

Students' Satisfaction Towards Online Learning Systems: Assessing Its Internal and External Factors

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Abstract This paper examines the internal factors (Internet self-efficacy and self-motivation) as well as an external factor (interaction) which affect university students' level of satisfaction towards online learning systems. Field data were collected from 282 students from a public university. Data were analysed using multiple regression analysis. The outcome of the analysis suggests that these factors are significant predictors to students' level of satisfaction when using a university's online learning system.

Keywords Interaction • Internet self-efficacy • Online learning • Self-motivation • Satisfaction

Introduction

The practice of infusing Web-based technologies into higher education has provided enriching learning experiences in this field. A shift towards embracing technology by universities is to provide continuous learning to the twenty-first century learners. Despite many studies investigating this phenomenon, previous literature falls short in providing insight towards online learning satisfaction

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amongst university students in Malaysia. The changes in the education landscape are driven by the popularity of many programme offerings being made available online (Ke and Kwak 2013). As students are the core users, these Web-based learning systems are tasked with the responsibility of helping students achieve their learning outcomes and satisfaction in fulfilling their overall education goals (Wei et al. 2015). This paper aims to assess both the internal and external factors affecting university students' satisfaction with online learning systems. Such assessment can help determine the effectiveness of knowledge construction that has taken place (Zhu 2012).

The characteristics of online learning systems satisfy the needs of modern learning in society signalling the importance of executing these systems effectively (Sun et al. 2008). In addition, past studies on this subject have not identified critical factors from a holistic viewpoint. Therefore, building on prior literature, this study proposes a research model that examines both the effect of internal factors (Internet self-efficacy and self-motivation) and an external factor (interaction) of students' characteristics on their level of satisfaction towards the online learning system.

Research Problem

Rapid acceleration in technology has revolutionized traditional learning methods into an entirely new educational platform and industry. These new technologies have profoundly enhanced the learning experiences for both students and instructors with an array of tools to facilitate engagement and motivation. Earlier reports by Chen and Jang (2010) identified the importance of changing learners' behaviours as the key to achieve online learning success instead of course design and learning context.

Traditional face-to-face education is no longer considered as the only way to transfer knowledge (Hiltz and Turoff 2005). Studies reveal that there is a growing tendency towards enrolling in Internet classes because of its simplicity and benefit (Eom et al. 2006; Allen and Seaman 2010). Consequently, the potential use of Web-based technologies in education has propelled many universities in setting up portals and offering programmes online to bolster conventional teaching methods (Khalid et al. 2006). Moreover, when compared to conventional learning environments, online learning systems eliminate geographical and physical limitations.

The simplicity and convenience of online learning, nevertheless, does not come without a price. Billions are spent on building systems that facilitate online learning. Notwithstanding the total amount of time and money spent in developing the systems, it does not necessarily justify success, thus causing vast amounts of losses. Hence, to measure the effectiveness and the usefulness of online learning systems that warrant the success of online learning systems implementation, Alavi et al. (1995), as well as Graham and Scarborough (2001) noted that it is crucial to evaluate the level of its users' satisfaction. Goi and Ng (2009) also suggest that with a higher satisfaction level, Web-based programs will have greater opportunities to

influence learners' participation in future. In spite of its magnitude, little has also been done to assess the effect of key factors, such as Internet self-efficacy and self-motivation, as well as interaction, on students' satisfaction towards online learning. It is therefore important to inquire about students' level of satisfaction and their perceptions on the overall impact of their learning experiences through the digital platform. This is vitally important because online education is becoming a fast-growing delivery method in higher education (Bolliger and Wasilik 2009).

Objectives of the Study

Amidst the existence of a plethora of evidence documenting students' satisfaction towards online learning, such investigations are only limited to areas, such as the content of the online learning courses (i.e. perceptions towards the content of the course and structure of the course and how it affects students' satisfaction). Hence, there is a need for this study to examine a regression-based model for students' satisfaction towards online learning system involving students' internal and external characteristics, such as Internet self-efficacy and self-motivation, and interactions. The research model is based on two earlier studies by Kuo et al. (2014) and Eom et al. (2006), which investigated the level of satisfaction towards online learning. This study, however, will examine the level of students' satisfaction towards the online learning system.

