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Alteration of Influencing Factors of e-Learning Continued Intention for Different Degrees of Online Participation




Chi-Cheng Chang[1] (the corresponding author), Chaoyun Liang[2], Kuen-Ming Shu[3], and Yi-Chun Chiu[1]
[1]National Taiwan Normal University, [2]National Taiwan University, [3]National Formosa University, Taiwan

Abstract

The purpose of the present study was to investigate the variation of influencing factors of e-learning continuance intention for different degrees of participation and to examine moderating effects of degrees of participation on influencing factors of e-learning continuance intention. Participants included 670 learners from an adult professional development website. Data was collected based on questionnaires and analyzed by Structural Equation Modeling (SEM). The Revised Information System Success Model proposed by DeLone and McLean and Innovation Adoption Theory of Rogers were adopted in the present study. A research model including two constructs (curriculum and system as well as innovation adaptation) and eight influencing factors were proposed in the present study based on features of e-learning. The results revealed that the factors in the construct of curriculum and system could be varied for different degrees of learner participation. Among those factors, system quality and online interaction were the factors for the differences between low and high groups of participation. Furthermore, the factors in the construct of innovation adaptation could be varied for different degrees of participation. Among

those factors, compatibility was the factor for the differences between low and high groups of participation. Degree of online participation demonstrated moderating effects on the influences of online interaction, relative advantage and compatibility in e-learning continuance intention.

Keywords: e-Learning, E-Learning Continuance Intention, Revised Information System Success Model, Innovation Adoption, Degree of Participation.

Introduction

Importance to Research e-Learning Continued Intention and Influencing Factors

With the development of digital technology, e-learning provides instant, convenient, flexible, and long-distance learning to people. Although applications of e-learning in the recent years have been popular, a successful key is e-learning continued intention. Since there are many influencing factors for e-learning intention, there are many studies exploring these relevant issues. Some studies found that discontinuance e-learning intention was a common phenomenon (Roca, Chiu, & Martínez, 2006; Lee, 2010; Sun, Tsai, Finger, Chen, & Yeh, 2008; Wu, Tsai, Chen, & Wu, 2006). Therefore, e-learning continuance intention and its influencing factors were important issues that required further explorations.

Theories for Supporting e-Learning Continued Intention and Influencing Factors

Many previous studies about influencing factors of e-learning intention were based on theories or research models including: Revised Information System Success Model (RISSM) (Delone & Mclean, 2003), Innovation Adoption Theory (IAT) (Rogers, 2003), Theory of Planned Behavior (TPB) (Ajzen, 1991; Mathieson, 1991), Decomposed Theory of Planned Behavior (DTPB) (Taylor & Todd, 1995), Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975), Expectation-Confirmation Model (Oliver, 1980; Bhattacherjee, 2001a, 2001b; Lee, 2010), Expectancy-Value Theory (Fishbein & Ajzen, 1975; Chen, 2011) Social Cognitive Theory (Bandura, 1997, 2001), Self-Determination Theory based on extrinsic and intrinsic motivation (Gagne & Deci, 2005), extended Technology Acceptance Model (TAM) (Cheung & Vogel, 2013; Venkatesh & Davis, 2000), Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh, Morris, Davis, & Davis, 2003), extended (UTAUT) (Chen, 2011; Lin, Lu, & Liu, 2013), and Education Behavior Intention Model (EBIM), (UTAUT + learning styles + teaching styles) (Lin, Lu, & Liu, 2013). These above-mentioned theories have their own particular background and purposes as well as their own advantages and disadvantages. However, single theory or model is not enough for establishing a research model. The current trend is to integrate multiple theories for establishing

a research model. Among these theories, RISSM and IAT have been commonly used for developing research models.

Why Use RISSM and IAT

An e-learning website is a type of information system. A successful information system depends on user satisfaction and e-learning continuance intention (Delone & Mclean, 2003). The influencing factors of e-learning continuance intention for the RISSM proposed by Delone and Mclean included information quality, system quality, and service quality. Some studies have already adopted the RISSM to explore influencing factors of e-learning intention (Chang, 2013; Ramayah, Ahmad, & Lo, 2010; Li, Duan, Fu, & Alford, 2012; Roca et al., 2006; Wang & Chiu, 2011). The IAT proposed by Rogers (2003) stated five influencing factors of innovation adaptation, including relative advantage, compatibility, complexity, trialability, and observability. Some studies have also already adopted the IAT to explore influencing factors of e-learning intention (Duan, He, Feng, Li, & Fu, 2010; Lee, Hsieh, & Hsu, 2011; Liao, & Lu, 2008; Sawang, Newton, & Jamieson, 2013; Van Slyke, Belanger, & Comunale, 2004; Zhang, Wen, Li, Fu, & Cui, 2010; Žvanut, Pucer, Ličen, Trobec, Plazar, & Vavpotič, 2011). The RISSM focused on the use of the system, so it was not appropriate to be adopted independently for exploring the influencing factors of e-learning intention. Therefore, the IAT was also adopted in the present study for enriching the research because the RISSM and IAT are complementary.

Research Questions

The degree of e-learning/online participation is the extent that a user participates in the online activities such as online discussion, online material reading, and online resource sharing, etc. Degrees of participation in e-learning was a key factor for managing an e-learning website (Chang, Tseng, & Chen, 2012; Martins & Kellermanns, 2004), and positively affected learners' reuse intention (Dae-sik & Jeong-kyoum, 2013). E-learning experiences (Lin, 2011) and e-learning participation properties (mandatory group versus optional group) (Žvanut et al., 2011) moderated the relationship between influencing factors and e-learning intention. On the other hand, the possible existence of moderating effects from online degrees of participation is less studied which can be an issue to explore further. Especially, participation is a nature of active adult users and affects learning outcomes. Active or genuine participation (as compared with passive or feigned participation) reinforces motivation and learning experience (Knowles, Holton III & Swanson, 2005). E-learning users should involve active participation, rather than passive observation. Thus, the present study examined whether influencing factors of e-learning continuance intention were different between adult users with high and low degrees of participation and examined moderating effects of participation. According to the aforementioned context, the research questions included: 1) For adult users with low degrees of participation, what are the influencing factors of e-learning continuance intention? 2) For adult users with high degrees of participation, what are the influencing factors of e-learning continuance intention? 3) Are there any differences in influencing factors of e-learning continuance intention due to different degrees of participation among adult e-learning students? Does the degree of

participation have the moderating effects on the influencing factors of e-learning continuance intention?

