

FACTORS AFFECTING COLLEGE STUDENTS' INTENTION TO USE U-LEARNING FOR ENGLISH STUDIES IN SICHUAN, CHINA

Xi Fan^{1*}, Somsit Duangekanong¹, Mengyu Xu¹

Graduate School of Business and Advanced Technology Management,
Assumption University, Bangkok, Thailand, 10240

Received: September 7, 2021

Revised: September 30, 2021

Accepted: October 5, 2021

ABSTRACT

This research aims to examine the effects of perceived ease of use, social influence, service quality, perceived usefulness, satisfaction, and attitude toward using on intention to use of u-learning system for English studies among college students. This study applied technology acceptance model (TAM), information systems success theory (IS success theory) and unified theory of acceptance and use of technology (UTAUT) to propose a conceptual framework. The quantitative approach was employed to collect the data. Prior to data collection, Item-Objective Congruence (IOC) and Cronbach's Alpha (CA) were used to ensure validity and reliability of constructs. The data were gathered by using purposive and convenience sampling. For data analysis, confirmatory factor analysis (CFA) was carried out to test factor loadings, convergent validity, discriminant validity and fit model. Structural equation model (SEM) was utilized to confirm the hypotheses and relationships among constructs. The results indicated that perceived ease of use, social influence, service quality, perceived usefulness, satisfaction and attitude were factors affecting college students' intention to use u-learning for their English studies. In addition, perceived ease of use has the strongest impact on intention to use. For practical application, system developers and academic practitioners are recommended to improve perceived ease of use and perceived usefulness of u-learning systems, to ensure the service quality of the system, to increase satisfaction level of students and promote a positive attitude to the systems. Furthermore, educators are suggested to emphasize the importance and advantages of u-learning for more efficient study and motivational environment of English classes among college students.

Keywords: U-learning, Perceived ease of use, Social influence, Service quality, Perceived usefulness, Satisfaction, Attitude toward use, Intention to use

Introduction

Ubiquitous learning (u-learning) refers to a learning environment which provides self-paced learning, lifelong learning and interactive learning with timely feedback and support. U-learning is a new way of learning that is

delivered by electronic' devices with internet access such as personal computer, tablet, mobile and smart phones (Casey & Mifsud, 2005; Ley, 2007; Tan, Liu, & Chang, 2007; Shih, Chu, Hwang, & Kinshuk, 2011). According to the survey from Pearson Education, 81% of global respondents believe

*corresponding author: e-mail: 3977321@qq.com

that learning style has become more and more independent. Globally, nearly 76% of respondents believe that college students demand more online learning courses. About 80% of learners in China, the United States, Australia and Europe said that they have been engaging with online professional short-term courses (Hong, 2019). From the statistics above, it is concluded that self-learning has been becoming a trend, and u-learning is more popular than ever.

U-learning is a very practical and effective way for language study. According to former studies, u-learning is the most frequently used for learning method in field of language training courses (Joiner, Nethercott, Hull, & Reid., 2006; Chen & Li, 2010; Liu & Chu, 2010). It is explained as comprehensive learning, which means that a learner does not only learn a subject, but also obtains related knowledge in the process of learning. For instance, students are studying French in a language station, the station might provide related information and knowledge like French history or culture afterwards (Megan, 2020). College's English learning in China had developed since the restoration of college's entrance examination in 1978. Since then, English had become a compulsory subject that students could graduate on a condition to pass English examinations for entering universities. As more students chose to study abroad after finishing undergraduate or even senior high school, the role of English learning has been exerted a greater importance. In the 2000s, a large-scale language tutoring agencies has emerged. Those agencies provide modern learning platforms for students to study English. English learning is not restricted to classrooms or universities, people of different ages and identities have more opportunities to learn English at any time and any place. Therefore, English learning in China becomes much more diversified (China Daily, 2016).

The technology related to teaching and learning that have been arisen dramatically due to Covid19 outbreak. The problem stated that many students are prohibited to have face-to-face contact and physical class have been avoided. Most schools and universities must adopt quickly to use different kinds of online learning. Therefore, u-learning integrates online solutions in order to help educators continuing their classes during the pandemic. Since English learning in universities has evolved from traditional classroom learning to u-learning in order to provide college students with a better learning environment, it is necessary for researchers to figure out what factors impacting college students' intention to engage u-learning for their English lessons. The researchers intend to provide additional knowledge for the adoption of u-learning for English language studies in universities. In addition, the findings of this study would highly contribute for the technological practices among system developers, educators and practitioners to consider the influential factors to develop or use the u-learning integrated with the educational programs

Literature Review

Theories used in the study

In this study, three theories were utilized to construct the research framework, which include technology acceptance model (TAM), information success theory (IS success theory) and Unified Theory of Acceptance and Use of Technology (UTAUT).

Firstly, technology acceptance model (TAM) was developed by Davis (1989) which indicates whether people accept a technology or not and is significantly influenced by perceived ease of use and perceived usefulness of the technology. Later, TAM was incorporated with social influence in the model (Hsu & Lu, 2004).

Secondly, information success theory (IS success theory) was stated by DeLone and McLean (1992) which pointed out that people's acceptance of a certain information theory depends on system quality and information quality. (DeLone & McLean, 2003). The original IS success theory was updated with adding service quality into the model. In the new model, information quality, system quality, and service quality affect users' satisfaction and adoption of information system.

Thirdly, unified theory of acceptance and use of technology (UTAUT) is developed by Venkatesh, Morris, Davis, & Davis (2003). It is widely used in most research to investigate the adoption of information technology. The full model is constructed with key variables such as performance expectancy, effort expectancy, social influence and facilitating conditions that have impact on intention to use toward actual usage. This study emphasizes social influence from UTAUT which predicts perceived usefulness that effect intention to use u-learning (Cheung & Lee, 2009; Kim, Ferrin, & Rao, 2009; Venkatesh, Thong, Chan, Hu, & Brown, 2011; Wang & Chiang, 2009).

Perceived ease of use

Zhang, Zhao, and Tan (2008) indicated that perceive ease of use is when users believe that using a technology is easy. According to Kao and Lin (2018), perceived ease of use refers to what performance users can conduct by using online learning systems. Teo, Lim, and Lai (1999) stated that people hold a positive opinion toward a system if they think the system is easy to utilize. Dalhberg, Guo, and Ondrus (2015) demonstrated that perceived ease of use plays a significant role in predicting consumers behavior to make a payment by mobile phones. In research of Van der Heijden (2004), perceived ease of use had a positive effect on online consumers' intention to browse entertainment websites both directly and indirectly via perceived usefulness.

Perceived usefulness

In field of ubiquitous learning, perceived usefulness is the belief of users that ubiquitous learning can help them derive study quality (Lin, 2013). For mobile payment context, perceived usefulness presents what extent that mobile payment system is advantageous to people (Kalinic, Marinkovic, Molinillo, & Liebana-Cabanillas, 2019). Former researchers focus on online banking which indicated that perceived usefulness exerts a great influence on users' attitude and intention (Celik, 2008; Chau & Ngai, 2010; Cheng, Lam, & Yeung, 2006; Chiou & Shen, 2012; Lee, 2009 a). According to a report of mobile commerce in Taiwan, perceived usefulness was proved to have a positive impact on people's behavioral intention toward mobile commerce (Hung, Hwang, & Hsieh, 2007; Lin & Shih, 2008).

