			
19 "I think that computers are very easy to use"	27%	59%	86%
26 "If a problem is left unsolved in a computer lab, I would continue to think about it afterward"	25%	59%	84%
36 "I have a lot of self-confidence when I work with computers"	20%	59%	79%
34 "Once I start to work with a computer, I would find it hard to stop"	12%	51%	63%

Table 13: Positive statements with agreement

The negative form of statements which have rated the most (> 50%) as Strongly Disagree and Slightly Disagree included:

	Negative statements	Strongly Disagree	Slightly Disagree	Total
8	"Learning about computers is a waste of time"	65%	35%	100%
15	"I think that I will take a long time to finish my work when I use a computer"	27%	63%	90%
22	"Computers make me feel uneasy and confused"	41%	49%	90%
6	"Working with a computer would make me nervous"	39%	49%	88%
14	"Using a computer is very frustrating"	39%	47%	86%
16	"Working with computers will not be important to me in my work"	35%	51%	86%
25	"Computers cause more problems on my teaching and make my lessons more difficult"	27%	59%	86%
31	"Using a computer would be very hard for me"	35%	51%	86%
39	"I get a sinking feeling when I think of using a computer to teach"	25%	59%	84%
7	"I do not think that I could handle a computer course"	39%	37%	76%
13	"I don't think I would do advanced computer work"	16%	57%	73%
33	"Computers are too complicated to use"	25%	45%	70%
30	"I think computers are too expensive to use"	16%	55%	71%
41	"Computers take up too much of my time to prepare the lessons"	6%	63%	69%
38	"I would try to use alternative instructional methods, instead of using Computers "	18%	51%	69%
5	"I cannot think of any way that I will use computer in my career"	27%	41%	68%

23	"I am not the type of person who can do very well with computers"	37%	25%	62%
21	"I will do as little work with computers as possible" =	16%	45%	61%
32	"I am not good with computers"	20%	41%	61%

Table 14: Negative statements with Disagreement

5.2.2.3 Mean of the four Dimensions and the Confidence interval distribution

Based on the table below, the means of the CAS dimensions were calculated. In general the data suggested that overall the participants of this study have quite a positive attitude toward computer use. A higher mean of a dimension indicated more positive; however, a higher mean for anxiety indicated less anxiety (High control of anxiety).

The attitude toward liking of this group of participants is approximately 73%, 80% has less Anxiety toward computer, 78% on computer confidence and 82% on computer usefulness. (Remark: The total maximum available score for liking is 40, anxiety is 40, confidence is 36 and usefulness is 56)

Dimensions	Mean	95% confidence Interval for the difference	
		Lower	Higher
Computer Liking	29.3469	28.3204	30.3735
Computer Anxiety	32.2449	31.0584	33.4314
Computer Confidence	27.6735	26.4656	28.8813
Computer Usefulness	46.2245	44.8975	47.5515

Table 15: Mean of the four Dimensions and the Confidence interval distribution

5.2.2.4 The reliability of the CAS questionnaire

The overall Cronbach's alpha[17] coefficient reliability of this questionnaire is 0.90. In addition, the Cronbachs alpha coefficient reliabilities for the four dimensions are listed in the following table 16.

	Cronbachs Alpha	No. of Questions
Computer Liking	0.65	10
Compute Anxiety	0.80	10
Computer Confidence	0.81	9
Computer Usefulness	0.79	14

Table 16: Cronbachs Alpha for the four Dimensions

5.2.2.5 The correlation among the four measure dimensions

The table below shows the correlations among the four dimensions obtained from this study. The Correlation analysis (Pearson) indicated very high significant ($p<=0.001$) correlations between the four dimensions, ranging from $r=0.605$ to $r=0.873$ at $p=0.000$. It means that the dimensions are inter-correlated with one another.

These relationships suggest that teachers who like computer will have less computer anxiety and more computer confidence and they will find computers more useful.

		Computer Liking	Computer Anxiety	Computer Confidence	Computer Usefulness
Computer Liking	Correlation Pearson	1	0.698**	0.674**	0.664**
	Significance		0.000	0.000	0.000
	N	49	49	49	49

[17] is a widely accepted measurement of internal consistency (reliability) of a multivariate measurement composing of correlated items.
(http://www.stattools.net/Alpha_Exp.php#Introduction%20to%20coefficients%20of%20reliability)

Computer Anxiety	Correlation Pearson	0.698**	1	0.873**	0.709**
	Significance	0.000		0.000	0.000
	N	49	49	49	49
Computer Confidence	Correlation Pearson	0.674**	0.873**	1	0.605**
	Significance	0.000	0.000		0.000
	N	49	49	49	49
Computer Usefulness	Correlation Pearson	0.664**	0.709**	0.605**	1
	Significance	0.000	0.000	0.000	
	N	49	49	49	49

N. = Number of samples (Teachers)
**p<=0.001 very high significant

Table 17: The correlation among the four measure dimensions (Liking, Anxiety, Confidence and Usefulness)

5.2.2.6 New Dimension is introduced

Due to these four dimensions measurements having very close correlation, a new parameter Computer-Progressivity is introduced in order to find out a more accurate influence data in further calculations.

The new dimension computer-Progressivity is the total summation of the four dimensions Computer Liking, Anxiety, Confidence and Usefulness. This summation can help optimize the calculation error in the probability calculation (Meyer, 2002).

Computer-progressivity: = Liking + Anxiety + Confidence + Usefulness

In the following sections, the new computer-progressivity is added into the tables between the dimensions and the demographic sections' data, so that, we can have more accurate tests in order to decide which dimensions will be under final consideration. Any significant influence on the dimensions without having the new dimension computer progressivity will be omitted (With the line shadow in the tables 19 and 20).

5.2.3 Analysis among the Demographic section and the four dimensions

5.2.3.1 By independent T-Test

T-Test was applied in order to find out if a certain part of the demographic data and teachers' computer background data (e.g. teachers who own a computer at home/in the school; use of application; are teachers use of computer for instruction and etc.) have any significant influence on their attitude (with the four dimensions such as liking, anxiety, confidence and usefulness). Many of the results among the CAS dimensions and the demographic data and teachers' background information showed no significant relationship. However, teachers' use of ICT facilities in their teaching, use of computer for preparing teaching materials, sharing computers in the school, own a computer in the school, use of applications (in the school) as well as use of applications (outside of the school) were significant related with the use of computers.

1) There were no significant differences between the male/female teachers on computer liking and usefulness, however, the male showed significantly greater confidence than the female with male (mean = 30.00), t = 2.30, df = 18.84 and p = 0.03, and for Computer Anxiety, the Male (mean = 34.5) also showed less computer anxiety than the Female (mean = 31.51), t = 2.40, df = 20.69 and p = 0.03.

In general, the result of **gender differences** for computer attitudes (computer liking, anxiety, confidence and usefulness) towards the use of computer technologies by using independent t-tests have shown that male have a more positive attitude than female, with computer progressivity male (M) = 142.8 and Female (M)= 133.1. However, it will not be considered as an influence factor due to the Computer Progressivity's significant level p>0.05, p=0.054.

		N	Mean	Significance
1) Gender				
Computer Confidence	Male	12	30.00	0.032
	Female	37	26.92	
Computer Anxiety	Male	12	34.50	0.026

	Female	37	31.51	
Computer Progressivity	Male	12	142.75	0.054
	Female	37	133.13	

N. = Number of samples (Teachers)
Table 18: T-test for Gender on computer attitude

2) **Teachers' use of ICT facilities in their teaching** has close relationship from the dependence variables CAS dimension Computer 'Anxiety', as well as also having relationship with Computer 'Confidence' and 'Liking'. The test was calculated from 40 teachers who use computers for their teaching and 9 teachers were not using computers for their teaching. It showed a high significant (p=0.002) on Computer Anxiety with the mean of using M (Yes) = 33 and not using M (No) = 29, significant (p= 0.01) on Computer Confidence with the mean of using M (Yes) = 28 and not using M (No) = 25, and (P= 0.02) on Computer Liking with the mean of using M (Yes) =30and not using M (No) = 28.

3). For the teachers' computer usages '***the use of computer for preparing teaching materials'*** has very close relationship from the dependence variables CAS dimension computer 'confidence', and close relationship with 'Anxiety', 'Liking' and 'Usefulness', which means if teachers have less confidence toward computers, they will have anxiety, not liking computers and finding computers not so useful, and these will cause them not to use computers for their work.

