Evaluating Students' E-Learning Satisfaction in English Studies Based on UTAUT

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Original Research Article

ABSTRACT

This study assesses factors affecting students' satisfaction with E-learning for English study based on unified theory of acceptance and use of technology (UTAUT). The sample data collected from 338 students in Zhaoqing University in China have been analyzed using structural equation modelling. The results reveal that facilitating conditions, performance expectancy and hedonic motivation have significant and positive impact on behavioural intention, but social influence and effort expectancy are not directly and significantly related to behavioral intention. Furthermore, behavioral intention, facilitating conditions and hedonic motivation directly correlate with students' satisfaction with E-learning for English study. Performance expectancy indirectly influence students' satisfaction mediated by behavioral intention. The six constructs of performance expectancy, hedonic motivation, facilitating conditions, effort expectancy, social influence, and behavioural intention account for 65.6 % of the total variance in Chinese students' satisfaction with E-learning for English study.

Keywords: Satisfaction; E-learning; English study; UTAUT; hedonic motivation.

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1. INTRODUCTION

Currently, as information and communication technologies (ICT) has advanced extremely fast, we have witnessed they are revolutionizing not only how we work but also how we study. Many corporations and organizations train their employees by using ICT. Numerous colleges and educational institutions work to enhance the caliber of instruction by utilizing e-learning. E-learning encompasses computer-assisted instruction, digital learning, web-based education, interactive learning, and internet-based learning [1-2]. According to Maatuk et al. [3], E-learning is primarily a web-based educational system that uses technology to give learners knowledge or skills. While instruction can take place both within and outside of classrooms, the core of E-learning is computers and the Internet implementation [4]. E-learning is more flexible, convenient, and economical than traditional ways of teaching and learning. Students can learn anytime and anywhere and learn as much as they want to. Nowadays, more and more educational institutions and universities in the world deliver their courses through the network platforms or smartphone apps. Some students who engaged in E-learning have better academic performance and thus they have a positive attitude towards E-learning [5] and are satisfied with it [6]. Others have negative impressions and assessments of E-learning [7], and thus they are unsatisfied with E-learning [8].

Research into the variables that affect how satisfied students are with E-learning may provide insight into the areas on which E-learning should concentrate and what matters most to students engaging in E-learning [9], and promote ongoing and expanded engagement and utilization in E-learning. However, so far, limited studies have been done on the factors which impact satisfaction with E-learning of students, especially for language study, which is the focus of this academic study. Therefore, this study explores the following two questions: (1) What factors will affect students' satisfaction with E-learning? (2) What are the relationships between these factors? This academic study attempts to figure out the crucial factors that exert effect on students' E-learning application satisfaction for language study, figure out the relationships among them, and statistically test the conceptual model based on UTAUT. The study contributes to better understanding of the variables affecting students' satisfaction with E-learning for language study. In addition, some advice will be given to E-learning designers, educational institutions and instructors.

2. LITERATURE REVIEW

2.1 Theoretical Framework

New technology innovations usage and acceptance is frequently presented as one of the most developed research fields. Many theoretical models, originating in psychology, information systems, and sociology, have been developed as a result of research in this field to explain people's intentions to use innovations [10]. The theory of reasoned action (TRA) [11], derived from social psychology, is a popular explanation of human behavior that explains technology adoption and is a forerunner to many other theories [12]. Consequently, technology acceptance model [13] came into being to explain why IS/IT was accepted. Besides, Ajzen [14] demonstrated the capacity of the theory of planned behavior (TPB) to offer a highly helpful theoretical framework for comprehending and forecasting the adoption of novel innovations. To have a better comprehension of technology adoption, the construct of perceived usefulness in TAM and the variables in TPB are merged into a combination model of TAM and TPB [15]. In addition, the model of personal computing utilization, the motivation model, social cognitive theory, and innovation diffusion theory have been developed to investigate the behavioral intention or actual use of technology. Based on empirical and conceptual commonalities across the eight theoretical models mentioned above, unified theory of acceptance and use of technology (UTAUT) was created [12].

