Gender Differences in the Continuance of E-learning

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Abstract

The objectives of this study were to: (a) investigate the factors underlying learners' continuance of E-learning; (b) explore gender differences in the relationships among dominants influencing E-learning continuance; and (c) construct E-learning continuance model (ECM model). The results showed that two of the four proposed continuance variables have significant relationship with intention to continue using E-learning: these are *social encouragement expectancy confirmation* and *facilitating condition expectancy confirmation*. The moderate effect of genders on the continuance of E-learning was also found in *social encouragement expectancy confirmation* factor. These findings suggest that researcher should take into consideration factor of gender in the development of E-learning theories. E-learning stakeholders should now realize that male and female learners may perceive the same E-learning system differently, and they may weight these perceptions differently in considering the continuance of E-learning.

Keywords: E-learning, continuance, usage, gender differences, technology acceptance

1. Introduction

E-learning is a learning system that uses web and internet technology to facilitate teaching and learning. The benefits of E-learning to learners will not be realized if learners fail to use this technology [1,2]. The last decade has seen an increasing body of theory-based research on learner's acceptance and use of E-learning. Most of these ground their researches on Technology Acceptance Model [3]. These view E-learning usage as an extension of acceptance behavior: if individual learners accept an E-learning technology, they will both take it up and continue using it [4]. These studies therefore encounter difficulty in explaining why those learners who do start to use the system opt out later (the 'acceptance discontinuance anomaly') [5]. While initial acceptance is a vital condition for realizing the success of E-learning, long-term viability of the

system and its eventual success depend on its continued use rather than first-time use [6,7].

As active as these streams of research have been, none has dealt with the possible impact of gender in a learner's acceptance and continuance of E-learning. Is such an omission important? Is there value to be added by extensions to the literature that consider the effect of gender on use of E-learning? Through analysis of 116,000 questionnaires gathered in 40 countries, Hofstede's research found a nearly consistent pattern of men rating advancement and earning power more highly and women rating interpersonal aspects, service, and physical environment more highly [8]. Hofstede's extensive work offers insight into how sex differences in thinking and behavior arise, which suggests, in turn, why that efforts should be made to examine gender differences in continuance of E-learning behavior [9,10].

To fill the existing gaps left by other researchers, this research has the following objectives:

(1) To investigate the factors underlying learners' continuance of E-learning after its initial acceptance.

(2) To understand gender differences in the relative influence of underlying factors on learners' continuance of E-learning.

(3) To formulate and empirically validate the E-learning continuance model (ECM model).

2. Theoretical framework and hypotheses

Upon the review of literature, empirical evidence suggested that learners' continuance behavior is driven by their intention (motivation), which is a comprising function of his/her expectations towards E-learning [11]. Additionally, Learners' expectations changed over time as they experienced the system after taking it up and this change in expectations might have a corresponding impact on learners' continuance behavior: learner opted out from the E-learning system because their expectations changed from high before uptake, to low after using the technology [12,13,14,15,16]. To better understand the continued use of E-learning, the question is now *'how expectations do change or are modified over time?'*

The Cognitive Dissonance Theory (CDT) was applied as grounded theories for providing the answer of temporal change in learners' expectations. Under the assumption that individuals have a need to maintain some level of consistency (consonance) between their cognition and reality, the CDT asserted that there will be a psychological state of dissonance when cognitive structures (expectation) and

reality are inconsistent with each another [17]. Dissonance produces discomfort and, correspondingly, an individual will attempt to reduce it by changing their expectations.

In the context of E-learning usage, learner may experience cognitive dissonance during the period of usage if their initial expectations (that earlier led to acceptance and uptake) are disconfirmed by the actual performance of E-learning system. Rational learners may remedy this dissonance by distorting or modifying their expectations so they are more consistent with reality.

To find out what a learner expects from E-learning, Unified Theory of Acceptance and Use of Technology (UTAUT) was selected because the model presents a more comprehensive and conclusive set of expectations than any other individual model. The UTAUT asserted that there are four expectation factors that directly affect an individual's use of technology: (1) 'performance expectancy'; (2) 'effort expectancy'; (3) 'social influence' and (4) 'facilitating conditions' [18].

By integrating grounded theories (CDT and UTAUT models), it can be inferred that intention to continuance, which promotes the actual continuance of E-learning, is influenced by four expectancy confirmation factors: (1) performance expectancy confirmation; (2) effort expectancy confirmation; (3) social encouragement expectancy confirmation; (4) facilitating condition expectancy confirmation.

