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An Integrative Model To Predict The Continuance Use Of Electronic Learning Systems: Hints For Teaching

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Abstract

There is an increased expectation about the useful ness of electronic learning (e-learning) to complement or substitute traditional face-to-face learning. However, the growth rate of the e-learning market has not properly reflected the high expectation. Researchers began to direct their attention to the assessment of e-learning effectiveness in order to solve the issue. However, little has been known about why some users stop adopting e-learning after their initial experience. Our work focuses on investigating the continuance usage problems in the field of information technology. A theoretical framework is proposed to address the continuance issue. This integrative framework makes three major contributions. First, it integrates the frameworks of computer self-efficacy (CSE) and the expectation-confirmation model (ECM). Second, it theorizes the causal relationship between the factors of perceived usefulness, confirmation, satisfaction , and information system (IS) continuance in the e-learning context. Finally, it explains users ' online learning behaviors through a field survey. The results indicate that, in the context of learning conceptual k nowledge in undergraduate education, there are significant relationships among the CSE of online learners, their perceived usefulness, confirmation, and satisfaction levels.

INTRODUCTION

Massachusetts Institute of Technology's (MIT) attempt to offer virtually all of its courses online by September 2007 has alerted many higher educational institutes to the strategic importance of e-learning programs. A search on the U.S. News database identified 265 online degree programs as of February 11, 2003. International Data Corporate estimated that the world corporate c-learning market was $6.6 bill ion in 2002 and will grow to nearly $24 billion by 2006, at a compound annual rate of 35.6%. Obviously, online learning is blooming.

While traditional institutions of higher education were considered late to adopt e-learning, they introduced c-learning systems in several ways (e.g., www.blackboard.com, www.wcbct.com, and www.GlobalMinds.com): redesigning course curriculums (e.g., University of Michigan, Flint and portions of state universities systems in the U.S.); recruiting new faculty with interests and experience conducting e-learning programs (American Capital University and University of West Georgia); and establishing pure c-universities (Universitas 21 Global in Singapore and University of Phoenix). While trying to adopt e-learning systems to meet the demands of online learners, educational administrators, researchers, and practitioners may doubt the ability of current online programs to attract new users and, most importantly, to retain users who participated in online programs.

As e-l earning gains attention, it is important to establish an appropriate framework for research to enhance the effectiveness of this new trend. This study establishes the relevance of applying the expectation/confirmation model (ECM) and computer self-efficiency (CSE) theories to e-learning in higher education. The attempt is a major departure from most of today's studies on e-learning which focus on developing e-learning approaches and mediums to improve the effectiveness of virtual learning environments (V LE). This study argues that online learners' computer self-efficacy and expectations may be more important prerequisites than the V LE itself to the continuous use of any e-learning system.

Research has demonstrated that CSE may also exert significant influence on individuals' emotional reactions to using computers, as well as their actual computer use (Compeau & Higgins, 1995). Hence, it is plausible that CSE may also affect the constructs of ECM. Research integrating CSE and ECM

for studying virtual learning environments might provide more insight into understanding the reuse of learning systems.

Information technology plays a very important role in an e-learning environment. Technology acceptance theories are fairly defined; however, the initial acceptance does not guarantee the success of the system implementation. The continuous use of information technology at the individual user level is central to the survival of many business-to-consumer electronic commerce firms, such as internet service providers (ISPs), online retailers, online bankers, online brokerages, online travel agencies, and the like. The importance of continuance, compared to acceptance, is evident because acquiring new customers may cost five times more than retaining existing ones, given the costs of searching for new customers, setting up new accounts, and initiating new customers to the IS. Understanding online learners' intent to continue using is the primary goal of this study.

We conducted a field survey of users who had used an online learning system for their MIS introductory courses. A path analysis was used to test the proposed model and identify the constructs of the model and their relationships. This integrative framework will be most useful to educational administrators or e-learning system providers by exploring ways to improve the retention rate of online users. The immediate findings of the field survey will provide evidence for researchers beginning to recognize the importance of computer efficacy and expectations, and their contributions to the re-adoption of e-learning systems.

