

# Assessing computer attitudes: Does it matter for teacher education in developing countries?

Su Luan WONG

Faculty of Educational Studies, Universiti Putra Malaysia, Malaysia

\*suluan@upm.edu.my

**Abstract:** The digital education revolution has had a significant impact on the teaching-learning environments. In this new era, it is unimaginable to have technology illiterate teachers in classrooms. The demand for education reform in most developing countries has been growing ever since to ensure that teachers are equally proficient in both computer technology competencies and pedagogical content knowledge. The success of such educational reforms also relies on teachers' attitudes and willingness to embrace computer technologies in the learning environment. To cope with these expectations, teacher training institutions should include computer related attitudinal objectives in their teacher training programmes. This paper explores the issues surrounding the assessment of computer attitudes among teachers and student teachers with the view whether such assessment matters in teacher education. The focus of this paper is guided by three relevant questions—"What is computer attitudes?", "What affects computer attitudes?", and lastly "Why measure computer attitudes?"

**Keywords:** Computer attitudes, teacher education, developing countries

## 1. Introduction

The rapid proliferation of the computer technology in the 21<sup>st</sup> century has had significant impacts on the teaching-learning environments. Realising the importance of ICT for education, governments in many developing countries have started to take incremental but concrete steps to bring the positive impact of ICT into the classrooms (Southeast Asian Ministers of Education Organization, 2010). For example, the Malaysian government spent almost USD 1.8 billion in the last decade to train teachers to integrate ICT in the classrooms and also to equip schools with adequate ICT infrastructures. The Malaysian Ministry of Education aims to improve the ICT device-to-student ratio from about 1:30 in 2011 to 1:10 by 2020 (Ministry of Education, 2012). In 2001, Vietnam announced its Master Plan for ICT in education for the year 2001-2005 which emphasised on infrastructural development and IT training (Peeraer & Van Petegam, 2011). The aforesaid initiatives are a testament to the growing concerns of developing countries in bridging the digital gap in schools.

As we progress into a technology-based society, it is imperative that teaching experiences with computers as effective pedagogical tools are made available to teachers (Teo, Lee & Chai, 2008). For this reason, there is great urgency for teachers to be able to use and integrate ICT effectively in the teaching-learning process. Teachers today need to develop their abilities and feelings of self-efficacy as they integrate computer technologies successfully as a teaching-learning tool (Wong, Jalil, Ayub, Bakar & Tang, 2003). In other words, teachers need to be comfortable with computer technologies and are able to consolidate and innovate their teaching (Heale, 2011).

The demand for education reform has been growing ever since to ensure that teachers are able to teach effectively with computer technologies. Education reforms in most developing countries have emphasised the need to integrate computer technologies into learning, teaching and assessment (Peeraer & Van Petegam, 2011). In fact, moving in tandem with this change, teacher education policies in many developing countries have also been reformed to ensure trainee teachers are equally proficient in both computer technology competencies and pedagogical content knowledge. The success of such

educational reforms relies on teachers' attitudes and willingness to embrace computer technologies in the learning environment (Albirini, 2006). Indeed, Albirini (2006, p.386) stressed that "developing nations have the responsibility not merely to provide computers for schools, but also to foster a culture of acceptance amongst the end-users of these tools".

To cope with these expectations, it is essential for teacher training institutions to include computer related attitudinal objectives in their teacher training programmes so that student teachers develop positive attitudes toward computer technologies. For this reason, the focus of this paper is to answer the question of whether it matters to measure teachers' computer attitudes particularly in developing countries. The focus of this paper is guided by three questions— "What is computer attitudes?", "What affects computer attitudes?", and lastly "Why measure computer attitudes?"

## **2. What is computer attitudes?**

Attitude is considered to be a very important concept from the social psychology point of view mainly because of its importance in social judgements and behaviours (Zhang & Sun, 2009). Attitudes guide behaviour and "favourable attitudes predispose positive responses to the object and unfavourable attitudes predispose negative responses" (Ajzen & Fishbein, 2005, p.17). Ajzen (1988) classified attitude into three distinct categories—affect (reflects feelings toward the attitude object, cognition (reflects perceptions and information about the attitude object) and conation (reflects behavioural intention and action with respect to the attitude object). In an earlier study, Breckler (1984) also confirmed the three dimensional definition of attitudes by testing the tripartite model of attitude structure by Rosenberg and Hovland (1960).

It is widely believed that attitudes is formed after the individual is exposed to an object for a certain period of time. Therefore, it is possible that teachers would have developed some attitudes toward computers when they have been in contact with these tools either for personal or professional use. In the context of computers, Kay (1993) defined computer attitudes by drawing on the definitions proposed by Breckler (1984) and Ajzen (1988). He employed a four dimensional definition of computer attitudes—affect (feelings towards computers), cognition (perceptions of and information about computers), conation (behavioural intentions and action with respect to computers) and perceived behavioural control (perceived ease or difficulty of using computers).