Social influence

Social influence is to what extent that people see an importance of other persons' ideas and behaviors (Venkatesh & Davis, 2000). Kim, Ko, and Takahashi (2008) explained social influence as how people are affected by others and imitate others' behaviors. Teo and Pok (2003) postulated that when a new behavior emerges, social influence exerts a strong effect on behavioral intention. Social influence is explained in three aspects. The first aspect is an agreement with others in own mind. For second aspect, people's decision is affected by famous people. The third aspect is an agreement with others and a person presents his or her point of view in a public (Kelman, 1958). Mallat, Rossi, Tuunainen, and Öörni (2006) pointed out that people's acceptance of a certain product or technology is significantly influenced and decided by advice from others.

Service quality

Service quality is a system which fulfills users' needs. It represents trust, timely response and focus of individual needs (DeLone & McLean, 2004; Ahn, Ryu, & Han, 2007; Wang & Lin,

2012). Gronroos (1984) proposed that service quality is a comparison and evaluation between the perception of service and the obtained actual service. Sufficient and good service quality from IT department and workers make users perceive that the system is helpful (Park, Roman, Lee, & Chung, 2009; Lee, 2010). Gefen (2002) indicated that online service quality exerts a positive effect on users' trust and loyalty. Per the study of Allen, Mahto, and Otondo (2007), under the circumstance of job's online hunting, as job seekers are not able to contact with employers directly, a company's website is viewed as a service quality that significantly attracts job hunters.

Attitude toward use

Al-Debei, Al-Lozi, and Papazafeiropoulou (2013) defined attitude as the degree whether a person accept a behavior or not before taking actions. Kim and Woo (2016) described attitude as an individual assessment of a certain object in a positive or negative way. Nunnally and Bernstein (1994) mentioned that attitude is a social interaction that people exchange their own opinions with each other and to prove or disapprove others' opinions, as well as to impact others. Previous studies showed that attitude was a significant factor of users' acceptance of information technology (Angst & Agarwal, 2009; Bhattacharjee & Sanford, 2006; Kitcharoen, & Vongurai, 2021).

Satisfaction

Oliver (1980) defined satisfaction as individuals' psychological responses to the product or service they receive. Bitner and Hubbert (1994) proposed that, in terms of commercial activities, satisfaction refers to a personal evaluation after engaging a certain purchasing occasion. An effect of satisfaction is that it builds trust between customers and brands (Hyun, 2010; Roman, 2003; Singh & Sirdeshmukh, 2000). Numerous researchers indicated that websites serve as a gateway between customers and companies, so its

interface might affect satisfaction of customers who experience in surfing product information via online channel (Anderson & Srinivasan, 2003; Bansal, McDougall, Dikolli, & Sedatole, 2004). Assael (1987) found that satisfaction plays a significant role on customer's positive attitude toward a certain product or service, which promotes consumers repurchase behavior.

Intention to use

In terms of technology acceptance, intention to use is defined as a possibility of utilizing the technology (Karjaluoto, Shaikh, Leppaniemi, & Luomala, 2020; Benjangjaru & Vongurai, 2018). For internet's surfing and obtaining information, intention to use is explained as people's tendency to use a certain website to look for necessary information (Sumaedi, Bakti, Rakhmawati, Astrini, & Jati, 2020). As far as online technology is concerned, users' satisfaction can boost a positive attitude and intention to use the technology (Wu & Liu, 2007; Lee, 2009 b). Perceived usefulness of information technology is considered to be the most influential element in predicting users' intention to utilize the technology (Venkatesh, Thong, & Xu, 2012; Venkatesh et al., 2003). Miltgen, Popovič, and Oliveira (2013) discovered that people's strong intention to use information technology can promote and probably recommend the technology to others.

Research Hypotheses

Perceived ease of use and perceived usefulness

Many empirical research showed that perceived usefulness was affected directly and indirectly by perceived ease of use (Davis, 1989; Venkatesh & Davis, 2000). According to Bruner and Kumar (2005), if a system is easy to operate and improve users' work efficiency, they perceive that the system is useful. Hence, the researcher proposed the following hypothesis:

H1: Perceived ease of use has a positive effect on perceived usefulness.

Social influence and perceived usefulness

According to previous studies, perceived usefulness was positively affected by social influence (Venkatesh & Davis, 2000; Yi, Wu, & Tung, 2005). In terms of online commerce, consumers' behavioral intention was influenced by social influence via perceived usefulness (Cheung & Lee, 2009; Kim et al., 2009; Venkatesh et al., 2011; Wang & Chiang, 2009). Thus, the following hypothesis was set: H2: Social influence has a positive effect on perceived usefulness.

Service quality and perceived usefulness

Former studies on consumers' satisfaction in retail industry found that service quality of check out system affected perceived usefulness of consumers (Fernandes & Pedroso, 2017). Ayo, Oni, Oyerinde, and Eweoya (2016) carried out a series of research on online banking and confirmed that perceived usefulness of users was significantly affected by service quality of online banking systems. The theoretical relationship was derived to determine a hypothesis:

H3: Service quality has a positive effect on perceived usefulness.

Perceived usefulness and attitude toward use

In technology acceptance model, perceived usefulness is an important factor of attitude (Childers, Carr, Peck, & Carson, 2001; Curran & Meuter, 2005; Kleijnen, Wetzels, & de Ruyter, 2004; Nysveen, Pedersen, & Thorbjørnsen, 2005; Porter & Donthu, 2006; Robinson, Marshall, & Stamps, 2005). Previous studies about online banking business showed that perceived usefulness had a positive effect on users' attitude and intention (Celik, 2008; Chau & Ngai, 2010; Cheng et al., 2006; Chiou & Shen, 2012; Lee, 2009 a). Hence, the proposed hypothesis was derived: H4: Perceived usefulness has a positive effect on attitude toward use u-learning.

Satisfaction and attitude toward use

Assael (1987) indicated that satisfaction is an important factor of consumers' positive attitude, which raise the possibility of repurchasing. According to Olsen (2002), consumers' attitude toward products was influenced by satisfaction. From u-learning perspective, this study hypothesized that satisfaction positively effects attitude toward using ubiquitous learning as stated in the following hypothesis: H5: Satisfaction has a positive effect on attitude toward use u-learning.

Perceived usefulness and intention to use

Rogers (1995) posited that it would be easier for people to accept new things or ideas in condition to that they believe the new things are outstanding and helpful. Nysveen et al. (2005) stated that if users perceive a service is beneficial to solve problems and improve work efficiency, users' intention to use the service would be very high. Thus, the following hypothesis was proposed:

H6: Perceived usefulness has a positive effect on intention to use u-learning.