In the next two sections, the integrative framework to predict the continued use of the e-learning system is proposed based on literature reviews of the ECM and CSE theories. The authors, then, test the integrative framework and hypothesize on the causal relationship among different constructs. The article concludes with an analysis and discussion of the results, explanation of the study limitations, implications for research and conclusions.

CONCEPTS FORMATION

Technology Acceptance Model

The Technology Acceptance Model (TAM) theory (Figure 1) is useful in explaining the usage behavior of information technology (IT) (Davis, Bagozzi & Warshaw, 1989). The theory was built upon Ajzen and Fishbein 's (1977) theory of reasoned action that asserts that beliefs could influence attitudes, which lead to intentions to use and finally actual usage behaviors. Understanding the causal relationship would be helpful in explaining IT (including e-learning systems) adoption behavior.

Davis, et al. (1989) asserted that perceived usefulness (PU) and perceived ease of use (PEOU) represent beliefs finally leading to actual use of IT.
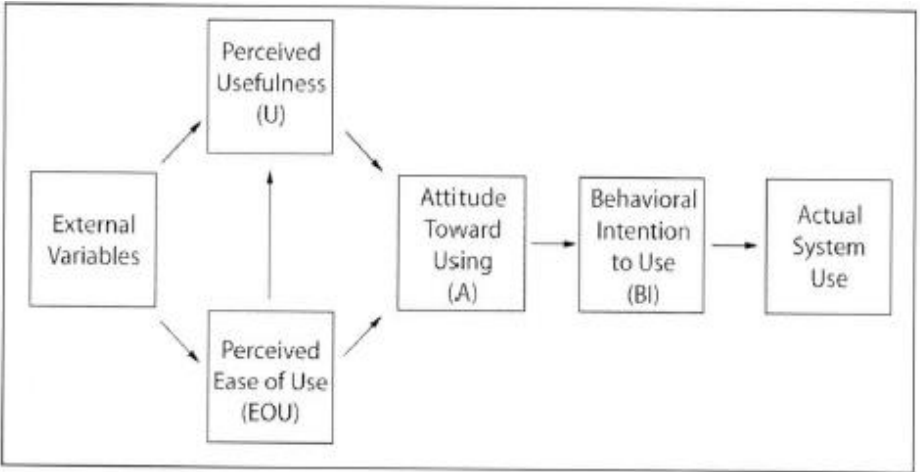
Figure 1. Technology Acceptance Model (TAM)

Perceived useful ness is the degree to which a person believes that a particular system will enhance his or her job performance (i.e., by reducing the time to accomplish a task or providing timely information). Perceived ease of use is the degree to which a person believes that using a particular system will be free of effort. Two other constructs in TAM are the attitude toward use and behavioral intention to use. The attitude toward use is the user's evaluation of the desirability of employing a particular information system's application. Behavioral intention to use is a measure of the likelihood a person will employ the application (Ajzcn and Fishbein, 1 977). Both attitude and behavioral intention are critical i n studying the use of information technology (Oliver, 1 980).

