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FACTORS INFLUENCING STUDENTS' INTENTIONS OF CONTINUED USE OF LEARNING MANAGEMENT SYSTEMS

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ABSTRACT

Higher education is exceedingly being delivered online through learning-management-systems. Students must continuously use these systems to perform their academic tasks. Therefore, it is important that LMS designers and institutions clearly understand what factors influence students' behavior towards the continued use of LMS.

This research-in-progress aims to improve understanding on students' continuance intentions towards LMS. It proposes a model by integrating three theories - Expectation-Confirmation, Self-efficacy, and Flow - to explain continuance behavior. To test this model, a research plan is laid out involving a questionnaire survey for data collection, and appropriate statistics for data analysis. Findings will inform academicians and designers how to ensure the continued use of LMS by students.

Keywords

Learning-management-system, Expectation, Disconfirmation, Self-efficacy, Satisfaction, Flow, Continuance

INTRODUCTION

Learning management systems (LMS) have assumed a critical role in delivering education in universities and colleges. Therefore, it becomes critical for management to ensure frequent, appropriate, and effective long-term use of these technologies for success (Lyytinen and Hirschheim 1987). This can be achieved only through a clear understanding of factors influencing students' intentions to continue using these systems.

The criticality of continuance is well recognized in IS literature, although by different names (Xmud 1982; Kwon and Xmud 1987; Cooper and Xmud 1990), acknowledging the existence of a post-acceptance stage when IS use transcends conscious behavior and becomes a routine activity. Batacherjee (2001) proposed a model to predict continuance intentions of online banking customers integrating TAM and Expectation Confirmation Theory. Integrating constructs from Social Cognitive Theory with this model, Hsu et al. (2004) explain continuance behavior of World Wide Web users. However, IS continuance has not been examined in a learning scenario in which, the outcome is learning effectiveness instead of repurchase of products or services. Motivational factors like concentration and flow lead to effective learning (Hoffman and Novak, 1996).

The objective of this study is to improve our understanding of factors influencing learners' intentions to continue using LMS. In particular, it aims to find answers to the following research questions:

RQ1: What factors will determine a learner's continuance behavior of an LMS?

RQ2: Do outcome expectations and self-efficacy determine continuance behavior of learners towards LMS use? If yes, how?

RQ3: Do satisfaction with prior use and prior perceived disconfirmation influence the continuance behavior of learner's LMS use? If yes, how?

RQ4: Do other factors, like intrinsic motivation, also influence continuance behavior? If yes, how?

A model of LMS continuance is proposed integrating constructs from Expectation-Confirmation, Self-efficacy, and Flow theories. The research plan is laid-out, involving survey-based data collection, and analytical method is outlined.

Findings of this study will help educational technologists and institutions understand how to make LMS integral to the curriculum.

BACKGROUND

Continuance behavior is associated with experience of a system beyond initial use. Hence, it's worthwhile to examine a theory concerned with behavior contingent on experience.

Expectancy Confirmation Theory

Expectancy confirmation theory (ECT) holds that people's intention to repurchase a product or service is determined primarily by their satisfaction with prior use (Anderson and Sullivan, 1993). Satisfaction is influenced by pre-consumption expectation and post-consumption disconfirmation. People form a feeling of satisfaction based on their level of disconfirmation.

Drawing a parallel between continuance of Web-based applications and repurchase decisions, Bhattacharjee (2001) asserts that both involve (1) an initial decision, (2) are influenced by initial use experience, and (3) can potentially lead to ex post reversal of the initial decision. Using constructs of TAM and ECT, he reports that users' continuance intention is influenced by perceived usefulness of continuance and their satisfaction with it. He also reports that user satisfaction is influenced by perceived usefulness and their confirmation of expectation from prior IS use. Bhattacharjee's (2001) model can certainly be used in the context of online services like e-learning. Continuance behavior seems obvious fallout of positive experience of a user, which is associated with the belief in one's ability to handle the system. What follows is a discussion of self-efficacy theory that addresses beliefs in our abilities.

Self-efficacy theory

Wood and Bandura (1989) assert that continued use of a system is significantly influenced by one's perceived ability to complete it, better known as self-efficacy (Bandura, 1997). In IS, the importance of self-efficacy has long been realized (Davis, 1989), and when dealing with computing, has been termed computer self-efficacy (Compeau and Higgins, 1995a, b). In the realm of Internet, it has been referred to as Internet self-efficacy (ISE). ISE is the belief in one's capability to organize and execute courses of internet actions to produce given attainments. This belief in ability is distinct from one's skills (CSE) (Eastin and LaRose, 2000). Prior studies have examined the impact of ISE on web-based instruction (Joo et al. 2000), information search (Kuo et al. 2004), and electronic services (Hsu and Chiu, 2004).