Attitude toward use and intention to use

Previous studies affirmed a point of view that people's behaviors rely on and are influenced by their attitude (Bobbitt & Dabholkar, 2001; Fishbein & Ajzen, 1975). In online banking concept, researchers showed that users utilize online banking systems and service if they have a positive attitude toward using the systems and service (Lai & Li, 2005; Cheng et al., 2006; Suh & Han, 2002; Lee, 2009 a; Chiou & Shen, 2012). Therefore, this study proposed that attitude toward use potentially effects intention to use, with the assumptions shown below.

H7: Attitude toward use has a positive effect on intention to use u-learning.

Satisfaction & intention to use

Numerous studies showed that satisfied website users have a high intention to revisit and use the website. Consequently, they would suggest

others use it (Collier & Bienstock, 2006; Cristobal, Flavian, & Guinaliu, 2007; Bansal et al., 2004; Wolfinbarger & Gilly, 2003). On the contrary, other studies indicated that dissatisfied website users reduce reliance on the website or even refuse to use the website, thus, they look for other websites as replacement (Anderson & Srinivasan, 2003; Yoo & Donthu, 2001). Based on this discussion, the following hypothesis was proposed.

H8: Satisfaction has a positive effect on intention to use u-learning.

Perceived ease of use and intention to use

Doll and Torkzadeh (1988) attested that in terms of technology acceptance, users tend to employ a technology that is easy to use. Chang, Li, Hung, and Hwang (2005) theorized that if people perceive an online service system is easy to use, it probably raises their intention to use the system. Hence, the researcher hypothesized that perceived ease of use positively impacts intention to use:

H9: Perceived ease of use has a positive effect on intention to use u-learning.

Research Methods and Materials

Research framework

The research framework was constructed based on four previous empirical studies. Firstly, Kao and Lin (2018) studied how service quality, perceived ease of use, perceived usefulness and other factors impacted usage intention of e-learning for police education. Secondly, Hu and Lai (2019) examined factors influencing students' behavioral intention to use learning management systems on computer and mobile which showed that social influence was one of the important variables to be considered in this study. Thirdly, Athiyaman (1997) carried out on how students' satisfaction influenced attitude toward service quality of the university, and together impacted students' communication behaviors. Lastly, Kashive, Powale, and Kashive (2020) investigated factors affecting both professionals' and students' intention to use artificial intelligence that enabled e-learning, and how satisfaction and attitude impacted intention to use e-learning. The research framework of this study is illustrated in Figure 1.

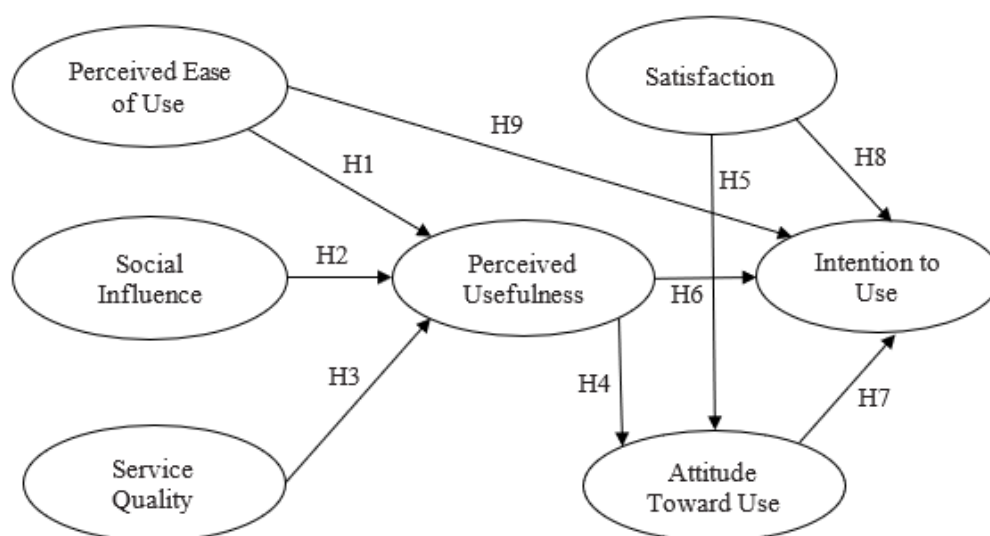


Figure 1 Conceptual framework

The study aims to examine how perceived ease of use, social influence, service quality perceived usefulness, satisfaction and attitude toward use affect college students' intention to use u-learning for English studies in Sichuan, China. 7 variables and 9 hypotheses were developed as a research framework.

Methodology

This research applied a quantitative method to distribute online questionnaires for data collection. There are three parts in the questionnaire. The first part is screening questions, the second part is scale items with 5-point Likert scale and the last part is respondents' demographic questions.

Before collecting data, Item-Objective Congruence (IOC) was validated by the rating score of three experts. Cronbach's Alpha (CA) reliability test was employed to 30 participants for a pilot study. Afterwards, the survey was distributed to 500 respondents for the data gathering. The sampling technique was applied by using purposive to select the second-year undergraduate students and convenience sampling to distribute survey via online channels. The data were analyzed by confirmatory factor analysis (CFA) and structural equation model (SEM), using SPSS and AMOS software.

Population and sample size

According to Schmidt and Pardo (2014), target population is a group of people that is chosen to be studied in research. In this study, the researchers select the second year of undergraduate students who have been studying school of mathematics and school of economics and management at Southwest

Jiaotong University in Sichuan province of China as a target population. The reason for the target selection was that the second-year students are appropriate group that have sufficient experience in u-learning for English studies, comparing to the freshmen and not as busy as the third and the fourth-year students. According to Kline (2011), sample size is a quantity of sampling that researcher considers including in the research. The minimum sample size of 425 was recommended by Soper (n.d.). As a result, the researcher considered 500 samples to be a proper sample size for this study.

Sampling technique

In this study, the researcher applied purposive sampling to select the second-year undergraduate students who have been studying school of mathematics and school of economics and management at Southwest Jiaotong University in Sichuan province of China and convenience sampling to distribute online questionnaires to 500 participants.

Purposive sampling

According to Robinson (2014), purposive sampling is purposeful selection of respondents who can represent characteristics relevant to the research objectives. In this study, the criteria used to select the target population was the participants who are second year of undergraduate students in school of mathematics and school of economics and management at Southwest Jiaotong University in Sichuan province of China. Those students must have experience in using u-learning for their English classes. The proportional calculation of sample size is presented in Table 1.

Table 1 Sample size (second year undergraduate students)

School	Population size	Proportional sample size (N = 500)
School of mathematics	207	139
School of economics and management	537	361

Convenience sampling

According to Cooksey and McDonald (2019, p. 858), convenience sampling is the selection of respondents who are effort-free and cost-minimized to reach for the data collection. Questionnaires were distributed via online and social media channels which include WeChat and QQ that allow respondents to complete at their convenience.