UTAUT includes key factors including performance expectancy (PE), social influence (SI), and effort expectancy (EE) that have a direct impact on users' behavioral intentions (BI). And information technology use behavior (UB) can directly correlate with BI and facilitating conditions (FC). Furthermore, the variables of age, experience, gender, and voluntariness of usage moderate the effects of the four major variables—SI, PE, FC, and EE—on BI and UB. UTAUT has been widely applied to explain individuals' use intention and acceptance of technology [16,17], and has been empirically proved to be a robust model in many situations [18-22]. This study investigated students' satisfaction with E-learning adoption for English study, therefore, the UTAUT model was used as the theoretical basis. The following hypotheses

were proposed and some alterations were made to the original UTAUT model (Fig. 1).

H1: PE positively correlates with BI to apply E-learning for studying English.
H2: EE positively correlates with BI to apply E-learning for studying English.
H3: SI positively correlates with BI to apply E-learning for studying English.
H4: FC positively correlates with BI to apply E-learning for studying English.

2.2 Hedonic Motivation

Hedonic motivation (conceived as perceived enjoyment) is taken as an intrinsic motivation, and refers to the enjoyment or delight obtained from utilizing a technology [23] in the context of technology application. Hunde et al. [24] described it as the extent to which the behavior of utilizing a particular system is viewed as enjoyable in and of itself, independent of any performance implications ensuing from system use. Many studies have focused on the importance of intrinsic motivation in technology acceptance research since Venkatesh [25] introduced perceived enjoyment to TAM [26]. HM has been revealed to be positively and significantly connected with users' adoption of technology [27], and also plays a significant influence in intention to adopt technology [28]. Moreover, HM has been discovered to be an important factor in determining behavioral intention to utilize technology in a learning situation [19,24,29,30], and it is also a critical

factor influencing user' satisfaction with technology acceptance [23,31]. In E-learning context, HM is a basic intrinsic motivation which described the degree to which using an E-learning system can be enjoyable [31]. We included HM as a determiner of students' behavioral intention and satisfaction with E-learning for English study.

H5: HM positively correlates with BI to apply E-learning for studying English.
H6: HM positively correlates with SAT with E-learning for studying English.

2.3 Satisfaction

Oliver and Swan [32] defined satisfaction as a person's emotional assessment derived from their experiences and beliefs. It may be regarded as a person's happiness index. Learning satisfaction is the attitudinal factor which can measure the affective respect. A satisfied student usually had positive E-learning experiences [9]. End-user satisfaction, as used in technology, describes users' level of satisfaction with the system's capacity to satisfy their information needs [33]. When end users interact with an E-learning system, they will either feel satisfied or unsatisfied. Research on the variables impacting users' satisfaction produced a variety of results. For example, perceived usefulness, user involvement, user experience, organizational support and user attitude all have a significant influence on user satisfaction [34].
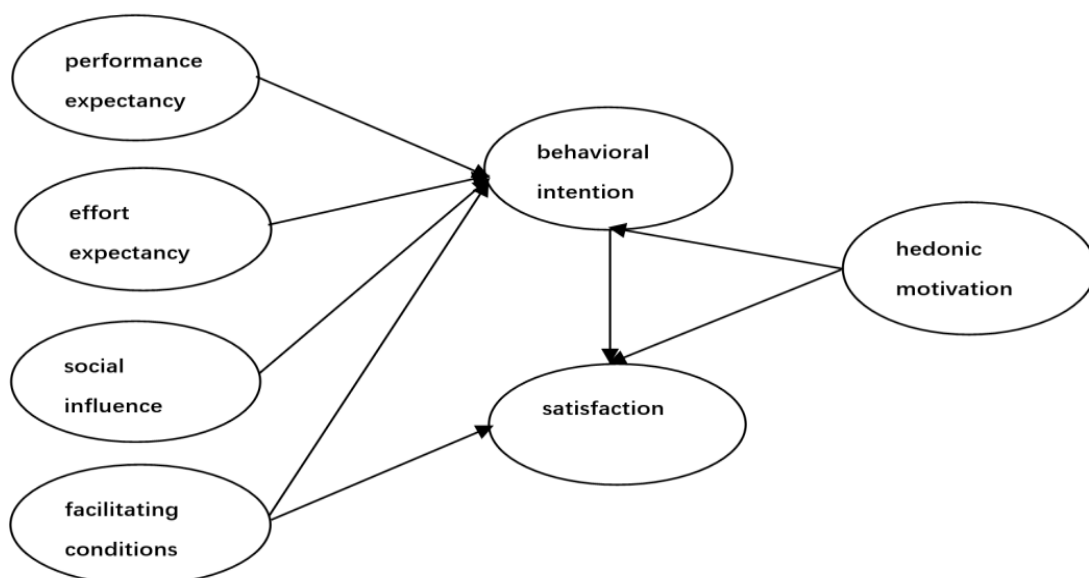