Performance Expectancy Confirmation

'Performance expectancy confirmation' (PEC) is defined as the degree to which an individual learner confirms that an E-learning system has a higher ability to support them to achieve their intended learning outcome than they previously expected [20,21]. A learner's motivation to continue using E-learning is affected by the learner's attitude towards the system after using it [22,23]. A learner will have a positive attitude towards an E-learning system if he/she confirms that its use supports them to learn better, or achieve the intended learning outcome faster, than other possible ways of learning.

Men may place great emphasis on work and are motivated by achievement needs than women [24,25]. Venkatesh and Morris also found that men consider the usefulness of the system to a greater extent than women in making their decisions on the use of information technology [18]. Therefore, we hypothesize:

H1: performance expectancy confirmation will influence behavioral intention to continue using E-learning

H1a: performance expectancy confirmation will influence behavioral intention to continue using E-learning more strongly for men than it will influence women

Effort Expectancy Confirmation

The 'effort expectancy confirmation' (EEC) is defined as the degree to which an individual learner confirms that the use of an E-learning system was easier than he/she expected [20,21]. Learners would be frustrated by the system if they perceived that the use of the system is complicated, which may impede their learning progress. Frustrated feelings will lead them to opt out of the system [26,27,28].

Higher levels of computer anxiety among women can be expected to lead to lowering of self-efficacy [29,30,31]. Such perception is important for female learner in continuance of the E-learrning decisions.

H2: effort expectancy confirmation will influence behavioral intention to continue using E-learning

H2a: effort expectancy confirmation will influence behavioral intention to continue using E-learning more strongly for women than it will influence men.

Social Encouragement Expectancy Confirmation

The social encouragement expectancy confirmation (SEEC) factor is defined as the degree to which an individual learner confirms that encouragement from their significant persons on the use of E-learning was better than expected [20,21].

Women and men differ in the extent to which they can be influenced by others [30,31]. It implies that women may weight the opinion of other people in considering continuance of E-learning and need more support.

H3: social encouragement expectancy confirmation will influence behavioral intention to continue using E-learning

H3a: social encouragement expectancy confirmation will influence behavioral intention to continue using E-learning more strongly for women than it will influence men.

Facilitating condition Expectancy Confirmation

The facilitating condition expectancy confirmation (FCEC) factor is the degree to which an individual learner confirms that there are IT resources to support their use of E-learning [20,21]. The influence of facilitating condition expectancy confirmation on continuance of E-learning will be moderated by gender, such that the effect will be stronger for men.

H4: facilitating condition expectancy confirmation will influence behavioral intention to continue using E-learning

H4a: facilitating condition expectancy confirmation will influence behavioral intention to continue using E-learning more strongly for men than it will influence women

The factors found from the literature were now integrated to construct the E-learning continuance model (ECM model): see Figure 1.

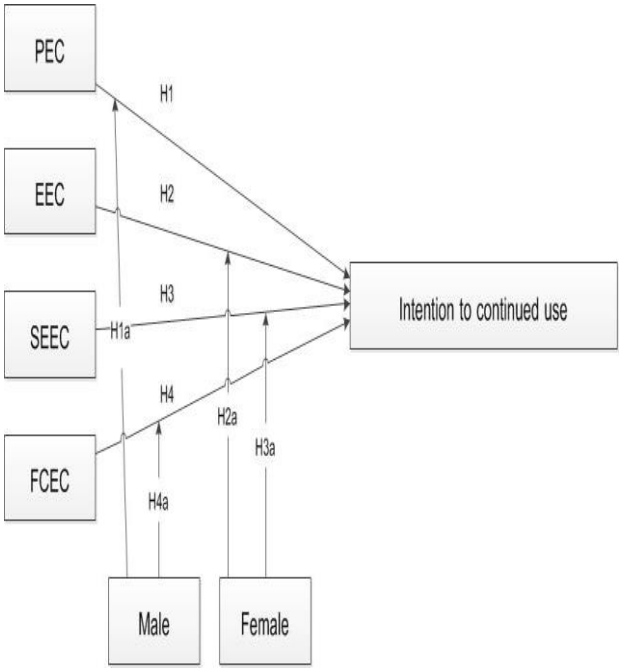

Figure 1 The proposed ECM model

3. Method

Participants and System

To control the potential effect of university variables (e.g. type of E-learning system and infrastructural constraints) on individual learner use of E-learning, the participants in this experiment were learners at a single Thai university, Rajamangala University of Technology Thanyaburi, or RMUTT [31].

