



## PRE-SERVICE TEACHERS' ICT LITERACY: A CASE STUDY IN A MALAYSIAN TEACHERS' TRAINING INSTITUTION

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### Abstract

In the last two decades of education reform, teachers have been viewed as central to both the problems of education and their solutions. Education researchers and school leaders have faced the challenge of motivating teachers to high levels of performance. The purpose of this study is to examine the Information and Communication Technology (ICT) literacy among the pre-service teachers in a teacher training institution in Malaysia. This study investigates the knowledge level of ICT, usage habits and the attitude towards using ICT among the pre service teachers. A survey was used for data collection and it was found that participants show different habits of ICT usage while they are studying in the institution. The research found that pre-service teachers have different attitudes towards ICT, based on gender and age. Recommendations are made and implications and suggestions for further research are provided in this paper.

**Keywords:** pre-service teachers, ICT Integration in teaching and learning, teacher training institution, ICT usage, ICT literacy

### Introduction

Today the world is largely connected by technology driven communication with ever increasing outreach of Information and Communication Technology (ICT). The important of ICT in people's lives is unimaginable and it's important to understand that the technological literacy will become a functional requirement for people's work, social and even personal lives (Iroha Kalu, 2014). For social and economic reasons, students will need computer and communication technology skills to live successfully in a knowledge-based society (Danner, 2013).

Malaysia implemented the first computer system in 1966. Since then, the Government has introduced various initiatives to facilitate the greater adoption and diffusion of ICT to improve capacities in every field of business, industry, education, and life in general. These measures include the enhancement of education and training programmes. (Chan, Foong-Mae, 2002)

### Background

ICT refers to the range of technologies that are applied in the process of collecting, storing, editing, retrieving and transfer of information in various forms (Olakulehin, 2007). On the other hand ICT in education refers teaching and learning the subject matter that enables understanding the functions and effective use of information and communication technologies. It is also used to refer to the convergence of audio-visual and telephone network with computer networks through a single cabling or link system.

The concept of ICT in education, as seen by the Ministry of Education, includes systems that enable information gathering, management, manipulation, access, and communication in various forms, (Chan, Foong-Mae, 2002)

Today, a great number of experiences with educational technology in higher education exist worldwide, especially in the developed world. This has resulted in new opportunities in the integration of pedagogical and technological resources, which has enlarged flexibility across the learning process. It has equally improved the communication between lecturers and students and the interaction between different educational resources (Danner & Pessu, 2013). Oliver (2002) asserts that the use of ICT in higher education such as teacher training institutes enhances student-centered learning. Within higher education, one of the major teaching challenges has always been helping students to bridge the gap between knowledge and real life practice. This is especially important in applied academic disciplines such as education where professional knowledge is constantly being renewed and recreated through real practice (Cheetham & Chivers, 2001)

Regardless of the quantity and quality of technology available in classrooms, the important matter is the teacher is using ICTs. Therefore, pre service teachers must have the competence and the right attitude towards technology (Kadel, 2005). Competence is defined as the ability to combine and apply relevant attributes to particular tasks in particular contexts. These attributes include high levels of knowledge, values, skill, personal dispositions, sensitivities and capabilities, and the ability to put those combinations into practice in an appropriate way (Commonwealth Department of Education, Science and Training, 2002). An ICT competency describes what a teacher should know to be able to use technology in his/her professional practice. Kirschner and Woperies (2003) highlighted some major ICT competencies teachers require. These include competency in: making personal use of ICT; mastery of a range of educational paradigms that make use of ICT; making use of ICT as minds tools; using ICT as tool for teaching, mastering a range of assessment paradigms which involves use of ICT; and understanding the policy dimensions of the use of ICT for teaching and learning. Similarly, Marija and Palmira (2007) classified ICT competencies into two: basic and educational ICT competence.