Results and Discussion

Demographic information

According to Table 2, among 500 respondents, 47.81% were male and 52.19% were female. Most respondents had been using u-learning for English classes more than 3 months but less than 1 year. For time spent on weekly English learning, 1 hour to 5 hours ranked the first place. Nearly half of respondents aim to improve English reading through u-learning. More than 90% of respondents preferred using mobile phone as the equipment to attend u-learning for English courses.

Table 2 Demographic Information

N = 500	Percentage	
Gender	Male	47.81%
	Female	52.19%
Experience in u-learning for English classes	< 3 months	27.49%
	3 months-1 year	53.19%
	> 1 year	19.32%
Time spent per a week for English learning	< 1 hour	18.13%
	1 hour-5 hours	51.59%
	> 5 hours	30.28%
Literacy skills improvement purpose	Listening	37.65%
	Speaking	16.14%
	Reading	40.24%
	Writing	5.98%
Preferred devices for u-learning	Computer	9.16%
	Mobile phone	90.84%

Confirmatory factor analysis (CFA)

According to Hair, Anderson, Tatham, and Black (2010), confirmatory factor analysis

(CFA) is widely used to examine the variables and scale items which draws a conclusion to approve the measurement model. As of Table

3, factor loadings of each variable were above 0.5, t-value > 1.98 and p-value < 0.05 (Hair et al., 2010). Composite reliability (CR) was greater than 0.7 and average variance extracted (AVE) was greater than 0.5 (Fornell & Larcker, 1981). In summary, all estimates were significant.

Table 3 Confirmatory factor analysis result, composite reliability (CR) and average variance extracted (AVE)

Variables	Source of questionnaire (measurement indicator)	No. of item	CA	Factors loading > 0.5	S.E.	t-value > 1.98 & p-value < 0.5	CR > 0.7	AVE > 0.5
Perceived ease of use (PEOU)	Du, Zhu, Zhao, and Lv (2012), Lin (2013), Gao and Bai (2014)	4	0.875	0.716-0.965	0.035-0.035	23.195***-20.588***	0.878	0.646
Social influence (SI)	Du et al. (2012), Lu (2014), Bashir and Madhavaiah (2015)	5	0.887	0.743-0.910	0.040-0.041	20.500***-21.180***	0.889	0.617
Service quality (SQ)	Zhou (2011), Aboelmaged (2018)	4	0.860	0.711-0.907	0.040-0.040	20.548***-18.692***	0.863	0.614
Perceived usefulness (PU)	Watjatrakul (2013), Du et al. (2012), Cheng (2020)	5	0.890	0.731-0.911	0.038-0.040	22.611***-20.051***	0.891	0.623
Satisfaction (SA)	Watjatrakul (2013), Carlson and Cass (2010), Yu, Roy, Quazi, Nguyen, and Han, (2017), Cheng (2020)	4	0.863	0.727-0.908	0.041-0.043	19.338***-20.552***	0.866	0.619
Attitude toward using (ATT)	Loiacono and McCoy (2018), Bashir and Madhavaiah (2015)	4	0.864	0.729-0.922	0.040-0.042	19.747***-20.903***	0.867	0.622
Intention to use (IU)	Watjatrakul (2013), Gao and Bai (2014), Du et al. (2012)	6	0.903	0.744-0.919	0.038-0.039	21.163***-22.023***	0.904	0.612

*** = Significant at the 0.05 significant levels ($p < 0.05$)

Remark CA = Cronbach's Alpha, CR = Composite reliability, AVE = Average variance extracted

According to Fornell and Larcker (1981), discriminant validity was evaluated by computing the square root of each AVE. In this study, the value of discriminant validity was larger than all inter-construct factor correlations, therefore, the discriminant validity was considered to be acceptable as shown per Table 4.

Table 4 Discriminant validity

	PEOU	SI	SQ	PU	SA	ATT	IU
PEOU	0.804						
SI	0.565	0.785					
SQ	0.590	0.571	0.784				
PU	0.587	0.507	0.572	0.789			
SA	0.581	0.569	0.580	0.554	0.787		
ATT	0.536	0.532	0.590	0.589	0.561	0.789	
IU	0.618	0.561	0.554	0.577	0.574	0.567	0.782

Remark The diagonally listed value is the AVE square roots of the variables

As shown in Table 5, the fit model of CFA presented that CMIN/DF, GFI, AGFI, CFI, NFI, TLI and RMSEA were measured to confirm convergence validity and discriminant validity. All estimates were greater than acceptable values. Therefore, the convergence validity and discriminant validity were ensured.

Table 5 Goodness of fit for confirmatory factor analysis (CFA)

Index	Criterion	Statistical values
χ^2/df (CMIN/df)	< 3 (Hair et al., 2010)	1.143
GFI	> 0.90 (Bagozzi & Yi, 1988)	0.940
AGFI	> 0.85 (Sica & Ghisi, 2007)	0.929
CFI	> 0.95 (Hu & Bentler, 1999)	0.994
NFI	> 0.95 (Arbuckle, 1995)	0.953
RMSEA	< 0.08 (Hu & Bentler, 1999)	0.017
Model summary		Acceptable model fit

Remark CMIN/df = The ratio of the chi-square value to degree of freedom, GFI = goodness-of-fit index, AGFI = adjusted goodness-of-fit index, CFI = comparative fit index, NFI = normalized fit index, and RMSEA = root mean square error of approximation.

Structural equation model (SEM)

According to Jöreskog and Sörbom (1993), structural equation model (SEM) is a tool that utilizes parameters in the observation variables and latent variables analysis. Besides, it examines the relationships with latent variables. Per Table 6, SPSS AMOS

was used to measure and modify the model of the Goodness of Fit index for structural equation model. Consequently, the fitting values were all acceptable including CMIN/df = 1.213, GFI = 0.937, AGFI = 0.925, CFI = 0.991, TLI = 0.990, and RMSEA = 0.021.

Table 6 Goodness of fit for structural equation model (SEM)

Index	Criterion	After adjustment
χ^2/df (CMIN/df)	< 3 (Hair et al., 2010)	1.213
GFI	> 0.90 (Bagozzi & Yi, 1988)	0.937
AGFI	> 0.85 (Sica & Ghisi, 2007)	0.925
CFI	> 0.95 (Hu & Bentler, 1999)	0.991
NFI	> 0.95 (Arbuckle, 1995)	0.990
RMSEA	< 0.08 (Hu & Bentler, 1999)	0.021
Model summary		Acceptable model fit

Remark CMIN/df = The ratio of the chi-square value to degree of freedom, GFI = goodness-of-fit index, AGFI = adjusted goodness-of-fit index, CFI = comparative fit index, NFI = normalized fit index, and RMSEA = root mean square error of approximation.

The significance of each variable was calculated by regression weights and R^2 variance. All hypotheses' results of the structural model in Table 7 were significantly supported when $p = 0.05$. Perceived usefulness has the strongest effect on attitude toward use at $\beta = 0.428$, followed by perceived ease of use on intention to use ($\beta = 0.424$), satisfaction on attitude

toward use ($\beta = 0.418$), perceived ease of use on perceived usefulness ($\beta = 0.359$), service quality on perceived usefulness ($\beta = 0.334$), satisfaction on intention to use ($\beta = 0.290$), attitude toward use on intention to use ($\beta = 0.209$), and social influence on perceived usefulness ($\beta = 0.129$). Hence, all estimates were supported.