The Expectation-Confirmation Theory in Marketing

The Expectation-Confirmation Theory (ECT) (Figure 2) asserts that consumers' intention to repurchase a product or service is significantly influenced by their prior experience with that product or service (Anderson & Sullican, 1993; Oliver, 1980). Satisfactory experience is a key enabler for building and retaining long-term consumer relationships. ECT is widely used in customer behaviors literature to study consumer satisfaction (Ander- son & Sullican, 1993), post-purchase behavior (such as repurchase) (Dabol kar, Shepard and Thorpe, 2000), customer complaints (Oliver, 1980), and service marketing in general (Stum pf, Brief & Hartman, 1987 ; Yenkatesh & Davis, 1996). The predictive ability of this theory has been demonstrated over a wide range of product repurchase and service continuance contexts, including automobile repurchase (Schunk, 198 1), camcorder repurchase (Dabolkar, et al., 2000), restaurant services, and business professional services (Stumpf, ct al., 1987).
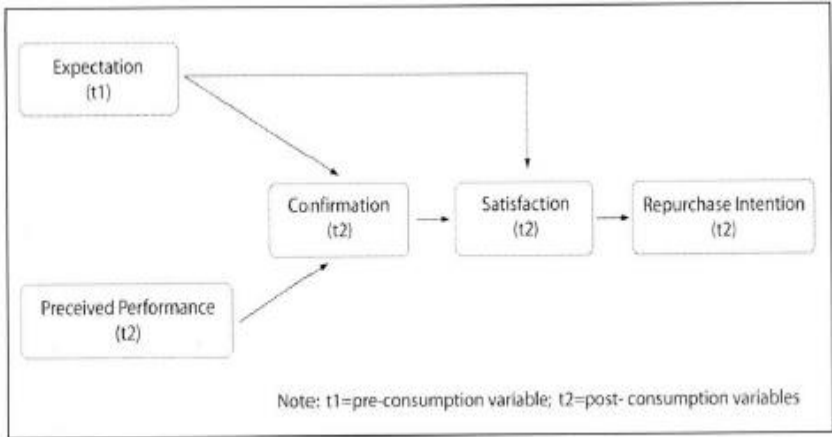
Figure 2. Expectation-Confirmation Theory (ECT)

Satisfaction was initially defined in the context of job performance as a pleasurable or positive emotional state resulting from the appraisal of one's job. Oliver (1993) applied the concept to the consumption context and defined it as the summary psychological state resulting when the emotion surrounding disconfirmation expectations is coupled with the consumer 's prior feelings about the consumption experience. Both definitions underscore a psychological or affective state related to and resulting from a cognitive appraisal of the expectation-performance discrepancy (confirmation). Lower expectation s and/or higher perceived performance lead to a greater confirmation, which results in positive influences on customer satisfaction and continuance intention. Reversing the relationship causes disconfirmation, dissatisfaction, and a discontinuance intention. Hence, confirmation is inversely related to expectation and directly related to perceived performance.

ECT also theorized expectation as another determinant of satisfaction because expectation provides a baseline or reference level with which customers evaluate products and services. Customers with a high baseline level of expectation for a product or service tend to have higher satisfaction levels after using it. On the contrary, customers with a low expectation for a product or service often have lower satisfaction levels after using it.

The Expectation-Confirmation Model in Information System Adoption

Bhattacherjee (200 I) suggests that the I S users' continuance decision is similar to consumers' repurchase decision because both decisions: (I) follow an initial (acceptance or purchase) decision ; (2) are influenced by the initial use (of IS or product) experience; and (3) can potentially lead to ex-post reversal of the initial decision . He also proposed an Expectation-Confirmation Model (ECM) (Figure 3) by integrating the ECT and TAM. The most
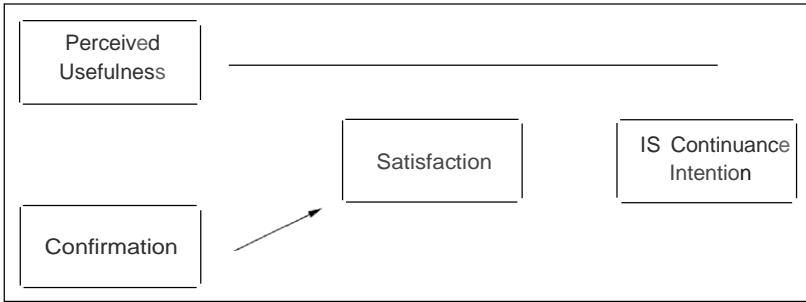
Figure 3. Expectation-Confirmation Model (ECM)

significant difference between ECM and other models is the use of pre-consumption and post-consumption factors.

The ECT holds that consumers' intention to repurchase a product or continue service use is determined primarily by satisfaction with prior use of that product or service (Anderson & Sullican, 1 993; Oliver, 1 980; Patterson , Johnson & Spreng, 1 997). However, Bhattacherjee (2001) extended ECT to a different context in three ways. First, while ECT examines both pre-consumption and post-consumption variables, the ECM focuses only on post-acccptance variables because the effects of any pre-acceptance variables are already captured with i n the confirmation and satisfaction constructs. Second, ECT only examines the effect of pre-consumption expectation, not post-consumption expectation. The ECM amends ECT to include ex-post expectation . Third, (ex-post) expectation is represented in the proposed model by (ex-post) perceived usefulness, because perceived usefulness is a cognitive belief salient to IS use (Dav is et al., 1989). IS continuance context i s the only belief that consistently demonstrates influence on user intention across temporal stages of IS use (Karahanna, Straub & Chervany, 1999).