Lee (1997) found that a great number of students in teacher preparation programmes were not equipped with basic computer operational skills. Ozoemelem's (2010) study revealed that there is a low level of skillfulness in the use of ICT

among students of Nigerian universities. Similarly, Yusuf (2005) reported that teachers in Nigerian secondary schools are not competent in basic computer operations and in the use of generic software.

In recent years, the gender gap issue in ICT has been the subject of many studies both internationally and locally. Studies have established that females tend to be less interested in computers than males and use them less often in their spare time (Schaumburg, 2001). In addition, studies have established that girls are less confident than boys in their computer skills, and that boys scored better than girls in computer related knowledge and skills. In addition, the three computer related occupations (computer scientists, computer engineers and system analysts, and computer science and engineering) are the top career choices for boys (Derbyshire, 2003). Bebetos and Antoniou's (2008) and Kadel's (2005) studies also found that females have negative attitudes towards computers; as a result they are often less computer literate than males. Sefyrin (2005) asserted that competence in ICT could be seen as a question of interest in ICT, where men are more interested in ICT than women.

Many studies show the existence of significant gender differences in ICT competencies among students. Oliver's (1993) study, a replication of an earlier (1985) study, assessed gender differences in ICTs skills among upper primary and lower secondary school students in a city school district in Western Australia. The study revealed significant gender differences among primary school pupils. They further observed that gender differences that were observed among primary school pupils in the 1985 study were still evident in 1991. On the other hand, fewer gender differences were evident among the secondary school students in 1991 compared to what was observed in 1985. In another study, which focused on gender differences in specific areas of computer competency, Rajagopal and Bojin's (2003) found that there were gender differences among male and female college and university students. Their study revealed that 12 percent of male students and 3 percent of female students declared their skills in creating and editing Web page as excellent whereas 35 percent of the male students and 68 percent of the female students reported that they do not have any knowledge in this area. However, in word processing, a clear majority of male, 59 percent and 46 percent of the female students declared their skill as excellent, while 2 percent of the males and 6 percent of the female students said that they have no skill at all. This result is at variance with the common stereotype of women as typist if we were to equate word processing with word processing, a field where women have dominated.

Research by Meelissen (2005) showed that girls seem to have a lower self-efficacy compared to boys especially in more complicated computer tasks. Meelissen's (2005) study of grade five students revealed that regardless of their gender the students could perform most of the common computer tasks such as copying text and saving documents, word processing, or using a draw programme. For less common and more advanced computer skills, such as sending an attachment via an e-mail, forwarding an e-mail, and downloading programs or documents from the Internet, boys showed more self-efficacy than girls. Research done by TengkuFaekah (2005) showed that four male students in the Kubang Pasu district of Kedah, a northern state in Malaysia, have higher perceived ICT competency than their female counterparts. However, activities such as handling computer hardware and performing computer maintenance are still dominated by males (Atan, Azli, Rahman & Idrus, 2002). From the review of studies above, it appears that the evidence for specific gender differences in ICT competency is inconclusive although there is a wide-spread belief that computers and the Internet are male-dominated technologies. It would, therefore, be interesting to find out how gender affects the perceived ICT competencies of trainee teachers in the teacher training institute especially now that ICT is seen as not only crucial for the teaching and learning process but also for professional advancement.

A descriptive survey was carried out by R.B. Danner in Negeria among the students in teacher preparation programme at the University of Benin. The target population was all the students in level 200, 300 and 400 of the faculty of education. The instrument for the data collection which was used is a questionnaire adapted from Basse. The results of the study showed that the students' ICT usage was low, particularly the use of internet and email. Only 2% of the respondents perceived themselves to be competent in Power Point with about 70% having no capability at all. There was also a significant difference in the perceived competency among students according to the type of computer training, with those with formal training perceiving themselves to be most competent in ICT skills. From the findings, the lack of access to computers and internet connectivity within the faculty present a serious issue affecting staff and students' use of ICT applications.