Fig. 1. The proposed model

Martín-Rodríguez et al. [35] evaluated the major factors influencing E-learning satisfaction, and found the course design and contents, the accessibility and visualization of materials on the teaching platform, and the opportunity for interaction were significant variables. A significant impact of BI on satisfaction was found by Shin and Kang [36] who made investigation on the adoption of a mobile learning management system at an online university. This study assumed that FC and BI had a direct and significant effect on students' satisfaction with E-learning for English study. Thus, the following two hypotheses were proposed, and the conceptual mode of the current study was showed in Fig. 1.

H7: FC positively correlates with SAT with E-learning for studying English.
H8: BI positively correlates with SAT with E-learning for studying English.

3. METHODOLOGY

3.1 Data Collection and the Participants

Self-reported data from students at Zhaoqing University in China was gathered through a survey. Convenience sampling was used by the surveyors, who asked 380 freshmen to participate in the investigation. The aims of the current study were illustrated before distributing the questionnaire. The questionnaire consists of three parts. The first part gave an objective description of E-learning; The second part was the main part which included 27 items of the measurement scale; The last part collected the participants' demographic information. Eventually, 338 students participated in the survey. Among the 338 respondents, male accounted for 25.4% and female accounted for 74.6%. Students at the age of 18 and 19 occupied 46.2% and 42.9% respectively. The students who voluntarily used E-learning for English study accounted for 97.9%. The demographic information was showed in Table 1.

3.2 Measurement Scale

The study's instrument, which consisted of 27 items to measure the seven components of EE, SI, FC, PE, BI, HM, and SAT, was developed from earlier research (Table 2). The scale of Venkatesh et al. [12] was used to measure the constructs in UTAUT. BI was assessed using three items, while FC, SI, PE, and EE were measured using four items each. The HM construct originated from Venkatesh et al. [23]. To assess satisfaction, the five-item scale utilized in earlier research [31,37] was used. The scale used a seven-point Likert scale, 1 indicating "strongly disagree" and 7 indicating "strongly agree".

3.3 Data Analysis

The age, voluntariness of use and gender of the respondents were examined using the software SPSS27. Additionally, SPSS27 was used to evaluate each construct's Cronbach alpha value. Next, The validity and reliability of the instrument, as well as the fitness of the measurement model, were evaluated using confirmatory factor analysis (CFA). In order to determine whether the sample data fit the structural model based on UTAUT using Amos24, structural equation modeling (SEM) was finally carried out. SEM is a statistical method that works well for examining complicated variables and causal link systems. In light of this, SEM was used in the current study to analyze the correlations between the seven constructs of PE, SI, EE, FC, HM, BI, and SAT.

Table 1. The participants' demographic information (number=338)

Measure	Category	Frequency	Percent
Gender	Male	86	25.4
	Female	252	74.6
Age	17	16	4.7
	18	156	46.2
	19	145	42.9
	≥20	21	6.2
Voluntariness of use	Voluntary	331	97.9
	Mandatory	7	2.1