Table 7 Hypothesis result of the structural model

Hypothesis	Standardized path coefficients (β)	t-value	Test result
H1: PEOU \rightarrow PU	0.359	6.265***	supported
H2: SI \rightarrow PU	0.129	2.316***	supported
H3: SQ \rightarrow PU	0.334	5.759***	supported
H4: PU \rightarrow ATT	0.428	8.278***	supported
H5: SA \rightarrow ATT	0.418	8.140***	supported
H6: PU \rightarrow IU	0.232	2.528***	supported
H7: ATT \rightarrow IU	0.209	3.655***	supported
H8: SA \rightarrow IU	0.290	3.510***	supported
H9: PEOU \rightarrow IU	0.424	5.954***	supported

*** $p < 0.05$

The results from table 7 are summarized as followed:

H1: The standardized path coefficient between perceived ease of use and perceived usefulness was 0.359 (t-value = 6.265***). Therefore,

perceived ease of use had a positive effect on perceived usefulness. Consequently, H1 was supported.

H2: The standardized path coefficient between social influence and perceived usefulness was

0.129 (t-value = 2.316***). Hence, social influence had a positive effect on perceived usefulness. Subsequently, H2 was supported.

H3: The standardized path coefficient between service quality and perceived usefulness was 0.334 (t-value = 5.759***). Then, service quality had a positive effect on perceived usefulness. Consequently, H3 was supported.

H4: The standardized path coefficient between perceived usefulness and attitude toward use was 0.428 (t-value = 8.278***). Therefore, perceived usefulness had a positive effect on attitude toward use u-learning. Accordingly, H4 was supported.

H5: The standardized path coefficient between satisfaction and attitude toward use was 0.418 (t-value = 8.140***). Thus, satisfaction had a positive effect on attitude toward use u-learning. Consequently, H5 was supported.

H6: The standardized path coefficient between perceived usefulness and intention to use was

0.232 (t-value = 2.528***). Therefore, perceived usefulness had a positive effect on intention to use u-learning. Accordingly, H6 was supported.

H7: The standardized path coefficient between attitude toward use and intention to use was 0.209 (t-value = 3.655***). Therefore, attitude toward use had a positive effect on intention to use u-learning. So, H7 was supported.

H8: The standardized path coefficient between satisfaction and intention to use was 0.290 (t-value = 3.510***). Hence, satisfaction had a positive effect on intention to use u-learning. Accordingly, H8 was supported.

H9: The standardized path coefficient between perceived ease of use and intention to use was 0.424 (t-value = 5.954***). Hence, perceived ease of use had a positive effect on intention to use u-learning. As a result, H9 was supported. In accordance with the hypotheses results, the direct, indirect and total effects of relationships are presented in Table 8.

Table 8 Direct, indirect and total effects of relationships

Independent variables	Dependent variables											
	PU				ATT				IU			
	DE	IE	TE	R ²	DE	IE	TE	R ²	DE	IE	TE	R ²
PEOU	0.359	-	0.359	0.535	-	0.154	0.154	0.559	0.341	0.083	0.424	0.587
SI	0.129		0.129		-	0.055	0.055		-	0.030	0.030	
SQ	0.334	-	0.334		-	0.143	0.143		-	0.077	0.077	
SA	-	-	-		0.418	-	0.418		0.203	0.087	0.290	

Remark DE = Direct effect, IE = Indirect effect, TE = Total effect (DE+IE)

Conclusion and Implications

Conclusion

This research paper aims to investigate factors affecting college students' intention to use u-learning of English studies. The target population in this research were second year undergraduate students of two programs at Southwest Jiaotong University, Sichuan province of China. From relevant literatures, the researcher proposed research framework which contains 7 latent variables and 9 hypotheses. The quantitative method was

conducted to distributing online questionnaires for data gathering. Before collecting data, IOC and Cronbach's Alpha pilot test were used to confirm validity and reliability of the research. After collecting data, CFA and SEM were applied to verify the research framework.

The results are summarized as follows. For the influencers of usage attitude, perceived usefulness had the strongest effect on attitude toward use u-learning which conveyed those benefits of u-learning could influence the positive attitude of students to engage this form of learning for their English lessons. Attitude toward use was

also influenced by satisfaction which explained that students who feel satisfied with u-learning are more likely to accept to use this technology which aligns with previous studies (Bobbitt & Dabholkar, 2001; Fishbein & Ajzen, 1975).

There were three factors that affected perceived usefulness in this study which involves perceived ease of use, service quality and social influence. Perceived ease of use was the most influential factor of perceived usefulness (Nysveen et al., 2005). Students who feel that u-learning is easy to function tends to see the benefit of using it. Service quality as tools and network provided by the school can also endorse the perception of benefit. Social influence is referred to their teachers and friends who convince students to use u-learning to improve their English literacy skills.

Perceived ease of use, satisfaction, perceived usefulness and attitude toward use were found to have a positive effect on intention to use accordingly. These findings confirmed the technology acceptance model that the behavioral intention occurs when students perceive the ease of use, feel satisfied of the outcome from using, obtain clear benefits to improve their English learning's efficiency and engage positive attitude toward the usage of u-learning (Doll & Torkzadeh, 1988; Collier & Bienstock, 2006; Cristobal et al., 2007; Bansal et al., 2004; Wolfinbarger & Gilly, 2003). In conclusion, the results achieved its research objectives to confirm determinants affecting intention to use of u-learning for English studies among students.

Implications

The implications of this study are explained in both theoretical and practical way. Theoretically, the findings precisely confirmed previous theories, namely, technology acceptance model (TAM), information systems success theory (IS success theory) and unified theory of acceptance and use of technology (UTAUT).

For the first of practical implications, perceived ease of use u-learning for English studies receives the greatest attention as the results showed that perceived ease of use had the most influential impact on intention to use the system. For u-learning system developers, it is an obligation to produce a user-friendly platform to enhance u-learning environment. Secondly, according to TAM, as perceived usefulness was another important factor which affected behavioral intention, the improvement of perceived usefulness should be emphasized. For instance, an individualized learning style and tracking service are essential in u-learning systems. In that case, students are able to choose English courses in different contents and levels according to their situation. A useful u-learning system helps students to study more systematically and efficiently, which can increase students' intention to use the system. Thirdly, an efficient learning system can win users' satisfaction which is explained that it is easier for a user who is pleased with a system to create more positive attitude. Thus, users' intention to use the system is increased. Fourthly, as far as behavioral intention is concerned, service quality and social influence are two vital elements which cannot be ignored. For system developers, timely update of u-learning system content and service are greatly important. In language learning, it is a common sense that constant learning and regularly review are the way to help mastering a foreign language. A learning system with a good service quality ensures active learning environment and provides timely feedback to users. Besides, system providers should provide more guidance to users, reduce their stress, and increase their confidence in using u-learning systems. In addition to the improvement of u-learning system functions, universities' leaders and educators are able to increase students' intention to use u-learning

for their English studies by enhancing social influence of the platforms and systems. For instance, some training and communication activities can be organized to help students share learning experience and feedback of the usage a better learning solution. Students can acquire knowledge from other users who have successfully utilized and have received benefits from using u-learning systems. These practices potentially increase social influence and students' intention to participate in u-learning environments.