According to TAM-based studies, perceived usefulness is an adequate expectation i n the ls continuance model that often imposes monetary and n on-monetary costs on IS users. Hence, rational users most likely go through a non-trivial decision process, similar to that in ECT, prior to making an informed decision choice. However, in order to adapt ECT to a different context (i .e., IS continuance), several theoretical extension s are required. Such extensions provide unique opportunities for theory refinement. Potentially, they can explain is continuance decisions better than ECT alone.

Computer Self-Efficacy (CSE)

CSE was derived from self-efficacy. Self-efficacy, the bel ief that one has the capability to perform a particular behavior, is an important construct in

social psychology. It is defined as an estimation of one's ability to success-fully perform target behaviors to produce outcomes (Bandura, 1977). Self-efficiency perceptions have been found to influence decisions about how to behave (Betz & Hackett, 1981), the effort exerted and persistence in attempting behaviors (Barling & Beattie, 1983; Brown & Inouye, 1978), the emotional responses (including stress and anxiety) of the individual per- forming the behaviors (Spreng, MacKenzie & Olshavsky, 1996), and the actual performance attainments of the individual with respect to the behavior (Locke, 1976; Schunk, 1981; Wood & Bandura, 1989). Several more recent studies (Burkhardt & Brass, 1990; Hill, Smith & Mann, 1987; Webster & Martocchio, 1992) have examined self-efficacy with respect to using computers and a variety of computer behaviors. These studies found evidence of a relationship between self-efficacy and registration in computer courses at universities, and adoption of high technology products (Hill, Smith & Mann, 1987) and innovations (Burkhardt and Brass, 1990), as well as performance in software training (Gist & Mitchell, 1992; Webster & Martocchio, 1992). All of the studies argue for further research to fully explore the role of self-efficacy in consumer behavior.

Computer self-efficacy refers to a judgment of one's capability to use a computer. It is not concerned with one's past actions but rather with one's judgments of future actions. Moreover, it does not refer to simple component sub-skills, like formatting diskettes or entering formulas in a spread- sheet. Rather, it incorporates judgments of the ability to apply those skills to broader tasks (Compeau & Higgins, 1995).

THEORETICAL MODEL

The purpose of this research is to test and verify the constructs of ECM in a virtual learning environment. In addition, this research introduces a Computer Self-Efficacy (CSE) construct into ECM, and explores the relationship between CSE and other constructs of ECM. A theoretical frame- work that integrates CSE and ECM theories in the VLE based on eight hypotheses is presented in Figure 4.

Lower expectations and/or higher performance leads to greater confirmation, which in tum positively influences customer satisfaction and continuance intentions. The reverse causes disconfirmation, dissatisfaction, and discontinuance intentions (Bhattacherjee, 2001). Just as the cognitive beliefs in IS acceptance contexts (i.e., perceived ease of use and perceived usefulness) are related (Davis, Bagozzi & Warshaw, 1989), constructs in IS continuance contexts (i.e., confirmation and perceived usefulness) may also be related. For instance, users may have low initial usefulness perceptions because they are unsure what to expect from a new IS use. Nonetheless, they may still want to accept it intending to make their usage experience a basis for more concrete perceptions.
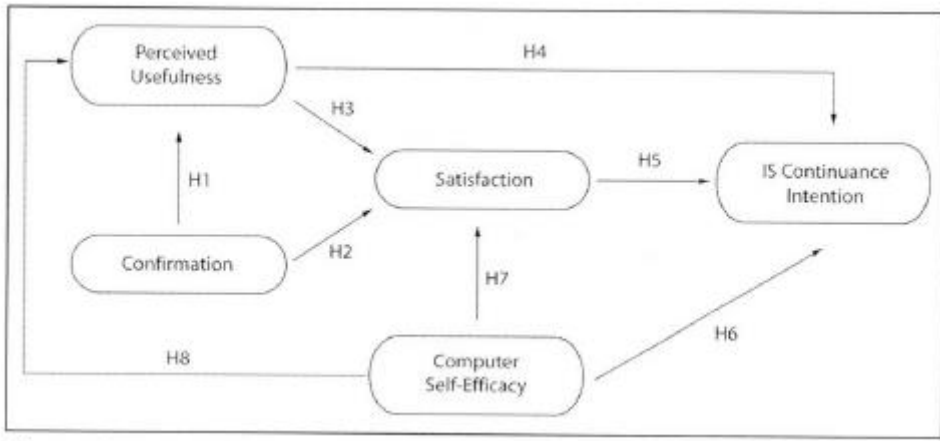
Figure 4. Research framework