Table 2. Items of the scale

Constructs	Items of the scale	Source
performance expectancy	PE1: I am strongly motivated by the recognition from peers. PE2: Using E-learning is helpful for my English study.	Venkatesh et al. [12]
	PE3: E-learning helps me complete English tasks more quickly.	
	PE4: E-learning helps me improve English learning performance.	
effort expectancy	EE1: I can use E-learning.	Venkatesh et al. [12]
	EE2: My interaction with E-learning would be clear and understandable.	
	EE3: Learning to use E-learning is easy for me.	
	EE4: It would be easy for me to become skilled at E-learning.	
social influence	SI1: Those important to me think that I should know how to use E-learning for English study.	Venkatesh et al. [12]
	SI2: Those influencing me think that I should use E-learning for English study.	
	SI3: The university encourages me to use E-learning for English study.	
	SI4: The university supports students' use of E-learning for English study.	
facilitating conditions	FC1：I have the resources necessary to use E-learning for English study.	Venkatesh et al. [12]
	FC2：I have the knowledge necessary to use E-learning for English study.	
	FC3：E-learning is compatible with my English learning needs.	
	FC4：Technical assistance is always available.	
behavioral intention	BI1：I intend to use E-learning to study English in the next months.	Venkatesh et al. [12]
	BI2：I predict I would use E-learning to study English in the next months.	
	BI3：I plan to use E-learning to study English in the next months.	
satisfaction	SAT1: I was very content with using E-learning for English study.	DeLone and McLean [37]; Chao [31]
	SAT2: I was very pleased with using E-learning for English study.	
	SAT3: I was satisfied with E-learning efficiency on English study.	
	SAT4: I felt delighted with using E-learning for English study.	
	SAT5: Overall, I was satisfied with using E-learning for English study.	
hedonic motivation	HM1: Using E-learning to study English is fun.	Venkatesh et al. [23]
	HM2: Using E-learning to study English is enjoyable.	
	HM3: Using E-learning to study English is very entertaining.	

4. RESULTS

4.1 Validity and Reliability

The validity and reliability of the instrument, as well as the fitness of the measurement model, were assessed using CFA with maximum likelihood estimation. In order to verify the validity of the variables, PE1 was eliminated because the factor loadings of all the variables—aside from PE1—were found to surpass 0.5 [38]. To evaluate the validity of the instruments, average

variance extracted (AVE) was also used in addition to factor loadings. Each construct's AVE value (Table 4) is 0.603 (EE), 0.549 (SI), 0.671 (PE), 0.560 (FC), 0.770 (BI), 0.744 (HM), and SAT (0.677). This indicated that all unobserved variables' AVE values exceeded 0.5 [39], further supporting the measurement scale's good validity.

The Cronbach's alpha values of PE, FC, EE, SI, HM, BI, and SAT were, respectively, 0.858, 0.827, 0.857, 0.817, 0.894, 0.907, and 0.912 (Table 3), exceeding 0.7 [40]. CR values (Table 4) surpassed 0.7 [41]: EE, 0.857; SI, 0.826; PE, 0.860; FC, 0.835; BI, 0.909; HM, 0.897 and SAT, 0.913.

4.2 Measurement Model

The study's findings showed that the sample data—X^2/df: 3.121; The Tucker–Lewis index (TLI): 0.886; The incremental fit index (IFI): 0.904; The comparative fit index (CFI): 0.903; RMSEA: 0.079—did not very well fit the measurement model. Thus, in order to enhance the measurement model, SI1 was eliminated. Thus, the updated measurement model's fit indices were good (Table 5). The chi-square value of the modified model was 712.395 (p < 0.001) and the degrees of freedom was 254. The normed chi-square value was 2.805, lower than the suggested value of 5.0 [42]. TLI was 0.907; CFI was 0.921; IFI was 0.922. All the values of IFI, TLI and CFI were greater than the standard criterion of 0.90 [42]. The mean square error of approximation (RMSEA) was 0.073, lower than the threshold of 0.08 [42].

4.3 Structural Model

The statistical findings showed that the data fit the structural model satisfactorily (Table 6). The chi-square value was 714.138 and the degrees of freedom was 257 (p < 0.001). The X^2/df ratio was 2.799, within the suggested range (< 5.0) [42]. Moreover, the other fit indices exceeded the recommended criterion of 0.90 [42] : 0.922 (IFI); 0.908 (TLI) and 0.922 (CFI). The RMSEA was 0.073, without surpassing 0.08 [42].

Table 3. The factor loading and Cronbach's alpha of the constructs

Constructs	Items	Factor loading	Cronbach's alpha
performance expectancy	PE2	0.806	0.858
	PE3	0.814	
	PE4	0.911	
effort expectancy	EE1	0.684	0.857
	EE2	0.702	
	EE3	0.855	
	EE4	0.850	
social influence	SI1	0.589	0.817
	SI2	0.676	
	SI3	0.837	
	SI4	0.830	
facilitating conditions	FC1	0.765	0.827
	FC2	0.813	
	FC3	0.701	
	FC4	0.709	
behavioral intention	BI1	0.863	0.907
	BI2	0.856	
	BI3	0.912	
hedonic motivation	HM1	0.820	0.894
	HM2	0.872	
	HM3	0.893	
satisfaction	SAT1	0.800	0.912
	SAT2	0.870	
	SAT3	0.823	
	SAT4	0.849	
	SAT5	0.769	

