Using Technology Acceptance Model to Investigate the Adoption of Information System for the Qualification of Curriculum Standard and Teacher Professional Production of Faculty of Education, Bansomdejchaopraya Rajabhat University

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Abstract

The purpose of this study is to propose a unified model integrating the technology acceptance model (TAM) to investigate the intention to use information system for data collection and qualification of curriculum standard and teacher professional production at Faculty of Education, Bansomdejchaopraya Rajabhat University. This study is quantitative research. The instrument was a questionnaire with the samples of 375 participants who were students of Bachelor of Education in 2020. The statistics used in this research were frequency, percentage, mean and standard deviation. Structural equation modeling was conducted to test the research hypotheses. The results show that behavioral intention (INT) factor was dependent on the direct influence of perceived usefulness (PU) factor and was dependent on the direct and indirect influence of perceived ease of use (PEOU).

Keywords: Information System, Technology Acceptance Model, Bachelor of Education.

1. Introduction

At present, the web application is a very popular technology. Web applications are widely used because the infrastructures of network technology have been developed to be widely accessible. The web application is a technology to propose documents, which consists of text, images, sound, and animation through the internet. Web application presents various information by the specified objectives. In addition, the web application is very compatible with database systems [1].

Bansomdejchaopraya Rajabhat University is an educational institution at the higher education level. The most important process of Bachelor of Education programs is the teaching professional experience process, which is quality controlled by the Faculty of Education, Bansomdejchaopraya Rajabhat University and the Secretariat Office of the Teachers' Council of Thailand. This process is coordinated with lecturers from the university and supervisory teachers from schools for quality control of teacher students in the courses include practicum 1, practicum 2, internship 1, and internship 2. In the past, faculty would have students requested their program to collect preliminary data, which found that the problem was the collected data files were modified. There are mistakes, incorrect data, and not up to date data. As a result, the school often misrepresented information. Therefore, the web application has been used to manage information, and to facilitate further application for the qualification of curriculum standard and teacher professional production. Figure 1 presents the use case diagram of the information system which includes student functions, supervisor functions, supervisor administrator functions, and administrator functions [2].

Considering the adoption of information system for the qualification of curriculum standard and teacher professional production of Faculty of Education, Bansomdejchaopraya

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Rajabhat University, an investigation of factors that influence student's usage of an information system may reveal insights into its viability.

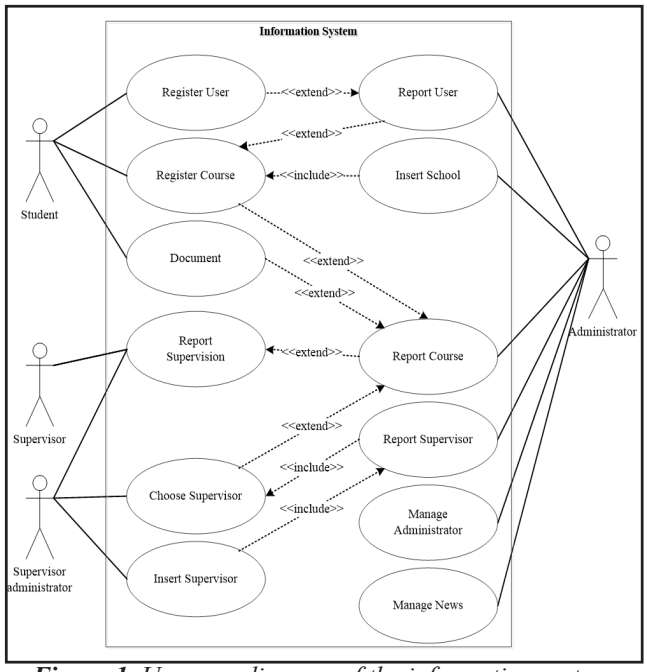

Figure 1. *Use case diagram of the information system.*

2. Theoretical Background and Related Researches

2.1 Structural Equation Modeling (SEM)

Structural Equation Modeling analysis or path analysis is a technique in statistical analysis for testing in which the study variable sets in the research have a causal relationship as stated in the hypothesis model. SEM is used to analyze the structural relationship between measured variables and latent constructs. SEM is the combination of factor analysis, regression analysis, determination of variance (Covariance), and determination of correlation coefficient (Correlation) [3].

