

Student Satisfaction in Web-based ERP-Simulated Learning Environments

PENJIRA KANTHAWONGS

Business Computer Department, School of Business Administration, Bangkok University
Phahonyothin Rd., Pathum Thani 12120 THAILAND
penjira.k@bu.ac.th

NITTANA SOULISAK

Management Department, School of Business Administration, Bangkok University
Phahonyothin Rd., Pathum Thani 12120 THAILAND
nittana.s@bu.ac.th

PENJUREE KANTHAWONGS

Bachelor of Business Administration (English program), Kasem Bundit University
Patthanakarn Rd., Bangkok 10250 THAILAND
penjuree_ka@bba.kbu.ac.th

Abstract: - Student satisfaction is an important part of the effort to successfully promote higher education. This is true given the dynamic increase in ERP course offerings. This research investigates the relationship among attitudinal variables impacting to student satisfaction in ERP-simulated courses. The regression model indicates three strong relationships between satisfaction with the class and a) satisfaction with the instructor, b) perceived ease of use, and c) perceived flexibility. The results also reveal that satisfaction with the instructor constitutes the highest relative weight of importance toward satisfaction with the class followed in order by perceived flexibility and perceived ease of use and it is suggested that these relationships represent the most important considerations for students and instructors in ERP-simulated enhanced courses.

Key-Words: - ERP, Simulation, Satisfaction, TAM, Education, Web-based Learning

1 Introduction

Enterprise Resource Planning (ERP) software has been implemented by organizations in industrialized countries such as Sweden and Australia [1] [2]. Currently, many organizations in developing countries such as China and Thailand have also accelerated the implementation of ERP systems [3] [4]. According to AMR Research [5], the five biggest ERP vendors—SAP, Oracle (which bought PeopleSoft, J.D. Edwards), Sage Group, Microsoft's Business Solution Group, and SSA Global (which bought Baan)—accounted for 72 percent of a \$23.6 billion business in 2004. Moreover, AMR has also predicted that the growth would rise from 2004 through 2011 around 11 percent compound annual growth rate [6]. Since the global adoption of ERP is high, demand for ERP literate graduates has motivated many higher education institutions to build alliances with ERP software vendors [7]. Many universities have struggled in incorporating ERP systems into their curriculums because high costs on purchasing hardware, supporting the

system, and gaining the required expertise remain challenges. Important technological trends, such as software-as-a-service (SaaS), application service providers (ASPs), and ERP simulation, open opportunities for universities especially in developing countries with limited resources to become users of ERP services in classrooms. The success of these teaching and learning methods is likely to have direct implications for graduates' employability and their job readiness for industry [8]. The growing of technology in today's society and the rapid adoption of technological solutions in every aspect of education may necessitate a paradigm shift in understanding of the classroom experience. The raise of these ERP educational offerings and the impacts on students has not been examined to a great extent. Many researchers have suggested the use of ERP simulation as part of business studies' courses in order to assist students in understanding and aligning business goals with technical strategies that support organization's current and future needs. The utilization of ERP-simulated software allows students to obtain hands

on experience in various aspects of business processes [9] [10] [11]. This way the students will be able to work through the types of transactions that would take place in a simulated business setting. Nevertheless, many questions remain. What causes some students to lose interest or motivation in a class? This paper addresses outcomes in using classroom technologies from the students' perspectives. Ideally, research would identify variables contributing to student satisfaction. When the simulation is employed in the course structure, additional questions arise. Do students perceive the technology as assisting or impeding the learning process? What are the determinants of student satisfaction in ERP-simulated courses? Are the students readily willing to accept the addition of new technologies in a course? A previous study made a comparison between students' learning outcome in two settings: one when students used a web-based ERP-simulated classroom environment and the other one with teamwork and role-playing method without using the ERP-simulated software [12]. Technology Acceptance Model (TAM), its extension models, and Diffusion of Innovation Theory (DIT) were applied to web-based ERP-simulation context [13] [14] [15]. Empirically, results showed that students who did not utilize web-based ERP-simulated classroom demonstrated significantly higher achievement than those who used the system [12]. The current study extends previous studies by investigating attitudes of satisfaction related to using ERP-simulated systems for students enrolled in an undergraduate business course. Moreover, this research provides an analysis of variables that have been suggested to affect satisfaction, as they relate to satisfaction within the course in a university in Thailand.