Table 4. CR, AVE and discriminant validity of the constructs

	CR	AVE	PE	EE	SI	FC	BI	HM	SAT
PE	0.860	0.671	**0.819**						
EE	0.857	0.603	0.430***	**0.777**					
SI	0.826	0.549	0.577***	0.550***	**0.741**				
FC	0.835	0.560	0.456***	0.687***	0.736***	**0.748**			
BI	0.909	0.770	0.508***	0.440***	0.616***	0.700***	**0.877**		
HM	0.897	0.744	0.518***	0.448***	0.559***	0.556***	0.530***	**0.863**	
SAT	0.913	0.677	0.480***	0.495***	0.556***	0.619***	0.599***	0.766***	**0.823**

Table 5. Modified measurement model fit indices

	X^2	df	X^2/df	IFI	TLI	CFI	RMSEA
Fit Indices	712.395	254	2.805	0.922	0.907	0.921	0.073
Suggested Value			<5	≥0.90	≥0.90	≥0.90	≤0.08

Table 6. Structural model fit indices

	X^2	df	X^2/df	IFI	TLI	CFI	RMSEA
Fit Indices	714.138	257	2.799	0.922	0.908	0.922	0.073
Suggested Value			<5	≥0.90	≥0.90	≥0.90	≤0.08

The results of the empirical research showed among the eight hypotheses, six hypotheses were confirmed, whereas H2 and H3 were not supported (Table 7). It was found that PE directly connected with BI ($\beta_{PE \to BI}$ = 0.188, t = 2.959, p < .01). However, EE and SI exerted no significant impact on BI ($\beta_{EE \to BI}$ = -0.138, t = -1.868, p > .05; $\beta_{SI \to BI}$ = 0.091, t = 1.137, p > .05). Furthermore, FC positively and directly correlated with BI ($\beta_{FC \to BI}$ = 0.575, t = 5.477, p < .001) and SAT ($\beta_{FC \to SAT}$ = 0.193, t = 2.877, p < .01). Besides, HM was significantly connected with BI ($\beta_{HM \to BI}$ = 0.128, t = 2.071, p < .05) and SAT ($\beta_{HM \to SAT}$ =

0.575, t = 9.561, p < .001). BI was positively and directly related to SAT ($\beta_{BI \to SAT}$ = 0.158, t = 2.512, p < .05). Additionally, the findings showed EE, SI, PE, HM, FC, and BI accounted for 65.6% of the total variance in students' satisfaction with E-learning implementation to learn English, and EE, PE, SI, HM, and FC explained 56% of the total variance in the behavioral intention to apply E-learning for English study. Thus, the correlations between the eight constructs in this investigation, as shown in Fig. 2 were validated by these statistical data.
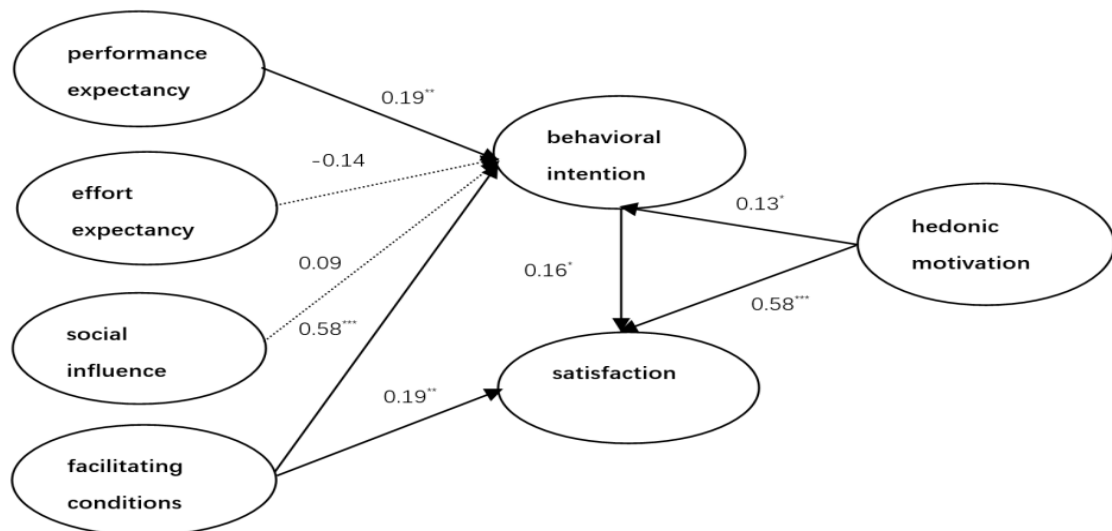