The test was calculated from 43 teachers using and 6 teachers were not using computers for preparing their teaching materials. It has shown very high significant (p= 0.001) on confidence with the mean on using M (Yes) =28 and not using M (No) =24, high significance (p=0.01) on computer liking with the mean on using M (Yes) =30 and not using M (No) =27, and significant (P= 0.03) on usefulness M (Yes) =47 and M (No) =42. (Remark on calculating: The total maximum available score for liking is 40, anxiety is 40, confidence is 36 and usefulness is 56)
As referring to the above, teachers used computers to develop and organize their instruction related materials, for instance making handouts with Microsoft Word, Spreadsheet and PowerPoint. In other words, whether or not to use ICT in teaching seemingly has an influence on computer confidence, liking and anxiety value.

4) Another finding was on whether teachers are **sharing computers** in the school. Because not all the teachers own a computer in the school, sometimes even when someone owns a computer, he or she might need to share with other teachers for doing their teaching material preparation, online and etc.

Here, it shows a very high significance (p= 0.001) on confidence when M (Yes) =26,and M (No)=30, and a high significant on computer liking (p= .006) when M (Yes) =28 and M (No) =31, anxiety (p= .004) when M (Yes)=31and M (No)=34, and usefulness (P= .009) when M (Yes) =45 and M (No) =49

5). **Use of applications** also has a significant influence on teachers' attitude. The test results are showed in Table 19 and Table 20. Basically, the use of applications will have a very close relationship with computer anxiety and confidence, close relationship with Liking, as well as having a relationship with usefulness.

The influencing parameters are shown in the following two tables; which are T-Test in the school (Table 19) and outside of the school (Table 20).

T-Test:

In the school		N	Mean	Significance
1) Do you use ICT facilities in your teaching?				
Computer Liking	Yes	40	29.7250	0.022
	No	9	27.6667	
Computer Anxiety	Yes	40	32.9750	0.002
	No	9	29.0000	
Computer Confidence	Yes	40	28.2000	0.011
	No	9	25.3333	
Computer Progressivity	Yes	40	137.5500	0.003
	No	9	126.3333	
2) Use for preparing teaching Materials				
Computer Liking	Yes	43	29.6744	0.013
	No	6	27.0000	
Computer Anxiety	Yes	43	32.7907	0.004
	No	6	28.3333	
Computer Confidence	Yes	43	28.1395	0.001

	No	6	24.3333	
Computer Usefulness	Yes	43	46.7907	0.034
	No	6	42.1667	
Computer progressivity	Yes	43	137,3953	0.000
	No	6	121.8333	
3) Sharing computer with teachers in the School				
Computer Liking	Yes	31	28.1935	0.006
	No	18	31.3333	
Computer Anxiety	Yes	31	31.0000	0.004
	No	18	34.3889	
Computer Confidence	Yes	31	26.1935	0.001
	No	18	30.2222	
Computer Usefulness	Yes	31	44.8710	0.009
	No	18	48.5556	
Computer progressivity	Yes	31	130.2581	0.001
	No	18	144.5000	
4) Use for exam analysis				
Computer Anxiety	Yes	30	33.6333	0.001
	No	19	30.0526	
Computer Confidence	Yes	30	28.9667	0.003
	No	19	25.6316	
Computer Usefulness	Yes	30	47.2333	0.042
	No	19	44.6316	
Computer progressivity	Yes	30	139.4667	0.008
	No	19	239.2105	
5) Use for Word				
Computer Anxiety	Yes	40	33.1000	0.001
	No	9	28.4444	
Computer Confidence	Yes	40	28.2750	0.003
	No	9	25.0000	
Computer Usefulness	Yes	40	46.8500	0.048
	No	9	43.4444	
Computer progressivity	Yes	40	137.8750	0.003
	No	9	124.8889	
6) Use for Spreadsheet				
Computer Liking	Yes	17	31.5294	0.008
	No	32	28.1875	
Computer Anxiety	Yes	17	35.2941	0.000
	No	32	30.6250	

Computer Confidence	Yes	17	30.4118	0.001
	No	32	26.2188	
Computer progressivity	Yes	17	145.1765	0.003
	No	32	130.3438	
7) Use for lesson plan				
Computer Anxiety	Yes	30	33.3667	0.014
	No	19	30.4737	
Computer Confidence	Yes	30	29.0000	0.005
	No	19	25.5789	
Computer progressivity	Yes	30	139.6333	0.009
	No	19	128.9474	
8) Use for Presentation				
Computer Confidence	Yes	24	28.4118	0.041
	No	15	26.000	
Computer Usefulness	Yes	24	47.2059	0.012
	No	15	44.0000	
Computer progressivity	Yes	24	138.1471	0.024
	No	15	129.4667	
9) Use for Database*				
Computer Anxiety	Yes	9	34.8889	0.008
	No	40	31.6500	
Computer Confidence	Yes	9	30.5556	0.009
	No	40	27.0250	
10) Use for Internet *				
Computer Anxiety	Yes	47	32.2979	0.04
	No	2	31.0000	
11) Use for searching info related to teaching				
Computer Confidence	Yes	45	28.0222	0.043
	No	4	23.7500	
Computer progressivity	Yes	45	136.2444	0.026
	No	4	127.0000	
12) Own a computer in the school				
Computer Confidence	Yes	25	29.2800	0.008
	No	23	26.1739	
Computer progressivity	Yes	25	139.7200	0.048
	No	23	131.4348	

* According to 5.2.2.6 any independence variable, which without having the new dimension computer progressivity in the table, will be omitted (with the line shadow).

Table 19: T-Test: In the school within Demographic section data and the four dimensions

T-Test:

Outside of the School		N	Mean	Significance
1) Use for exam analysis				
Computer Anxiety	Yes	20	34.1000	0.009
	No	29	30.9655	
Computer Confidence	Yes	20	29.4500	0.015
	No	29	26.4483	
Computer Usefulness	Yes	20	47.8500	0.048
	No	29	45.1034	
Computer progressivity	Yes	20	141.9500	0.015
	No	29	131.0345	
2) Use for Spreadsheet				
Computer Liking	Yes	37	28.4054	0.021
	No	12	32.2500	
Computer Anxiety	Yes	37	31.1622	0.001
	No	12	35.5833	
Computer Confidence	Yes	37	26.6486	0.008
	No	12	30.8333	
Computer Usefulness	Yes	37	45.2703	0.028
	No	12	491667	
Computer progressivity	Yes	37	131.4865	0.007
	No	12	147.8333	
3) Use for Presentation				
Computer Anxiety	Yes	22	30.5000	0.007
	No	27	33.6667	
Computer Usefulness	Yes	22	44.1364	0.003
	No	27	47.9259	
Computer progressivity	Yes	22	129.3636	0.006
	No	27	140.4815	
4) Use for Database*				
Computer Anxiety	Yes	45	31.7778	0.015
	No	4	37.5000	
Computer Usefulness	Yes	45	45.6667	0.023
	No	4	52.5000	
5) Use for preparing teaching Materials*				

Computer Liking	Yes	34	29.9118	0.048
	No	15	28.0667	
6) Use for Word*				
Computer Usefulness	Yes	14	43.9286	0.020
	No	35	47.1429	
7) PC access at home*				
Computer Liking	Yes	47	29.4043	0.011
	No	2	28.0000	
Computer Anxiety	Yes	47	32.3617	0.011
	No	2	29.5000	
Computer Confidence	Yes	47	27.7660	0.029
	No	2	25.5000	
8) WWW access at home*				
Computer Confidence	Yes	44	27.9545	0.030
	No	5	25.2000	
9) Use for exam analysis				
Computer Anxiety	Yes	29	30.9655	0.009
	No	20	34.1000	
Computer Confidence	Yes	29	26.4483	0.015
	No	20	29.4500	
Computer Usefulness	Yes	29	45.1034	0.048
	No	20	47.8500	
Computer progressivity	Yes	29	131.3045	0.015
	No	20	141.9500	

* According to 5.2.2.6 any independence variable, which without having the new dimension computer progressivity in the table, will be omitted (with the line shadow).

Table 20: T-Test: Outside of the school within Demographic section data and the four dimension

5.2.3.2 By Correlation analyses (Pearson)

Correlation analyses (Pearson) were conducted to examine any relationship among the variables within the demographic section's data and the CAS four dimensions, the results showed that only certain data is significantly related.