The G*power 3.1.5 program was used to calculate the optimum sample size for this study. To explore the moderate effect of gender on the continuance of E-learning, two multiple regression models between four continuance factors (PEC, EEC, SEEC and FCEC) and continuance intention are required for the group of male and female learners. To detect the relationship with less than conventional Type I error (.05) and II error (.80), the minimum number of participants required for each regression model was found to be 40. As a consequence, the total number of respondents in this study was 80 learners: (1) 40 male learners and (2) 40 female learners.

Moreover, a simple random sampling technique was used for selecting individual learners to be included as a sample of this study. As the concept of this technique is to randomly select the respondents from the sampling frame, all learners have an equal opportunity to be included in the study and also the research hypothesis can be tested by using generalization from the sample to the population [32]

Measures

To ensure the validity and reliability of the scales, validated items adapted from prior studies were used and pilot study was conducted: see Table 1.

Table 1 Cronbach's alpha value of each set of items

factor	items	Cronbach's alpha
PEE	1. How much do you think that E-learning was useful for your education? 2. How much do you think that E-learning allowed you to learn more quickly? 3. How much do you think that E-learning improved your score?	.89
EEC	1. How much do you think that learning to operate E-learning system was easy? 2. How much do you think that you became skilful at using E-learning? 3. How much do you think that E-learning was easy to use?	.78
SEEC	1. How much do you think that the director of your university encouraged the use of E-learning? 2. How much do you think that your lecturers encouraged the use of E-learning? 3. How much do you think that your friends encouraged the use of E-learning?	.87
FCEC	1. How much do you think that you have necessary IT resources (e.g. a computer and internet) to use E-learning? 2. How much did the university provide you with the necessary IT resources to use E-learning? 3. How much did the IT staff assist you with the use of E-learning system when you needed help?	.86
Intention	I intend to continue using E-learning.	-
Adapted from Davis et al. (1989); Bhattacherjee (2001); and Venkatesh et al. (2003)		

Cronbach's (1951) technique was used to determine the internal consistency of the set of items [33]. The results indicated that Cronbach's values for the sets of items in this study ranged from .78 to .89. All values were above 0.7, exceeding the threshold value recommended by Nunnally (1978) [34]. Therefore, the questionnaire for measuring each E-learning continuance factor was considered a reliable measurement instrument.

4. Data analysis, results and discussion

Factors influencing continuance of E-learning

To investigate the factors underlying learners' intention to continue using a E-learning after its initial acceptance, multiple regression analysis was conducted using four proposed continuance factors (PEE, EEC, SEEC and FCEC) as a predictor of learner's continuance intention in the entire sample (see Table 2).

Table 2 Multiple regression analysis between four proposed continuance factors and continuance intention using data from entire sample

Independent variables	Non-standardized coefficients		Standardized coefficients	t	Sig.
	B	SE	β		
Constant	1.51	.96		2.17	.033
PEE	.19	.12	.19	1.68	.096
EEC	-.09	.13	-.09	-.78	.438
SEEC	.43	.12	.42	3.69	<.001
FCEC	.32	.13	.29	2.47	.016
a. Dependent variable: intention to continuance R = .73; R-square= .54; $F(4, 75)$ = 21.53.1; p-value < .001					

The linear combination of the four prosed continuance factors was significantly related to the continuance intention: $F(4, 75) = 21.53$, $p < .001$ The multiple correlation coefficient was .73, indicating that approximately 54 per cent of the variance of the continuance intention was accounted for by the linear combination of the four proposed factors. It was found that *social encouragement expectancy confirmation* significantly predicted continuance intention ($\beta = .42$, $p < .001$), as did *facilitating condition expectancy confirmation* ($\beta = .29$, $p = .016$).

This meant that a learner who had a high level of confirmation that they had the necessary IT resources and the use of E-learning system was supported by their important persons normally showed a higher level of intention to continue using E-learning than a learner with a low confirmation. A similar finding has been reported by many studies concerned with E-learning usage in higher education in Thailand [35, 36] and other countries [37].