Although low initial usefulness perceptions are easily confirmed, such perceptions may be adjusted higher as a result of the confirmation experience when users realize that their initial perception s arc unrealistically low. In other words, confirmations will tend to elevate users' perceived useful- ness; disconfirmation will reduce such perception s. E- learning is in its early adoption phase for many learners who are accustomed to learning with a live instructor. I n the VLE environment, on line learners' extent of confirmation with the e-learning system is positively associated with its perceived useful- ness to assist their learning. Therefore, this research hypothesizes:

H I Online users' extent of confirmation is positively associated with their perceived usefulness of an e-learning system in a VLE.

ECT posits that user satisfaction can be explained by two constructs: expectation of the IS and confirmation of the expectation following use. Expectation provides the baseline level against which confirmation i s assessed to determine users' evaluative response or satisfaction. Confirmation is positively related to satisfaction with IS use when the expected benefits of IS use are actually realized. On the other hand, users may have a d is- confirmation experience when actually using the system if the system does not live up to their original expectation. Confirming online users' experiences and satisfaction levels using an e-learning system allows us to assess the causal relationship between these two constructs. Thus, we hypothesize:

H2 Online users' extent of confirmation is positively associated with their satisfaction with using the e-learning system in a VLE.

TAM theory asserts that post-consumption expectation can be represented as ex-post perceived usefulness in the proposed IS continuance model (Davis,

et al., 1989). Many researchers (Mathieson, 1991; Taylor & Todd, 1995) have found that perceived usefulness and perceived case of use are salient factors influencing IS acceptance behaviors. Perceived usefulness captures the instrumentality of IS use, while ease of use taps into the self-efficacy dimension. Because perceived usefulness and ease of use are the primary motivators of IS acceptance, it is plausible that these motivators can also influence subsequent continuance decisions. Comparing the relative effects of perceived usefulness and ease of use during the pre-acceptance and post-acceptance stages of IS use, some empirical studies report that (1) usefulness impacts attitude substantially and consistently during both stages of IS use, and (2) perceived ease of use has an inconsistent effect on attitude in the initial stages, which seems to further subside and become non-significant in later stages (Karahanna, Straub & Chcrvany, 1999). In keeping with these observations, perceived usefulness is expected to be the most salient ex-post expectation influencing users' post-acceptance affect (i.e., satisfaction). Our hypothesis, therefore, only examines the perceived usefulness of an e-learning system and its effects on the satisfaction level of online learners.

H3 Online learners' perceived usefulness (PU) of an e-learning system is positively associated with their satisfaction with using the e-learning system in the VLE.

According to the TAM model, the perceived usefulness is a direct predictor of acceptance intention (in addition to its indirect effect via attitude), which accounts for circumstances where high instrumentality consideration has more influence than low effect on motivating usage intentions. Enhanced performance is instrumental in achieving various rewards that are extrinsic to the task context, such as promotions or monetary gains. IS use is often viewed as a means to performance enhancement. People tend to subconsciously pursue instrumental behaviors or strive for rewards. The tendency is independent of the timing or stage of such behaviors. Therefore, it is likely that the usefulness- intention association, originally derived in an acceptance context. may also hold true in the continuance context. This leads to the fourth hypothesis:

H4 Online learners' continuance intention to use an e-learning system is positively associated with their perceived usefulness of the e-learning system.