Many of the results among the CAS dimensions and the demographic data and teachers' background information showed no correlation, for example it did not find statistically significant results to support the computer attitude and age difference

toward computer use in teaching, however, computer experience has positively correlated with attitudes toward using computers, indeed, only computer anxiety(r=0.361, p= 0.01) and computer usefulness(r=0.307, p=0.03) were significantly correlations with the year(s) of computer experience. These result shows that teachers will have less anxiety and will use more computer instruction if they have more computer experience.

The teachers' knowledge of computer usage and understand of the instruction software could be included into the computer experience, and due to teachers' year(s) of computer experience will affect teachers' use of computers for instruction, which means it will take time for teachers to be effective and knowledgeable computer users for instruction.

		Computer Liking	Computer Anxiety	Computer Confidence	Computer Usefulness	Computer Progressivity
The year(s) of Computer Experience	Correlation Pearson	-	0.361*	-	0.307*	0.306*
	Significance		0.012		0.034	0.035
	N		49		49	49

*P<=0.05 Significant

Table 21: Correlation between demographic section and CAS dimensions

5.2.4 Finding on problems and barriers of ICT use in Malaysian Schools

Along with the teachers' attitude test on analysis and results above from this study, the problems and barriers of ICT use in Malaysian schools are shown in Figure 21 based on the second questionnaire (pg.85, 4.3 Description of Questionnaire) which has been given to teachers along with the first questionnaire. The question was given as: 'What are the problems and barriers of using Computer technologies teaching in Malaysian school?' With ten options, teachers need to select their best choice to describe problems and barriers. There are:

1. Short of time [e.g. with the regularly scheduled classes, they may not have enough opportunities to practice using computers in the classes, too much additional administrative work] ☐

2. Short of technical support ☐
3. Short of computer hardware and software facilities set up in the classroom or office ☐
4. Short computer training ☐
5. Power supply disruption ☐
6. Internet access problems ☐
7. Computer equipment failure ☐
8. Language problems [e.g. since most of the original resources and materials are in English] ☐
9. Poor management support [e.g. the Principal] ☐
10. Others:

However, only 21 participants have given their feedbacks out of 49 participants, 8 from big towns and 13 from small towns. The following findings throw light on the barriers and problems on ICT use in school according to the twenty-one participants.

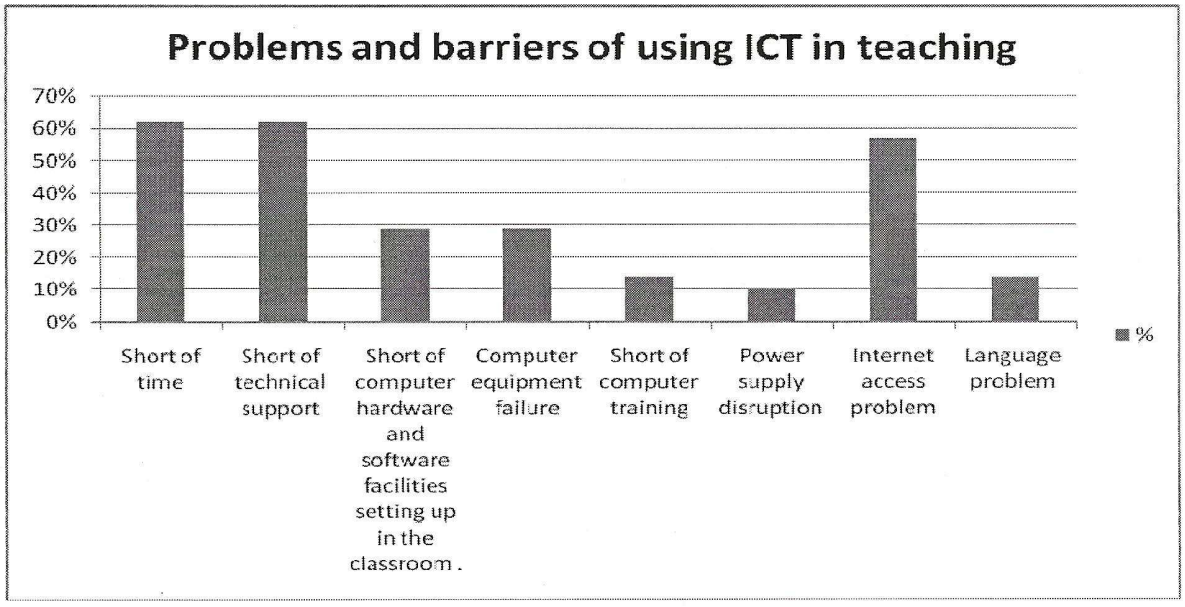

Figure 21: Distribution of Problem and barriers on ICT use in schools

The study results show that the top three problems face by teachers use of ICT in teaching are short of technical support (62%), short of time (62%) and internet access problem (57%).

The rests follow by short of computer hardware and software facilities setting up in the classroom (29%), computer equipment failure (29%), language problem (14%), short of training (14%) and power supply disruption (10%).

Basically, the problems of using computers in the classroom in the rural areas according to this questionnaire are mostly internet access problems followed by short of technical support, short of time, short of computer hardware and software facilities set up in the school, computer equipment failure, training, language problem and power supply disruption. In fact, a burden of maintenance is another problem especially in the rural area of public schools, which associated with donated or old computers that might exceeded their lifespan. It is difficult to focus on integrating ICTs to support learning if the basic technological equipment and facilities issues with technical support cannot be overcome.

However, these are slightly different in term of the internet access problem which is not the main issue for teachers who come from big towns, as well as power supply disruption also not so often a problem in the city areas, in fact, the main problem is short of time and short of technical support.

For ICT integration programs to be more effective and sustainable, we need to take note of the above issues, since ICTs in education programs require large capital investments, technicians support (inadequate technical support[18] was highlighted as a major problem in most of the areas, in addition, the downtime caused by inadequate technical support or hardware/software failure would have an impact on students' study progress, for example unavailability of hardware or software for ICT-based learning process) (Frost and Sullivan, 2006) and administrators/ teachers must be competent in using the technologies.

[18] Technical support included support from both the ICT facilities vendor as well as the internal helpdesks within MOE.

Chapter 6: Discussion, limitation and conclusion

This chapter discusses and synthesizes the findings of this study with answering the research questions, limitations and provides results in drawing the conclusions from the analysis of the data together with the research described in the literature review.

The study of the attitudes toward computer use among the teachers in Malaysian schools is critical for the successful implementation of computer infrastructure; with the CAS questionnaires, the results in chapter 5 provided a statistically reliable and valid measure of Malaysian teachers' attitudes toward technology use, additionally with the problems and barriers of technology use in the school. The research questions have provided a framework for this study and through the data in the demographic section as well as through the four dimensions comprised in the CAS to analysis and determine the finding of this study. There are age, gender, experiences, computer ownership, training, access to computer and internet, computer usage, support, as well as the Computer Liking, Anxiety, Confidence and Usefulness. Correlation analysis and T-test were used to examine relationships among the demographic data, computer usage. The CAS, Chi-Squared Test (Chi^2) was used to examine demographic data. Data from this study was collected during 2011to 2012.

6.1 Summary, Discussion with conclusion of the finding

A summary by looking at the distribution of gender in this study, 24% were Male and 76% were Female, out of 49 respondents. This is not surprising that most of the participants were females, according to Kumar et al. (2008a), it also shows that the proportion of teachers in Malaysia is also dominated by a female workforce.

Approximately 38% are big towns and 62% from small towns.

The age of the respondents range from 21-60, with the majority 27% within 31 to 35, followed by the range of 36-40 and 41-45 (18% each respectively), 26-30 (15%) and

21-25 (10%), which has shown that about 45% of the participants were between the range from 31-45.

The distribution of teaching experience in the range of 10-15 years was 27%, follow by 23% within 5 to10 years, 20% within 2 to 5 years and 10% in 'less than 1 year' and more than 20 years, 6% within 15 to 20 years and the last group is only 4% within 1 to 2 years.

In terms of their computer experience, 33% have 10 to15 years of computer experience, 25% are in the range of 15 to 20 years, 19% are 2 to 5 years, 13% are 5 to10 years, 4% in 'less than 1 year' and 1 to 2 years and the last group is 2% more than 20 years of computer experience. Additionally, 71% of the teachers obtained computer training before and during their teaching.