A similar study was done by Erdogan (2010). The study comprises of the knowledge level of teachers in ICT use among Turkish teachers. The findings indicated that the most widely used ICT type is the Internet followed by word processing. The mean scores of the responses showed the respondents having close to little information. The results also revealed that teachers had a high level of knowledge about the software but low levels of information on most software. The results also confirmed that teachers have a low level of ICT knowledge and those previously trained about computers had higher level of use than those who did not receive any training. This clearly shows that training is important for teachers. Most teachers tend to use the internet, email, word processing, graphics and presentation software as these skills are essential for the job scope. However, there are some technologies which require technical knowledge. The study too confirmed there is a significant correlation between the levels of knowledge about ICT and the use of ICT in education. It could be concluded that the higher the level of knowledge on ICT the higher the level of use in education.

## Problem Statement

Teachers who are vital link in the education field, play important role in implementing ICT education through teaching and learning. For this purpose, pre service teachers need to acquire ICT competencies such as the knowledge of ICT, attitude and use of ICT. It is important that they are exposed with enough knowledge and positive attitude towards ICT so that they will use it in teaching and learning when become novice teachers. This will ensure the students gain better learning experiences.

Teacher training is clearly required to prepare teachers with ICT skills to equip students with the kinds of critical skills needed. As members of the society, it is their responsibility to contribute meaningfully in the country's future

development. All pre service teachers need to be familiar with ICT applications and competent in the use of ICT applications before they start their career as a teacher. If teachers are expected to integrate ICT into the school curriculum, preparations must be made at the pre service teacher education level. Teacher preparation programmes should focus on the need for student-teachers to have ICT skills for their own use, in the preparation of materials for teaching and learning activities; the need to facilitate the direct use of ICT in students' learning activities within the classroom situation; and the need for teachers to develop in their students a critical awareness of ICT applications and the social implications (Robbins, 1998).

Lack of adequate knowledge and experience is one of the main factors why teachers do not use technology in their teaching. This also results in teachers' negative attitude towards computer and technology. In addition, lack of confidence leads to reluctance to use computers by teachers (Kumar & Kumar, 2003).

Therefore, this study will investigate the knowledge, attitude and use of ICT among the pre service teachers in a teacher training institution in, Malaysia.

### Objectives of the Study

This study is aimed to investigate ICT Literacy among pre service teachers in a Teacher Training Institution in Malaysia. The objectives of this study are to find out:

- i. the ICT knowledge level of the pre service teachers in the teacher training institution..
- ii. the pre service teachers' attitude towards ICT.
- iii. the level of ICT usage for educational purpose by the pre-service teachers.

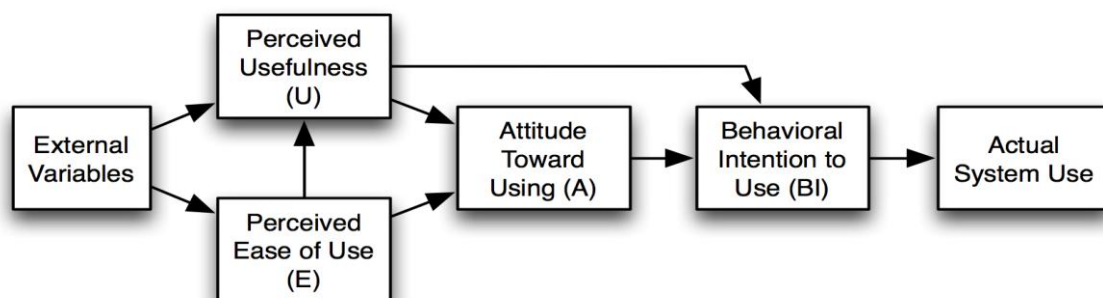
**Following research questions were built:** What is the ICT knowledge level possessed by the pre service teachers?

What are the pre service teachers' attitudes towards ICT?

What is the level of ICT usage for educational purposes by pre service teachers?