Theoretical Framework and Research Hypotheses

Revised Information System Success Model (RISSM)

The RISSM proposed by DeLone and McLean (2003) was determined by six constructs including information quality, system quality, service quality, user satisfaction, intention to use, and effectiveness of use. Information quality, system quality, and service quality affected intention to use and user satisfaction, whereas intention to use and user satisfaction affected effectiveness of use. User satisfaction and intention to use affected each other. Some studies also confirmed that information quality, service quality, and system quality affected user satisfaction, and user satisfaction affected e-learning intention (Chang, 2013; DeLone & McLean, 2003; Roca et al., 2006; Wang & Chiu, 2011).

E-learning websites are one kind of information systems which commonly consist of curriculum and system platform. The information contents in an information system are similar to the curricular contents in an e-learning website. For e-learning, service quality of information system is too broad, so course flexibility (effectiveness and convenience of use) is adopted instead. Information quality of information system, for e-learning, is similar to course quality. System quality of an information system is similar to system quality of an e-learning website. Generally speaking, online interaction is not included in an information system (e.g., interactions between learners and teaching materials, interactions between learners and teachers, or interactions among learners), but online interaction is a key factor in successful e-learning (Cho, Cheng, & La, 2009; Elsayed, 2005; Hernandez, 2011; Liaw, 2008). Some research model for e-learning intention consisted of influencing factors including interactions, interactive learning activities, or use of interactive tools (Hernandez, 2011; Liaw, 2008), so online interaction was adopted as another influencing factor.

Curriculum and system could affect learners' e-learning intention (Chang & Tung, 2008; Sun et al., 2008; Liu, Chen, Sun, Wible, & Kuo, 2010). Flexibility of a curriculum (e.g., time, place, and learning method) could attract learners to use e-learning and enhance their satisfaction (Arbaugh & Duray, 2002). Ramayah et al. (2010) confirmed that service quality of an e-learning system positively affected e-learning intention. Li et al. (2012) proved that service quality positively affected reuse intention toward e-learning. A study done by Wang and Chiu (2011) revealed that service quality of an e-learning system positively affected user satisfaction, and user satisfaction also positively affected e-learning continuance intention. Therefore, the hypothesis of $H_{1.1}$ was established:

$H_{1.1}$: Course flexibility can positively affect learners' e-learning continuance intention.

Course quality could enhance learners' e-learning intention and performance (Wang, Wang, & Shee, 2007; Wu, Kao, & Shih, 2010). Li et al. (2012) confirmed that course quality positively affected reuse intention toward e-learning. Ramyah et al. (2010) proved that information quality positively affected e-learning intention. A study done by Wang and Chiu (2011) revealed that information quality of an e-learning system positively affected user satisfaction, and user satisfaction also positively affected e-learning continuance intention. Therefore, the hypothesis of $H_{1.2}$ was established:

$H_{1.2}$: Course quality can positively affect learners' e-learning continuance intention.

System quality (e.g., reaction time, ease of use, user needs, accessibility, and reliability) could affect user satisfaction and intention to use information system (DeLone & McLean, 2003). Some studies showed that system quality influenced e-learning intention (Chang & Tung, 2008; Ramayah et al., 2010; Wu & Wang, 2006). Therefore, the hypothesis of $H_{1.3}$ was established:

$H_{1.3}$: System quality can positively affect learners' e-learning continuance intention.

Cho et al. (2009), Elsayed (2005), and Liaw (2008) all stated that online interaction affected e-learning performance. A study by Bharati and Chandhury (2004) showed that online interaction mechanisms positively affected online user satisfaction, while a study done by Wang and Chiu (2011) revealed that online communication quality positively affected user satisfaction and e-learning continuance intention. Li et al. (2012) confirmed that system interaction positively affected intention to reuse e-learning through usefulness and ease of use. Therefore, the hypothesis of $H_{1.4}$ was established:

$H_{1.4}$: Online interaction can positively affect learners' e-learning continuance intention.

Innovation Adoption Theory

An innovation adoption factor is a reason that users utilize to determine whether or not to adopt innovations and is a basis for the spread of innovations among users. The innovation adoption factors proposed by Rogers (2003) included relative advantage, compatibility, complexity, trialability, and observability. These innovation adaptation factors influenced users' intention to adopt innovations (Rogers, 2003). Although the TAM has been broadly used in the field of e-learning in recent years, perceived ease of use and perceived usefulness in the TAM can be replaced by complexity and relative advantage (Liao & Lu, 2008; Moore & Benbasat, 1991).

Relative advantage means that a user gains more advantages when he or she adopts innovations. The rate of adoption will be higher when a user believes that an innovation possesses many relative advantages. On the other hand, compatibility refers to the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential

users. The rate of adoption will be higher when the compatibility of an innovation is higher. Furthermore, complexity is the degree of difficulty of learning and using an innovation that a consumer believes. The rate of adoption will be lower when it is too complicated for users to learn and use. Trialability means the degree to which an innovation may be experienced. Normally, the rate of adoption will be higher when the degree of trialability of an innovation is higher. Observability is the advantages of an innovation are visible to users. An innovation that can be observed easily is more likely to be adopted.

Since the e-learning website adopted in the present study provides free services without trial, trialability is not applicable. Moreover, observability is not included in the present study because e-learning is popular (it is not a new thing) and its advantages are known by everyone. Therefore, relative advantage, compatibility, and complexity are the only three factors to be examined in the present study.

Compatibility refers to the degree to which an innovation is perceived as being consistent with personal expectations, which is an influencing factor of intention to adopt an innovation (Craig, France & Christie, 2004). Compatibility positively affected user attitude, and attitude affected intention to adopt (Cheung & Vogel, 2013). Some studies revealed that relative advantages and compatibility positively affected intention to adopt (Chen, 2011; Duan et al., 2010; Lee et al., 2011; Liao, & Lu, 2008; Zhang et al., 2010), whereas complexity negatively affected intention to adopt (Lee et al., 2011; Liao & Lu, 2008; Van Slyke et al., 2004; Zhang et al., 2010).

A study done by Sawang et al. (2013) showed that complexity negatively affected satisfaction and e-learning intention. A study by Van Slyke et al. (2004) indicated that compatibility mostly affected intention to adopt, followed by complexity and relative advantages. Therefore, the following hypotheses were established:

$H_{2.1}$: Relative advantage can positively affect e-learning continuance intention.