2.2 Technology Acceptance Model

Technology Acceptance Model is a theoretical model that has been widely used for evaluating how information technology is accepted. TAM was developed from the Theory of Reasoned Action. TRA is used to specify the context of behavioral intention to use of the product or a system. An individual's attitude and the subjective norm influence behavioral intention [4].

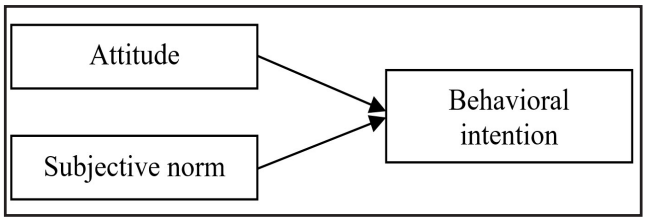

Figure 2. *Theory of Reasoned Action (TRA).*

TAM is used to specify the context of organizational Information Technology Acceptance and adoption. An individual's perception of perceived usefulness and perceived ease of use influence behavioral intention to use information technology [5].

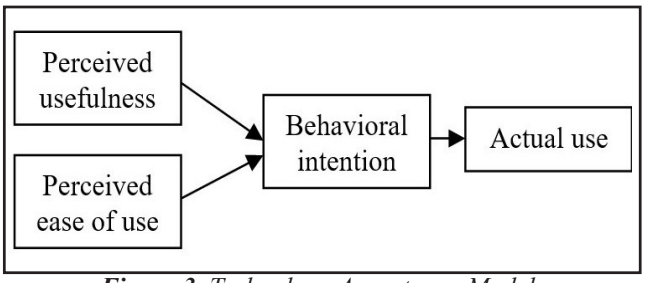

Figure 3. *Technology Acceptance Model.*

2.3 Literature Review

Abdullah et al. [6] were investigating the influence of the most commonly used external variables of TAM on perceived usefulness and perceived ease of use. The result showed that perceived usefulness and perceived ease of use had a significant and direct impact on behavioral intention. In addition, perceived ease of use had a significant and direct impact on perceived usefulness.

Mital et al. [7] were studying the influential factors of adoption of Internet of Thing in India. Hypotheses in this study did not test the direct impact on perceived usefulness from perceived ease of use. The result showed that perceived usefulness and perceived ease of use had a significant and direct impact on behavioral intention.

Wu and Chen [8] studied the influential factors in the continuance intention to use MOOCs educational system. The result showed that perceived usefulness had a significant and direct impact on behavioral intention. In addition, perceived ease of use had a significant association with

perceived usefulness and indirect impact on behavioral intention but perceived ease of use did not support behavioral intention.

Sánchez-Prieto et al [5] studied the influential factors in the behavioral intention of using mobile devices within the future teaching practice of pre-service primary education teachers. The result showed that perceived usefulness and perceived ease of use support behavioral intention. In addition, perceived ease of use support perceived usefulness. Baby and Kannammal [9] studied the influential factors in the behavioral intention of using internet technologies for training and learning. This paper focused on building a user-centric framework by NPA algorithm. The result showed that perceived usefulness and perceived ease of use can support behavioral intention. In addition, it showed that perceived ease of use can support perceived usefulness.

Table 1. *Hypotheses from the literature review.*

Author	PEOU > PU	PU > INT	PEOU > INT
Abdullah et al.	✓	✓	✓
Mital et al.		✓	✓
Wu and Chen	✓	✓	
Sánchez-Prieto et al.	✓	✓	✓
Baby and Kannammal (2020)	✓	✓	✓

3. Research Methodology

3.1 Hypotheses

This study has used the theoretical background of the TAM. We propose a research model that identified perceived usefulness and perceived ease of use as predictors of behavioral intention. The relationships between these constructs are in the proposed research model depicted in Figure 4.

