A study of student satisfaction in a blended e-learning system environment

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A R T I C L E   I N F O

A B S T R A C T

This study proposes a research model that examines the determinants of student learning satisfaction in a blended e-learning system (BELS) environment, based on social cognitive theory. The research model is tested using a questionnaire survey of 212 participants. Confirmatory factor analysis (CFA) was performed to test the reliability and validity of the measurements. The partial least squares (PLS) method was used to validate the measurement and hypotheses. The empirical findings indicate that computer self-efficacy, performance expectations, system functionality, content feature, interaction, and learning climate are the primary determinants of student learning satisfaction with BELS. The results also show that learning climate and performance expectations significantly affect learning satisfaction. Computer self-efficacy, system functionality, content feature and interaction significantly affect performance expectations. Interaction has a significant effect on learning climate. The findings provide insight into those factors that are likely significant antecedents for planning and implementing a blended e-learning system to enhance student learning satisfaction.

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1. Introduction

Classroom learning typically occurs in a teacher-directed instructional context with face-to-face interaction in a live synchronous environment. In contrast to this form of instruction, is an approach that promotes learner-directed learning. With emerging Internet commercialization and the proliferation of information technologies, online or electronic learning (e-learning) environments offer the possibilities for communication, interaction and multimedia material delivery that enhance learner-directed learning (Wu, Tennyson, Hsia, & Liao, 2008). Although e-learning may increase access flexibility, eliminate geographical barriers, improve convenience and effectiveness for individualized and collaborative learning, it suffers from some drawbacks such as lack of peer contact and social interaction, high initial costs for preparing multimedia content materials, substantial costs for system maintenance and updating, as well as the need for flexible tutorial support (Kinshuk & Yang, 2003; Wu et al., 2008; Yang & Liu, 2007). Furthermore, students in virtual e-learning environments may experience feelings of isolation, frustration and confusion (Hara & Kling, 2000) or reduced interest in the subject matter (Maki, Maki, Patterson, & Whittaker, 2000). In addition, student satisfaction and effectiveness for e-learning has also been questioned (Piccoli, Ahmad, & Ives, 2001; Santhanam, Sasidharan, & Webster, 2008).

With the concerns and dissatisfaction with e-learning, educators are searching for alternative instructional delivery solutions to relieve the above problems. The blended e-learning system (BELS) has been presented as a promising alternative learning approach (Graham, 2006). BELS refers to an instructional system that combines multiple learning delivery methods, including most often face-to-face classroom with asynchronous and/or synchronous online learning. It is characterized as maximizing the best advantages of face-to-face and online education.

While BELS has been recognized as having a number of advantages (e.g., instructional richness, access to knowledge content, social interaction, personal agency, cost effectiveness, and ease of revision (Osguthorpe & Graham, 2003)), insufficient learning satisfaction is still an obstacle to the successful BELS adoption (So & Brush, 2008). In fact, research findings from Bonk and colleagues have shown that learners had difficulty adjusting to BELS environments due to the potential problems in computer and Internet access, learners' abilities and

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beliefs in the use of technology, blended course design, participant interaction, and blended environments integration (Bonk, Olson, Wisher, & Orvis, 2002). These findings imply that an effective BLES environment should consider the human and technology factors that affect learner satisfactions with BELS, such as individual attitudes, participant interaction, educational technologies, and course design (Wu et al., 2008). Thus, more careful analysis of learners, educational technologies, and social contexts in BELS environments are needed (EL-Deghaidy & Nouby, 2008).

The adoption of BELS in supporting learning has made it significant to probe the crucial determinants that would entice learners to use BELS and enhance their learning satisfaction. The degree of student learning satisfaction with BELS courses plays an important role in evaluating the effectiveness of BELS adoption. Hence, comprehending the essentials of what determines student learning satisfaction can provide management insight into developing effective strategies that will allow educational institution administrators and instructors to create new educational benefits and value for their students. Because BELS environments differ from typical classroom and virtual e-learning, a review of previous research in learning technology shows that there is a lack of studies that have examined the crucial factors that determine learning satisfaction with BELS, such as individual cognition, technological environments, and the social contexts, as stated above. There is a need for more in-depth research to understand what determines student learning satisfaction in a BELS environment and to investigate how the determinants influence student perceptions of BELS contexts and their correlations. This study, therefore, proposes a research model, based on the social cognitive theory (Bandura, 1986), to investigate the primary determinants affecting student learning satisfaction in a BELS environment. We also empirically validate the proposed model and examine the relationships among those latent variables.