$H_{2.2}$: Complexity can negatively affect e-learning continuance intention.

$H_{2.3}$: Compatibility can positively affect e-learning continuance intention.

Self-Efficacy

Self-efficacy refers to a belief and confidence that a person perceives that he has ability to complete certain tasks (Bandura, 2005). Learners' ability to learn by their own pace is a key point for successful e-learning, so self-efficacy is very important to e-learning. Self-efficacy can affect learning satisfaction and learning performance (Peng, Tsai, & Wu, 2006; Sawang et al., 2013). Some research models affecting e-learning intention include self-efficacy factor (Alenezi, Abdul Karim, & Veloo, 2010; Cheung & Vogel, 2013; Dae-sik & Jeong-kyoum, 2013; Park, 2009; Roca et

al., 2006; Li et al., 2012; Liaw, 2008; Zhang, Fang, Wei, & Wang, 2012). Hence, self-efficacy was added into above-mentioned innovation adaptation.

Some studies confirmed that self-efficacy positively affected e-learning intention (Alenezi, Abdul Karim, & Veloo, 2010; Cheung & Vogel, 2013; Chiu & Wang, 2008; Dae-sik & Jeong-kyoum, 2013; Liaw, 2008; Park, 2009; Zhang et al., 2012). Li et al. (2012) proved that self-efficacy positively affected intention to reuse e-learning. Sawang et al. (2013) revealed that self-efficacy could positively affect e-learning satisfaction and intention. Thus, learners with high self-efficacy are more confident of completing e-learning and are more likely to use e-learning continuously. Therefore, self-efficacy can directly affect e-learning continuance intention, and the hypothesis of $H_{2.4}$ was established:

$H_{2.4}$: Self-efficacy can positively affect e-learning continuance intention.

Degrees of E-Learning Participation

Dae-sik and Jeong-kyoum (2013) pointed out that degree of e-learning participation positively affected learners' intentions to reuse e-learning. Žvanut et al. (2011) categorized learners into two groups with different online participation purposes, which were mandatory group and optional group and explored the influencing factors of e-learning intention between the two groups. The results showed that the influencing factors of e-learning intention between the two groups were different, and online participation purposes moderately affected e-learning intention. A study result found by Lin (2011) revealed that e-learning experiences moderated the relationships between e-learning intention and its influencing factors, and the degrees that satisfaction affected e-learning continuance intention could be varied by learners' e-learning experiences. A study done by Liao and Lu (2008) demonstrated that the influencing factors of e-learning continuance intention were different among students with different e-learning experiences. Degree of participation in the online community could affect interactive relationship among members (Koh & Kim, 2004), and interactive relationship could probably affect e-learning continuance intention. Based on these study results, influencing factors of e-learning continuance intention could vary depending on different degrees of participation in e-learning. The hypothesis of $H_{3.1}$ and $H_{3.1}$were established:

$H_{3.1}$: The effects of the influencing factors in the construct of curriculum and system on e-learning continuance intention can be different according to a learners' different degrees of participation (degree of participation possesses moderating effect).

$H_{3.2}$: The effects of the influencing factors in the construct of innovation adaptation on e-learning continuance intention can be different according to learners' different degrees of participation (degree of participation possesses moderating effect).

Research Method

Participants

Participants were learners from an adult professional development website. The website provides near thousands of e-learning curricula related to occupations such as human resources, finance, economics, accounting, computer, and management. In addition to curricula, online speeches, e-books, and online communities are also provided. There are over ten thousands of learners enrolled on the website. The e-learning website is one of the websites that provide a learning service to people who work in enterprises.

Sampling and Implementation

Stratified sampling was performed in the present study. High- and low-participation groups were randomly selected from 15% of the top 33% of the degree of participation for e-learning and 15% of the last 33% of the degree of participation for e-learning. There were 273 people in the high-participation group and 397 people in the low-participation group. Among the 670 participants, 314 were males (47%), and 356 were females (53%). Gay and Airasian (2000) believed that a sample should be at least 10% of whole population, and a sample should be at least 20% of the whole population when the number of the population is small (e.g., less than 500 people). Therefore, the numbers of the two groups in the present study met the requirement mentioned above.

The questionnaire was embedded into the main page of the website. The selected learners were required to complete the questionnaire within a deadline. After they completed the questionnaire, it would not show up again when learners logged in the website next time.

Research Framework

The framework of the present study was developed according to ISSM, IAT, and features of e-learning, as shown in Figure 1. Structural equation model (SEM) was employed to confirm the framework of the present study.