### The Conceptual Framework

The model adapted in this study was the Technology Acceptance Model (Davis, 1989). This model basically points out the external variable that influences the subject to use the tool. These external variables influence the perceived usefulness and the ease of use in using ICT. The attitudes of individuals too determine the use of ICT. What is the intention or behaviour that an individual possess too determine the actual system in use. The Technology Acceptance Model (TAM) is an information systems theory that models how users come to accept and use a technology. The model suggests that when users are presented with a new software package, a number of factors influence their decision about how and when they will use it, notably, Perceived usefulness (PU). PU was defined by Fred Davis as "the degree to which a person believes that using a particular system would enhance his or her job performance". Perceived ease-of-use (PEOU) - Davis defined this as "the degree to which a person believes that using a particular system would be free from effort" (Davis, 1989).



Fig

1: Technology Acceptance Model (Davies, 1989)

This framework was used to investigate the knowledge level, attitude and use of ICT skills among trainee teachers based on the demographic factor which is gender and department.

### Method

This study involved a descriptive research design which used the survey method of data collection .

This study was done in Teacher Training Institution in Malaysia.

The sample of the study comprised of 100 pre service teachers undergoing teacher training in various majoring subjects. . The random stratified sampling was used to select respondents from the total population of 300 pre-service teachers.

### Instrument

The research was done by distributing the adapted version of Charoula Angeli (2008), Department of Education, University of Cyprus. The questionnaire was divided into five parts; namely:.

#### Part 1: Demographic Information

In the first part, gender, department and teacher training experience of the respondents were studied. These questions were looked at in order to ascertain the socio-demographic level of the respondents in the research.

**Part 2: Knowledge on ICT**

In the second part, the respondents were asked to rate their knowledge on ICT skills such as word process, e-mailing, internet, excel and power point. Respondents were required to tick either on excellent, good, fair or no capability.

**Part 3: Attitude towards ICT**

In this part, the respondents were asked to respond towards their attitude upon ICT. The scales were ranked from disagree, neutral, agree and completely agree.

**Part 4: Use of ICT**

In this part, respondents were required to respond to how frequent do they use ICT while they are in training which were often, seldom and never.

**Part 5: Obstacles and Challenges using ICT**

In this part, obstacles and challenges faced by respondents were rated as often, sometimes or seldom.

**Data Analysis**

The data was analyzed using the SPSS program (Statistical Package for the Social Science). The descriptive test was used to explain the respondents' background, the ICT knowledge level of the respondents, attitude towards the use of ICT, usage of ICT among respondents and challenges or obstacles faced by the respondents in using ICT.

**Findings**

Following are the findings of the research:

**Demographic Background**

There were 64 females and 34 males for this study. The females represented 65.3% of the sample and the males comprised of 34.7% of the the sample of study. . 83% of the respondents have experience of using computers for more than 5 years Two third of the respondents have undergone formal training. This is 63% from the total whereas 35 % of them did not receive any formal training for ICT.

Table 1 : Gender

Gender	N	%
Male	34	34.7
Female	64	65.3

Table 2 : Using Computer

Using Computer	N	%
Less than 2 years	0	0
Between 2 to 5 years	15	15.3
More than 5 years	83	84.7

Table 3 : Formal ICT Training Received

Any formal ICT training received?	N	%
Yes	35	35.7
No	63	64.3

**Knowledge Level Possessed By Pre Service Teachers In Using ICT**

Table 5 below shows the respondents' attitudes towards ICT. The results on knowledge level possessed by pre service teachers in using ICT are shown in Table 4. 32% of the respondents have excellent knowledge in word processing and 61.2% of them possess good knowledge. Only 6% respondents rated themselves having fair knowledge in using MS Word application. As for MS Excel 51% of the respondents have fair knowledge on the application. About 29.6% regard themselves as having good knowledge using MS Excel. Slightly more than half of the respondents have good knowledge on PowerPoint application which comprises of 52% as they are required to do presentation during their learning process. 43% of them have acquired excellent knowledge on powerpoint presentation. 60% of the respondents have excellent knowledge on the social network such facebook as it has become most popular among the youngsters. As for knowledge on internet browsing 46% of the respondents have excellent knowledge and 47% of them have good knowledge on it. This shows that internet browsing is a vital for them to get more information related to their teacher training. The average mean shows that the respondents are equally excellent in the level of their knowledge in word processing, power point presentation and social network. This is due to their excess use of these tools in their daily life as pre service teachers.