The relationship between ISE and usage of e-learning systems seems obvious. Learning management systems present a complex environment, requiring considerable self-efficacy to operate successfully - learning to navigate and search for relevant information. In order to sustain continued use of LMS, learners must have adequate levels of ISE. Learners' continuance intentions will also be influenced by the ability of the LMS to keep him focused in learning activities. Next is a discussion of a theory concerned with concentration.

Flow Theory

'Flow represents optimal experience of events during which a person is completely absorbed with an activity (Csikszentmihalyi 1975), leaving no room for distractions. Many elements of flow are those readily associated with learning environments: a sense of control, clear goals, timely and appropriate feedback, enjoyment, concentration, and a belief that the challenges presented are just within reach of one's ability.

The importance of flow in education literature is well-established (Clarke & Haworth 1994; Shernoff, et al. 2003). It occurs more often in learning than other activities (Massimini & Carli 1988). But does a flow experience really enhance learning? Early studies on this topic have reported personal satisfaction of engaging in a flow experience (Csikszentmihalyi 1997), and explored flow to understand the experience of learners (Hoffman and Novak, 1996). In e-learning, the desired outcome is acquiring new knowledge as pre-determined by the designer. Although enjoying the motivating nature of the presentation is desired, the ultimate aim is for a deeper engagement with the learning concepts. Learners must be able to learn the presented material, have an enjoyable time, yet be in control to explore and take initiatives with their learning.

Based on the foundations of the aforementioned three theoretical perspectives, we propose a model of LMS continuance that takes into account learners' expectations and its disconfirmation, self-efficacy, and flow experience as predictors of their intention to continue using the LMS. The following section presents our model and relevant hypotheses.

RESEARCH MODEL

The proposed model is an adaptation of Bhattacharjee (2001) model of continuance, integrating constructs from ECT, SCT, and flow theory. ECT views expectation as a pre-consumption construct. The outcome expectation of continuance here is a post-use construct, evolving from experience of initial usage and pre-use expectation. The basic assumption is that outcome expectation, ISE, satisfaction with prior use, and flow will have a positive effect on the learner’s continuance of the LMS.

CSE is known to influence outcome expectations and performance (Compeau and Higgins, 1995a), and expectations of the outcomes of using computers and actual use (Compeau and Higgins, 1995b). These studies also observed a significant influence of outcome expectation on computer use. Johnson and Marakas (2000) found CSE to be significant predictor of performance, which in turn influences outcome expectancy. In the proposed model, outcome expectancy refers to perceived likely consequences of LMS continuance.

Since this study examines the impact of self-efficacy on LMS continuance behavior, it adopts the ISE construct, which represents a learner’s judgment of efficacy in using LMS. ISE is known to predict learners’ performance in search tasks (Joo *et al.* 2000), and intention to use electronic service (Hsu and Chiu, 2004). Hence, ISE is likely to influence learner’s intention to continue using LMS.

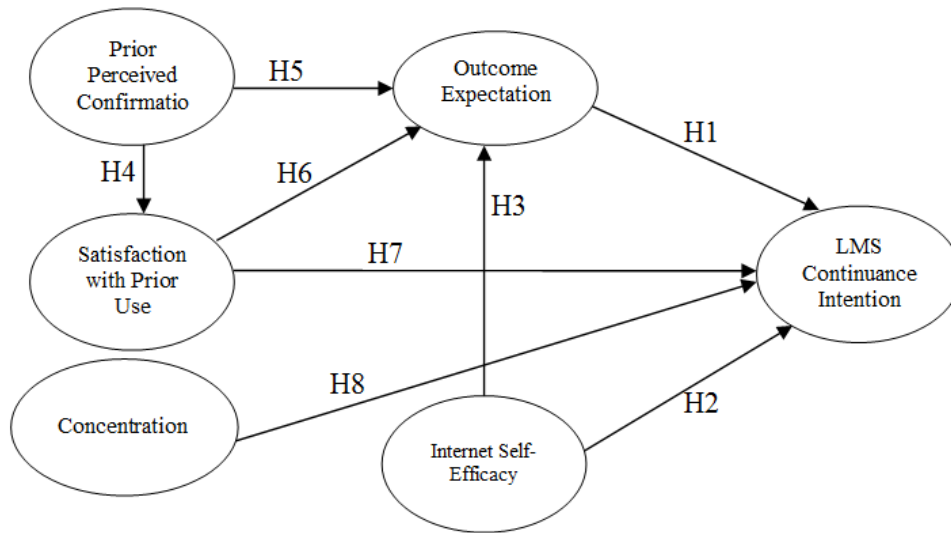


Figure 1 Mode of LMS Continuance

From the above discussion, we may deduce the following three hypotheses:

- H1:** The level of learners’ outcome expectations of continued LMS use is positively correlated with continuance intention.
- H2:** The level of learners’ perceived internet self-efficacy is positively correlated with their continuance intention regarding the LMS.
- H3:** The level of learners’ perceived internet self-efficacy is positively correlated with their outcome expectation of continued LMS use.