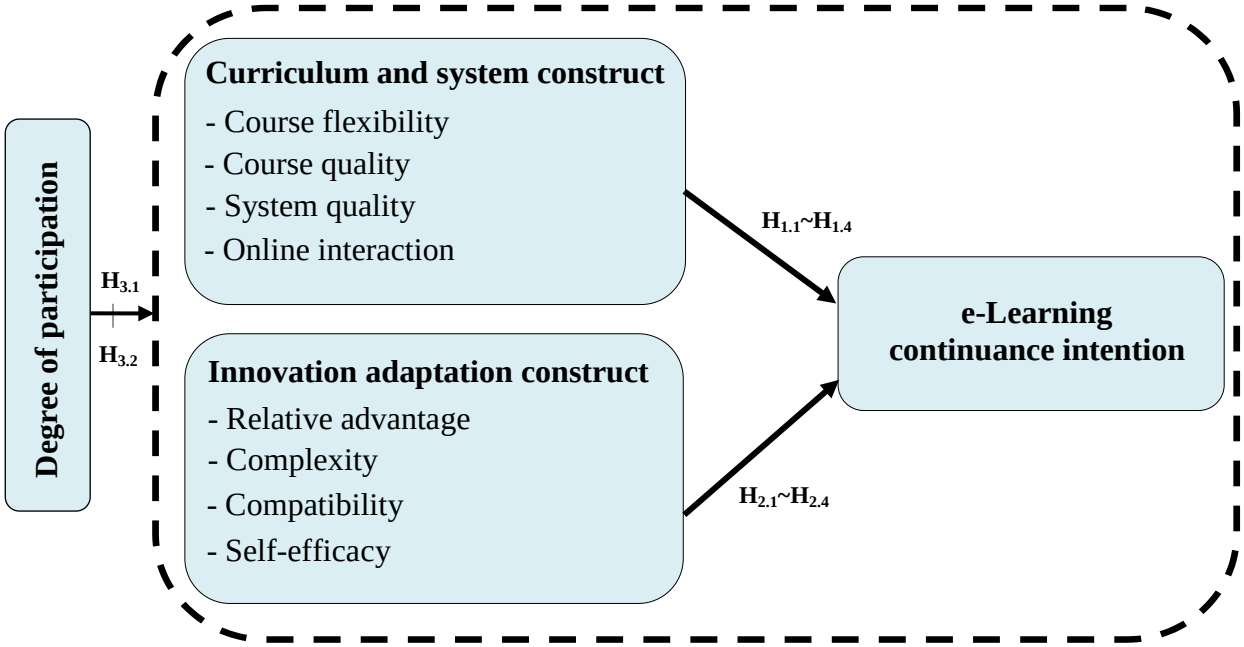

Figure 1. Research framework

Questionnaire

The first part of the questionnaire is participants' basic information including gender, age, educational level, and e-learning experiences. The second part is a scale for research variables (33 items). Each item was scored based on a 7-point Likert scale ranging from, *extremely agree* to *extremely disagree.* The operational definition of each latent variable (i.e. factor) and references of the scales are listed as the following:

1. Course flexibility (CF) (4 items): Efficiency and convenience of the course based on learning, working, and time (Sun et al., 2008).

2. Course quality (CQ) (3 items): Difficulty of the course and whether or not it meets users' needs (Liu et al., 2010).

3. System quality (SQ) (5 items): The e-learning system is easy to understand and operate, fast in response, and good on interaction mechanisms (Chen, 2010).

4. Online interaction (OI) (3 items): Levels of interactions with peers and teachers in e-learning (Sun et al., 2008).

5. Relative advantage (RA) (4 items): Effectiveness for e-learning is better than effectiveness for traditional learning (Liao & Lu, 2008).

6. Complexity (CP) (4 items): Difficulty of operation in the e-learning system (Liao & Lu, 2008).

7. Compatibility (CT) (3 items): The degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters (Liao & Lu, 2008).

8. Self-efficacy (SE) (4 items): Learners' belief and confidence in their ability for completing e-learning (Pituch & Lee, 2006).

9. Continuance intention (CU) (3 items): Learners' willingness to continuously use e-learning systems in the future (Liao & Lu, 2008).

10. Degree of participation: It was measured by behavior performance that learners participated in e-learning activities, as shown in Appendix 1. Each behavior was assigned a weighted score depend on its importance and impact. If the impact was negative, then a negative score was assigned. The scoring mechanism has been reviewed and used by the adult professional development website for several years.

Result

Reliability and Validity

Visual PLS 1.04 was performed for analysis of reliability and validity. Partial Least Squares (PLS) in SEM was conducted to examine models with different degrees of participation in the present study. Each factor in the questionnaire showed that Cronbach's α was higher than .8, indicating a good internal consistency among items in each factor. If an item in a factor was deleted and the Cronbach's α of the factor reduced, then the item should be remained. Finally, no items were deleted. The factor loading for each item (i.e. measuring variable) was greater than .6, meaning an adequate individual reliability for each item.

Confirmatory Factor Analysis (CFA) was performed in the present study to confirm validity of the questionnaire. The result of the CFA showed that composite reliabilities (CR) for all the factors were higher than .8, revealing a good internal consistency among the items in each factor. Average variance extracted (AVE) is used to measure the average explanatory power of each measuring variable (item) in a latent variable (factor). A high AVE means that a latent variable has a high convergent validity. The results revealed that AVE for each factor was higher than .7, which meant that each latent variable (item) had a good convergent validity (Barroso, Carrión, & Roldán, 2010).

Discriminant validity is the discrimination among measuring variables (items) in different constructs (i.e. factors), which was the square root of AVE (SRAVE) of each construct. Correlation coefficients appeared as a diagonal line in a correlation matrix among constructs were SRAVE of a factor. The result showed that correlation coefficients between any two constructs were smaller than SRAVE of measuring variables in a construct, implying that the measuring variables in each construct were different from one another (Barroso et al., 2010). Therefore, the questionnaire possessed adequate discriminant validity.

Test of Hypotheses

Bootstrap with extraction in Partial Least Squares (PLS) of SEM was conducted to examine causal relationships among variables. As shown in Table 1, in the construct of curriculum and system, only course flexibility positively affected learners' e-learning continuance intention. In the construct of innovation adaptation, compatibility and self-efficacy positively affected learners' e-learning continuance intention. Among the factors affecting e-learning continuance intention, compatibility was the most important factor followed by self-efficacy and course flexibility.

Table 1

Factors Affecting E-Learning Continuance Intention

Independent variables	β	t	adj. R^2
Course flexibility	.086**	2.198	
Course quality	.141	1.332	
System quality	.102	1.079	
Online interaction	.073	1.893	
			.395
Relative advantage	.004	.097	
Complexity	-.055	-1.102	
Compatibility	.516**	7.604	
Self-efficacy	.296**	7.869	

Note: ** $p < .01$

The model of factors affecting learners' e-learning continuance intention is shown in Figure 2. Hypotheses $H_{1.1}$, $H_{2.3}$, and $H_{2.4}$were supported. The model demonstrates an adequate goodness of fit by a middle *R* value.