Consistent with Ajzen and Fishbein's (1977) theory, Smith, Caputi and Rawstorne's (2000) defined computer attitudes as a person's general evaluation or feelings of favourableness or unfavourableness towards computer technologies (i.e. attitude towards object) and specific computer-related activities (i.e. attitude towards behaviours). Similarly, Divine, Wilson and Daubek (1997) defined computer attitudes as the level of affect one has for computers while Heinssen, Glass and Knight (1987) defined computer attitudes as people's feelings about the impact of computers on society and the quality of life, and their understanding of computers. Igbaria and Parasuraman (1993) conceptualised it as a representation of individuals' predisposition to react in a certain way toward them.

The aforementioned literature suggests that computer attitudes is a multi-dimensional construct and distinct in nature. However, it also suggests there is no one definite meaning of computer attitudes. There seems to be little consensus on the term used to define computer attitudes. The literature, however, does indicate that any scales intending to measure teachers' computer attitudes should at least constitute one of these dimensions— affective, cognitive, behaviour and behavioural control. Interestingly, assessing feelings toward computers or affection (Heinssen et al., 1987; Divine et al., 1997; Smith et al., 2000) seems to be gaining prominence in recent years (Garland & Noyes, 2008) but Yang and Yoo (2004) stressed that the cognitive dimension should not be ignored as it is just as significant.

## **3. Why measure computer attitudes?**

Salzer and Burks (2003) stressed that it is important to study computer attitudes because it is believed to have either positive or negative impacts on computer related behaviours. They asserted that the need to focus on teachers' computer attitudes is even greater simply because they are responsible to ensure the

future generation are prepared to function adequately in a technological society. They warned that teachers with negative computer attitudes may inhibit their ability to educate students in the use of computers. Computer attitudes is believed to influence not only teachers' acceptance of computers but their future use of computers in the classroom (Roussos, 2007). Teo et al. (2008) stressed that the main reason for assessing teachers' computer attitude is its ability to predict computer usage. In other words, teachers with positive computer attitudes would have higher likelihood of integrating computer technology successfully in their teaching-learning process. Teachers would respond favourably to computer technology use (behaviour) when they possess positive computer attitudes.

This behaviour-attitude relationship stems from the Theory of Reason Action (TRA) by Fishbein and Ajzen (1980) which posits that behavioural intent is a pertinent determinant of behaviour. It also proposes that this intention to perform a behaviour is a combination of attitude toward performing the behaviour and subjective norm. This theory holds that attitudes is key to understanding human behaviour. Researchers have continued to research on computer attitudes and found it to be a significant predictor of behavioural intentions or behaviour. Luan and Teo (2009) reported that computer attitudes had the biggest influence on Malaysian student teachers' intention to use computers in the future while Teo's (2012) study among Singaporean student teachers also reported the same findings. The link between these two variables was also established in an earlier study by Sadik (2006) who provided evidence that the level of school computer use was affected by teachers' computer attitudes in Egypt.

However, in recent years, many researchers have questioned the importance of measuring computer attitudes. There are researchers who strongly believe that attitudes construct is too trivial to be studied and excluded it from their model framework (Ma, Andersson & Streith, 2005). They are convinced that the attitude-behaviour relationship is weak and insignificant. Older and newer studies have shown empirically that computer attitudes does not have any effect on behavioural intention or behaviour (Davis, Bagozzi & Warshaw, 1989; Teo, 2009; Nistor & Heymann, 2010). For example, Teo's (2009) findings based on the structural equation modelling's (SEM) suggested that pre-service teachers computer attitudes did not contribute to the total variance accounted for in technology use.

Yang and Yoo (2004), however, disagreed that computer attitude is insignificant. They suggested that Davis and his colleagues' (1989) failure to find attitude to be a significant predictor of behaviour may have been due to the mixed measures of the attitude construct. In their opinion, cognitive and affective dimensions of attitudes are two different constructs and should not be measured together. According to them, this is mainly because only cognition has a stronger influence on behaviour than affection. For this reason Yang and Yoo (2004, p.20) argued that the anomaly reported in Davis et al.'s findings could have been "because the potentially significant influence of cognition was offset by the insignificant influence of affect". Zhang, Aikman and Sun (2008) continued to investigate the nature of two types of attitudes—attitudes toward object (ATO) and attitudes toward behaviour (ATB). Their study showed that they are two distinct constructs and ATB fully mediates the role of ATO on the user's behavioural intention to use a system. In other words, positive attitude toward computer technologies will only indirectly lead teachers to decide to use such technologies in the learning environments. Zhang et al. (2008) also cautioned that the mismatched between conceptualisation and operationalisation of attitude in past studies may have caused researchers to overlook the importance of attitudes in technology acceptance studies.

Understandably, appreciating and monitoring teachers' computer attitudes is important in ensuring the success of computer integration in the classrooms. At the same time, understanding the antecedents of computer attitudes is equally important as it can lead to teachers forming more favourable attitudes toward computers. Thus, the next section will discuss the possible factors related to computer attitudes.