The ECT theory states that users' IS continuance intention is determined primarily by their satisfaction with prior IS use. Several industry studies provide anecdotal evidence for this association (Lederer, Maupin, Sena and Zhuang, 2000; Karahanna et al., 1999). For instance, an Inteco study cites negative experiences and dissatisfaction resulting from slow access or engaged lines, poor help lines, and other technical problems as ISP users' primary reasons for service termination. Recall that satisfaction is an affect captured as a positive

(satisfied), indifferent, or negative (dissatisfied) feeling. Affect (as attitude) has been theorized and validated in TAM- based studies as an important predictor of the intention concerning IS use (Taylor et al., 1995; Karahanna, 1999). These studies provide indirect support for the satisfaction-continuance intention association derived from ECT. This leads to the fifth hypothesis:

HS Online learners' level of satisfaction with the initial use of an e-learning system is positively associated with their e-learning continuance intention.

Self-efficacy perceptions arc expected to be a significant precursor to computer use (Bandura, Adams & Beyer, 1977; Betz & Hackett, 1981 ; Hill, Smith & Mann, 1987). While self-efficacy has not been explicitly measured in other IS research, there is some evidence to support the influence of self-efficacy. Barki and Huff (1990) measured the "willingness to change" construct as a surrogate for self-efficacy and suggested that it was related to the use of a decision support system. This leads to the sixth hypothesis:

H6 The higher an online learner's computer self-efficacy, the greater the chance his/her use of an e-learning system.

Self-efficacy judgments substantially influence the emotional responses of individuals. Individuals tend to prefer and enjoy behaviors they feel they arc capable of performing and to dislike those they do not feel they can successfully master. Several studies in psychology provide support for this contention. One found that self-efficacy perceptions were significantly related to affect (or interest) for particular occupations (Betz & Hackett, 1981). This leads to the seventh hypothesis:

H7 The higher the individual's computer self-efficacy, the higher his/her interest in computer use.

There is experimental evidence supporting the causal flow from CSE to system-specific perceived ease of use, but Social Cognitive Theory plays a prominent role in self-efficacy perceptions. Self-efficacy judgments are purported to influence outcome expectations (Bandura, Adams & Beyer, 1977). Based on TAM, perceived usefulness is also affected by external variables, such as computer self-efficacy (Vcnkatesh & Davis, 1996). Hence:

HS The higher an online learner's computer self-efficacy, the higher his/her outcome expectations.

METHODS

Subjects of the Research

The participants in the study are MIS major students. These participants were required to use the Idea E-Learning System for a Management Information System (MIS) course. Respondents completed pre-test questionnaires during the first class meeting of spring semester and post-test questionnaires in the last class meeting, both during regularly scheduled class times. As an incentive to participate, respondents received extra credit in the MIS course. A total of 260 students completed the pre-test questionnaires, and a total of 247 students completed the post-test questionnaires. Due to missing data, 187 responses (pre-test 71.9%, post-test 75.7%) were used in this analysis. The sample consisted of 101 men and 86 women.

Measures

A review of the literature was undertaken to identify construct definitions and any existing measures. Based on this review, scales were formed for each of the constructs in the model. Previously developed and validated instruments were adopted directly. A few constructs required adaptation of existing measures.

The dependent variable, IS continuance intention, was measured using three items adapted from Bhattacherjee (2001). The two initial items measured respondents' intention to continue e-learning as opposed to discontin-uing it or using any alternate way such as traditional learning environments. The third item assessed respondents' overall discontinuance intention (worded negatively to control for potential common-method bias).

"Perceived Usefulness" items were adapted from Davis et al.'s (1989) six-item perceived usefulness scale and used a 7-point Likert scale. A high- er score means the perceived usefulness of that item is much stronger. Score sums ranged from 6 to 42.