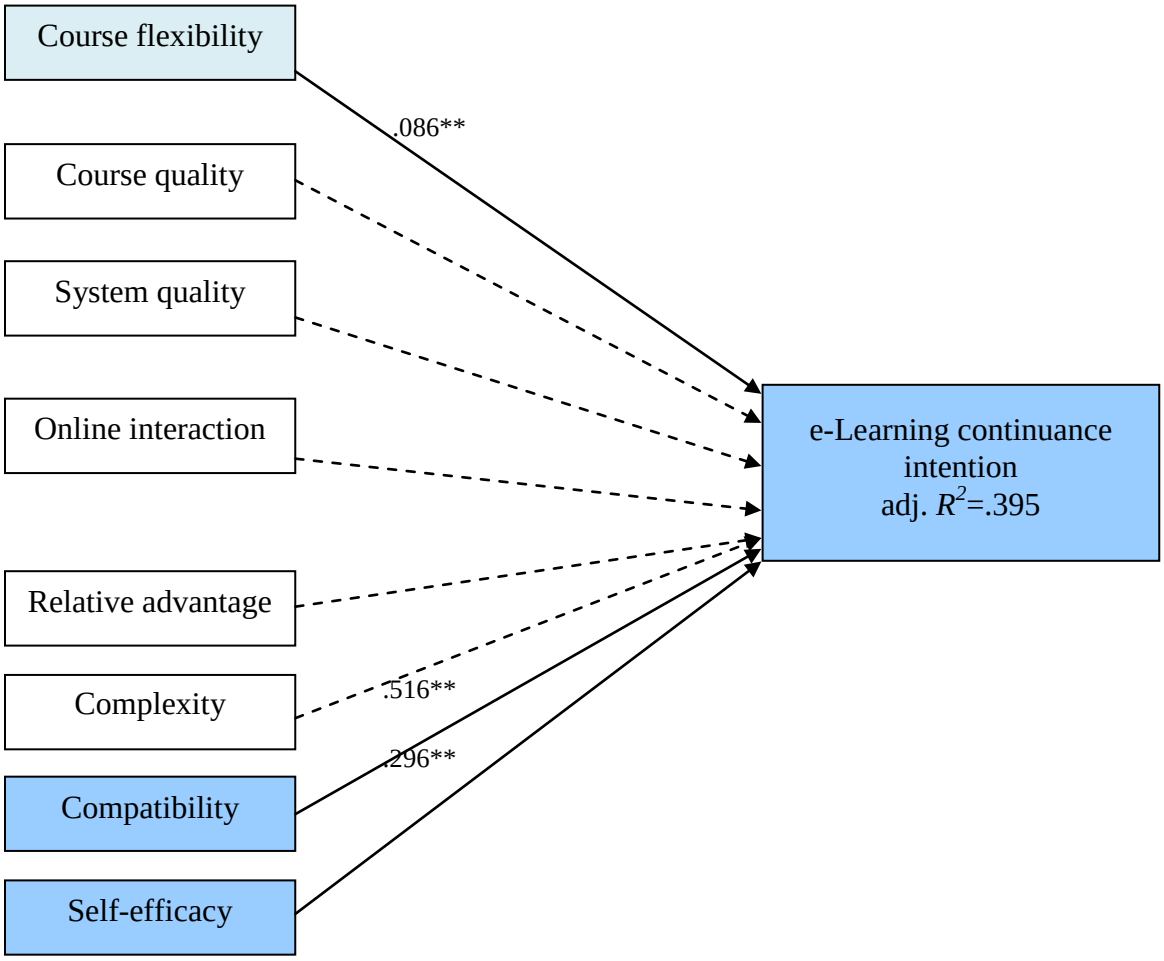

Figure 2. Model of factors affecting learners' e-learning continuance intention

Note: Solid lines represent significant results, whereas dotted lines represent insignificant results; **p < .01

For the low-degree-of-participation group, as shown in Table 2, course flexibility and system quality in the construct of curriculum and system, as well as relative advantage, compatibility and self-efficacy in the construct of innovation adaptation all positively affected learners' e-learning

continuance intention. Relative advantage was the most important factor followed by self-efficacy, compatibility, course flexibility, and system quality.

Table 2

Factors Affecting E-Learning Continuance Intention for the Low-Degree-Of-Participation Group

Independent Variables	*B*	*t*	adj. R^2
Course flexibility	.123**	2.605	
Course quality	.064	1.422	
System quality	.113*	2.050	
Online interaction	-.042	-1.510	
			.756
Relative advantage	.335**	5.465	
Complexity	.064	1.178	
Compatibility	.232**	3.717	
Self-efficacy	.271**	4.334	

Note: * $p < .05$, ** $p < .01$

The model of factors affecting learners' e-learning continuance intention for the low-degree-of-participation group is shown in Figure 3. The model demonstrates an adequate goodness of fit by a high *R* value.