Table 4: Knowledge Level of the Pre Service Teachers in ICT

Statement	Excellent %	Good %	Fair %	No Capability %	Mean	Std. Deviation
Word Processing	32.7	61.2	6.1	-	1.73	.566
Spread Sheet	8.2	29.6	51.0	11.2	2.65	.788
PowerPoint	43.9	52.0	4.1	-	1.60	.570
Social Network	61.2	31.6	7.1	-	1.46	.629
Emailing	36.7	45.9	17.3	-	1.81	.713

#### Attitudes Among Pre Service Teachers Towards The Use Of ICT

Table 5 presents the results on the respondents' attitudes towards ICT. It shows that 63.3% of the respondents feel unsure if anything goes wrong. Only 20% of them agreed that they are confident that they can fix if something goes wrong. 90.8% of the respondents feel excited to use ICT in teaching and learning and find it is not stressing them out 91.9% of the respondents agree that ICT will change the way they teach and learn. 61% of the respondents disagree that the ICT is not conducive to use in teaching and learning because they find easy to use. Only 3.1% of the respondents completely agree that using ICT in teaching and learning is not easy. The majority of the respondents i.e. 94.9% agree that computer help them in teaching and learning effectively.

Table 5: Attitudes Towards The Use Of ICT

Items	CA%	A%	N%	DA%	Mean	Std.D
I feel comfortable using ICT as a tool in teaching and learning	51.0	42.9	5.1	1.0	1.56	.643
The use of computer stresses me out.	2.0	12.2	33.7	52.0	3.36	.777
If something goes wrong I will not know how to fix it.	2.0	20.4	63.3	14.3	2.90	.650
The use of ICT in teaching and learning excites me.	35.7	55.1	9.2	-	1.73	.618
The computer is a valuable tool for teachers.	50.0	46.9	3.1	-	1.53	.560
The computer will change the way I teach and learn.	38.8	53.1	8.2	-	1.69	.616
The ICT is not conducive to use in teaching and learning because it is not easy to use.	3.1	15.3	20.4	61.2	3.40	.858
The computer helps me to understand concepts in more effective ways.	32.7	59.2	8.2	-	1.76	.593
The computer helps me in teaching and learning more effective ways.	42.9	52.0	4.1	1.0	1.63	.616
The computer creates technical problems and not conducive to use in teaching and learning	3.1	13.3	41.8	41.8	3.22	.793

#### Level of ICT Use For Educational Purposes

Table 6 shows the result of questions asked on ICT used for educational purposes by pre service teachers. 66.3% of the respondents mentioned that they regularly use ICT tools for teaching and learning specific subjects. 78.6% of the respondents are finding and accessing information and educational materials for teaching and learning. 72.4% of the respondents use ICT to make lesson plan and conduct presentation which are part of their training. 88.8% of the respondents often use ICT for report preparing, writings and assignments. The results for the use of ICT shows that majority pre service teachers use ICT tools in their teaching and learning activities.

Table 6: Use Of ICT For Educational Purposes By Pre Service Teachers

Items	Often	Seldom	Never	Mean	Std.D
Learning for specific subjects in IPG and teaching my major subject	66.3	33.7	-	1.34	.475
Teaching computer skills to others	21.4	72.4	6.1	1.85	.505
Finding and accessing information and educational materials	78.6	18.4	3.0	1.21	.482
Making lesson plan and presentation	72.4	22.4	5.2	1.33	.570
Communicating with other students	51.0	45.9	3.1	1.52	.560
Communicating with lecturers	32.7	58.2	9.2	1.77	.606
Preparing reports, writings, assignments	88.8	11.2	-	1.11	.317
Collaborating and sharing with others (lecturers/Students)	55.1	44.9	-	1.45	.500

