

Teaching using information and communication technology: Do trainee teachers have the confidence?

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ABSTRACT

The Information and Communication Technology (ICT) is an important aspect of education. Numerous benefits of using ICT in education have been unearthed therefore, ICT should be widely used in teaching. However, in order to use ICT in teaching, teachers have to have certain level of confidence. They have to be prepared to use ICT in teaching. In relation to that, this study sought to identify trainee teachers' confidence in teaching using ICT. The respondents comprised 675 trainee teachers at Universiti Putra Malaysia (UPM). They were all were final year students in the teacher education program. Their confidence was assessed using 12 statements on their ability to integrate Information and Communication Technology (ICT) in teaching. The study showed that trainee teachers were quite confident integrating ICT with teaching. The study also showed a significant difference in the level of confidence between students with teaching experience and students without teaching experience. Older students were more confident integrating ICT in teaching than younger students.

Key words: *ICT; Student teachers; Classroom teaching; Computer confidence; College students*

INTRODUCTION

Information and Communication Technology (ICT) has been proven to be a very important aspect of the teaching learning process. Numerous studies show that the quality of learning [e.g. Davis et al. (1997)] can be significantly enhanced when ICT is integrated with teaching. Research done by Bransford et al. (1994) showed that ICT can enhance critical thinking, information handling skills, the level of conceptualization, and problem solving capacity. This novel technology is supposed to add value to education and to support more effective pedagogy by providing knowledge for learners and by enhancing communication that promotes learning (Privateer, 1999). Grégoire, Bracewell, and Laferrière (1996) also noticed that the opportunities for networking and collaborative learning indicate that several principles or theories, which promote learning, can be more easily integrated in teaching.

The importance of ICT in education has prompted UNESCO Asia and Pacific Regional Bureau for Education in Bangkok to design a project named 'Preparing the Next Generation of Teachers Through ICT'. This project aims aimed at assisting teacher education institutions in Asia-Pacific region to prepare teachers on how and when to best use the technologies for teaching and learning. It is one of the most recent initiatives of UNESCO for the professional development of teachers, which the Organization has supported for 60 years. (UNESCO, undated)

Malaysia has a big vision, known as VISION 2020. It calls for sustained, productivity-driven growth. This vision will be achievable with a technologically literate and critically thinking workforce who is prepared to participate fully in the global economy (Government of Malaysia, 2006). In line with the country's vision, the Ministry of Education of Malaysia (MOE) has initiated the transformation of the nation's educational system whereby ICT has become a central concept in Malaysian educational system.

ICT in Malaysian education

The concept of ICT in education is seen as a system that enables information gathering, management, manipulation, access, and communication in various forms (MOE, 2003). In line with this, the Ministry of Education of Malaysia has formulated three main policies related to ICT in education (MOE, 2003):

- ICT is for all students. ICT is used as an enabler to reduce the digital gap between the schools.
- ICT is used as a teaching and learning tool, as part of a subject, and as a subject itself.
- ICT is to be used to increase efficiency, productivity, and effectiveness of the management system.

In relation to these three policies, the Ministry of Education of Malaysia intends to have all 10,000 primary and secondary schools to be wired and fully equipped with ICT. A website known as *MySchoolNet* was set up by the Ministry of Education to help increase the use of ICT in education and to provide links to help teachers and students access educational information readily. Realizing that teacher ability is a vital component for the success of ICT in implementation in schools, various agencies within the MOE provide on-going training to educational personnel. The MOE has also implemented computerization programs in many schools. The computerization program was implemented to introduce ICT literacy to as many schools as possible to reduce the digital divide to some extent. To achieve these objectives schools are equipped with computer laboratories and are connected to the internet.

One other initial effort towards the realization of VISION 2020 was the establishment of SMART SCHOOL. It is believed that Smart Schools would act as the catalyst for this massive transformation (Chan, 2002). The Malaysian Smart School is a learning institution that has been systemically reinvented in terms of teaching learning practices and school management to prepare children for the Information Age. The most distinctive feature of the Smart School is that the teaching and learning environment is built on best international practices. This entails aligning the curriculum, pedagogy, assessment, and teaching–learning materials to meet the objectives of preparing its graduates for the information age. Initially, 90 Smart Schools were included in a pilot project. It is the vision of the Ministry of Education of Malaysia that by 2010, all 10,000 primary and secondary schools in Malaysia will be developed into Smart Schools.