3.1.1 Perceived Usefulness

Perceived usefulness factor is the perception of personnel that has a direct impact on behavioral intention on the usage information system. They believe that the information system can help them to improve their working performance. This will influence behavioral intention [4]. Thus, we propose the following research hypotheses:

H1. Perceived usefulness has a positive effect on behavioral intention.

3.1.2 Perceived Ease of Use

1) Perceived ease of use factor is the perception of the personnel that has a direct impact on perceived usefulness on the usage information system. The information system is designed to be user friendly. This will influence perceived usefulness [4]. Thus, we propose the following research hypotheses:

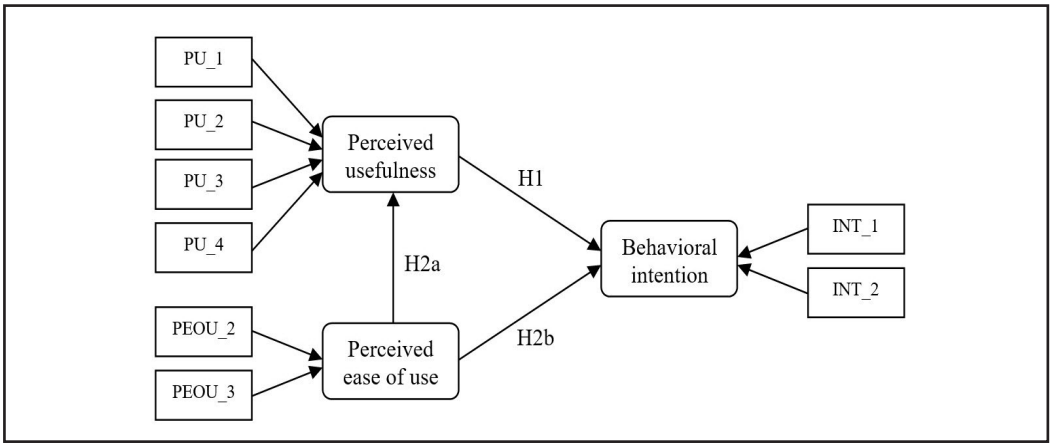

Figure 4. *Proposed research model.*

H2a. Perceived ease of use has a positive effect on perceived usefulness.

2) Perceived ease of use factor is the perception of the personnel that has a direct impact on behavioral intention on the usage of information system. They expect the information system to be easy to use. This will influence behavioral intention [4]. Thus, we propose the following research hypotheses:

H2b. Perceived ease of use has a positive effect on behavioral intention.

3.2 Questionnaire Development

We used a questionnaire survey with two sections to test our proposed research model. The first section includes demographic questions about the participants, and the second section includes perceived usefulness questions, perceived ease of use questions, and behavioral intention questions. The survey questionnaire in this study was mainly adapted from previous studies on information system adoption. Each item was measured on a five-point Likert-type scale. (5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree and 1 = strongly disagree) The questionnaire items are presented in Table 2.

3.3 Data Collection

The survey was conducted using an online (Web-based) structured questionnaire. The participants of this study were studying in the faculty of education at Bansomdejchaopraya Rajabhat University. We created a questionnaire by Google Application. We collected data from December 2019 to February 2020; overall, 375 valid surveys were returned. The summary of the demographic characteristics of the respondents are presented in Table 3.

4. Results

4.1 Normality Test

Table 4 shows different values for mean, standard deviation, skewness coefficient, and kurtosis. The average of all constructs is the Agree level (3.50 - 4.49). The standard deviation is from 0.662 to 0.791. Moreover, the values of skewness and kurtosis can be considered as normality test data. Data is normal when skewness < 3 and kurtosis < 10 [13].