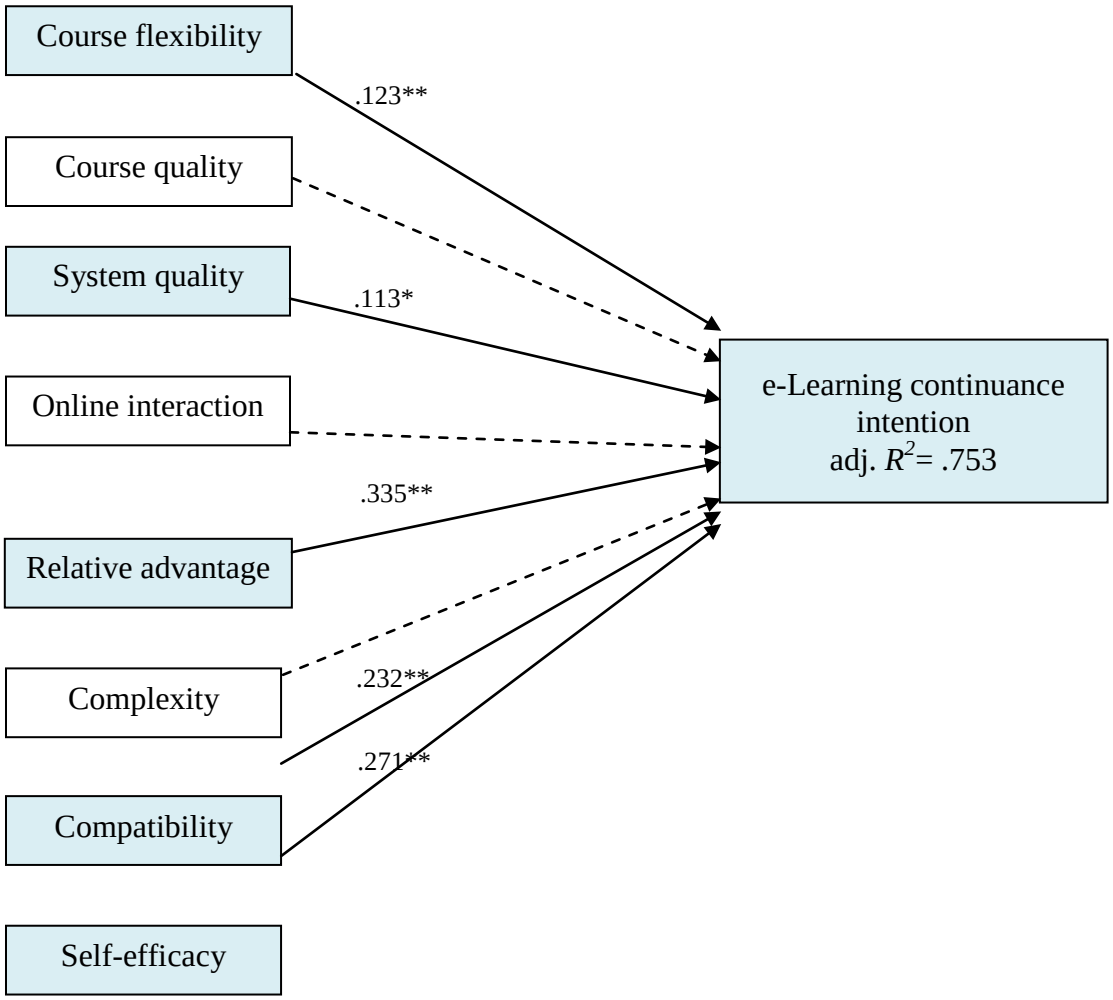

Figure 3. Model of factors affecting learners' e-learning continuance intention for the low-degree-of-participation group.

Note: Solid lines represent significant results, whereas dotted lines represent insignificant results; * p < .05, ** p < .01

For the high-degree-of-participation group, as shown in Table 3, course flexibility in the construct of curriculum and system, as well as relative advantage and self-efficacy in the construct of innovation adaptation positively affected learners' e-learning continuance intention. Online interaction negatively affected learners' e-learning continuance intention. Self-efficacy was the most important factor followed by course flexibility and relative advantage.

Table 3

Factors Affecting E-Learning Continuance Intention for The High-Degree-Of-Participation Group

Independent variables	β	t	adj. R^2
Course flexibility	.220**	3.387	
Course quality	.010	.217	
System quality	.029	.522	
Online interaction	-.091*	-2.209	
			.723
Relative advantage	.211**	2.932	
Complexity	.059	.848	
Compatibility	.110	1.363	
Self-efficacy	.434**	4.634	

Note: * $p < .05$, ** $p < .01$

The model of factors affecting learners' e-learning continuance intention for the high-degree-of-participation group is shown in Figure 4. The model demonstrates an adequate goodness of fit by a high *R* value.

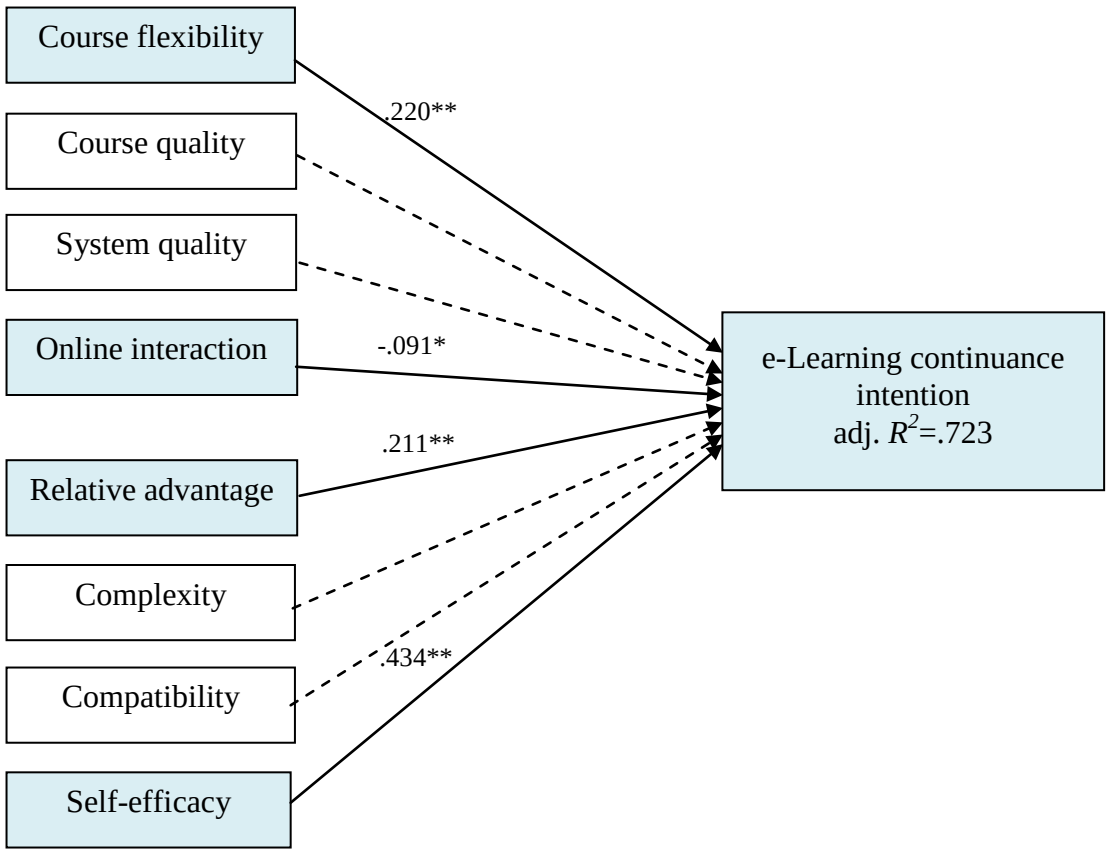

Figure 4. Model of factors affecting learners' e-learning continuance intention for the high-degree-of-participation group.

Note: Solid lines represent significant results, whereas dotted lines represent insignificant results; * $p < .05$, ** $p < .01$

The hypotheses, $H_{1.1}$、$H_{2.1}$、$H_{2.4}$, were supported when learners were categorized into different groups, as shown in Table 4 for the test of hypotheses about factors affecting e-learning continuance intention.

Table 4

Test of Hypotheses about Factors Affecting E-Learning Continuance Intention for Learners in the Different Groups

Hypotheses	Test	
	Low degree of participation	High degree of participation
$H_{1.1}$: Course flexibility positively affects learners' e-learning continuance intention.	Supported	Supported
$H_{1.2}$: Course quality positively affects learners' e-learning continuance intention.	Unsupported	Unsupported
$H_{1.3}$: System quality positively affects learners' e-learning continuance intention.	Supported	Unsupported
$H_{1.4}$: Online interaction positively affects learners' e-learning continuance intention.	Unsupported [1]	Unsupported
$H_{2.1}$: Relative advantage positively affects e-learning continuance intention.	Supported	Supported
$H_{2.2}$: Complexity negatively affects e-learning continuance intention.	Unsupported	Unsupported
$H_{2.3}$: Compatibility positively affects e-learning continuance intention.	Supported	Unsupported
$H_{2.4}$: Self-efficacy positively affects e-learning continuance intention.	Supported	Supported

Note: Online interaction can negatively affect e-learning continuance intention.