The vision of the country and the MOE in particular will not be realized if teachers and other educational personnel are not ICT literate and do not have the confidence in integrating ICT for teaching. According to Baylor and Ritchie (2002), regardless of the amount of technology and its sophistication, technology will not be used unless faculty members have the skills, knowledge and attitudes necessary to infuse it into the curriculum. Therefore, it is important for future teachers to be equipped with what is needed to help them integrate ICT in teaching. The Universiti Putra Malaysia (UPM) as one of the teacher education institutions in the country must play a big role to help the MOE in particular and the government in general. UPM must produce teacher graduates who are capable of using ICT in the classroom. Teacher education students at UPM are required to take courses in ICT related courses. One of these courses is Information Technology in Education. It is a three credit-hour course (2+1) whereby students attend a two hour lecture and a three hour laboratory works. Besides enrolling in this course, students are also required to enroll in a program-specific ICT course. For example, students in the agriculture science program [B. ED. (Agric. Science)] are required to enroll in a course called Computer Application in Vocational and Technical Education. Similarly, other programs also require their students to register for a program-specific computer course. Thus, all teacher education students at UPM enroll in at least two computer related courses.

Research problem

There is an urgency to improve the quality and equity of education to bridge the gap between developed and developing nations, and ICT is perceived as a necessary tool for this purpose. However, the presence of technology alone will not stimulate significant changes in a school. Teachers are an important ingredient in the implementation of ICT in education. Without the involvement of teachers, most students may not take advantage of all the available potential benefits of ICT on their own. Teachers need to actively participate in using ICT. They have to be trained in the use of information technology and in its integration in classroom activities to enhance thinking and creativity among students. They must also learn to facilitate and encourage students by making them responsible for their own learning. The teachers have to upgrade their skills regularly, if they want to stay abreast of developments in their profession and to remain confident in their application of the technology. Karsenti and Larose (2001) stated that a major obstacle to an adequate use of technology across all grade levels and in the curriculum is the lack of a critical mass of teachers who feel comfortable in using the technology and who can provide support and exemplary instances of good practice to those who are still not well versed with technology.

All teachers trained by teacher training colleges or universities have to take at least one course in ICT or computer education. UPM is one of the institutions for training teachers and all trainee teachers at UPM have to enroll in at least one ICT course. But, after the completion of those courses, do the trainee teachers feel confident in using ICT in the classroom? To address this, a study was conducted to assess the confidence level of UPM trainee teachers in the use of ICT in teaching.

Objectives of the study

The study attempted to assess trainee teachers' confidence to integrate ICT in teaching based on the following:

- (a) Gender
- (b) Program of studies
- (c) Academic performance, and
- (d) Teaching experience

METHODOLOGY

The study was a part of a larger study on 'Student Teachers Teaching Efficacy'. A total of 645 trainee teachers enrolled at the Faculty of Educational Studies, Universiti Putra Malaysia were involved in the study. They were final year students with different majors. The study was conducted during their final semester at the Faculty. Each trainee teacher received a set of questionnaire. The administration of the study was done during a briefing session of teaching practicum. Each trainee teacher was requested to complete a questionnaire, which took about 30 minutes to complete. This study employed a survey research methodology.

Instrumentation

A survey instrument was used to solicit information on trainee teachers' background attributes (gender, age, majors, and teaching experience), teacher beliefs in their abilities to integrate technology in teaching. The instrument was field-tested for reliability and content validity. Reliability estimate as ascertained using Cronbach Alpha was .94

Data analysis

The Statistical Package for the Social Sciences (SPSS version 11) was used for data analysis. The statistical tools used for the study include; frequencies, percentages, means, t-tests, and ANOVA.

RESULTS AND DISCUSSION

Who are the respondents?