#### **4. What affects computer attitudes?**

It is important that student teachers at teacher training institutions receive adequate training to be able to integrate computer technologies effectively when they go back to schools as teachers. Teo (2008) warned that failure to do so will produce teachers who are ill-prepared to teach effectively with

computer technologies. For this reason, the preceding literature will not only focus on the antecedents of teachers' computer attitudes but that of student teachers' as well.

In general, it is believed that there are many antecedents of teachers' computer attitudes. Two widely studied antecedents are the teachers' perceptions of how useful and easy to use computers are. The relationships between these two antecedents and computer attitudes are deeply rooted in the TAM (Davis, 1989). The TAM posits that a user's attitudes toward computer use is jointly influenced by how the person perceived the usefulness of a system and its ease of use. Findings from past studies have suggested that student teachers' attitudes toward computer use are directly influenced by perceived usefulness and ease of use (Teo et al., 2007; Luan & Teo, 2009). Recent studies showed evidence that perceived usefulness and perceived ease of use have a direct effect and indirect effect on computer attitudes respectively among secondary school teachers (Moses, Wong, Mahmud & Abu Bakar, 2013; Wong, Osman, Goh & Rahmat, 2013). Suffice to say, when compared between the two factors, perceived usefulness is considered to be a stronger predictor on attitudes toward computer use than perceived ease of use (Teo, Lee & Chai, 2007; Luan & Teo, 2009). In essence, the aforesaid findings suggest that favourable computer attitudes is formed when both student teachers and teachers believed that computers are useful and easy to use.

Teo et al. (2008) also further suggested that apart from the two aforementioned factors, subjective norms can affect teachers' computer attitudes. Their findings indicate that teachers' computer attitudes are influenced by the views of people whom they regard as important in their lives. In other words, when teachers believe that important people such as school principals support their computer use, they tend to form more positive computer attitudes. Teo et al. (2008) proved that subjective norm does influence computer attitudes even when computer use in the classrooms is volitional and not mandatory.

In addition to perceived usefulness, perceived ease of use and subjective norms, Teo and Schaik (2009) found facilitating conditions to have a significant influence on computer attitude indirectly through perceived ease of use among student teachers. They defined facilitating conditions as factors that exist in the environment which a person believe have an influence over a his/her desire to perform a task (Teo & van Schaik, 2009) while Venkatesh, Morris, Davis and Davis (2003) explains it as the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system. In addition, technological complexity has been found to have a direct and significant impact on student teachers' computer attitudes (Teo, 2012). It is defined as the degree to which a person believes that a system is relatively difficult to understand and use (Thompson, Higgins, & Howell, 1991). This means that when student teachers perceived computers to be low in complexity, the likelihood of them possessing positive attitudes is higher.

In a more recent study, the results of a study by Wong (2013) pointed to the importance of learning strategies in fostering more favourable computer attitudes among student teachers. Learning strategies such as attitudes, motivation, time management, concentration, selecting main ideas, study aids and test strategies were most significantly correlated with attitudes toward computers. Out of these seven learning strategies, only selecting main ideas was found to be the best predictor of computer attitudes. It could then be concluded that student teachers with the ability to identify important points in lectures and pinpoint pertinent concepts in reading materials will have more positive computer attitudes (Wong, 2013).

The aforementioned studies provide some evidence that computer attitudes are influenced by many variables. It is, therefore, possible to manipulate these variables to form more positive computer attitudes among student teachers and teachers. At the same time, past literature have also shown that non-manipulatable variables such as teacher characteristics are equally capable of affecting computer attitudes. For example, gender has had a mediating effect on computer attitudes based on many studies in the past 20 years (Wong & Hanafi, 2007). Male student teachers were found to possess more significant positive attitudes towards computer laptops than female student teachers (Kay, 2006). The gender gap reduced when both males and females were given access to 24-hour access to a laptop and the Internet. On the contrary, the gender gap between male and female teachers were not apparent when teachers have equal access to computers (Bakr, 2011).

## 5. Conclusion

To return to the main question raised in this paper—Does attitudes matter for teacher education in developing countries?, it would be reasonable to assume that the answer is a definite yes. Echoing Shaft, Sharfman and Wu's (2004) point of view, Sadik (2006) stressed that computer attitudes is a very important variable to be studied in teacher education because computer attitudes when taken as an independent variable, it has the ability to predict teachers' computer use in the classrooms. On the other hand, as a dependent variable, it is affected by many manipulatable and non-manipulatable antecedents. In other words, computer attitudes has an effect on teachers' intention to use computers and at the same time, it can be changed and shaped to be more positive. Policy makers and curriculum planners must acknowledge the role computer attitudes plays in ensuring the success of computer integration in the classrooms. The author would like to stress that many of the aforesaid cited studies originated from the developed world, but strongly believes that studies undertaken in such countries are very relevant to developing countries despite the cultural diverse technology users. Clearly, developing countries are implementing education reform policies aimed at matching the technological advances of developed countries. In a nutshell, computer attitudes is too important to be missed, more so for teacher education in developing countries.

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