Fig. 2. The SEM results of the proposed model

Table 7. Test results of hypotheses

Hypothesis	Result
H1: PE positively correlates with BI to apply E-learning for studying English.	Supported
H2: EE positively correlates with BI to apply E-learning for studying English.	Unsupported
H3: SI positively correlates with BI to apply E-learning for studying English.	Unsupported
H4: FC positively correlates with BI to apply E-learning for studying English.	Supported
H5: HM positively correlates with BI to apply E-learning for studying English.	Supported
H6: HM positively correlates with SAT with E-learning for studying English.	Supported
H7: FC positively correlates with SAT with E-learning for studying English.	Supported
H8: BI positively correlates with SAT with E-learning for studying English.	Supported

5. DISCUSSION

EE was not positively and directly related to BI, consistent with the current research [43]. Chinese Z generation are familiar with and skilful at using E-learning, thus EE was not considered as a predictor of BI. Moreover, it was discovered that there was no direct and positive correlation between SI and BI, which is consistent with the findings of earlier research [24]. This implies that while deciding whether to use E-learning for their English study, Chinese students might give careful consideration to their own personal experiences and ideas.

PE was revealed to have a positive and substantial relationship with BI, conforming to the existing studies [44,45]. This indicates that college students plan to apply E-learning to improve their English study skills if they perceive E-learning does good to enhance their English learning ability and performance. Additionally, FC positively and strongly influenced BI, aligning with the past studies [16,46]. FC was also revealed to positively and directly correlate with satisfaction. Such results indicate that if resources, knowledge, and assistance supporting are available for students to use E-learning during the process of learning English, Chinese students are likely to adopt and satisfied with E-learning for English study.

HM had positive and direct effect on BI, which is in line with prior literature [19,30,43]. And it also exerted significant influence on satisfaction, supported by previous research [23,31]. Such results show that if students believe E-learning to be fun and enjoyable, they are inclined to apply and satisfactory with E-learning for English study. Lastly, BI played an important role in satisfaction, which was confirmed by empirical studies [36,47]. It indicates that students will be satisfied with E-learning for English study if they have intention to adopt it.

6. CONCLUSION

The current study aims to find out the factors affecting Chinese students' satisfaction with E-learning for their English acquisition, and the correlations among these variables. The results revealed that FC, PE and HM had a significant and positive impact on BI, but SI and EE did not directly and significantly affect BI. Furthermore, BI, FC and HM directly correlated with students' satisfaction with E-learning for English study. PE indirectly influenced students' satisfaction mediated by BI. PE, HM, FC, EE, SI, and BI accounted for 65.6 % of the total variance in Chinese students' satisfaction with E-learning for English study.

This study empirically validated a conceptual model to evaluate students' satisfaction with E-learning for English study. Additionally, the study helps to better comprehend the variables influencing students' satisfaction with E-learning for acquiring English and adds to the body of knowledge in this context. In addition, because PE directly influenced students' behavior intention, and in turn affects students' satisfaction, E-learning designers, educational institutions and teachers should focus on enhancing the E-learning system and delivering high-quality E-learning materials and knowledge to assist students to make their English learning more effective. Besides, HM exerted significant impact on students' behavioral intention and satisfaction as well, thus, E-learning designers and instructors should attach great importance to making E-learning more diversified, interesting and fun, which can stimulate students' intrinsic motivation to adopt E-learning, and result in students' stronger intention to use it and their satisfaction with it. When students have good learning experiences, they will be satisfied with E-learning for English study.

Regarding limitations, the sample size of this study was restricted to a single institution, and its

conclusions should be taken cautiously because satisfaction levels with E-learning for English study may change at other universities. Future research can examine whether voluntariness and experience can moderate satisfaction and behavioral intention. Moreover, some other factors such as learning outcomes and attitude can be considered to influence students' satisfaction in future investigation.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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