This finding has important implications for E-learning stakeholders in universities that should provide both necessary IT infrastructure (such as computers, internet system) and the staffs (lecturers and IT staff) to assist with its use for promoting the continuance of E-learning.

Moderating effects of gender on the continuance of E-learning

In order to investigate whether or not gender can moderate the influence of proposed continuance factors on intention and also which type of gender moderates better than the other, data was divided into two groups, including male and female data. In each group, multiple regression analysis between four proposed continuance factors (PEE, EEC, SEEC and FCEC) and learner's intention to continuance was conducted. The comparison between the estimated coefficients for each pair of relationship between two groups was carried out using Z-test. as shown in the following equation:

$$Z = \frac{b_1 - b_2}{\sqrt{(SEb_1)^2 + (SEb_2)^2}}$$

Where: Z is the value of Z-statistic

b_1, b_2 is non-standardized regression coefficient between each proposed continuance factor and continuance intention in group 1 and group 2 respectively

SEb_1, SEb_2 is standard error between each proposed continuance factor and continuance intention in group 1 and group 2 respectively

Finally, a p-value for the computed z_difference was obtained using the table of standard normal distribution. The results of these analyses are as follows:

Table 3 Gender differences in relationships of fourpospoed continuance factors and E-learning continuance intention

Causal relationship	Group 1 (male)		Group 2 (female)		Z	p-value	result
	B	SE	B	SE			
PEC ÷ Intention	.22	.17	.19	.17	-.15	.44	Not sig.
EEC ÷ Intention	.03	.19	.18	.18	.69	.25	Not sig
SEEC ÷ Intention	.22	.18	.57	.17	1.73	.04	support
FCEC ÷ Intention	.41	.20	.28	.18	-.59	.27	Not sig

The regression coefficient between the social encouragement expectancy confirmation factor and the continuance intention was significantly different in a group of male and female learners (B difference = .35, p = .04). This result suggested that the influence of social encouragement expectancy confirmation factor on continuance intention can be moderated by gender and the influence will strongly for women than it will influence men. The statistical results of the filed study suggest the development of the ECM model (see Figure 2) and the model suggested the continuance of E-learning is driven by a learner's intention to continuance, which is a comprising function of *social encouragement expectancy confirmation* and *facilitating condition expectancy confirmation*. The effect of *social encouragement expectancy confirmation* on the intention to continuance can also be moderated by the gender.

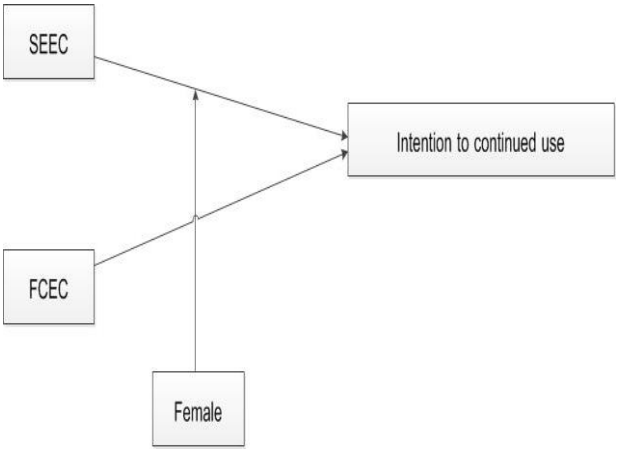

Figure 2 The E-learning continuance model

5. Conclusion

To ensure long-term viability of E-learning and its eventual success, the aim of this research was first to investigate the underlying factors for the continuance of E-learning. The results showed that two of the four proposed continuance variables had a significant relationship with intention to continue using E-learning: *social encouragement expectancy confirmation* and *facilitating condition expectancy confirmation*.

With the context of arguing that the exploration of gender issues with respect to E-learning usage is important, this research investigate and demonstrate how women and men difference in their decision to continue using E-learning. The result showed the moderate effect of gender on the continuance of E-learning, and women will consider heavily on

the encouragement of their important person than men.

The third objective was to construct E-learning continuance model (ECM model). The model however was developed with a snapshot research apporach, so additional research are still needed to evaluate the validity of the ECM model.

Understanding better the gender differences in the continuance and usage of E-learning help researchers to take more consideration of gender to develop E-learning theories in the future. E-learning stakeholder, moreover, now realize the same E-learning system may be percieved differently by gender and they can then improve the continaunce of E-learning using the ECM model.

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