Disconfirmation is the discrepancy between an individual’s perceptions of service’s performance and his expectation levels (Oliver, 1980). Disconfirmation is known to significantly influence satisfaction of course instruction (Oliver and Shapiro, 1993), and user information satisfaction (Kettinger and Lee, 1994). Bhattacharjee (2001) found that performance disconfirmation can predict user satisfaction with e-banking. This leads to the fourth hypothesis:

H4: The level of learners' prior perceived disconfirmation is positively correlated with level of satisfaction with prior LMS use.

Prior experience generates information that enable users evaluate the outcome more clearly and confidently (Compeau and Higgins, 1995b).

Prior perceived confirmation is a cognitive evaluation of the outcome from prior experience, while satisfaction follows the affective state following prior experience. Hence, prior perceived confirmation and satisfaction with prior LMS use will positively influence learners' outcome expectation of continuance. This leads to the next two hypotheses:

H5: The level of learners' prior perceived disconfirmation is positively correlated with their outcome expectations of continuing LMS use.

H6: The level of learners' satisfaction with prior use is positively correlated with their outcome expectations of continuing LMS use.

Bhattacharjee (2001) found that satisfaction with prior use of online banking is the strongest predictor of users' continuance intention. So, it is likely that after gaining some satisfaction with prior LMS use, the satisfaction level will influence learners' reuse intentions. This leads to the next hypothesis:

H7: The level of learners' satisfaction with prior LMS use is positively correlated with their continuance intention.

The attention spans of learners are short due to limitations of time and information processing resources (Miller, 1975). Therefore, concentration can be critical for efficient learning. Concentration as a measure of flow has been found to positively influence the overall experience of computer users (Novak, et al. 1998) and their continuance intention of a system (Liu, et al. 2005; Webster, et al. 1993). So, it is likely that the level of concentration of a learner induced by an LMS will influence the perceived learning outcome, and hence outcome expectation of continuance. This leads to the next hypothesis:

H8: The level of concentration induced by the LMS is positively correlated with continuance intention.

PROPOSED METHOD

The model of continued use of LMS proposed by this paper is rooted on three theories –ECT, SCT, and Flow Theory, all of which consider an individual as the unit of analysis. Hence, the unit of analysis for the proposed model will be an individual. As the context of study here is e-learning, the population, and hence the sample chosen for this study must involve learners who make use of an LMS. For the two components of the model - expectation confirmation and Internet self-efficacy– prior experience of an IS is essential. Therefore, the sample chosen for this study should have some experience in using an LMS for learning. The flow component of the proposed model requires examination of level of concentration associated with the learning environment (the way in which the learning material is presented), and how that impacts learning outcome. Therefore, it necessitates designing learning tasks associated with different levels of flow.

We plan to adopt a field survey for collecting data for this study. Our sample will include university students with at least one semester's experience of learning through LMS. We will divide the participants into three groups through random sampling, and provide a one-hour, hands-on demonstration of the program. The program will involve an LMS-based learning task, during which participants will understand a case and complete a quiz. For this purpose, each group will get a different interface of the LMS, each associated with varying levels of flow. Then we will request them to complete a questionnaire survey including measures of the various constructs of our model.

We will design the questionnaire with items validated in earlier studies. Items on continuance intention will be adapted from Bhattacharjee (2001). Items on confirmation and satisfaction will come from McKinney et al. (2002) and Kettinger and Lee (1997). Items on outcome expectations will come from Compeau and Higgins (1995b). Items on ISE will come from Joo et al. (2000). Items on flow will be derived from Liu, et al. (2005) that found concentration (a measure of flow) as a predictor of continuance behavior. The minimum value of Cronbach's alpha reported by these studies was 0.7, indicating an acceptable reliability. Next, we will perform a Q-sort test by requesting scholars in the IS department at the university to assess the instrument. Finally, we will conduct a pilot study involving graduate students. All these steps will establish the instrument's reliability.

DATA ANALYSIS

First, confirmatory factor analysis will be conducted for assessing adequacy of measurement model. Construct reliability and validity for all the measurement scales will be evaluated via CFA approach using LISREL. Each scale item will be modeled as a manifested indicator of its hypothesized latent variable. Model equation will involve use of maximum

likelihood approach, using input from item raw data matrix. Construct reliability will be evaluated using Cronbach's alpha values.

Next, various structural models – social-cognitive component, expectation-confirmation components, flow component, and interaction components – will be compared. These will be evaluated for validity using structural equation modeling approach. The comparative strength of the models will then establish the validity of the proposed model.

CONCLUSION

In this study, we propose a model to predict the continuance behavior of students towards Learning management systems. For this purpose, we adopt constructs from the expectation-confirmation theory, self-efficacy theory, and flow theory. We intend to adopt a positivist approach to test this model involving a questionnaire survey of university students experienced in learning with an LMS. Results will have implications for LMS designers as well as educational institutions.

REFERENCES

Provided separately along with this document.