The Assessment of Information Technology Literacy and Basic Computer Competency Level of Secondary School Teachers

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Abstract

Since Information Technology (IT) and computers are significantly important in Thai education, IT and Computer-Assisted Instruction (CAI) have been currently used in most schools in Thailand to support classroom teaching. Whilst the secondary school students have access to information technology and are capable to use computers relatively high, their teachers should obtain both IT literacy and computer skills in addition to their general qualifications. This study aims to assess IT literacy of secondary school teachers, to study their attitudes toward the use of IT in their school context, to assess their basic computer competency and to design and develop a set of research tools which also can be used for general public. The researcher created a set of tools to conduct with fifteen subjects who were secondary school teachers in three demonstrated schools located in Bangkok. The data was collected from a set of tools comprising of questionnaires, structured interviews to assess IT literacy of the subjects, questionnaires to assess attitudes of the subjects toward IT and computer use and task-based tests as the subjects were asked to perform computer tasks as generally required in their teaching. Data analysis method was the combination of qualitative and quantitative methods. The results of the study reveal that IT literacy level of the teachers in the study was at good to very good level, their attitudes toward the use of IT in their school context were positive, their basic computer competency levels on; data processing was at good level, data entry applications was at need improvement level, presentation skills was at very good level and information management was at good level. As for pedagogic implications of the study, the research tools can be used by schools or any interested parties for intensive planning and training as part of their personnel or teacher professional development.

Keywords: Information Technology literacy, basic computer competency, assessment, secondary school teachers

1. Introduction

This paper deals with IT (Information Technology) literacy and basic computer competency of secondary school teachers. It addresses computer skills and attitudes of secondary school teachers toward IT in their teaching environment. From computer technology development history, it has been accepted without dispute that the computer is essential to communication in social life and particularly education since the first personal computer (PC) was invented about forty years ago (Kopplin, 2002). The use of computers creates effective work and perfectly saves time and human resources. In the past half-century, technology has

been developed by the combination of computer and communication technologies to be Information and Communication Technology or ICT (Malaiwong, 2008). People have therefore realized and used this technology globally. The very large and expensive mainframe was developed to a smaller personal computer which is portable and costs much less so that most people can afford to have one as an electric appliance (Paireiw, 2008). In 1983, the Internet, a global system of interconnected computer networks that use the standard Internet Protocol to serve billions of users worldwide was created and quickly became the most widely used network protocol in the world (Kapor, 1993). It is certain that such IT developments have impacts on how people communicate process information and most importantly learn in their specific educational contexts (Thatchayapong, 1998 and Srithanya, 2009).

As known, the majority of educators use IT as part of their instruction and for realizing learning activities in and outside the classroom. There have been computer functions called CAI (Computer-Assisted Instruction), and specific computer skills required of teachers in facilitating and supporting their work. Computer for education involves four categories: (1) Computer for Educational Administration, (2) Computer for Educational Service or Computer Managed Instruction, (3) Computer Literacy, and (4) Computer Assisted Instruction (Taylor, 1980)

2. Rationale and Background of the Study

This research focuses on secondary school teachers who have to cope with computer literate students. They need to be able to use IT in teaching and computer-assisted instruction as a tool in teaching management as outlined in the national agenda 2008-2012 by the Ministry of Education, Thailand (Office of the Education Council, 2008). The IT agenda requires that IT be a tool for teachers to enhance the quality and efficiency of teaching, self-directed learning via information search, and supports life-long learning for Thai citizens.

In the past decades, quite a few studies reported research findings in science teaching that computer literacy of science teachers seems to increase their computer use in instruction (Beaudin 2001, Beaudin & Grigg, 2001, Thomas 2001, Ocak & Akdemir, 2008). These researchers were in support of the use of computers in the classroom, particularly for science instruction. It was pointed out that teachers' lack of computer skills could impede quality instruction and deprive students of learning opportunities. Some researchers have identified causes for insufficient IT skills in teachers as

stemming from limited access to equipment and lack of training, and recommended necessary training to alleviate identified shortcomings (Bosh & Cardinale 1993, John 2004, Okojie et al. 2006). Undoubtedly, a number of teachers seem to be under pressure in becoming IT literate at the functional level to be able to work efficiently in their school environment.

Considering all expectations imposed on teachers regarding their functional IT literacy and computer skills required in their school work, the researcher felt the need to study IT literacy of secondary school teachers and their mastery of required computer skills. Without identified IT limitations on an empirical basis, it would definitely be unlikely to provide assistance and training as needed by teachers. Since teachers at the secondary school level need to possess functional IT literacy and skills in computer used for instruction, not to mention basic electronic communication channel with their students via the Internet. For this reason, secondary school teachers should be an appropriate subject for research. This is to secure necessary information for teacher training in the most needed area at the moment. The IT literacy, computer skills and attitudes of the teachers are to answer the above questions.

3. Objectives

To develop a set of research tools in order to assess IT literacy and basic computer competency of secondary school teachers and to study their attitudes toward the use of IT in their school context.

4. Research Methodology

4.1 Subjects
In the pilot study, the researcher had five participating teachers in grades 7-12 from one secondary school in Bangkok. These teachers taught science, mathematics, Thai, Thai Cultural Studies and English, and volunteered to participate in the pilot study. The researcher arranged for meetings to collect data at the date and time convenient to them. The sample size of 15 subjects should be included in the main study and reported in a separate paper.