Table 2. *Survey items.*

Constructs	Items	Measures	Reference
Perceived usefulness	PU_1	Using the information system improves teacher professional production process.	- Wu and Chen [8] - Kim et al. [10]
	PU_2	Using the information system increases communication between staff and students.	
	PU_3	Using the information system enhances teacher professional production effectiveness.	
	PU_4	Using the information system is valuable for teacher professional production.	
Perceived ease of use	PEOU_2	The interaction with the information system is clear and understandable on responsive website design.	- Wu and Chen [8] - Stantchev et al. [11]
	PEOU_3	Using the information system is easy and compatible with online devices.	
Behavioral intention	INT_1	I intend to use the information system for teacher professional production.	- Wu and Chen [8] - Arpaci [12]
	INT_2	I will continue using the information system increasingly in the future.	

Table 3. *Demographics characteristics of the respondents.*

Items	Type	Frequency (n = 375)	Percentage
Gender	Male	93	24.80
	Female	282	72.20
Program	Early Childhood Education	21	5.60
	Music Education	11	2.93
	Mathematics	57	15.20
	English	60	16.00
	Elementary Education	20	5.33
	Computer Education	21	5.60
	General Science	40	10.67
	Western Music Education	2	0.53
	Thai	51	13.60
	Arts Education	6	1.60
	Social Studies	41	10.93
	Physical Education	13	3.47
	Thai Dramatic Arts	15	4.00
	Educational Psychology and Guidance	5	1.33
	Technology Digital for Education	1	0.27
	Biology	3	0.80
	Thai Music Education	8	2.13

Table 4. *Descriptive statistics.*

Construct	Mean	S.D.	Skewness	Kurtosis
PU_1	4.13	0.733	-0.486	0.093
PU_2	4.15	0.707	-0.366	-0.474
PU_3	4.13	0.704	-0.378	-0.299
PU_4	4.21	0.677	-0.379	-0.393
PEOU_2	4.05	0.791	-0.774	1.030
PEOU_3	4.05	0.776	-0.680	0.727
INT_1	4.10	0.688	-0.286	-0.355
INT_2	4.18	0.662	-0.216	-0.752

Table 5. *Result of reliability and convergent validity.*

Construct	Items	Factor Loading	Cronbach's Alpha	Composite Reliability	AVE
Perceived usefulness	PU_1	0.777	0.894	0.896	0.684
	PU_2	0.870			
	PU_3	0.830			
	PU_4	0.828			
Perceived ease of use	PEOU_2	0.836	0.812	0.812	0.684
	PEOU_3	0.818			
Behavioral intention	INT_1	0.779	0.785	0.786	0.647
	INT_2	0.829			

4.2 Confirmatory Factor Analysis (CFA)

4.2.1 Reliability and Convergent Validity

We evaluated the reliability and convergent validity of all items using four criteria [14]: Factor loading of all items should be larger than 0.70. Cronbach's alpha should be larger than 0.70. Composite reliability (CR) should be larger than 0.70. And average variance extracted (AVE) should be larger than 0.50.

4.2.2 Discriminant Validity

We evaluated the discriminant validity of all constructs by comparing the square roots of AVE with the factors correlation coefficient. The AVE should be larger than the correlation coefficient of other constructs [14].

Table 6. *Result of discriminant validity.*

	Perceived Usefulness	Perceived Ease of Use	Behavioral Intention
Perceived Usefulness	**0.827**		
Perceived Ease of Use	0.809	**0.827**	
Behavioral Intention	0.798	0.736	**0.804**

4.2.3 Goodness of Ft Test

We evaluated the goodness of fit test by the following indices [8], [15]: the chi - square / Degree of freedom, Standardized Root Mean Square Residual (SRMR), Goodness -of - fit index (GFI), Normed fit index (NFI), Comparative fit index (CFI), Tucker Lewis index (TLI) and Root mean square residual (RMSEA). All of the indices are presented in Table 7.