The influencing factors of e-learning continuance intention for the high- degree-of-participation group, low-degree-of-participation group, and the overall participants are summarized in Table 5. Degree of e-learning participation had a moderating effect on the influences of online interaction, relative advantage and compatibility in e-learning continuance intention.

Table 5

Factors Affecting E-Learning Continued Intention

Constructs	Variables	Low degree of participation	High degree of participation	Overall
Curriculum and system	Course flexibility	Positive effect (.123**)	Positive effect (.220**)	Positive effect (.086*)
	Course quality	NA	NA	NA
	System quality	**Positive effect (.113*)**	NA	NA
	Online interaction	**NA**	**Negative effect (-.091*)**	NA
Innovation adaptation	Relative advantage	Positive effect (.335**)	Positive effect (.211**)	NA
	Complexity	NA	NA	NA
	Compatibility	**Positive effect (.232**)**	**NA**	Positive effect (.516**)
	Self-efficacy	Positive effect (.271**)	Positive effect (.434**)	Positive effect (.296**)

Note: * $p < .05$, ** $p < .01$

Discussion

Course Flexibility As Well As Compatibility and Self-Efficacy Positively Affected Adults' E-Learning Continuance Intention

The study results showed that course flexibility in the construct of curriculum and system, as well as compatibility and self-efficacy in the construct of innovation adaptation, positively affected adults' e-learning continuance intention. Among these three factors, compatibility had the highest effect followed by self-efficacy and course flexibility. For the low-degree-of-participation group, the five factors affecting adults' e-learning continuance intention included course flexibility,

system quality, relative advantage, compatibility, and self-efficacy. Among these factors, relative advantage had the greatest effect, followed by self-efficacy, compatibility, course flexibility, and system quality. On the other hand, for the high-degree-of-participation group, the four factors affecting users' e-learning continuance intention included course flexibility, online interaction, relative advantage, and self-efficacy. Among these factors, self-efficacy had the greatest effect, followed by course flexibility, relative advantage, and online interaction. Moreover, online interaction had a negative effect.

According to the results of the present study, course flexibility and self-efficacy could positively affect e-learning continuance intention for both high- and low-degree-of-participation groups. Thus, these two factors were the main factors that affected adults' e-learning continuance intention, as the confirmation of a study done by Arbaugh and Duray (2002) that course flexibility was a key factor facilitating learners to use e-learning. Adults were able to learn on their own, so self-efficacy was a key factor that affected e-learning, as confirmed by some studies that self-efficacy positively affected e-learning intention (Alenezi, Abdul Karim, & Veloo, 2010; Cheung & Vogel, 2013; Chiu & Wang, 2008; Dae-sik & Jeong-kyoum, 2013; Li et al., 2012; Liaw, 2008; Park, 2009; Sawang et al., 2013; Zhang et al., 2012). Since the affecting degree of compatibility was higher than course flexibility and self-efficacy, compatibility was the key factor that affected adults' e-learning continuance intention. When e-learning was consistent with learners' learning styles and compatibility of experiences, learners would have higher e-learning continuance intention. This result was consistent with some studies that compatibility positively affected e-learning intention (Chen, 2011; Duan et al., 2010; Lee et al., 2011; Liao, & Lu, 2008; Zhang et al., 2010).

Effects of Factors in the Construct of Curriculum and System on E-Learning Continuance Intention Could Be Varied With Different Degrees of Participation. Among These Factors, System Quality and Online Interaction Were Varied in Both Groups

In the study done by Žvanut et al. (2011), factors affecting e-learning intention could be different depending on different degrees of e-learning participation, so degree of e-learning participation had a moderating effect on the influences of system quality and online interaction in e-learning intention. Course flexibility and system quality in the construct of curriculum and system could positively affect e-learning continuance intention for the low-degree-of-participation group. The effect of course flexibility was greater than the effect of system quality. Course flexibility could positively affect e-learning continuance intention for both high- and low-degree-of-participation groups, and the effect on e-learning continuance intention for the high-degree-of-participation group was greater than the effect on e-learning continuance intention for the low-degree-of-participation group. Furthermore, online interaction could negatively affect e-learning continuance intention for the high-degree-of-participation group.

Course flexibility of e-learning helps learners overcome limitations of time and space, which is the main factor for most learners to use e-learning. Regardless of degrees of participation, course flexibility played a positive role for e-learning continuance intention, which showed the core value of e-learning. This result was consistent with the outcome found by Argaugh and Duray (2002) that course flexibility was a significant factor that facilitated learners' satisfaction for continuance use of e-learning.

System quality could positively affect e-learning continuance intention for the low-degree-of-participation group, but not for the high-degree-of-participation group. The services provided by an e-learning website can be categorized into two aspects: content and technology. Even if the two aspects are interdependent, the main delivery method for e-learning is that contents are displayed by technology. Consequently, technologies are not only a key for establishing the overall learning environment, but also an appearance role for users to establish their first impression. Therefore, system quality was a determinant for the low-degree-of-participation group' e-learning continuance intention. System quality is the first line for human-machine interfaces, including experiences on ease of use, visual designs and interactive functions. It could effectively and directly affect users' learning feelings and enhance contents of e-learning. As confirmed by some studies (Chang & Tung, 2008; Ramayah et al., 2010; Wu & Wang, 2006), system quality affects e-learning intention. Hence, for running an e-learning website, system quality must be emphasized in order to effectively deliver course content, build a good learning atmosphere, and enhance learning value.

Online interaction included communications and discussions among users and instructors. It was found that online interaction could negatively affect e-learning continuance intention for the high-degree-of-participation group, but not for the low-degree-of-participation group. There are many differences between e-learning and traditional learning, so creating an adequate interaction for e-learning like in traditional classroom is a crucial goal for development of e-learning. Bharati and Chandury (2004) proved that instant services and user interactive mechanisms in a website were the most important factors affecting user satisfaction. However, the high-degree-of-participation group with features of active and clear motivations belonged to active audience proposed by the communication theory, so the needs of online interaction could be different when using goals were different. For users who want to learn independently, too many online interactions probably lead to a negative effect because interactions for online courses are virtual rather than face-to-face interactions.