The respondents consist of 675 trainee teachers (pre-service and in-service) at the Universiti Putra Malaysia. All the respondents are final year students in the teacher education program. Approximately 41% of the respondents comprised those who are in the process of upgrading their academic qualifications. These were trainee teachers who held a teaching certificate before their enrollment in Bachelor of Education programs. Another 59% of the respondents comprised those who have not been in any teacher education program before their enrollment in Bachelor of Education at Universiti Putra Malaysia.

Nearly 74% of the respondents are female while another 26% are male with an average age of 28.1 years. Approximately 48% of the respondents are below 25 years. They have a moderate academic ability with mean CGPA of 3.0 (SD = .3). The majority of them (85.8%) obtained a CGPA between 2.75 and 3.75. Their majors were: Biology (16.7%), Economics (12.3%), Agriculture Science (11.9%), Mathematics (10.4%), Guidance and Counseling (8.9%), Accountancy (6.7%), Malay Language (6.5%), TESL (6.2%), Home Science (5.3%), Physical Education (4.6%), Information technology (4.4%), Chemistry (3.1%), Statistics (1.5%), and Physics (1.5%).

Do trainee teachers think they are able to integrate ICT in teaching?

As a part of a larger survey on teaching efficacy, trainee teachers were asked to make a self-reflection on their ability to integrate ICT in teaching. All teacher education students at the Faculty of Educational Studies, Universiti Putra Malaysia were asked to register for at least two courses on Information Technology in Education. It was a general course to be taken by all teacher education students at the Faculty of Educational Studies, UPM. It is a three-credit hour course. In addition to this common course, all teacher education programs at UPM required students to register for a program-specific ICT course. For example, students in agriculture science programs were asked to register for a Computer Application in Vocational and Technical Education course. Similarly, other programs also required their students to register for a program-specific computer course. Thus, all teacher education students were enrolled in at least six credits of computer-related courses. After completing both the technology-related courses, students were asked to do a self-reflection on their confidence to integrate ICT in teaching. Their confidences (Table 1) were assessed using 12 statements on their ability to integrate ICT with teaching. The study shows that trainee teachers were quite confident integrating ICT with teaching ($M = 3.94$; $SD = .08$).

Do teacher education students' differ among themselves in the level of confidence to integrate ICT in teaching?

Teacher education students at UPM majored in 14 different areas. However, for the purpose of this analysis, these majors were categorized into four main areas, namely, science-related area, vocational- and technical-related area, language-related area, and other area. One-Way ANOVA showed that there was a significant difference in perceptions of the students with regard to their confidence to integrate ICT with teaching [$F(3, 673) = 6.05, p < .05$]. A post-hoc analysis using

Tukey HSD showed that students in vocational majors were more confident than students in science majors. No significant perceptions of confidence were observed among other students (Table 2). On the basis of an independent sample t-test, it was found that the level of confidence differs significantly between male and female trainee teachers ($t_{(672)} = 4.33, p < .05$). The study shows that male trainee teachers score significantly higher ($M = 48.9, S. D. = 6.07$) than female trainee teachers ($M = 46.7, SD. = 5.83$). The study also showed a significant difference in the level of confidence between students who had teaching experience and those who did not have teaching experience ($t_{(672)} = 2.56, p = .011$). Students who had several years of teaching experience scored significantly higher ($M = 47.98, SD. = 5.97$) than those who had no teaching experience ($M = 46.79, SD. = 5.82$). The study also revealed that older students were more confident integrating ICT in teaching than younger students ($r = .173, p < .05$). No significant correlation was detected between academic performance and the level of confidence to integrate ICT in teaching ($r = .042, p > .05$)

Table 1: Mean and Standard Deviations Trainee Teachers Confidence to Integrate ICT in Teaching

	Mean	SD
I can continuously use ICT in teaching	4.03	.63
I can use ICT effectively in teaching	4.00	.63
I have the readiness to use ICT in teaching	3.99	.64
I am ready to answer questions about ICT whenever posted by students	3.77	.65
I have the skills to teach using ICT	4.00	.60
I feel very confident in welcoming questions related to ICT from students	3.92	.61
I feel I am able to motivate students to use ICT in learning	4.01	.61
I feel very confident is using multimedia for teaching	4.04	.62
I am able to design learning experience using ICT for high achievers	3.89	.64
I feel very confident to evaluate computer software for teaching and learning	3.84	.65
I have the confidence to integrate ICT in my teaching	3.93	.62