Table 7. *Result of goodness of fit test.*

Indices	Result Value	Recommend Value
Chi - square / Degree of freedom	1.375	≤ 3
Standardized Root Mean Square Residual	0.0154	≤ 0.05
Goodness - of - fit index	0.985	≥ 0.9
Normed fit index	0.987	≥ 0.9
Comparative fit index	0.996	≥ 0.95
Tucker Lewis index	0.994	≥ 0.95
Root mean square residual	0.032	≤ 0.05

4.3 Hypotheses Testing

The three hypotheses presented above were tested collectively using structural equation modeling. The R2 values represent the proportion of the variance in the dependent variables that is predictable from the independent variables. The path coefficient values represent the direct effect of the independent variables on the dependent variables. Figure 5 presents the resulting R2 values and the resulting path coefficient values of the proposed research model.

A summary of the hypotheses testing results of the Standardized path coefficients and path significances is presented in Table 8. All of the paths are significantly determined. All hypotheses are supported by the data.

5. Conclusions

5.1 Perceived Usefulness

Figure 5 shows that perceived usefulness is significantly determined by perceived ease of use with path coefficient value being 0.809. The R2 value is 0.655 that can explain 65.5% of the observed variance in perceived usefulness. This implies that perceived ease of use is a predictor of perceived usefulness. This result is consistent with previous studies [6], [8].

5.2 Behavioral Intention

Figure 5 shows that behavioral intention is significantly determined by perceived usefulness with path coefficient value being 0.586 and perceived ease of use with path coefficient value being 0.262. The R2 value is 0.661 that can explain 66.1% of the observed variance in behavioral intention. Perceived usefulness contributed most to the observed explanatory power than perceived ease of use. This implies that perceived ease of use is more influential than perceived usefulness to be a predictor of behavioral intention. This result is consistent with previous studies [5], [6].

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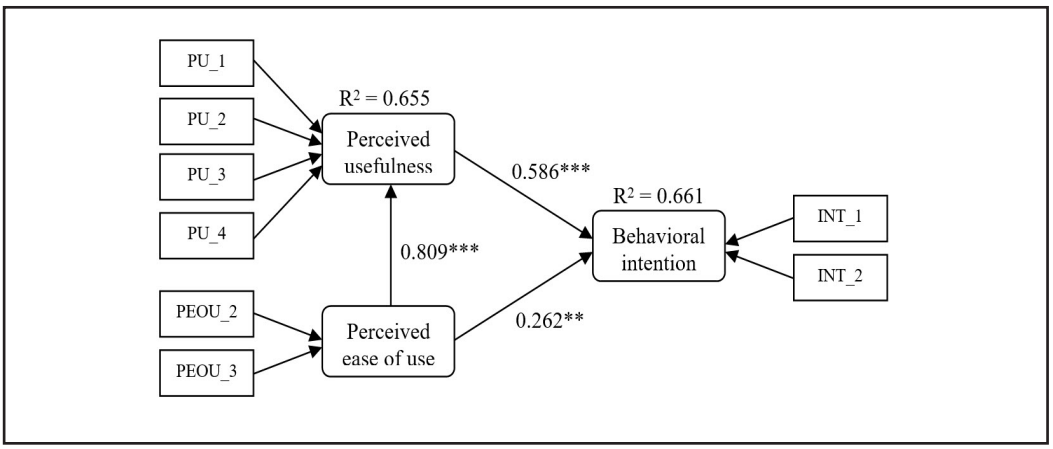

Figure 5. *Path Analysis.*

Table 8. *Result of path analysis.*

Hypothesis	Path Coefficient	P Value	Result
H1: Perceived usefulness > Behavioral intention	0.586	P < 0.001***	Supported
H2a: Perceived ease of use > Perceived usefulness	0.809	P < 0.001***	Supported
H2b: Perceived ease of use > Behavioral intention	0.262	P < 0.01**	Supported

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