2 Literature Review

2.1 Satisfaction with the Course and the Instructor

In the context of satisfaction with their choice of higher institution, this notion suggests that satisfaction is a distinct construct that is mediated by prior perceptions of service quality [16] [17]. The instructors are the source of course information and they provide central focal points for their students [18]. Haytko [19] found that hybrid course evaluations were significantly lower than traditional course evaluations for both the instructor and the course. Students reported dissatisfaction related to

the interaction with the instructor in the hybrid course. Likewise, Marks, Sibley, and Arbaugh [20] emphasizes that instructor-student interaction is the most important thing predicting effective online learning. Then, the satisfaction factor of online learning is applied to ERP-simulated learning environment. Hence,

H1: Satisfaction with the instructor is positively related to students' satisfaction with the class.

2.2 Ease of use

The Technology Acceptance Model (TAM) is one theoretical model that attempts to explain use of computer based technologies, with the primary explanatory variables being perceived ease of use and perceived usefulness in adapting TAM to predict user's acceptance of information technology and defined perceived ease of use as "the degree to which a person believes that using a particular system would be free of physical and mental effort" [14] [21]. Arbaugh [22] [23] claimed that in the context of web-based courses, the TAM suggested that perceived ease of use of the delivery medium would promote students' satisfaction with the medium and with their online course experience. The researcher further revealed that perceived ease of use was positively associated with student satisfaction ratings in online MBA courses. Gefen [24] had already applied TAM model to the ERP context by examining how trust and ERP usefulness were built during ERP implementation. Additionally, ease-of-use has been cited as one key factor in designing successful ERP-simulation software [25]. Many researchers suggest that the embedded simulation is an integral part in enterprise applications providing powerful and simulation-based decision making capability [10]. Hermans et al. [18] suggested the most important considerations for students and instructors in Internet enhanced courses with the triad relationships among student's satisfaction with the instructor, perceived ease of use of the course technology, and satisfaction with the course. Based on this past research, it is hypothesized that:

H2: Ease of use is positively related to students' satisfaction with the class.

2.3 Flexibility

Previous literature research on computer mediated communication emphasizes that the flexibility inherent in web-enhanced courses are likely to "help groups reach relational intimacy high enough to compare to face-to-face groups, though taking a longer time to develop" [26]. This view suggests

that flexibility in the course is a result of the medium “being both time and place independent, allowing course interactions to continue over time and through any interruptions” [27]. Due to this independence, students have “a high degree of flexibility in regard to when and where they access web-enhanced courses and what course tools they choose to utilize.” This flexibility is likely to attract a more competent type of student or a non-traditional student. Having the flexibility, which students see as “freedom” should be related to both ease of use and satisfaction. This leads to the following hypotheses:

H3: Perceived flexibility is positively related to students’ satisfaction with the class.

2.4 Commitment

While commitment has been shown to be strongly related to social interaction it may be more of an antecedent to satisfaction with the course. When web-based interaction replaces face-to-face interaction, social opportunities are diminished, and a student’s acceptance of the technology, self-commitment to education, and in turn satisfaction with the course may be compromised [18]. In web-enhanced courses, students are likely to have more responsibilities placed upon them than traditional face-to-face learning environments. For instance, students may be required to download course materials, access Internet links, or participate in on-line discussions that do not correspond with class lectures. Thus, students should become active rather than passive learners. Self-motivation and self-discipline require students to commit to the technology and to the course. Past research suggests that students with strong commitment will be more successful and are likely to learn the most in web-enhanced courses than those with less motivation [28]. Student’s commitment is a major factor that impacts the attrition and completion rates in the web-enhanced course and a lack of commitment is linked to high dropout rates [29]. Additionally, Eom, Wen and Ashill (2006) found that student motivation was positively related to perceived student satisfaction with the web-enhanced course [30]. Students who are committed to their education beyond just being committed to one course should be more satisfied with their experiences. Thus, the following hypotheses are offered:

H4: Commitment is positively related to students’ satisfaction with the course.