Limitation and further study

The limitation of this study is the restriction of latent variables. In behavioral intention studies, especially in technology acceptance model, apart from the variables used in this study, there are other important factors which impact behavioral intention. In that case, the future study might include additional variables to examine their relationships with behavioral intention such as information quality, system quality and facilitating conditions.

References

- Aboelmaged, M. G. (2018). Predicting the success of Twitter in healthcare A synthesis of perceived quality, usefulness and flow experience by healthcare professionals. *Online Information Review*, 42(6), 898-922.
- Ahn, T., Ryu, S., & Han, I. (2007). The impact of web quality and playfulness on user acceptance of online retailing. *Information and Management*, 44(3), 263-275.
- Al-Debei, M. M., Al-Lozi, E., & Papazafeiropoulou, A. (2013). Why people keep coming back to Facebook: Explaining and predicting continuance participation from an extended theory of planned behaviour perspective. *Decision Support Systems*, 55(1), 43-54.
- Allen, D. G., Mahto, R. V., & Otondo, R. F. (2007). Web-based recruitment: Effects of information, organizational brand, and attitude toward a web site on applicant attraction. *Journal of Applied Psychology*, 92(6), 1696-1708.
- Anderson, R., & Srinivasan, S. (2003). E-satisfaction and e-loyalty: A contingency framework. *Psychology and Marketing*, 20(2), 123-138.
- Angst, C. M., & Agarwal, R. (2009). Adoption of electronic health records in the presence of privacy concerns: The elaboration likelihood model and individual persuasion. *MIS Quarterly*, 33(2), 339-370.
- Arbuckle, J. J. (1995). *AMOS user's guide*. Chicago: Small Waters.
- Assael, H. (1987). *Consumer behavior and marketing action* (3rd ed.). MA: PWS-Kent.
- Athiyaman, A. (1997). Linking student satisfaction and service quality perceptions: The case of university education. *European Journal of Marketing*, 31(7), 528-540.
- Ayo, C., Oni, A. A., Oyerinde, J., & Eweoya, I. O. (2016). E-banking users' behavior: E-service quality, attitude, and customer satisfaction. *The International Journal of Bank Marketing*, 34(3), 347-367.
- Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science*, 16(1), 74-94.
- Bansal, H., McDougall, G., Dikolli, S., & Sedatole, K. (2004). Relating e-satisfaction to behavioral outcomes. *Journal of Services Marketing*, 18(4), 290-302.

- Bashir, I., & Madhavaiah, C. (2015). Consumer attitude and behavioral intention towards Internet banking adoption in India. *Journal of Indian Business Research*, 7(1), 67-102.
- Benjangaru, B., & Vongurai, R. (2018). Behavioral intention of Bangkokians to adopt mobile payment services by type of users. *AU-GSB E-Journal*, 11(1), 34.
- Bhattacharjee, A., & Sanford, C. (2006). Influence processes for information technology acceptance: An elaboration likelihood model. *MIS Quarterly*, 3(4), 805-825.
- Bitner, M. J., & Hubbert, A. (1994). Encounter satisfaction versus overall satisfaction versus quality. In R. T. Rust & R. L. Oliver (Eds.), *Service quality: New directions in theory and practice* (pp. 241-268). London: Sage.
- Bobbitt, L. M., & Dabholkar, P. A. (2001). Integrating attitudinal theories to understand and predict use of technology-based self-service: The internet as an illustration. *International Journal of Service Industry Management*, 12(5), 423-450.
- Bruner, G. C., & Kumar, A. (2005). Explaining consumer acceptance of handheld internet devices. *Journal of Business Research*, 58(5), 553-558.
- Carlson, J., & Cass, A. O. (2010). Exploring the relationships between e-service quality, satisfaction, attitudes and behaviours in content-driven e-service web sites. *Journal of Services Marketing*, 24(2), 112-127.
- Casey, D., & Mifsud, T. (2005). Time-slicing through space: De-structuring formal learning environments with u-learning technologies. *International Journal of Learning*, 12(3), 113-120.
- Celik, H. (2008). What determines Turkish consumers' acceptance of internet banking?. *International Journal of Bank Marketing*, 26(5), 353-370.
- Chang, I. C., Li, Y. C., Hung, W. F., & Hwang, H. G. (2005). An empirical study on the impact of quality antecedents on taxpayers' acceptance of internet tax-filing systems. *Government Information Quarterly*, 22(3), 389-410.
- Chau, V. S., & Ngai, L. W. L. C. (2010). The youth market for Internet banking services: Perceptions, attitude and behavior. *Journal of Services Marketing*, 24(1), 42-60.
- Chen, C. M., & Li, Y. L. (2010). Personalised context-aware ubiquitous learning system for supporting effective English vocabulary learning. *Interactive Learning Environments*, 18(4), 341-364.
- Cheng, T. C. E., Lam, D. Y. C., & Yeung, A. C. L. (2006). Adoption of internet banking: An empirical study in Hong Kong. *Decision Support Systems*, 42(3), 1558-1572.
- Cheng, Y. M. (2020). Quality antecedents and performance outcome of cloud-based hospital information system continuance intention. *Journal of Enterprise Information Management*, 33(3), 654-683.
- Cheung, M. K., & Lee, M. K. (2009). Understanding the sustainability of a virtual community: Model development and empirical test. *Journal of Information Science*, 35(3), 279-298.
- Childers, T. L., Carr, C. L., Peck, J., & Carson, S. (2001). Hedonic and utilitarian motivations for online retail shopping behavior. *Journal of Retailing*, 77(4), 511-535.