Specifically, this study intends to achieve the following objectives:

- (i) To determine the relationship between Internet self-efficacy and satisfaction towards the online learning system,
- (ii) To determine the relationship between Internet self-motivation and satisfaction towards the online learning system and
- (iii) To determine the relationship between interaction and satisfaction towards online learning system.

Research Methodology

This study was conducted using undergraduate students from one of the local universities in Malaysia. It was a quantitative study whereby judgmental sampling was used to sample students who were at least at their sophomore year. The underlying reason for such criterion is that these students had been exposed to at least a one-year experience in using the university's online learning system. Hence, these students were deemed to be able to provide their opinions based on their perception and experience pertaining to the use of the university's online learning system.

Online questionnaires were used to collect data from the target respondents. Students that were keen to participate in this survey were given the URL link directing them to the online questionnaire Website. Answers were made compulsory in such a way that students had to complete every question on each page so as to proceed to subsequent page and submit. Hence, missing data were not an issue.

The instruments used for this study were derived from the past literature. For internal factors, Internet self-efficacy was measured using a 5-item measure developed by Kuo et al. (2014) while self-motivation was assessed using a 2-item measure developed by Eom et al. (2006). Both measurements achieved good reliability scores of 0.839 and 0.732, respectively. Online learning system satisfaction, on the other hand, was measured using a 4-item measure. The reliability score of the measure was 0.812. Lastly, interactions were measured using a three-dimensional scale developed by Kuo et al. (2014) which was consisted of learner–learner interactions (4 items), learner–instructor interactions (5 items), learner–content interactions (3 items). All three dimensions achieved satisfactory reliability scores of 0.731, 0.786 and 0.794, respectively. The summated scores of all the dimensions were then used for subsequent analysis.

SPSS was used to perform the analysis. Specifically, Pearson correlation and multiple regressions analysis were conducted to assess the postulated relationships of the study.

Results/Discussions

Prior to assessing the relationship between the constructs, Harman's single-factor test was carried out to address the issue of common method variance (CMV) due to collecting data from a single source. The Harman's one single factor test yields a result of 29% of variance explained for the first factor. This percentage is lower than the threshold value of 50%, indicating that CMV is not an issue in this study.

Pearson correlation analysis was then conducted to assess the bivariate relationship between constructs. The results suggest that each bivariate relationship is found to be significant and positive. Both Internet self-efficacy ($r = 0.461$) and self-motivation ($r = 0.523$) are found to be positively and moderately associated with students' satisfaction. However, interactions are strongly associated with students' satisfaction ($r = 0.640$). Tables 1 and 2 depict the constructs correlation with the construct reliability value along the diagonal.

In the similar vein, prior to assessing the postulated relationships, all constructs in the study undergo the assessment of multicollinearity. A variance inflation factor (VIF) value of more than 3.3 indicates possible collinearity issue amongst constructs. Nonetheless, the results from the assessment as shown in Table 3 suggest that multicollinearity is not an issue as the values for the predictors are lower than the threshold value of 3.3.

Results from multiple regression analysis suggest that the three predictors, namely Internet self-efficacy, self-motivation and interactions explain 45% of

Table 1 Constructs correlation

	No. of items	Mean	SD	IS	SM	SAT	INT
Internet self-efficacy	5	3.587	0.644	(0.839)			
Self-motivation	2	3.495	0.674	0.486 ^a	(0.732)		
Satisfaction	4	3.516	0.730	0.461 ^a	0.523 ^a	(0.812)	
Interaction	3	3.421	0.564	0.528 ^a	0.613 ^a	0.640 ^a	(0.657)

^aCorrelation is significant at the 0.01 level (two-tailed)
 Values along the diagonal represent Cronbach's alpha reliability

Table 2 Constructs correlation (first-order level—dimensions of learning interaction)