The conceptual research model which incorporated independent and dependent variables for identifying students’ satisfaction with the Web-based ERP-simulated class was depicted in Figure 1.

3 Methodology

Initially, theoretical literature from various sources was reviewed to design a quantitative research framework. The target population for this study was undergraduate students enrolling in a business computer course conducted through a traditional in-class lecture with the use of web-based ERP-simulated system, the university’s learning management system, and e-Mail system. These systems were used to handle interactive communication between an instructor and students and enhance administrative functions such as assigned reading materials, ERP-simulated interactive exercises, grade books, interactive multiple-choice questions for each chapter, general information about the course syllabus, assignment schedules, class policies and projects, and web-site links associated with assignments. A survey questionnaire assessing the constructs in the current study was developed from published scales of previous research as stated in the literature review. All of the scales were measured on a 5-point Likert scale, ranging from 1 = strongly disagree to 5 = strongly agree. The cross-sectional survey was conducted on the last day of the class on 30 April 2010. A total of 91 self-administrated questionnaires were distributed to all students in a business computer class at a university in Thailand and 83 of usable surveys were returned giving an overall response rate of 91%. The response rate was high, mainly due to the fact that the questionnaires were collected right after the respondents completed the forms on the last day of the class. Respondents were almost evenly split by gender, 50.6% were female and 49.4% were male. Based on age, 39% of respondents were 22 years old and another 34% were 21 years old.

4 Results and Discussions

In this study, Cronbach’s alpha was used for checking a reliability and internal consistency of the constructs. The alpha coefficients of the reliability analysis ranged from .680 to .853 indicating that all of the scales were acceptable [31]. Factor analysis was utilized to examine the underlying dimensions of the constructs. Due to interdependence among measures, the principle components analysis with Varimax rotation was implemented to extract the factors. Variables with high loadings in the same factor form a group. All of the eigenvalues were greater than one. The total variance explained by the five factors is 69.2%. Overall, the factor loadings in the current study were greater than 0.5 which was

considered as good and practically significant [32]. The regression analysis for identifying the relationship between independent and dependent variables were illustrated in Table 1. Overall, the results indicated a statistically significant linear relationship between the constructs with a p-value less than 0.5. There were positive associations between the students' satisfaction with the class and the three factors: a) the satisfaction of the instructor, b) perceived ease of use, and c) perceived flexibility. Hence, H1, H2, and H3 which stated that these factors were positively related students' satisfaction with the class, were supported. Nevertheless, no positive relationship was shown between the students' satisfaction with the class and commitment. Thus, H4 was not supported.

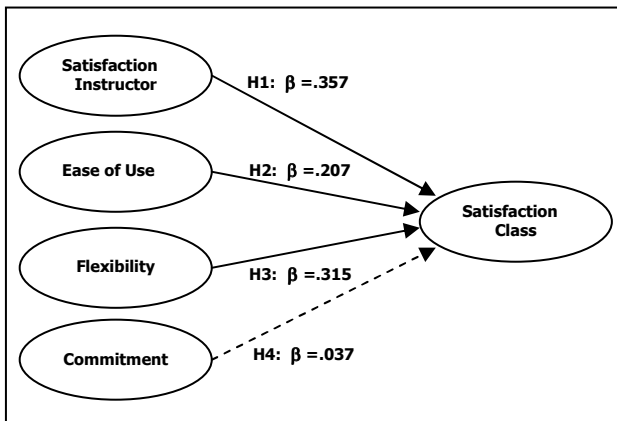
Table 1: The Results of Hypothesis Testing

Hypothesis	Construct	β	Sig.	Support
H1	Satisfaction with Instructor	.357	.001*	Yes
H2	Ease of Use	.207	.035*	Yes
H3	Flexibility	.315	.001*	Yes
H4	Commitment	.037	.708	No

Note: $R = .674$; $R^2 = .454$; $p^* < .05$

According to Figure 1, the results also show that satisfaction with the instructor ($\beta=.357$) constitutes the highest relative weight of importance toward satisfaction with the class followed in order by perceived flexibility ($\beta=.315$) and perceived ease of use ($\beta=.207$).