### Obstacles Faced By Pre Service Teachers In Using ICT

Table 7 explains the results of the obstacles faced by pre service teachers in using ICT. Majority of the respondents (81%) find that they sometimes face the obstacles or challenges for all the 9 items in this part of the study. 81.6% of the respondents face lack of technical support, 64.3% of them find lack of time and 66.3% responded that they have limited knowledge on how to make full use of ICT. 53.1% of the respondents agree that sometimes they are lack of understanding on how to integrate ICT in teaching and learning. 62.2% of the respondents sometimes face challenges when there is a lack of software or websites that support teaching and learning. The other obstacles that they sometimes face are lack of internet connectivity (55.1%), lack of computer skill (64.3) and lack of lecturer support (56.1%). About 4% to 36% of the respondents are seldom facing the obstacles in all the 9 aspects in this part of the study.

Table 7: The Obstacles or Challenges Faced By Pre Service Teachers In Using ICT

Items	Often %	Sometimes %	Seldom %	Mean	Std. D
Lack of technical support.	14.3	81.6	4.1	1.90	.418
Lack of time in IPG and school.	14.3	64.3	21.4	2.07	.596
Limited knowledge on how to make full use of ICT.	8.2	66.3	25.5	2.17	.557
Limited understanding on how to integrate ICT my teaching and learning.	10.2	53.1	36.7	2.27	.635
Lack of software or websites that support teaching and learning	15.3	62.2	22.4	2.07	.613
Lack of Internet connectivity	30.6	55.1	14.3	1.84	.653
Lack of computer skills	8.2	64.3	27.6	2.19	.568
Lack of support from lecturers and college	9.2	56.1	34.7	2.26	.614

### Discussion

The findings of the study can be summarized under four headings, namely, the level of knowledge pre service teachers possesses in using ICT, the pre service teachers' attitudes towards ICT, the level of ICT used for educational purposes by pre service teachers and the obstacles or challenges faced by pre service teachers in using ICT.

Research question one was aimed to investigate the knowledge level of the pre service teachers in ICT. The average mean of the items was 1.85 which shows that the pre service teachers' level of knowledge on ICT is good at using applications such as word processing, spread sheet, power point and e-mailing as these are the main applications which are commonly and often used in the teaching profession. The results seem similar to research done by Moganashwari & Parilah (2013) where majority group of teachers were knowledgeable on ICT. Study by Vahidah (2013) also confirms this research as the findings of the study reflects that the respondents have good knowledge in ICT.

The second finding is related to attitudes. The results demonstrated that majority of the respondents have positive attitude towards using ICT in teaching and learning activities. The Davis Technology Acceptance Model (TAM) corresponds well with the study. The average mean shows that the pre service teachers completely agree with the statements on attitude towards ICT. They feel comfortable using ICT as a tool in teaching and learning and find that it does not stress them out. The use of ICT in teaching and learning excites them and look at it as a valuable tool for teachers. The pre service teachers also find that ICT is conducive and more effective to use in teaching and learning because of its ease of use.

The findings also show that pre service teachers use ICT very often. They use ICT to, do presentations, communicate with other trainees and prepare reports. This finding is parallel to studies done by Danner and Pessu (2013).

Lastly the research also shows that the pre service teachers often face obstacles in using ICT. The average mean for is 1.85 which shows that they face the obstacles in using ICT and often find lack of technical support and lack of software or websites that support teaching and learning, internet connectivity, and support from lecturers and administrators of the college.

### Conclusion and Recommendation

The findings of the study have implications on pre service teachers and policy makers. It is important that pre service teachers are well equipped in order to be on par with students..

Policies which had been formulated should be implemented effectively to fulfill the needs of the knowledge society in the information age. This study focused on pre service teachers' knowledge, attitude and use of ICT. Future studies should be done on students' perception on teachers towards knowledge, attitude and use of ICT. This will be enable the policy makers to make improvement in the current education system as well as look into trainee teachers' needs.

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