The following summary shows the findings of variables significant correlated with teachers' Attitude toward computers use.

Variables	**Teachers' attitude toward computers**
1. Age	-
2. Gender	-
3. Teaching experience	-
4. Teaching subject	-
5. Training	-
6. Computer experience	Anxiety and Usefulness
7. Computer ownership	Anxiety, confidence, liking and usefulness
8. Use of Application	Anxiety, confidence, liking and usefulness
9. Use for preparing teaching	Confidence, liking and usefulness
10. Computer instructional use	Anxiety, confidence and liking

6.1.1 The research questions 1:

1) What are the actual barriers and challenges of using ICT teaching in Malaysian Schools?

In addition to this study of how teachers attitudes (on computer liking, anxiety, confidence and usefulness) may influence computer use in teaching, many studies have also identified numerous problems and barriers as reasons for why teachers rarely use computers in the classroom, such as lack of training, lack of knowledge and skills (Yildirim, 2000; Jones, 2004; Chong et al., 2005; Yushau, 2006; Hamzah, Ismail and Embi, 2009; Saud et al., 2010), lack of time (Jones, 2004; Chong et al., 2005; Yushau, 2006; Hamzah, Ismail and Embi, 2009; Saud et al., 2010; Frost and Sullivan, 2010), internet access problems (Hamzah, Ismail and Embi, 2009), lack of facilites (Hamzah, Ismail and Embi, 2009) and lack of technical support (Jones, 2004;Chong et al., 2005).

According to Pelgrum (2001), beside the main obstacle of an insufficient number of computers, the success of educational innovations depends largely on the skills and knowledge of teachers. Lack of knowledge and skills was the second most inhibiting obstacle to the use of computers in schools, which means teachers might get little training about the pedagogical practices and how to incorporate ICT in the curriculum. Meanwhile, two major barriers were identified from the Saud et al. (2010) study: lack of time for preparing the teaching materials and lack of knowledge and skills for producing advanced ICT teaching materials. However, the finding of this study has only shown the similar outcome of **'short of time'** to the previous study. Another finding was the **'short of technical support',** these two obstacles were the **two main obstacles** of ICT use in the classroom for this study. Knowledge and skill on computers is not a big issue to this group of participants, it might be due to the fact that most of the teachers had training before and during their teaching.

On the other hand, according to Jones (2004), use of ICT requires more time, in particular the time needed for preparation of lessons and resources, to explore and practice using the technology, to deal with technical problems and to receive

adequate training. Also in this study, lack of time (62%) available in many aspect of teachers's work is always a problem, especially with regularly scheduled classes and many additional administrative work. Therefore they may not have enough opportunities to use ICT for preparing their teaching and practice using computers in the classes. This finding is fully supported by the past studies from Jones (2004) and Saud Muhamad Sukri et al. (2010).

Although studies have shown that some real concern for teachers, when considering making use of ICT, is the fear of equipment breaking down in a lesson or having fear that they will do something wrong and cause damage to it themselves when they use the equipment (Jones, 2004). Based on the results obtained from the teachers in this study, the fear of computer equipment failure is only about 21%, which means the participants of this study do not have as much worry about equipment failure. In fact, this study discovered that lack of technical support (62%) is an important concern for them, if any equipment failure occurs, especially when teachers themselves cannot handle the computer faults once the computers breaks down during the class, and they will not be able to continue the class using the technologies.

This group of participants already had background knowledge in using computers, as mentioned earlier, most of them had computer training (71%) before and during their teaching career. According to their feedback, knowledge of how to use computers in teaching is not a big problem for them. However, one of the teachers mentioned that some teachers (who were not participants of this study) are still having fears of using computers to teach, although she has prepared all the presentation notes for them to use, they still prefer using the traditional 'chalk and talk teaching' method, because they worry about computer break downs during the class and they do not know how to handle this issue in front of the pupils.

In fact, this has suggested that there is still a strong relationship between the barrier caused by fear or anxiety of doing damage to equipment or break downs, as well as the barrier caused by lack of teacher confidence in using technologies in the classroom. This finding is also strongly supported by the research from Jones

(2004), as technical faults with ICT equipment are likely to lead to lower levels of ICT use and also reduce teacher confidence and cause teachers to avoid using the technology in the classroom. Indeed, study has suggested that this can be improved by organizing periodic training or workshops for teachers (Yushau, 2006); however, this study has shown that teachers' computer training is not a significant factor on teachers' attitude toward computer use of ICT in teaching.

The **third main obstacle** according to this group of participants is the **internet access problem** (57%). The issue of lack of Internet connectivity is a particular challenge and it has already been mentioned early in the paper under 'ICT in Teacher Education' during 2007-2008 (UNESCOBangkok, 2007-2008, pg.17),

"At the current rate of development of connectivity, it is unlikely that the infrastructure will be in place in time to connect all schools to the Internet by 2010." (UNESCOBangkok, 2007-2008, pg.17), however, this issue has remained unsolved. It was also mentioned by Hamzah, Ismail and Embi (2009) that internet connection is one of the problems in Smart Schools, such as 'Internet connection is very slow', 'sometimes jammed or crash', in addition, the internet connection is sometimes down or no electricity due to thunder storms.

Internet access in schools is one of the problems in this study; it might be due to broadband connections still being very limited. Again, school and government should work closely with Internet Service Providers to help in determining appropriate bandwidth connections in schools to avoid insufficient 'bandwidth' to support the application software and communication requirements. However, a combination of online and offline resource access, which is similar to the suggestion from the ICT integration in the Thailand case study by UNESCOBangkok (2004), is temporarily the most appropriate to support and promote effective teaching and learning now. Without a good infrastructure and connectivity, the ICT integrated system (encompassing web-based courseware, on-line management tools and technical support) will not be accessible to rural schools. The lack or low quality of connectivity in rural schools threatens to amplify the disadvantages of rural learners as well (UNESCOBangkok, 2007-2008).

6.1.2 Teachers' attitude

6.1.2.1 The research questions 2 (a):

Whether teachers are holding the right or positive computer attitude?

Positive attitudes have been shown in several studies to correlate with successful implementation of computer usage (Mukti, 2000). Regarding the perceiption of the participants in this study, the results revealed that most teachers in this study generally expressed positive feelings in using computer technology by examining the positive and negative statements to which they indicated their agreement and disagreement (in table 13: Positive statements with agreement). Overall, although some teachers are facing certain problems refering to the first research question of this study, teachers found that it is important for them to know and learn about computers. Examining teachers' use of computers has shown that they use applications such as Word (82%) and PowerPoint (69%) for preparing teaching (88%), lessons plans (61%), exercises and examinations (94%), analyze examination results (61%) and searching information related to teaching (92%).

The results of this study show that teachers possess fairly positive attitudes (Computer liking, confidence, anxiety and usefulness) toward computers and the use of computers. This finding is consistent with other similar study results from Loyd and Gressard (1984), Mukti (2000), Ahmad Ridzuan et al. (2001), Yuen and Ma (2001), Albirini (2004), Juanna et al. (2005) and Yushau (2006).

In fact, the attitude of the teachers towards liking, confidence, anxiety and usefulness of computer is far above the average with the means of 29, 28, 32 and 46 out of 40, 36, 40 and 56. A higher mean of a dimension indicated that it is more positive, but higher mean for anxiety indicated less anxiety (High control of anxiety). This has shown that approximately 73% of this group of participants have positive attitudes toward liking, 80% of them have less Anxiety toward computer, 78% have positive attitudes on computer confidence and 82% on computer usefulness; this is also an indication to show that teachers are aware of the importance of using ICT and perception of them toward ICT is more of a positive tool that can enhance the teaching and learning process (Yushau, 2006).

According to Al-Zaidiyeen et al. (2010), teachers' attitudes towards the use of computers had a direct relation with the use of ICT for educational purposes.

Teachers of this study showed a fairly positive attitude toward the use of computers, which means they would be more likely to incorporate ICT use in their classroom teaching in relation with their liking of computer, anxiety, computer confidence and usefulness. However, this study found out that teachers are not using computers frequently in the classroom, which is consistent with Ahmad Ridzuan et al. (2001). Their general finding showed that the respondents tended to use the computers in preparing teaching/ learning materials and administrative tasks, however, computers were seldom used to enhance the teaching and learning. Unlike Saud et al. (2010), their findings showed that application of ICT was widely used in teaching and learning technical subjects at vocational and technical education in Malaysia.