Figure 1: Conceptual Model of Student Satisfaction in Web-based ERP-simulated Class



Note: Significant paths ($p < .05$) between constructs were reported with standardized beta weights.

Consistent with Hermans et al. [18] and Marks et al. [20], the most significant relationship was found between satisfaction with the instructor and satisfaction with the class. This result points out that the higher the students' satisfaction toward the instructor, the more the students' satisfaction with the overall perceptions of the course. One explanation for the strong relationship may be found in the social interaction literature. The student populations, the ages of traditional students range from 18 to 24, show psychological measures of loneliness and depression [33] [34]. This is especially true for students who are in computer related field, spend more time online, or are teenagers [18]. Kanthawongs et al. [12] study reported that students who did not utilize web-based ERP-simulated classroom demonstrated significantly higher achievement than those who used the system. The main reasons of such lower performance appeared to be lack of social interactions. Then, the development of an "interactive course" might be the key to successful ERP in higher education offerings. An interactive course offering that encourages either real time or asynchronous communication between the student and the instructor may be necessary for maintaining student satisfaction [18]. Thus, although important technological trends such as ERP simulation open opportunities for universities especially in developing countries with limited resources to become users of ERP services in classrooms, the students' satisfaction with the instructor has proved to be the most important factor in web-based ERP-simulated learning environments.

In accordance with Arbaugh [22] [23], a significant relationship between satisfaction with the class and ease of use was reported. In the context of integrating TAM with ERP in higher education, the results of this study confirm the findings from Gefen [24] and Pittarese [11]. This research shows that the more ease of use, the better students' satisfaction with the class. Therefore, ease of use has been a key factor in designing successful ERP-simulation software. Previous research shows that flexibility "allowing course interactions to continue over time and through any interruptions" should attract a more competent type of student or a non-traditional student [27]. The results of the study confirm the literature that flexibility factor yields both independence and freedom for enhancing students' learning environment. Thus, the flexibility is necessary for developing and fostering the successful web-based ERP-simulated classroom. However, the lack of significance for commitment

and students' satisfaction with the class is interesting because previous studies of Frankola [28], Eom et al. [30], and Hermans et al. [18] reveal that the more student's commitment to the web-based ERP-simulated class, the better their satisfaction with the class. The results could be explained that since the course was conducted through a traditional lecture classroom environment incorporating with the use of web-based ERP-simulated system, students might prefer to rely on an instructor's lecture and guidance rather than merely self-regulated or self-motivated online learning environments. According to Kanthawongs et al. [12], empirically, the students who did not utilize web-based ERP-simulated classroom demonstrated significantly more achievement than those who used the system. Then, even if the students enroll to study web-based ERP-simulated system, they prefer to study it in face-to-face environment instead of distance learning or though complete online interaction with the instructor. It is possible that the contents of the course are too complicated to learn online individually.

5 Implications, Conclusions and Recommendations

The implication of this study is that the web-based ERP-simulated learning environment provides more channels and opportunities for the instructor to interact with students. The use of online forum, assigned reading materials, ERP-simulated interactive exercises, and grade book foster "a community of learners" among the members of the class [18]. However, the study reveals that the solely online learning method might not be suitable for web-based ERP-simulated learning environment. While this study is useful in providing support for previous literature in addition to some new findings, it also reveals several limitations. The sample size is only from one course and one university. Clearly, this study should be replicated at other universities and other similar ERP courses to validate and compare the results in different contexts. Further studies can extend the hypotheses and the proposed model to determine what other factors are likely to affect student satisfaction. As long as the global adoption of ERP continues to rise, the demand for ERP literate graduates persists. The use of ERP simulation provides universities with limited resources to become users of ERP services in classroom environment and allows business graduates to understand and align business goals with technical strategies and support the

organization's current and future needs. This study guides university administrators, educators, practitioners, or software vendors of how to create satisfied learning and training environment for ERP in education. It also indicates that learners' satisfaction with the instructor, perceived flexibility, and perceived ease of use are respectively related to learners' satisfaction with the course. However, in light of the growing needs for ERP education with different technological trends, the relationship between the learners and the instructors should be taken into an account.

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