4.2 Instrument
The researcher developed three assessment tools for the study: (1) Information Technology Literacy Assessment, (2) Computer Skills Assessment, and (3) Teachers' Attitude Assessment.

4.2.1 Information Technology Literacy Assessment Tool

There are two parts in this assessment tool:

Part One: A questionnaire asking for general information of the teachers in multiple choice format and open-ended questions

Part Two: A structured interview regarding IT literacy. The researcher conducted interviews with teachers in four areas:

(1) The general knowledge and understanding on information technology and communications
(2) Communication by Electronic Mail (e-mail)
(3) The IT and computer related ethical issues, privacy rights, intellectual property rights and related laws
(4) The potential of computers and related technology.

4.2.2 Computer Skills Assessment Tool

There are four tasks on computer competency in the form of skill-based functions as follows:

(1) Typing document with the use of Microsoft Word
(2) Performing basic calculations with the use of Microsoft Excel
(3) Producing a presentation with the use of Microsoft PowerPoint
(4) Searching, storing, retrieving and displaying information with the use of digital memory devices and printer

The researcher also developed a scaling measure to identify the level of computer skills attained by the subjects.

4.2.3 Teachers' Attitude Assessment Tool

A questionnaire on teachers' attitude toward IT literacy, their computer skills and related issues was on a Likert-based scale 1- 5 (Likert, 1932). There are two parts in this assessment tool:

Part One: The subjects to rate their satisfaction on computer in teaching and personal use, security, confidence to use, information and communication use

Part Two: The subjects to indentify the problems incurred while using, the problem is defined as every type of obstacle that causes the disorder to the use of computer. The participating teachers were to identify their levels of agreement to given statements on attitudes toward IT literacy, their use of computer for instruction, the problems and related areas of concern. It is expected that the subjects' responses in this part will be used to validate the constructed assessment tools as well.

5. Data Collection Procedure

The researcher arranged for appointments with participating subjects according to the date and time convenient to them. In each interview session, a voice recorder was used with permission from the interviewed teachers. The researcher took notes on important data in the subjects' responses.

As for sessions on computer skills assessment, each subject was provided with a computer to perform four computer tasks in the time limit of one hour as follows:

(1) Typing document - Microsoft Word - 15 minutes
(2) Performing basic calculations - Microsoft Excel – 15 minutes
(3) Producing a presentation - Microsoft PowerPoint – 15 minutes
(4) Searching, storing, retrieving and displaying information with the use of digital memory devices and printer – 15 minutes

The researcher monitored each session and collected finished work done by the subjects for scaling level assignment.

6. Results of the Study

6.1 Information Technology Literacy

From the subjects' responses to the questionnaire and structures interviews, four subjects claimed that they could handle well Microsoft Word, Excel, PowerPoint and the Internet. Three could use e-mail, and one could use MSN (Windows Live Messenger) and SPSS (Statistical Package for the Social Sciences). Three subjects were self-trained, two were trained while studying in college and at work; their training sessions varied from one hour to one semester (or four months).

It was found that all five subjects were at the moderate level of IT literacy. They were aware of IT but they could not define IT and its pertinence, they used the Internet for communication and information search, and were aware of intellectual property rights. They were in full support of law enforcement on IT abusive actions and privacy rights.

6.2 Computer Skills

All five subjects could perform on Microsoft Word in typing the given document. Only one subject could use Microsoft Excel for data entry at a highly functional level. As for their performance on Power Point, only three subjects could produce the presentation: one at a highly functional level, the other two at a fairly functional level. Their skills in

information management were at a moderate level: four subjects could search, store and retrieve the information on hard disc and flash drive but none could store into compact disc. All could perform the printing function with no difficulty. It can be concluded that only one subject was at a highly functional level in computer skill competency, three were at a fairly functional level and one was at a poorly functional level that should need improvement or training.

6.3. Attitudes towards IT
It was found that three subjects were very satisfied with their computer work in daily life. Five subjects strongly agreed that people should be responsible for their fault actions in computer use. All agreed that computer was very useful in their teaching and three felt rather confident in their computer use. Three subjects found hardware-related, software and technical problems seldom caused problems to their computer use, and were quite worried with problems encountered. Four subjects asked for assistance from IT specialists or friends to solve their problems. All subjects could take good care of their own computers, but needed help to handle computer virus threats. They were quite satisfied with the speed of Internet connection. From five subjects' responses, it can be concluded that all were strongly positive about IT and needed computer skills for their teaching. They felt rather comfortable with their computer use and admitted that they were quite worried with problems about computer virus threats.

7. Conclusion and Implications of the Study

As seen from the results of the study, five subjects have their IT literacy at a moderate level, and four had sufficient computer skills to perform their IT functions at work. Considering the subjects' computer skills as required in their teaching-learning activities, we can see that almost all still need more in-depth training in software programs related to their teaching subjects especially data entry/ retrieval and presentation program. Other training they may need is in the area of information management. In fact all these computer skills are matters of use and regular practice to gain competency or mastery. The use of assessment tools as shown in the pilot study certainly pinpoint to needs for secondary school administrators to identify and pay good attention to staff member who are weak in IT skills and hence plan for a training program to assist them to reach the functional level of computer competency.

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