"Confirmation" items are operationalized in the ECT literature in three ways: objective, inferred, and perceived (Zhang & Espinoza, 1998). Bhattacherjeer's (2001) three-item confirmation on a scale of 1 to 7 is adapted, where "l" meant strongly disagree and "7" meant strongly agree. Satisfaction was measured using Spreng et al.'s (1996) overall satisfaction scale from the ECT literature, originally designed to assess users' satisfaction with camcorder use. This scale captured respondents' satisfaction levels along seven-point scales anchored by four semantic differential adjective pairs: "very dissatisfied/very satisfied," "very displeased/very pleased," "very frustrated/very contented," and "absolutely terrible/absolutely delighted." This scale was appropriate because an affect such as satisfaction is best measured along bipolar evaluative dimensions (e.g., good/bad) (Ajzen & Fishbein, 1977). Further, this semantic differential technique

more clearly distinguished the satisfaction scale from other constructs that used Likcrt scales.

Com puter Self-Efficacy (CSE) was measured by the 10-item instrument developed by Compeau and Higgins (1995). The respondents had to answer "yes" or "no" first. I f yes, they choose a confidence degree from l to 1 0. Otherwise, the confidence degree was zero. Bandura et al. 's (1977) theory of sci f-efficacy and Schunk 's model of classroom learning (198 1) gu ided the development of the Computer Self-Efficacy Scale.

DATA ANALYSIS

This study used path analysis to test the model. The path analysis is a regression based technique that can analyze structural models with multiple-item construct s and direct and indirect path s. The path analysis is similar to standardized regression and was preferred to the SPSS l 0.0.07 version for this study. Construct validity is shown in Table 1.

The reliabil ity of these constructs are all higher than 0.7. The results are presented in Figure 5; Table I represents a correlation matrix of the five constructs. Confirmation demonstrated a direct, statistically sign ificant, positive relationship with Perceived Usefulness and Satisfaction (H I p<O.O 1, H 2 p<O.O 1). For individuals whose expectation s were further confirm ed, the satisfaction and perceived useful ness also more likely increased, thus supporting Hypotheses I and 2. Perceived usefulness demonstrated a direct, statis-

Table 1
Construct Validity

Item	PU	CI	S	C	CSE
c2/df	3.92*	NA	5.96	NA	4.55*
GFI	0.938'	NA	0.807	NA	0.862
AGFI	0.854'	NA	0.711	NA	0.783
NFI	0.972'	NA	0.814	NA	0.902'
NNFI	0.964'	NA	0.799	NA	0.896
CFI	0.979*	NA	0.839	NA	0.919*
SRMSR	0.0212·	NA	0.0753*	NA	0.0436*

Legend: PU=Perceived Usefulness, CI=Continuance Intention, C=Confirmation, S=Satisfaction, CSE=Computer Self-Efficacy

'Model fit: c2/df <5, AGFI > 0.8, GFI, NFI, NNFI, CFI are all > 0.9, SRMSR < 0.1

NA means the goodness-of-fit of the construct is acceptable. The p-value of c2 is NOT less than 0.01.
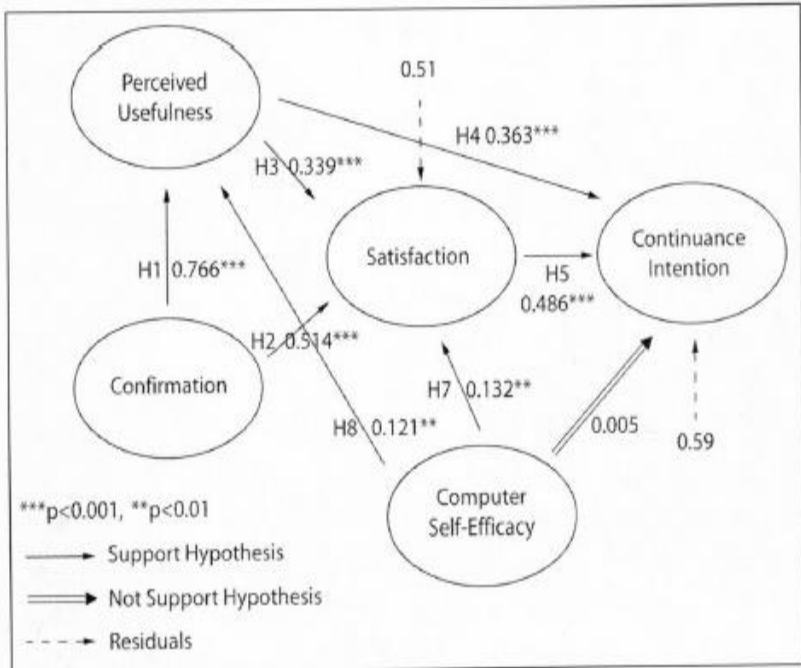
Figure 5. Correlation test results