The following showed that teachers in this study have problems in putting this positive perception into practice.

Important finding on the purposes of teachers' use of computers

Although results of this study showed that teachers were intensive computer users in different academic activities, the majority of the teachers (82%) used ICT facilities in their teaching, 38% of them were using them only occasionally, 28% were using daily and 18% were using weekly.

Teachers' level of basic computer skills and knowledge were considered quite good, most of them used computers as a tool for educational purposes such as internet and communication (email), seaching information for preparing lessons, exercise, examination and with high percentage of applications used, such as Word processing (which is the most commonly used software for writing memos and examinatiion papers), PowerPoint and Spreadsheets (Unfortunately, this study has not included details of teachers' use of ICT tools to prepare learning activities which attract and keep the pupils interested in the lesson, an example is teaching aids to lead and learn through multimedia software and so on). This show that most of the teachers can perform and complete tasks using computers, but they have slightly lower ultilization on presentation and low level use of spreadsheets.

However, the rate at which they use computers in the classroom to support learning was quite limited (they used computer mostly (61%) within one to five hours per week only in the classroom) compared to the computer usage in searching information, application use and other purposes. This is quite similar to Ertmer's (2005), he has mentioned that many teachers use technology for numerous low-level tasks for example word processing and Internet research, higher level uses for high-tech tools to enhance their lessons are still very much in the minority. This was the most significant finding in this study.

It is similar to the results from Ahmad Ridzuan et al. (2001), although teachers educators used computers for preparing exercises and examination questions, computer assitsted instruction was seldom utilized. This finding also coincides with the study results of Yushau (2006), more than 95% of the teachers of the faculty use computers for e-mail or Internet purposes, and more than 60% use computers for word-processing and other research purposes. This is slightly different from the first results of computer usages, by producing electronic slides from the study by Saud Muhamad Sukri et al. (2010), teachers produced and used electronic slides very often in the classroom. They have mentioned that this might be due to 'vocational and technical' teachers in Malaysia having been interested to learn more about the latest ICT applications in their effort to get connected with their students. Their other two highest ICT applications is of Malaysian vocational and technical teachers are internet searching for information and research, as well as to create and use group addresses for electronic mail which are similar to this study results.

The majority of the teachers in this study were from small towns (62%), this result is slightly compliance with the findings of Al-Zaidiyeen et al. (2010) who conducted a survey aimed to investigate the levels of ICT use by rural secondary school teachers. In their research, the majority of participants had very low levels of ICT use for educational purposes, only a small number of teachers were using ICT as an integral part of the teaching process.

As for this study, although many of the teachers (82%) have experience using ICT in their instruction, their frequency utilization is not so high. It is similar to the study from Yushau (2006), this results has also shown that having positive attitudes toward technology is not enough to indicate that ICT tools will automatically be used

in the classroom. Teacher educators need to increase their use of computers in actual teaching and learning activities rather than just verbally promoting its use or just using the computers for searching information and preparing lecture notes and examination questions (Ahmad Ridzuan et al., 2001).

6.1.2.2 The research questions 2 (b):

How is the teacher's attitude toward computer use within these two groups of Malaysia teachers?

In order to find out if there is any difference on equitable computer/ internet access as well as teachers' attitude between the two groups of schools, the data among the demographic section and CAS section was examined, which in terms of teachers' attitude (liking, anxiety, confidence and usefulness), ICT support, training, computer facilities access, internet acccess as well as ICTs' use.

Basically, the results showed that all dimensions, computer liking, anxiety, confidence, and usefulness do not have any significant differences between the two groups of participant. However, there are differences in certain demographic data in term of computer and internet access and support.

Availability of the assessments

Since using ICTs in teaching with interactive lessons offer a great opportunity at assisting students in developing the 21st century skills such as creativity and innovation, critical thinking and problem solving, communication and collaboration (UNESCOBangkok2, 2011), teachers might need to be able to access relevant digital information in various formats to suit the needs of the learning situation while digital information is becoming the major source of reference in schools today (McKay and Mat-jizat, 2011). Additionally, the findings from the experts in the study by McKay and Mat-jizat (2011), have showed that teachers should be creative and independent in gathering information related to teaching and learning from ICT-based media. Therefore, the availability of access to internet and computer facilities

is an important factor for teachers to collect or retrieve various necessary information.

Basically, the finding showed that teachers in private school have more internet access possibilities then public school teachers, based on this study. There was a significant difference between the two types of school in term of 'allowing internet access after school hours' as well as their 'access to internet anytime during school hours'.

Where by 'How much time are teachers allowed to access internet after school hours' at significant level of p=0.02 from the Public school with the Mean of M=3.10 and private school with the Mean of M=4.14, the maximum score available is 5, which means the higher the score, the more time is allowed to access school computer facilities after school hours. Another test was done by Chi-Squared Test (Chi^2) which indicates that there was a significant level of p=0.04, difference in teachers 'access to www anytime during school hours' between the two schools.

Duration of getting Support

Of the 49 teachers, 28 were getting support for ICT use from the school. The test was applied to 'The time frame to get the support from the schools', the results showed that there was a significant (p=0.04) difference between public school, with the mean of M=3.9, and private school M=2.11, in terms of the duration of getting support. The maximum available score is 7, which means the higher the value, the longer waiting time or duration of getting support. Such findings are new to the field, there was research examining the relationship between the general supports on ICT use but not specifically on the duration of getting support from ICT use. Therefore, this finding suggested that it is important to take note of the duration of provided support, but not concentrate on technical support availability only. Basically, this finding showed that private schools have better support for teachers then public schools.

Another interesting finding in the demographic data which will have direct relation to the above findings is how much time teachers are allowed to access school computers after school hours. It will also affect teachers' use of computers in the

classroom; they are inter-related to each other. As this study result showed, 'How many hours a week teachers use computers in the classroom' is significantly correlated (p=0.03, r=0.30) to 'how much time are they allowed to access school computer after school hours weekly'. This has been suggested and supported by Jones (2004) and Ertmer (2005), in their study for teachers' levels of access to ICT and the readiness of acessing to ICT, the availbility of classroom-ready digital content are important factors which will affect their ICT use as well as a detemining factor in a teachers' ability to integrate interavtive learning methods into their teaching (UNESCOBangkok2, 2011). Due to shortages of materials such as teachers limited access to the internet for getting their material or seaching information for their lesson, it will definitely affect their use of ICT in the classroom.

Overall, it is important to know that there are no differences in teachers' attitude within these two types of school. However, public schools should take more care and make improvements in the following two factors: 1) since the findings showed that how much time teachers will use computers for instruction in the classroom has a close relationship with how much time are they allow to access computers after school hours, and 2) the duration of getting support, as public schools require more waiting time for getting support, as well as less internet access in school after school hours, because these will have an indirect influence on their attitude toward ICT use in the classroom.

6.1.2.3 The research questions 2 (c), (d) and (e):

c) Whether the teachers' attitudes (which included also teachers' emotions and beliefs) influence teachers' use of technology?

d) What other factors affect their attitude?

e) How significantly different are the influence value?

Computer Attitudes

According to the Correlation analysis (Pearson), this study indicated very high significant (p<=0.001) correlations among the four dimensions, computer linking, anxiety, confidence and usefulness with ranges from r=0.605 to r=0.873 at p=0.000.

These relationships suggest that teachers use or do not use computers based very much on these four dimensions. As similarly suggested by Wahab (2009), that teachers use of computer is dependent on the intrinsic factors which are identified by comfort of computer (with emotion such as anxiety and confidence), instructional use (how useful as instruction tool), computer liking and usefulness (how useful computer are for work). In other words, this study's relationships suggest that normally teachers who like computers will have less computer anxiety and more computer confidence and they will find computers more useful.

The T-test results showed that there was a significant relationship between teachers' attitudes towards computers and **computer instructional use.**

Generally, the finding of this study showed that teachers' use of ICT facilities in their teaching has a close relationship from the dependence variables CAS dimension Computer 'Anxiety', as well as also having a relationship with Computer 'Confidence' and 'Liking'. The Test was calculated from 40 teachers who use computer for their teaching and 9 teachers who were not using computers for their teaching. It has shown high significant (p=0.002) on Computer Anxiety, significant (p= 0.01) on Computer Confidence, and (P= 0.02) on Computer Liking. This means teachers who use computers for instruction will normally has less anxiety of computers, more confidence and like computers.