- China Daily. (2016). *English education in China*. Retrieved from http://www.chinadaily.com.cn/kindle/2016-12/26/content_27777395.htm
- Chiou, J. S., & Shen, C. C. (2012). The antecedents of online financial service acceptance: The impact of physical banking services on Internet banking acceptance. *Behavior and Information Technology*, 31(9), 859-871.
- Collier, J., & Bienstock, C. (2006). Measuring service quality in e-retailing. *Journal of Service Research*, 8(3), 260-275.
- Cooksey R., & McDonald, G. (2019). How do I manage the sampling process?. In *Surviving and thriving in postgraduate research* (pp. 827-894). Singapore: Springer. Retrieved from https://doi.org/10.1007/978-981-13-7747-1_19
- Cristobal, E., Flavian, C., & Guinaliu, M. (2007). Perceived e-service quality (PeSQ): Measurement validation and effects on consumer satisfaction and web site loyalty. *Managing Service Quality*, 17(3), 317-340.
- Curran, J., & Meuter, M. L. (2005). Self-service technology adoption: Comparing three technologies. *Journal of Services Marketing*, 19(2), 103-113.
- Dalhberg, T., Guo, J., & Ondrus, J. (2015). A critical review of mobile payment research. *Electronic Commerce Research and Applications*, 14(5), 265-284.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319-339.
- DeLone, W. H., & McLean, E. R. (1992). Information systems success: The quest for the dependent variable. *Information Systems Research*, 3(1), 60-95.
- DeLone, W. H., & Mclean, E. R. (2003). The Delone and Mclean model of information systems success: A ten-year update. *Journal of Management Information Systems*, 19(4), 9-30.
- DeLone, W. H., & McLean, E. R. (2004). Measuring e-commerce success. applying the DeLone and McLean information systems success model. *International Journal of Information Management*, 9(1), 31-47.
- Doll, W. J., & Torkzadeh, G. (1988). The measurement of end-user computing satisfaction. *Journal MIS Quarterly*, 12(2), 259-274.
- Du, H., Zhu, G., Zhao, L., & Lv, T. (2012). An empirical study of consumer adoption on 3G value-added services in China. *Nankai Business Review International*, 3(3), 257-283.
- Fernandes, T., & Pedroso, R. (2017). The effect of self-checkout quality on customer satisfaction and repatronage in a retail context. *Service Business, Heidelberg*, 11(1), 69-92.
- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39-50.
- Gao, L., & Bai, X. (2014). A unified perspective on the factors influencing consumer acceptance of internet of things technology. *Asia Pacific Journal of Marketing and Logistics*, 26(2), 211-231
- Gefen, D. (2002). Customer loyalty in e-commerce. *Journal of the Association for Information Systems*, 3(1), 27-51.

- Gronroos, C. (1984). A service quality model and its marketing implications. *European Journal of Marketing*, 18(4), 36-44.
- Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (2010). *Multivariate data analysis* (6th ed.). Upper Saddle River, New Jersey: Prentice Hall.
- Hong, X. (2019). Pearson's "global learner survey report" released over 80% of learners around the world tend to "self-service education". Retrieved from http://edu.china.com.cn/2019-10/17/content_75310560.htm
- Hsu, C. L., & Lu, H. P. (2004). Why do people play on-line games? An extended TAM with social influences and flow experience. *Information & Management*, 41(7), 853-868.
- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6(1), 1-55.
- Hu, X., & Lai, C. (2019). Comparing factors that influence learning management systems use on computers and on mobile. *Information and Learning Sciences*, 120(7/8), 468-488.
- Hung, M. C., Hwang, H. G., & Hsieh, T. C. (2007). An exploratory study on the continuance of mobile commerce: An extended expectation-confirmation model of information system use. *International Journal of Mobile Communications*, 5(4), 409-422.
- Hyun, S. (2010). Predictors of relationship quality and loyalty in the chain restaurant industry. *Cornell Hospitality Quarterly*, 51(2), 251-267.
- Joiner, R., Nethercott, J., Hull, R., & Reid, J. (2006). Designing educational experiences using ubiquitous technology. *Computers in Human Behavior*, 22(1), 67-76.
- Jöreskog, K. G., & Sörbom, D. (1993). *LISREL 8: Structural equation modeling with the SIMPLIS command language*. NJ: Lawrence Erlbaum Associates.
- Kalinic, Z., Marinkovic, V., Molinillo, S., & Liebana-Cabanillas, F. (2019). A multi-analytical approach to peer-to-peer mobile payment acceptance prediction. *Journal of Retailing and Consumer Services*, 49, 143-153.
- Kao, R. H., & Lin, C. T. (2018). The usage intention of e-learning for police education and training. *Policing an International Journal of Police Strategies and Management*, 41(1), 98-112.
- Karjaluoto, H., Shaikh, A., Leppaniemi, M., & Luomala, R. (2020). Examining consumers' usage intention of contactless payment systems. *International Journal of Bank Marketing*, 38(2), 332-351.
- Kashive, N., Powale, L., & Kashive, K. (2020). Understanding user perception toward artificial intelligence (AI). *The International Journal of Information and Learning Technology*, 38(1), 1-19.
- Kelman, H. (1958). Compliance, identification, and internalization: Three processes of attitude change. *Journal of Conflict Resolution*, 1(1), 51-60.
- Kim, D. J., Ferrin, D. L., & Rao, H. R. (2009). Trust and satisfaction, two steppingstones for successful e-commerce relationships: A longitudinal exploration. *Information Systems Research*, 20(2), 237-257.
- Kim, K. H., Ko, E., & Takahashi, I. (2008). A model of adoption of digital multimedia broadcasting (DMB) service: Comparisons in Korea, Japan and Germany. *Psychology & Marketing*, 25(8), 806-820.

- Kim, Y. G., & Woo, E. (2016). Consumer acceptance of a quick response (QR) code for the food traceability system: Application of an extended technology acceptance model (TAM). *Food Research International*, 85, 266-272.
- Kitcharoen, K., & Vongurai, R. (2021). Factors influencing customer attitude and behavioral intention towards consuming dietary supplements. *AU-GSB E-Journal*, 13(2), 94-109.
- Kleijnen, M., Wetzels, M., & de Ruyter, K. (2004). Consumer acceptance of wireless finance. *Journal of Financial Services Marketing*, 8(3), 206-217.
- Kline, R. B. (2011). *Principles and practice of structural equation modeling*. New York: Guilford.
- Lai, V., & Li, H. (2005). Technology acceptance model for internet banking: An invariance analysis. *Information & Management*, 42(2), 373-386.
- Lee, J. W. (2010). Online support service quality, online learning acceptance, and student satisfaction. *The Internet and Higher Education*, 13(4), 277-283.
- Lee, M. C. (2009 a). Factors influencing the adoption of internet banking: An integration of TAM and TPB with perceived risk and perceived benefit. *Electronic Commerce Research and Applications*, 8(3), 130-141.
- Lee, M. C. (2009 b). Understanding the behavioral intention to play online games: An extension of the theory of planned behavior. *Online Information Review*, 33(5), 849-872.
- Ley, D. (2007). Ubiquitous computing. *Emerging Technologies Learning*, 2(1), 64-79.
- Lin, H. F. (2013). The effect of absorptive capacity perceptions on the context-aware ubiquitous learning acceptance. *Campus-wide Information Systems*, 30(4), 249-265.
- Lin, Y. M., & Shih, D. H. (2008). Deconstructing mobile commerce service with continuance intention. *International Journal of Mobile Communications*, 6(1), 67-87.
- Liu, T. Y., & Chu, Y. L. (2010). Using ubiquitous games in an English listening and speaking course: Impact on learning outcomes and motivation. *Computers & Education*, 55(2), 636-643.
- Loiacono, E., & McCoy, S. (2018). When did fun become so much work the impact of social media invasiveness on continued social media use. *Information Technology & People*, 31(4), 966-983.
- Lu, J. (2014). Are personal innovativeness and social influence critical to continue with mobile commerce? *Internet Research*, 24(2), 134-159.
- Mallat, N., Rossi, M., Tuunainen, V., & Öörni, A. (2006). An empirical investigation of mobile ticketing service adoption in public transportation. *Personal and Ubiquitous Computing*, 12, 57-65.
- Megan, S. (2020) *What is ubiquitous learning?: Practical adult insights*. Retrieved from <https://www.practicaladultinsights.com/what-is-ubiquitous-learning.htm>
- Miltgen, C. L., Popovič, A., & Oliveira, T. (2013). Determinants of end-user acceptance of biometrics: Integrating the 'big 3' of technology acceptance with privacy context. *Decision Support Systems*, 56(1), 103-114.
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). New York: McGraw-Hill.
- Nysveen, H., Pedersen, P. E., & Thorbjørnsen, H. (2005). Intentions to use mobile services: Antecedents and cross-service comparisons. *Journal of the Academy of Marketing Science*, 33(3), 330-346.