2. Basic concepts and theoretical foundation

2.1. Blended e-learning system

Blended learning is described as a learning approach that combines different delivery methods and styles of learning. The blend could be between any form of instructional technology (e.g., videotape, CD-ROM, CAI, web-based learning) with classroom teaching. Recently there has been an increasing movement toward blending e-learning and face-to-face activities with students participating in collaborative learning and interaction with their instructors and classmates. This is called "blended e-learning" or "blended e-learning system" (Graham, 2006; Singh, 2003).

Graham (2006) defined BELS as a mixing of instruction from two historically separate learning environments: classroom teaching and full e-learning. The term emphasizes the central role of computer-based technologies (e-learning systems) in blended learning, focusing on access and flexibility, enhancing classroom teaching and learning activities, and transforming the way individuals learn. From a course design perspective, a BELS course can lie anywhere between the continuum anchored at opposite ends by full face-to-face and virtual e-learning approaches (Rovai & Jordan, 2004). Kerres and De Witt (2003) identified three critical components of BELS that considers the *content* of the learning materials, the *communication* between learners and tutors and between learners and their peers, and the *construction* of the learners' sense of place and direction within the activities that denote the learning environment. This is an important distinction because it is certainly possible to enhance regular face-to-face courses with online resources without displacing classroom contact hours. Accordingly, we defined BELS as the combination of online and face-to-face instruction and the convergence between traditional face-to-face learning and e-learning environments.

Several BELSs, such as WebCT (www.webct.com) and Cyber University of NSYSU (cu.nsysu.edu.tw) have developed systems that integrate a variety of functions to facilitate learning activities. For example, these systems can be used to integrate instructional material (via audio, video, and text), e-mail, live chat sessions, online discussions, forums, quizzes and assignments. With these kinds of systems, instructional delivery and communication between instructors and students can be performed at the same time (synchronously) or at different times (asynchronously). Such systems can provide instructors and learners with multiple, flexible instructional methods, educational technologies, interaction mechanisms or learning resources and applying them in an interactive learning environment to overcome the limitations of classroom and e-learning. As a result, these online learning systems may better accommodate the needs of learners or instructors who are geographically dispersed and have conflicting schedules (Pituch & Lee, 2006). As BELS emerge as perhaps the most prominent instructional delivery solution, it is vital to explore what determines learning satisfaction in a blended e-learning environment.

2.2. Social cognitive theory

Social cognitive theory (Bandura, 1986) serves as an initial foundation in this study for exploring what determines student learning satisfaction in a blended e-learning environment. Social cognitive theory is a widely accepted and empirically validated model for understanding and predicting human behavior and identifying methods in which behavior can be changed. Several studies have applied it as a theoretical framework to predict and explain an individual's behavior in IS settings. The theory argues that the meta progress of a human being occurs through consecutive interactions with the outside environment and the environment must be subjected to one's cognition process before they affect one's behavior. It proposes that a triadic reciprocal causation among cognitive factors, environmental factors, and human behavior exists. Behavior is affected by both cognitive factors and environmental factors (Wood & Bandura, 1989). Cognitive factors refer to the personal cognition, affect and biological events. Environmental factors refer to the social and physical environments that can affect a person's behavior.

Environments influence an individual's behavior through his or her cognitive mechanisms. Hence, social cognitive theory posits two critical cognitive factors: performance expectations and self-efficacy that influence individual behavior. It gives prominence to the concept of self-efficacy – defined as one's judgments and beliefs of his/her confidence and capability to perform a specific behavior – recognizing that our performance expectations of a behavior will be meaningless if we doubt our capability to successfully execute the behavior in the first place. It can enhance human accomplishment and well-being, help determine how much effort people will expend on a behavior, how long they will persevere when confronting obstacles and how resilient they will be in the face of adverse situations. The theory further