An additional finding is that ***teachers' use of applications*** also has a degree of influence on their attitude.

Examinations done by T-test have shown that teachers' attitudes especially in Computer anxiety, confidence, liking and usefulness toward computer use have significant influence by their use of word processing, exam analysis, spreadsheet, presentation, lesson planning and searching information for teaching. Through more frequent use teachers will be able to begin (in other words, more confidence and less anxiety) developing and refining their skills which they need, to use technology and digital content for preparing more attractive instruction so that it will reduce the gap between students and teachers, in order to achieve and promoting a collaborative learning environment in the classroom (UNESCOBangkok2, 2011).

Regarding teachers' '***use of computers for preparing teaching materials***', has a very close relationship with the dimension of computer confidence, and a close relationship with computer liking as well as having a relationship with computer usefulness. The test was calculated from 40 teachers who use computers for preparing their teaching materials and 9 teachers who were not using computers for preparing their teaching materials. It has shown a very high significance (p= 0.001) on confidence, high significance (p=0.01) on computer liking, and significance (P= 0.03) on usefulness. This illustrates that the teacher's use or not use of computer technology for preparing their teaching is dependent very much on their computer confidence, liking and usefulness. An example, as they perceive computers to be useful to their teaching and learning, then they are more likely to have a positive attitude to the use of ICTs (Loyd and Gressard, 1985).

These are consistent with Al-Zaidiyeen N.J. et al's (2010) study, their correlation findings revealed that there was a significant positive correlation between teachers' level of ICT use and their attitudes levels, they also pointed out that if teachers hold negative attitudes towards the use of ICT, they will be less likely to contribute effectively to the utilization of ICTs for educational purposes.

The findings of the significance of teachers' attitude toward computer use are generally supported and refuted by researchers. According to the results from Ahmad Ridzuan et al. (2001), who have conducted a study to detemine the level of computer use and attitude towards computers among teacher educators, have shown that the three domain of CAS test computer liking, confidence and anxiety were significantly related to computer use. However, the study from Al-Khaldi and Al-Jabri (1998) has shown that anxiety and perceived usefulness were found to be insignificant determinants of computer utilization. As Juanna et al.(2005) measured teachers' attitudes toward IT in term of usefulness, confidence, anxiety and aversion, has shown in their analysis result that all of the factors, usefulness, confidence, anxiety and aversion toward teachers' use of IT, had a significant relationship.

Attitude and computer experience, training, computer ownership

The finding of this study indicated ***computer experience*** positively correlated with attitudes toward computer use. This is especially true between the year(s) of computer experience and computer anxiety($r=0.361$, $p= 0.01$) and computer usefulness($r=0.307$, $p=0.03$) were significantly correlated. In other words, computer experience has significant correlation with only computer anxiety and computer usefulness in teachers' attitude based on this finding. More computer experience will not guarantee that teacher will have more confidence and like of computers. Therefore, the relationship between teachers' attitudes and their computer experience suggested that teachers who use computers more often with more computer experience will normally have less anxiety and will find computers more useful and will use computers for their instruction according to these results.

In fact, this finding partially supports previous studies from Loyd and Gressard (1984), Yildirim (2000), Ahmad Ridzuan et al. (2001) and Wahab (2009). Compare the results to Loyd and Gressard (1984), who have examined about 454 high school and college students with only three subscales measurements (Computer Liking, Confidence and Anxiety), the computer experience was significantly related to more positive attitudes on the three subscales. Wahab (2009) has also indicated that teachers with greater years of computer experience were more comfortable with computers; he also suggested that teachers who have spent more time with computers feel more comfortable dealing with computers. Another finding result by Teo (2008), revealed significant associations between years of computer use (computer experience) and computer attitudes (level of confidence). However, this is not consistent with the result of this study.

Computer Anxiety

The correlations test indicated that teachers with more years of computer experience were having less anxiety on using computers ($r=0.361$, $p= 0.01$) as well as in their instruction. This is consistent with the previous study by Ahmad Ridzuan et al. (2001), their study was to find out the level of computer use of teachers in Johor Malaysia. Their results showed teachers educators have possitive attitudes and low computer anxiety toward computer use for teaching and learning in general.

As Wahab (2009) has also agreed, most teachers possess anxiety and they will try to avoid using computers due to their lack of computer experience, therefore, this finding suggested that it is important to take note that computer experience helps to reduce anxiety in computer use.

Computer Usefulness

The correlations test also indicated that teachers with more years of computer experience found computers more useful ($r=0.307$, $p=0.03$). This is similar to the study from Wong et al (2003), in term of usefulness, their Pretest results showed that participants who have IT competence, which means with computer experience, will likely find computers more useful; on the other hand, the differences from this study are that they also agreed that teachers with more computer experience had more confidence and less aversion (like) toward technology.

As a result, this study suggested that teachers with more experience will have less anxiety, found computer more useful, which can help them in using computer technologies in the teaching and learning process.

However, this study has a difference finding from Yushau (2006), he noted that computer experience did not show any significant influence of attitudes in any of the subscales. Also the results by Woodrow (1991) concluded and stated that computer literacy was not correlated with positive computer attitudes toward them and their use. She also criticized that knowledge based upon actual experience with computers has no correlation to be effective in developing positive computer attitudes.

Basically, Ahmad Ridzuan et al.(2001), are recognizing that teacher educators without experience in using computers exhibit significantly less computer use as compared to those with more than a year of computer use experience. Yushau (2006) also agreed that teachers with more than one year of experience were significantly less anxious than those with less experience.

Since teachers' year(s) of computer experience will affect teachers' attitudes of using computers for instruction, in other words, it will take time for teachers to be effective and knowledgeable computer users for instruction. Therefore, it is important to take note that computer courses should be provided as early as possible, as many consider it important to expose children early to this evolving technology (Look, 2005). Wong and Hanafi (2007), have also mentioned in their research that Introductory IT courses are compulsory for first year students in most of the institutions of higher learning around the world where students are taught to integrate IT tools in order to gain more computer experience, and based on the similar study with teachers by Wahab (2009), the study has suggested that it is important to provide computer training to pre-service or professional development opportunities to teachers on an ongoing basis, so that teachers could have more exposure to the computer.

On the other hand, teachers' attitudes are significantly related to the computer literacy course according to studies by Kumar et al. (2008a), Yildirim (2000),Yildirim and Kiraz (1999), Yuen and Ma (2002). Teachers' attitudes are significantly improved after the training (Yildirim, 2000). However, it is surprising that existing research does not show teachers' attitude toward computer use has any significant relationship with ***computer training*** for teachers, which is similar to the research by Darus and Ho (2008) and Kellenberger and Hendricks (2003). This might be due to the reasons that most of the teachers (71%) from this study had training before and during their teaching as well (63%).

However, some computer experienced teachers from this study have given their feedback and clearly indicated that teachers' perception of computers has changed after they attended the course or training and gained more confidence towards computer use. This is in line with what had been stated by the paper 'ICT for Teachers education', training has a positive impact on teachers' professional practice and they were increasingly confident in the use and application of ICT in their teaching (UNESCOBangkok, 2007-2008). In fact, this positive impact is provided when they obtain the right training, which means suitable to their level and needs, and this has also been indicated in the study from Yildirim (2000). Teachers

education programs should provide technology training for teachers that can satisfy their specific need. Many studies have also shown that learners are motivated to learn and learn best when what they learn is relevant to their needs at the time of learning (UNESCOBangkok, 2007-2008), otherwise, negative experiences with wrong training might exacerbate negative attitudes toward computers' use, as Yildirim (2000) mentioned, it will then influence the learning process. In this respect, appropriate teachers' training programs play an important role to provide a teachers training to help teachers to understand how the new technologies can best be used (Afshari et al., 2009).

In fact, teachers need to be computer literate themselves (Smart school project team, 1997; Kumar et al. , 2008b) to make the best use of the ICT tools. To reduce their anxiety so that they will like and feel confident in using ICT in their classroom, teachers should be equipped with the knowledge and skills and a better understanding of how to use/integrate ICT in their teaching and learning in the classroom. It is also important for teachers to understand the relevance, usability and usefulness of these tools in order to understand what ICT can do to enhance their own development and to enrich the learning experience of their students.

