Predicting Technology Acceptance among Student Teachers in Malaysia: A Structural Equation Modeling Approach

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Abstract: In response towards the advances of technology in the Malaysian education system, the authors investigated the predictors of technology acceptance among a sample of student teachers. Data collected from 245 student teachers were tested against the Technology Acceptance Model using the structural equation modeling approach. The variables that were tested included perceived usefulness (PU), perceived ease of use (PEU), attitudes toward computer use (ATCU), and behavioural intentions to use the computer (BI). The results of the study showed that ATCU was significantly influenced by PU and PEU. PEU also influenced PU significantly and BI was jointly influenced by PU and ATCU.

Keywords: Predictors, computer acceptance, student teachers

1. Introduction

In 1996, the Malaysian government identified Information and Communication Technology (ICT) as one of the important foundations for its planned transition from a production-based economy to a knowledge based one by the year 2020 [1]. To realise this plan, the 10,000 primary and secondary schools in Malaysia will be transformed into Smart Schools by 2010 [2]. The Smart School concept involves the restructuring of the curriculum to integrate ICT into the teaching-learning process [3]. In the process, all teachers will be expected to shift from being knowledge presenters to knowledge facilitators. As knowledge facilitators, teachers will perform certain roles different from the conventional classroom teaching practices [4][5]. They will play the roles of planners and managers, participants and guides [6]. For teachers to be planners and managers, in Lai's view, they will have to plan for a computer-supported learning environment and know how computer software could be integrated into the school curriculum. The role of teachers must be recognised as they will be the most important "teaching tools" in the implementation of the new technology. Hativa [7] stressed that the role of the teacher is the crucial factor in implementing and maintaining an innovation.

Oliver [8] predicted that ICT skills would form an essential part of the general literacy skills of all teachers. He stressed that teachers in today's schools must be proficient in computer technology in order to remain relevant for tomorrow's schools. For this reason, there is an urgent need to understand the technology acceptance among teachers in Malaysia. This study employs student teachers as participants because they have been found to be good proxy as teachers [9].

1.1 Technology Acceptance Model

Davis [10] introduced the Technology Acceptance Model (TAM) that identifies computer technology usage behavior. The TAM posits that computer technology usage is determined by behavioural intentions to use a system that in turn is jointly determined by the user's attitude and perceived usefulness. Attitude is also jointly determined by perceived usefulness and perceived ease of use. Lastly, perceived usefulness is influenced by perceived ease of use and several external variables such as system features, training, documentation and user support. For example, technology use and their intentions toward its use are mainly influenced by the technology interface such as its ease-of-use and perceived usefulness [11]. These variables, perceived usefulness (PU), perceived ease of use (PEU), attitudes towards computer use (ATCU), are hypothesized to be the determinants of user technology acceptance and used as independent variables in this study. The dependent variable is behavioural intention to use computer (BI). The hypotheses are listed below:

H1: Student teachers' PU will be significantly influenced by their PEU;
H2a: Student teachers' ATCU will be significantly influenced by their PU;
H2b: Student teachers' ATCU will be significantly influenced by their PEU;
H3a: Student teachers' BI will be significantly influenced by their PU;
H3b: Student teachers' BI will be significantly influenced by their ATCU.

2. Methodology

2.1 Subjects and Procedures

Participants of this study were student teachers from the Faculty of Educational Studies, Universiti Putra Malaysia (UPM). There were 245 participants in this study (183 females and 62 males) and all of them own computer at home. They had an average of 6.6 years of computer experience (S.D.= 3.8) and their average daily computer usage was reported to be 3.1 hours (S.D. = 2.4). Their mean age was 23.4 years old (S.D.= 5.5). They were volunteers who completed an online survey questionnaire written in PERL (Practical Extraction and Report Language) and PHP (Hypertext Preprocessor).

2.2 Instrumentation

The questionnaire comprised 14 items on a 5-point Likert scale with 1 representing "strongly disagree" and 5 representing "strongly agree" for positive items (and vice versa for negative items). These items were adapted from various published sources, as indicated in Table 1.

Table 1: List of constructs and corresponding items

Construct	Item	
Perceived Usefulness of computers (adapted from Davis [10])	PU1	Using computers will improve my work.
	PU2	Using computers will enhance my effectiveness.
	PU3	Using computers will increase my productivity.
	PU4	I find computers a useful tool in my work.
Perceived Ease of Use of computers (adapted from Davis [10])	PE1	My interaction with computers is clear and understandable.

	PE2	I find it easy to get computers to do what I want it to do.
	PE3	Interacting with computers does not require a lot of mental effort.
	PE4	I find computers easy to use.
Behavioural Intention to use computers (adapted from Davies [10])	BI1	I will use computers in future.
	BI2	I plan to use computers often.
Attitude towards computer use (adapted from Thompson et al. [12]; Compeau and Higgins, [13])	ATCU1	Computers make work more interesting.
	ATCU 2	Working with computers is fun.
	ATCU 3	I like using computers.
	ATCU 4	I look forward to those aspects of my job that require me to use computers.