	No. of items	Mean	SD	ISE	SM	SAT	LLI	LII	LCI
Internet self-efficacy	5	3.587	0.644	(0.839)					
Self-motivation	2	3.495	0.674	0.486 ^a	(0.732)				
Satisfaction	4	3.516	0.73	0.461 ^a	0.523 ^a	(0.812)			
Learner–learner interaction	4	3.583	0.668	0.447 ^a	0.494 ^a	0.377 ^a	(0.731)		
Learner–instructor interaction	5	3.161	0.715	0.317 ^a	0.447 ^a	0.504 ^a	0.515 ^a	(0.786)	
Learner–content interaction	3	3.518	0.807	0.456 ^a	0.479 ^a	0.582 ^a	0.294 ^a	0.386 ^a	(0.794)

^aCorrelation is significant at the 0.01 level (two-tailed)
 Values along the diagonal represent Cronbach's alpha reliability

Table 3 Assessment of multicollinearity

Constructs	Satisfaction
Self-motivation	1.700
Internet self-efficacy	1.473
Interaction	1.802

variances in students' satisfaction. Internet self-efficacy ($\beta = 0.131, t = 2.425$), self-motivation ($\beta = 0.176, t = 3.303$) and interaction ($\beta = 0.463, t = 7.741$) are found to be significantly associated with students' satisfaction. This indicates that all the three predictors are focal constructs in determining students' satisfaction towards an online learning system. Amongst the three predictors, interactions are found to have the largest effect over students' satisfaction, followed by self-motivation and self-efficacy (Table 4).

Table 4 Relationship assessment

	Beta	Std. error	<i>t</i>	<i>p</i> -value	Results
Self-motivation → satisfaction	0.176	0.063	3.032	0.003	Supported
Internet self-efficacy → satisfaction	0.131	0.061	2.425	0.016	Supported
Interaction → satisfaction	0.463	0.077	7.741	0.000	Supported

$R^2 = 0.449$, $F(3, 278) = 75.382$, $p < 0.01$

Contributions of the Study

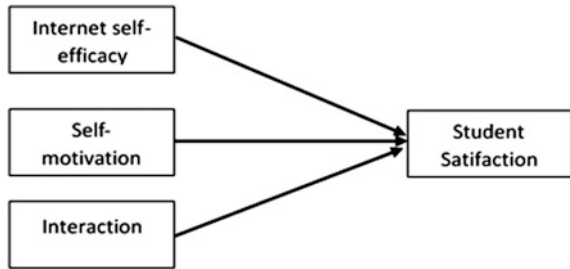
This study contributes to the body of knowledge in several ways. First, it provides an assessment of the factors influencing students' satisfaction towards online learning system. The assessment of the impact of both internal and external factors provides insight into the development of online systems. While it is important to develop a good online learning system, the providers and developers of the system should take student's ability in utilizing it into consideration. In practice, systems that are too sophisticated might be a problem for students who have low Internet self-efficacy. To some extent, students with low Internet self-efficacy may be unable to perceive the usage of specific complex functions embedded in the online learning system. This would lead to discouragement.

On the other hand, it is found that the level of satisfaction of students towards the online learning system is associated with the level of interaction that a student has when engaging with the online learning system. Notably, interesting functions and contents available on the online learning system as well as proactive interaction between learners and instructors through optimizing use of the function available in the online learning system would result in students' satisfaction. The access to audio and visual support executed in the online learning system would lead to excitement in utilizing the online learning system as an instrument to transfer knowledge. These virtual classrooms would then allow students to experience real-life classroom situations along with their instructors. As such, this will invariably enhance students' level of satisfaction towards online learning system. Moreover, the findings from this study also address the needs and concerns from the students' perspective and also their current capacity towards using the online learning platform as an educative function of acquiring knowledge.

Conclusions

This study proposed and tested a model that considered internal and external factors which affect students' satisfaction towards online learning system. Generally speaking, all the proposed relationships were found to be significant and positive, indicating the importance and relevance of these factors in the context of online learning system at institutions of higher learning. Since students were considered as

Fig. 1 Research model of the study



the most important users of the system, it is imperative to revisit the determining factors of their satisfaction towards the online system. The ability to identify factors determining their level of satisfaction is crucial as this will lead to the overall implementation success of the online learning system. The findings of this study will also provide relevant information for institutions to eliminate online learning systems that are deemed ineffective and to implement one that would practically benefit the students in their learning process and subsequent academic performance (Fig. 1).

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