On the other side, feedbacks from teachers have also indicated that some teachers are more likely to integrate ICT in their teaching when professional training in the use of ICT provides them time to practice and learn the technology, share and collaborate with colleagues. Whereby a suggestion here is that junior and senior or more experienced/ expert teachers should work together on classroom projects using ICT in order to help them to improve and enhance their teaching skills, to build their confidence and reduce their anxiety of using computer. Use of ICT in teaching is more likely to succeed with a combination of sharing expect/ experience between teachers and a continuous built-in process of teachers training.

However, according to Kumar et al. (2008a), training of AUC 10 years ago could be considered obsolete; it may not be applicable in today's world of IT. It is important to take note that school teachers should attend formal training 'recently', and their knowledge could be considered as 'up-to-date' and 'relevant'. In this respect, ICT professional development program for teachers should be planned and taken

carefully through sufficient, up-to-date and appropriate levels of computer training provided by teachers' trainer, training center or MOE in order to ensure continuous training of teachers before and during their teaching career in school. In fact, this computer training factor should also be available and considered.

An effective type of ICT trainings should then include basic ICT training which was mentioned in 6.1.1. Research question one, teachers need to know basic computer skills in case short of technical support, and pedagogical educational use of ICT. On the other side, teachers are not often taught how to revise their pedagogical practices in many ICT professional development courses or training. For example how to replace their traditional lessons by using ICT tools without depleting the curriculum coverage and so on, this means after training, teachers might still need some time to be effective in using ICT. Technology integration takes time; time to learn about the new tools, and time to be adequately prepared to use them (Afshari et al., 2009). Meanwhile, teachers owning a computer/ sharing computers in the school are significant influence of their computer attitudes. It is one of the factors which can influence teachers towards computer use in the classroom, therefore, it is also important to take note that teachers' interest in using ICT after their training is more likely to grow if they are provided with computers, of course with the training materials and software for classroom use as well.

As Yushau (2006) has mentioned many researchers have intensively investigated ***computer ownership*** and found it to be a statistically significant factor that influences attitude toward computers. However, this was not applied to his result findings because of all the professors having their own computer in their office. Some studies have shown that computer ownership has no significant relation to teachers' attitude to the use of computers (Kellenberger and Hendricks, 2003; Deniz, 2007). The main reason given by the researchers for this was because the owner did not attempt to learn how to use the computer or the computer was used by other people but not the owner (Kellenberger and Hendricks, 2003; Deniz, 2007).

However, the results of this study are not parallel with the others, this study has given and proven different results, that 'sharing computers in the school' is also a

factor that might influence teachers' attitudes, it shows a very high significance (p= .001) on confidence and a high significance on computer liking (p= .006), anxiety (p= .004) and usefulness (P= .009). As well as, if teachers 'own a PC in the school' will also have an influence on their computer attitude with computer confidence p=.008 between M (Yes) = 29, M (No) = 26.

Since teachers' levels of access to ICT and the readiness of acessing to ICT are important factors which will affect their ICT use, as well as a detemining factor in a teachers' ability to integrate interavtive learning methods into their teaching (Jones,2004; Ertmer 2005; UNESCOBangkok2, 2011) and as mentioned earlier in section 5.2.1.2, this study result has shown that how many hours a week teachers use computers in the classroom is significantly correlated (p=0.03, r=0.30) to how much time they are allowed to access school computers after school hours weekly. It is absolutely important to take note of this computer ownership issue.

Attitudes and age, gender and teaching experience

The examination of this study revealed that ***teaching experience*** has no relationship associated with any of the four dimensions. However, as expected, the years of teaching experience has a very high significance (p=0.000) correlation (r=0.85) with the age distribution, this is consistent with the research by Kellenberger and Hendricks (2003) and Wahab (2009).

Findings also indicated that there is no significant correlation to be found between ***age, gender*** and any of the CAS dimensions (Computer Liking, Anxiety, Confidence and Usefulness) in this study. The finding of this study are both supported and refuted by the past studies. It is supported by the previous studies from Ahmad Ridzuan et al.(2001), Kumar et al. (2008a), Teo (2008), Loyd and Gressard (1984), Woodrow (1991) and Kellenberger and Hendricks (2003), that there were no significant difference in computer use based on age, gender and computer attitudes, as no age difference by Yushau (2006)and no gender difference by Deniz (2007) and Wong and Hanafi (2007).

However, unlike the studies from Jones (2004), Kay (2007) and Hung and Hsu (2007), they found that males were more confident and have greater usage of computers compared to females. Overall, they found that males generally have more positive attitudes toward computers and were less anxious about computers than females. In reverse, some studies have given different results. Wahab (2009) recognized that the teaching profession has long been recognized as a female profession. Ariffin (2005) has indicated that females have more confidence and positive attitudes toward computers, similarly Tahira and Sadia (2011) reported that females hold less anxiety, more comfort, confidence and positive attitudes toward computers than males. On the other side, this study also disagrees with the study by Darus and Ho (2008) who found that younger age groups have a more positive attitude and tended to integrate more Computer-base technology into their instruction than senior. As well as Hung and Hsu (2007) who suggested middle-aged groups use more computers in their teaching.

Furthermore, many studies also showed that socio-demographic factors also have an effect on the level of AUC for teachers according toKumar et al. (2008a). The following are the findings among the demographic section.

Among Demographic data

This study has found out some interesting correlations of computer use (these have also been discussed in section 6.1.2.2) although some were not particularly strong, such as,

1) Hours a week teachers use computer in the classroom is significant correlated ($p=0.03$, $r=0.30$) to the time they are allowed to access school computer after school hours weekly.
2) Teachers use of computers for instruction in the classroom has significant correlation ($p=0.02$, $r=0.43$) on the time frame to get the ICT support. As mentioned earlier in the findings of this study in section 5.2.4, feedback from teachers who have participated in this study has shown that some teachers (who are not participants of this study) are still fearful of using computers to teach although all the

presentation notes have been prepared for them to use. They still prefer using the traditional 'chalk and talk teaching' method, because they worry about computer break downs during the class and they do not know how to handle this issue in front of the pupils. Obviously, technical support is an important factor which can influence teachers' attitudes in using technology in the classroom. Note must be taken of technical problem areas. In fact, not all teachers have technical skills to handle problems, therefore, a solution in case of lack of technical support availability in the school, teachers should also be prepared on how to handle basic technical issue. For example staff development training can also be arranged so that teachers can help each other when they are facing such a problem in this area. Because this is the most basic level before teachers use computers further in their teaching process, or else teachers just make use of the computer for basic applications, searching or retrieving information to prepare their teaching material without actual use of computers in the classroom.

The above significant discussions over the computer attitude and the demographics data have suggested that the computer attitudes and certain demographic data are the main factors to consider when assessing teachers' computer attitudes in the classroom.

6.2 Limitation

This research was completed while working between available resources and distance communication through the technology. It was very hard to arrange and conduct an interview through phone with a long distance call, due to the distance and the time difference. Thus, it was not possible to manage to get a real picture of the situation without the interview section.

On the other side, with the strategy of using email as a mode of communication, it was hard for the participants to express their opinions and feedback through email contact. Although twenty schools were involved in this study, it was only possible to get limited participation of school teachers in this research questionnaire, therefore the results obtained from this study cannot be fully generalized to the actual view. Conversely, although the overall reliability coefficients of all the four dimensions are

considered high, one of the individual dimension's reliability coefficients is not so high, this might be due to the fact that some questions have being changed in order to get certain feedback from teachers. Therefore, further research could be undertaken with a larger sample of teachers and carefully designed questions to test further the stability of the factors and reliability of the dimension liking identified in this exploratory study.

6.3 Endnote

The teacher has an important role to play in ICT facilitation in the teaching/learning paradigm shift. It is not guaranteed that ICT tools will automatically be used in the classroom if teachers have positive attitudes toward technology, but teachers overall attitudes (computer liking, confidence, anxiety and usefulness) will affect their utilization of computers.

The findings of this study indicated that teachers overall attitudes (computer liking, confidence, anxiety and usefulness) have significant determination on their utilization of computers. In additional, other variables which also have the influence on teachers' attitudes toward computer utilization, namely computer experience, sharing computer in the school/ own a computer in the school, use for preparing teaching, the use of applications as well as instructional use (getting technical support will be affected on instructional use as well). All of these are critical contributing factors to the teacher's attitude toward computers.