- Oliver, R. L. (1980). A cognitive model of the antecedents and consequences of satisfaction decisions. *Journal of Marketing Research*, 17(4), 460-469.
- Olsen, S. O. (2002). Comparative evaluation and the relationship between quality, satisfaction, and repurchase loyalty. *Journal of Academy of Marketing Science*, 30(2), 240-249.
- Park, N., Roman, R., Lee, S., & Chung, J. E. (2009). User acceptance of a digital library system in developing countries: An application of the technology acceptance model. *International Journal of Information Management*, 29(3), 196-209.
- Porter, C. E., & Donthu, N. (2006). Using the technology acceptance model to explain how attitudes determine internet usage: The role of perceived access barriers and demographics. *Journal of Business Research*, 59(9), 999-1007.
- Robinson, L., Marshall, G. W., & Stamps, M. B. (2005). Sales force use of technology: Antecedents to technology acceptance. *Journal of Business Research*, 58(12), 1623-1631.
- Robinson, R. S. (2014). Purposive sampling. In A. C. Michalos (Ed.), *Encyclopedia of quality of life and well-being research* (pp. 227-231). Bern, Switzerland: Springer.
- Rogers, E. M. (1995). *Diffusion of innovations*. New York: The Free Press.
- Roman, S. (2003). The impact of ethical behavior on customer satisfaction, trust and loyalty to the company: An empirical study in the financial services industry. *Journal of Marketing Management*, 19(9/10), 915-939.
- Schmidt, S., & Pardo, Y. (2014). Normative data. In *Encyclopedia of quality of life and well-being research* (pp. 141-146). Retrieved from https://doi.org/10.1007/978-94-007-0753-5_1964
- Shih, J. L., Chu, H. C., Hwang, G. J., & Kinshuk, D. R. (2011). An investigating of attitudes of students and teachers about participating in a context-aware ubiquitous learning activity. *British Journal of Educational Technology*, 42(3), 373-394.
- Sica, C., & Ghisi, M. (2007). The Italian versions of the Beck anxiety inventory and the Beck depression inventory-II: Psychometric properties and discriminant power. In M. A. Lange (Ed.), *Leading-edge psychological tests and testing research* (pp. 27-50). NY: Nova Science Publishers.
- Singh, J., & Sirdeshmukh, D. (2000). Agency and trust mechanism in consumer satisfaction and loyalty judgments. *Journal of the Academy of Marketing Science*, 28(1), 150-167.
- Soper, D. S. (n.d.). *A-priori sample size calculator for structural equation models [Software]*. Retrieved from <http://www.danielsoper.com/statcalc>
- Suh, B., & Han, I. (2002). Effect of trust on consumer acceptance of internet banking. *Electronic Commerce Research and Applications*, 1(3/4), 247-263.
- Sumaedi, S., Bakti, I., Rakhmawati, T., Astrini, N. J., & Jati, R. K. (2020). A model of intention to use official covid-19 websites. *Health Education*, 120(4), 249-261.
- Tan, T. H., Liu, T. Y., & Chang, C. C. (2007). Development and evaluation of an RFID-based ubiquitous learning environment for outdoor learning. *Interactive Learning Environments*, 15(3), 253-269.

- Teo, T. S. H., Lim, V. K. G., & Lai, R. Y. C. (1999). Intrinsic and extrinsic motivation in internet usage. *Omega*, 27(1), 25-37.
- Teo, T. S. H., & Pok, S. H. (2003). Adoption of WAP-enabled mobile phones among internet users. *Omega*, 31(6), 483-498.
- Van der Heijden, H. (2004). User acceptance of hedonic information systems. *MIS Quarterly*, 28(4), 695-704.
- Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*, 46(2), 186-204.
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425-478.
- Venkatesh, V., Thong, J. Y. L., Chan, F. K. Y., Hu, P. J. H., & Brown, S. A. (2011). Extending the two-stage information systems continuance model: Incorporating UTAUT predictors and the role of context. *Information Systems Journal*, 21(6), 527-555.
- Venkatesh, V., Thong, J. Y. L., & Xu, X. (2012). Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Quarterly*, 36(1), 157-178.
- Wang, J. C., & Chiang, M. J. (2009). Social interaction and continuance intention in online auctions: A social capital perspective. *Decision Support Systems*, 47(4), 466-476.
- Wang, K., & Lin, C. L. (2012). The adoption of mobile value-added services. *Managing Service Quality*, 22(2), 184-208.
- Watjatrakul, B. (2013). Intention to use a free voluntary service the effects of social influence, knowledge and perceptions. *Journal of Systems and Information Technology*, 15(2), 202-220.
- Wolfenbarger, M., & Gilly, M. (2003). eTailQ: Dimensionalizing, measuring and predicting e-tail quality. *Journal of Retailing*, 79(3), 183-98.
- Wu, J., & Liu, D. (2007). The effect of trust and enjoyment on intention to play online games. *Journal of Electronic Commerce Research*, 8(2), 128-140.
- Yi, Y., Wu, Z., & Tung, L. L. (2005). How individual differences influence technology usage behavior? Toward an integrated framework. *The Journal of Computer Information Systems*, 46(2), 52-63.
- Yoo, B., & Donthu, N. (2001). Developing a scale to measure the perceived quality of an internet shopping site. *Quarterly Journal of Electronic Commerce*, 2(1), 31-47.
- Yu, X., Roy, S. Q., Quazi, A., Nguyen, B., & Han, Y. (2017). Internet entrepreneurship and "the sharing of information" in an Internet-of-things context the role of interactivity, stickiness, e-satisfaction and word-of-mouth in online SMEs' websites. *Internet Research*, 27(1), 74-96.
- Zhang, S., Zhao, J., & Tan, W. (2008). Extending TAM for online learning systems: An intrinsic motivation perspective. *Tsinghua Science and Technology*, 13(3), 312-317.
- Zhou, T. (2011). Examining the critical success factors of mobile website adoption. *Online Information Review*, 35(4), 636-652.