Effects of the Factors in the Construct of Innovation Adaptation on E-Learning Continuance Intention Can Be Varied With Different Degrees of Participation. Among These Factors, Compatibility Was Varied in Both Groups.

Žvanut et al. (2011) found that factors affecting e-learning intention could be different depending on different degrees of e-learning participation, so the degree of e-learning participation had a moderating effect on the influence of compatibility in e-learning intention. Among the factors in the construct of innovation adaptation, relative advantage had the greatest positive effect on e-learning continuance intention for the low-degree-of-participation group, followed by self-efficacy and compatibility. For the high-degree-of-participation group, self-efficacy had the greatest positive effect on e-learning continuance intention, followed by relative advantage. With the comparison of the two groups, relative advantage and self-efficacy respectively played an important role for the low- and high-degree-of-participation groups. Compatibility affected e-learning continuance intention for the low-degree-of-participation group, but not for the high-degree-of-participation group. Therefore, this was the main difference between the two groups.

Relative advantage is users' cognition about learning effectiveness and efficiency. When e-learning is helpful to the enhancement of effectiveness, e-learning continuance intention will be higher. The result in the present study revealed that relative advantage positively affected e-learning intention, which was consistent with some study results (Chen, 2011; Duan et al., 2010; Lee et al., 2011; Liao, & Lu, 2008; Zhang et al., 2010). The result showed that relative advantage affected the low-degree-of-participation group more significantly than the high-degree-of-participation group. For the low-degree-of-participation group, relative advantage was very important because it was a factor that could facilitate e-learning continuance intention.

As also demonstrated in other study results (Alenezi, Abdul Karim, & Veloo, 2010; Cheung & Vogel, 2013; Chiu & Wang, 2008; Dae-sik & Jeong-kyoum, 2013; Li et al., 2012; Liaw, 2008; Park, 2009; Sawang et al., 2013; Zhang et al., 2012), the results in the present study showed that regardless of degree of participation, self-efficacy positively affected e-learning intention, especially for the high-degree-of-participation group. Self-efficacy is a belief that learners perceived whether or not the e-learning system is easy to use and whether or not they can complete the e-learning. Consequently, with a complex multimedia environment, convenience should be taken into consideration, and each function on the website should be easy to use, so that an appropriate learning environment can be established.

Since the members of low-degree-of-participation group were mostly novices in using e-learning website, compatibility became one of the factors that influenced their e-learning continuance intention. Some study results also confirmed that compatibility positively affected intention (Chen, 2011; Duan et al., 2010; Lee et al., 2011; Liao, & Lu, 2008; Zhang et al., 2010). Van Slyke et

al. (2004) found that compatibility had the greatest effect on intention, but it was found in the present study that compatibility did not significantly affect intention for the high-degree-of-participation group. The reason was that the high-degree-of-participation group was experienced in using e-learning website, so the compatibility would no longer be a problem. For running an e-learning website, after creating net flow and enhancing reach rate, having an idea about how to keep net flow for e-learning continuance intention and facilitate users' loyalty is important. At this point, compatibility is a key for keeping learners, which should be designed and implemented appropriately.

Based on the above-mentioned results, the degree of e-learning participation had a moderating effect on the influences of system quality, online interaction and compatibility in e-learning intention. In other words, effects of system quality, online interaction, and compatibility on e-learning intention depended on the degree of e-learning participation. This can be a reference for e-learning practitioners to design e-learning system and curriculum.

Conclusion and Future Work

The construct of curriculum and system, the construct of innovation adaptation, and the degree of participation were the bases for the research model examining the influencing factors of e-learning continuance intention in the present study. Based on various research variables, other constructs or factors are suggested for inclusion in the future studies in order to make a more complete examination on the research model. For the examination of the moderating effects of degree of e-learning participation, influencing factors in the two groups were compared in the present research model. That is also the contribution of the present study that the previous studies did not possess. These contributions are also made to online adult learning and online education because e-learning participation, continuance intention, and influencing factors may be the references to the implementation and evaluation of online adult learning. The attempt to identify the factors can promote continued intentions of using e-learning irrespective of low or high degree of adult online participation. Professional educators are interested in those factors which positively influence learners' intentions to complete their study programs and how these might be impacted by participation rates.

In the future, research can set the degree of participation as an influencing factor and use statistical methods to examine its moderating or mediating effects directly. Furthermore, other potential variables that possess moderating effects can also be examined. There are many other factors, for example, socio-economic, motivational, personal, and psychological variables that could also be influencing factors of continued intentions to use e-learning and further discussed in the future. For running an e-learning website, rich learning contents can create net flow and attract more learners. After enhancing learners' intention, learners' continuance intention can be

enhanced by adding values to contents and services in order to facilitate the continuous development of the e-learning website.

The ISSM and IAT were adopted as the theory bases for the research model in the present study. Other theories, such as Unified Theory of Acceptance and Use of Technology (UTAUT) and extended UTAUT, could also be used as the basis for an e-learning research model. The direct influencing factors of e-learning continuance intention were examined in the present study. There were some studies including intermediate variables for examining e-learning continuance intention, such as usage attitudes and satisfaction (Chang, 2013; DeLone & McLean, 2003; Park, 2009; Lee, 2010; Roca et al., 2006), in order to enrich the research model and explore the roles of usage attitudes and satisfaction in the relationships between e-learning continuance intention and its influencing factors.

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Appendix 1

Scale of degree of e-learning participation

Learning behavior		Score
Login	Becoming a member	+5
	Does not login in recent three months	-10
Recommendation	Recommending other people to join	+2
Class taking	Taking one course	+2
	Taking another new course	+3
	Completing one course	+8

Speech class taking	Taking a speech class	+8
	Providing an evaluation after taking a speech class	+1
Listening to e-book / talking book	Listening to e-book	+5
	Listening to talking book	+5
Community participation	Posting an article or question	+2
	Responding to an article or question	+3
	Posting an article or question that is deleted by the host	-2
	Responding to an article or question that is deleted by the host	-3
	Posting an article or question that is reported by other members	-2
	Responding to an article or question that is reported by other members	-3

Note: The table was discussed and established by experts with references of evaluation criteria on e-learning behavior.