Item mean = 3.94, SD=.08

Scale: very confident (5) to Not confident at all (1)

Reliability estimates = .94

N=674

Table 2: Means and Standard deviation of Trainee Teachers Confidence to To Integrate ICT in Teaching by Gender, Teaching Experience, Type of Programs

		N	Mean		test	p
Gender	Male	187	48.87	6.07	(t ₍₆₇₂₎ = 4.33	<.05
	Female	487	46.68	5.83		
Teaching experience	Yes	278	47.99	5.97	(t ₍₆₇₂₎ =2.56	<.05
	No	396	46.79	5.82		
Programs	SCIENCE	298	46.34	5.91	F(3,673)=6.05	<.05
	VOCATIO	232	48.46	5.71		
	LANGUAG	102	46.90	6.29		
	OTHERS	42	48.29	5.98		
	Total	674	47.28	5.97		

DISCUSSION AND CONCLUSION

Malaysia is very keen in developing the country into a knowledge-based economy. We believed that a K-Economy will provide the platform to sustain a rapid growth and enhance international competitiveness. In this quest, ICT will be the fundamental enabling tool. Malaysia needs to develop the human capital urgently needed and success largely depends on education. The government is committed to making ICT as a tool for teaching and learning more pervasive.

The present study shows that, in general, future teachers are quite confident in using ICT for teaching. We would expect students after having taken at least 6 credits of ICT related courses would feel very confident in the integration of ICT in their future teaching. We would expect the mean score to be at least 4.5 rather than 3.94. However, that is not the case. It could be students do not have experience on how to integrate ICT in teaching even if they have ICT skills. It could be they do not know how to integrate ICT in teaching because there is no model for them. Probably, teacher educators themselves do not use ICT in teaching. Their readiness to use ICT in teaching was about moderate (M=3.99), they are not quite ready to answer questions about ICT (M=3.77), they are confident enough to evaluate software for teaching purposes (M=3.84).

If teachers are not confident using ICT in teaching, it would probably hamper the effort by the MOE to use ICT as an enabler in teaching and learning.

The present study shows that ICT confidence among students differed significantly. Students in vocational related subjects were more confident than other students. It could be because students in vocational education enrolled in one other course that involved the use of computers in teaching and learning. Male students were found to be more confident than female students in the integration of ICT in teaching. Those with teaching experience were also found to be more confident than those without prior teaching experience. It could be because experienced students have been using or know when and where ICT can be used in teaching. According to Hativa & Lesgold (1996), teachers must be challenged to use ICT to make interconnected set of educational services what does this sentence mean?. In order to fulfill that challenge, teachers

need to achieve a level of technological competence which enables them to understand how and be able to meaningfully integrate ICT in teaching. Therefore, teacher education students must be given the opportunities and experience to integrate ICT in teaching. One of the opportunities is to integrate ICT during micro-teaching exercises.

Through the computerization project, the MOE expects all 10,000 schools in Malaysia to have computer laboratories, which are equipped with the latest computers with local area networking capability and the internet (Ministry of Education, 2003). It is envisioned that by 2010, the computer and student ratio will be 1 computer for every five students (MOE, 2003). The success of this task requires an immense amount of effort. Teachers have to be trained to acquire high level of competence in using ICT for teaching. However, the present study shows that much more effort has to be invested in teacher training. Even though ICT is part of the curriculum in all teacher education, teacher education students still lack the level of confidence needed to successfully integrate ICT in classroom.

Based on the study the following conclusions can be made:

1. Trainee teachers were quite confident with their ability to integrate ICT training teaching.
2. Male trainee teachers were more confident with the ability to integrate ICT in teaching.
3. Trainee teachers who had taught in schools felt more confident with their ability to integrate ICT in teaching
4. Vocational trainee teachers felt more confident with their ability to integrate ICT in teaching
5. There is no significant correlation between academic performance and levels of confident in the integration of ICT in teaching

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