3.0 Model Fit

3.1 Test of the proposed model

Structural equation modeling (SEM) was performed to test the fit between the research model (Figure 1) and the obtained data. In this study, AMOS 7.0 [14] was used and the estimation procedure employed was maximum likelihood estimation.

Table 2 shows the level of acceptable fit and the fit indices for the proposed research model in this study. Except for the χ^2, all values satisfied the recommended level of acceptable fit. In the case of the χ^2, it has been found to be too sensitive to sample size differences, especially for cases in which the sample size exceeds 200. Hair et al., [15] noted that, as the sample size increases, there is a great tendency for the χ^2 to indicate significant differences. Therefore, this anomaly is assumed to be applicable in the present study with a sample of 245. However, the results of the χ^2 / df value in the present study is well within the recommended χ^2 / df < 5. As can be seen from Table 4, there is a good fit for the proposed research model.

Table 2: Fit indices of the proposed research model

Fit Index	Recommended Level of Fit	Proposed Research Model
χ^2	n.s at p < .05	93.496, p < .01, significant
χ^2 / df	< 5	2.078
GFI	> 0.90	.941
NFI	> 0.90	.951
SRMR	< 0.05	.04
CFI	> 0.90	.973

Figure 1 shows the resulting path coefficients of the proposed research model. All hypotheses were supported by the data. The results show that perceived ease of use significantly influenced perceived usefulness (β = 0.526, p < 0.05), supporting hypothesis H1. Computer attitudes was influenced by perceived usefulness (β = 0.515, p < 0.05) and ease of use (β = 0.315, p < 0.05), supporting hypotheses H2a and H2b. Behavioural

intention was found to be influenced by perceived usefulness (β = 0.350, p < 0.05) and computer attitudes (β = 0.446, p < 0.05), thus supporting hypotheses H3a and H3b.

Three endogenous variables were tested in the model. PU was found to be significantly determined by PEU, resulting in an R^2 of 0.323. That is, PEU explained 32.3% of the variance in PU. ATCU was significantly determined by PU and PEU and the percent of variance explained was 55.4% (R^2 = .554). The dependent variable, BI was significantly determined by PU and ATCU resulting in an R^2 = .685. That is the combined effects of PU and ATCU explained 68.5% of the variance of BI. A summary of the hypotheses testing results is shown in Table 3.

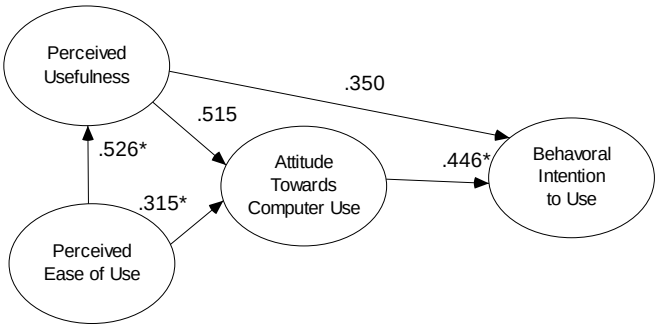

Figure 1: Path coefficients of the research model

Table 3: Hypothesis testing results

Hypotheses	Causal path	Path coefficient	Results
H1	PEU → PU	.526*	Supported
H2a	PU → ATCU	.515*	Supported
H2b	PEU → ATCU	.315*	Supported
H3a	PU → BI	.350*	Supported
H3b	CA → BI	.446*	Supported

* p < .05; ** p < .001

In agreement with the TAM [10], the proposed model of this study shows that intention to use computer technology is a function of PU and CA. CA is a function of PU and PEU. At the same time PEU has a direct effect on PU.

4. Discussion and Conclusion

This study aims to explore Malaysian student teachers' intention to use technology. All the hypotheses proposed in this study were supported. It was found that PU, PEU, and ATCU to be significant determinants of BI. However, PU was found to be a significantly stronger factor than PEU. PU has a direct impact on BI but PEU influences BI indirectly through ATCU and PU. ATCU also has a direct effect on BI.

The results of this study suggest that PEU is an important predictor of student teachers' acceptance of computer technology use. Yuen and Ma [16] explained that teachers would probably use computers once they believe that such machines are free from effort. This means that student teachers who participated in this study would mostly likely use computers when they perceive that they could use such tools with ease. As shown in this study, PU has a greater influence on BI. When teachers do not have an overview of how computers can be integrated into the teaching-learning process, these tools may not be perceived as useful [16]. This indicates that when student teachers in this study understand

how useful the computers are to them, they will most likely use these tools in their formal (academic purpose) or informal settings (leisure and entertainment purposes). This study also found that ATCU influenced BI significantly, indicating that students with positive attitudes of computers use are more inclined to use such tools.

5. Limitations

Participants of this study were from one public university in Malaysia. For this reason, the generalisability of this study is limited as the conclusions are based on the evidence from this particular study, where the participants were student teachers from the Faculty of Educational Studies, Universiti Putra Malaysia. The results of the study should also be used with caution because student teachers' views and opinions may differ from those of practising teachers in schools [9]. This is mainly because student teachers may not have been exposed to the expectations and challenges of using computer technologies in actual school settings.

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