tically significant, and positive relationship with Satisfaction and the IS continuance Intention (H3, p<O.O l; H4, p<O.O l). When users think the systems are useful, their satisfaction increases. Apparently, they will be more likely to continue using the systems to raise their person al perfo1mance, thus supporting Hypotheses 3 and 4. The satisfaction mea sure demonstrated a direct, statistically significant, and positive relationship with IS continuance intention (HS, p<O.O l). A s above, i f users feel highly satisfied with the systems, they will prefer to use them continuously, thus supporting Hypothesis 5.

CSE demonstrated a direct, statistically significant, but negative relation-ship with I S continuance intention (H6, p<0.05). When users have higher CSE, they might assume the system s are not the key reason for good personal performance. They tend to criticize the design of the system and, as a result, the intention to reuse the system is reduced if it does not meet their expectations. This finding docs not support Hypothesis 6.

CSE demonstrated a direct, statistically significant, and positive relation-ship with satisfaction and perceived useful ness (H 7 p<0.05 ; H8 p<0 .05). When users feel that they have more CSE, they will be more satisfied with the system and believe t he system is more useful to their personal performances, thus supporting Hypothesis 7 and 8. The correlation coefficients of constructs, other than H 6, arc all significant. Table 2 presents the correlations between variables.

Table 2

Correlation Matrix

	Perceived Usefulness	IS Continuance Intention	Confirmation	Computer Self-Efficacy	Satisfaction
Perceived Usefulness	1.000	0.630("')	0.794("")	0.339("')	0.782("')
IS Continuance Intention	0.630("')	1.000	0.650("*)	0.169(')	0.648("')
Confirmation	0.794("')	0.650("')	1.000	0.277(**)	0.821("')
Computer Self-Efficacy	0.339(**)	0.169(*)	0.277("")	1.000	0.384(**)
Satisfaction	0.782("')	0.648(**)	0.821("")	0.384("*)	1.000
Average	27.2674	13.1497	13.0642	68.9733	50.2834
Standard derivations	7.8022	2.2787	3.8627	18.7136	8.9719

•• p-value< 0.01, " p-value< 0.05

CONCLUSION

Online learning is the way of the trend. An appropriate design of the virtual learning environment will make the difference. A well-designed system might reduce learners' frustration and attract them to continue using the system . Teaching system design should not only focus on the technical aspects. There i s more to take into consideration. This research proposed an integrative framework to bridge the factors of computer self-efficacy and expectation in virtual learning environments (YLEs). A three-month field study was

conducted to examine these factors. The attempts *io* integrate CSE and ECM models and to assess their validity by explaining the usage behavior of online l earners was effective. Most of the hypothesized relationships, pro-posed based on CSE and ECM theories, were supported.

The implications of the finding from this research are imp01lant to college teaching. While instruction son web design are mainly focusing on technicality, other factors, such as computer efficacy and the level of expectation and confirmation are critical. This study's results arc also of interest to e-learning system vendors who are anxious to improve the retention rate of their existing users. The results attest to the importance of conducting a successful e-learning program by improving the confirmation experience that eventually leads

to an increase in actual reuse. Understanding the source of IS continuance intention will help us design more effective e-learning systems.

Future researchers may want to take a longitudinal view to assess whether the IS continuance intention changes with time. Researchers who are interested in applying the proposed framework to other constructs are encouraged to repeat our research methods with subjects having different backgrounds. Although this research has good internal validity, generalization of the results could be limited since subjects for this research are college students. Thus, the implications of the study may not be applicable to practitioners with diverse backgrounds (such as working adults).

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