Proper use of ICT tools offers students and teachers learning and teaching opportunities and improves learning and teaching processes (UNESCOBangkok, 2004). Since this study showed that teachers' computer attitudes are a factor that influence teachers' use of computers in the classroom in order to enhance the learning process, improve performance and reduce computer resistance, computer attitude should be improved especially in computer confidence and to minimize computer anxiety.

Moreover, this study also showed that successful implementation and use of ICT in education should also consider other aspects such as community support as well,

non-teaching staff who support the ICT integration, technical support, computer training, ICT infrastructure and resource readiness, they are closely interlinked.

Basically, no single solution can address the immense challenges of ICT integration. To promote ICT uptake in schools, administrative and pedagogical support for the teachers are absolutely necessary in order to provide teachers with a platform and support for the integration of ICT in the school as well as helping some teachers to overcome their initial fear of ICT. Moreover, the factors found in this study must be taken to note in order for ICT to be implemented in a consistent, efficient, and better way in the classroom.

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Appendix

1. The brief history of Malaysia education system

With reference to Azizi (2007), the source for the education system of Malaysia link (Husni,n.d.) and the Ministry of Education Malaysia (MOE Edu directions), the following is the brief summary of the history of Malayisa education system.

A decade before the end of the British colonial period, Malaya [19] education system was reorganized according to the Barnes Report 1951. During that time, it was unorganized; the education system varied according to the different ethnic groups (basically the different ethnic groups mentioned here are the main ethnic communities from Malays, Chinese and Indians), in terms of syllabus, curriculum and methods of dissemination. Basically, there were four types of vernacular schools, giving by English, Malay, Chinese, and Tamil Medium, the different ethnic groups were running their own schools and each of the ethnic groups tried to propagate their language and culture; and English-medium schools were run by missionaries and the British government.

In the year 1950, the Central Advisory Committee [20] tried to unify the multiracial society through a standardized education system with one medium of instruction, which is English only, in all schools in Malaya by implementing the Holgate Report - with the main purpose of unifying the local education system; however; it was rejected by the Federal Legislative Council.

Another committee, which was established one year later in 1951, produced the Barnes Report. This report recommended the establishment of a single-type primary school or national school open to pupils of all races. The national schools used Malay and English as the main media of instruction, secondary schools had to maintain English as their mode of instruction, and this threatened the existence of the Chinese schools, and of course this drew the attention to the Chinese educationists for the existence of Chinese education. Therefore, the Fenn-Wu Report came up shortly after the release of the Barnes Report. This report placed more emphasis and suggestions on trying to get the recognition of the Chinese language from the government. It supported one national educational system, but proposed to maintain the Chinese medium school.

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[19] It was called Malaya before Sabah and Sarawak joined Malaya in 1963, several provisions in the Constitution were amended and the country's name was changed to Malaysia by the time when they joined. (according to Malaysia.gov.my, History of the Constitution)

[20] In 1949, a Central Advisory Committee on Education was set up to aid the government in deciding on the best form of education system.

However, the '1952 Education Ordinance ', which was based on the Barnes Report, was approved. It was unable to get the support from the Chinese and Indian ethnic groups and was not completely implemented. Finally, after a long time, the Razak Report was subsequently approved by the Federal Legislative Council in 1956. This formed the basis for the Malaysia Education System. Basically, the education system under the Razak report should compromise two types of primary schools,

1) Standard primary schools known as National schools which used Malay as a medium of instruction, and
2) Standard-type primary schools know as National type schools which used Chinese, Tamil, or English as the medium of instructions. Common syllabus (similar to standard primary schools) must be used, and Malay must be a compulsory subject.
All National Secondary Schools should use a common syllabus and examination, to enforce Malay and English as compulsory subjects, all teachers should be trained with a common syllabus in teacher's training colleges.

In 1960, Rahman Talib formed another review committee which was to study the Razak Report, with the aim of emphasizing the use of Malay as the medium of instruction. Later on, the Rahman Talib Report acted as a foundation to build on the Education Act of 1961, and it was subsequently passed by the Parliament. The extension of this Act was Education Act 1996, and the National Education System begins after the Education Act was passed.

According to the paper 'the Education System of Malaysia' (Husni, n.d.), the government can make use of this National Education system as a tool to build the nation and foster unity by using a common syllabus and curriculum. By doing that, the Government also hoped that the economic functions imbalances which were associated with a particular ethnic group would eventually be phased out through a unified education system.

2. Type of schools in Malaysia

	National School	National Type School
Primary School	Sekolah Kebangsaan (SK) *(6 years program, this is fully recognized and financially supported by the government)*	Sekolah Jenis Kebangsaan (SJK) 1. Sekolah Jenis Kebangsaan Cina, SJK(C) *- For Chinese school* *- Instruction medium: Mandarin with simplified Chinese characters* 2. Sekolah Jenis Kebangsaan Tamil, SJK(T) – For Tamil School *- Instruction medium: Tamil* *(6 years program, this is fully recognized and financially supported by the government)*
Secondary School	Sekolah Menengah Kebangsaan (SMK) *This is fully recognized and financially supported by the government)*	Sekolah Menengah Jenis Kebangsaan (SMJK) *(Available only in Chinese independence high schools (Private schools), this is partially recognized by government, however, 100% financial supported by private)*

3. Table of Overview Level of Malaysia National Education System

Educations	Age of children	Compulsory
Pre-school/Kindergarten	Between 4-6	1 year
Primary	7-12	6 years
Secondary National school		
Lower level (Form1-3)	13-15	3 years
Upper level (Form4-5)	16-17	2 years
Secondary National type school		
Junior middle	13-15	3 years*
Senior middle	16-18	3 years*
Post-secondary	18	
Form six		1.5 years

Matriculation		1 year
Tertiary / higher education	18 onward	
Certificate		1 – 1.5 years
Teacher training institutes		2-3 years
Diploma/ advanced diploma	19 or 20	3-5 years
Undergraduate studies		1-5 years
Postgraduate studies		
(Master degree or Ph.D)		

* Each level will take a year, a total of six years programs, however, students will be remaining at the same level if they cannot pass the school examinations each year. As a consequence, some students may take more than six years to finish their study.

4. Table of the percentage distribution of gender between public and private schools in big town and small town.

Descriptions			Percentage (%)	
Public	Male	Big Town	4	12
		Small Town	8	
	Female	Big Town	16	28
		Small Town	12	
Private	Male	Big Town	2	12
		Small Town	10	
	Female	Big Town	16	48
		Small Town	32	

5. Details distribution of age with Education Background

Range of Age	Education Background (%)						Total (%)
	High School	Teacher training	College	Bachelor	Master	Doctorate	
up to 21	-	-	-	2	-	-	2
22 to 25	-	-	-	10	-	-	10
26 to 30	-	2	2	9	2	-	15
31 to 35	-	2	2	15	8	-	27
36 to 40	-	2	2	10	4	-	18
41 to 45	-	-	2	10	4	2	18
46 to 50	2	2	-	-	-	-	4
51 to 55	-	4	-	-	-	-	4
56 to 60	-	-	-	2	-	-	2
Total (%)	2	12	8	58	18	2	100

6. Year(s) of teaching experience distribution

Year(s) Of Teaching Experience	Percentage (%)
less than 1 year	10
1 to 2 years	4
2 to 5 years	20
5 to 10 years	23
10 to 15 years	27
15 to 20 years	6
More than 20 years	10

7. Year(s) of computer Experience distribution

Year(s) Of Computer Experience	Percentage (%)
less than 1 year	4
1 to 2 years	4
2 to 5 years	19
5 to 10 years	13
10 to 15 years	33
15 to 20 years	25
More than 20 years	2

8. Computer usage for teachers (in the school and outside of the school)

Computer is mostly use for	Percentage (%)
In the Schools	
Preparing teaching	88
Lesson Plan	61
Exercise/ Exam	94
Analysis Exam result	61
Search info related to teaching	92
Search info Not related to teaching	71
Communicate with parents	14
Internet	96
Email	82
Chat	47
Game	25

Presentation	69
Word	82
Spreadsheet	35
Database	18
Outside of the schools	
Preparing teaching	69
Lesson Plan	57
Exercise/ Exam	78
Analysis Exam result	41
Search info related to teaching	78
Search info Not related to teaching	67
Search Info Not accessible from School	39
Communicate with parents	22
Internet	98
Email	80
Chat	61
Game	22
Presentation	55
Word	71
Spreadsheet	25
Database	8

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