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Understanding the adoption of e-learning in South Korea: Using the extended Technology Acceptance Model approach*

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Abstract

In an era of educational paradigm shifts, adoption of e-learning has been a significant phenomenon in South Korea. This study examines characteristics of instructor, teaching materials, perceived mobility, and perceived connectedness as key independent factors for intent to use e-learning systems, by way of effects on perceived usefulness and ease of use. Although the psychological factors influencing e-learning adoption are well defined, the framework that accounts for such effects remains ambiguous. The suggestion herein is that intent to use e-learning is related to the user's motivational factors, a connection that can be explained in terms of the Technology Acceptance Model (TAM). The results indicated that instructor characteristics and perceived mobility were the important factors determining the learners' perceived ease of use and perceived usefulness. In addition, perceived connectedness is positively related to intention to use e-learning (ITU). This study represents a beginning step to investigate the mechanism of adopting e-learning with result implications and the future directions of study.

Keywords : e-learning, technology acceptance model, perceived connectedness, perceived usefulness, intention to use

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Introduction

E-learning, which simply refers to online learning, is a buzzword in the global education industry. As technology advances, e-learning's impact could be greater than that of any other educational development. E-learning is an innovation that epitomizes a significant new educational paradigm (Cantoni, Cellario, & Porta, 2004; Chiappe & Lee, 2017; Kelly & Bauer, 2004; Noesgaard & Ørngreen, 2015; Nortvig, Petersen, & Balle, 2018; Park & Kwon, 2016).

E-learning offers several advantages: 1) real-time education programs; 2) differentiated contents and educational methods; 3) ongoing discussion and the potential to interact virtually with other students; and 4) online supervision with quick feedback. In these high-tech and rapid learning systems, students can learn how to, what, and why, unrestricted by barriers of time (Nortvig et al., 2018; Roblyer & Knezek, 2003; Roblyer & Marshall, 2003). E-learning is a vital tool for many students and businesspeople. It offers an excellent type of learning to that in offline classroom scenarios because it offers high numbers of learner access greater amounts of content and feedback (Beth, Jordan, Schallert, Reed, & Kim, 2015; Cho & Tobias, 2016; Engelbrecht, 2003). Many students are utilizing e-learning and increasing their awareness of specific topics they can study. Yet, despite the important role of this recent educational phenomenon, few studies exist on the role of user-acceptance (B. C. Lee, Yoon, & Lee, 2009; Liaw, 2008; Liu, Liao, & Pratt, 2009; Means, Toyama, Murphy, & Baki, 2013; Noesgaard & Ørngreen, 2015; Park & Kwon, 2016; Park, Kim, & Kwon, 2016). It may be that educational tools using e-learning are still in their initial step of enlargement and growth (Ryan, Kaufman, Greenhouse, Joel, & Shi, 2016).

Therefore, understanding the mechanisms of e-learning acceptance is important for diverse organizations. Advanced e-learning systems and contents can assist employees and students and serve as an innovative tool for planning a national education roadmap for the future. E-learning's popularity in South Korea has grown along with the rapid development of the country's information and communication technology industry (Cho & Tobias, 2016; B. C. Lee et al., 2009; Misko, Choi, Hong, & Lee, 2005; Park & Kwon, 2016). Many leading universities and organizations have established e-learning systems and plan to institute e-learning "campuses" set in online environments (Yoo, Han, & Huang, 2012). Yet despite its popularity in South Korea, very little is known about what determines the adoption of e-learning (Grzybowski, 2013; B. C. Lee et al., 2009; S. Lee, Byun, Kwon, & Kwak, 2008; Park & Kwon, 2016; Yoo et al., 2012).

This study, therefore, aimed to explore a user-acceptance model based on the Technology Acceptance Model (TAM) that investigates key psychological determinants of acceptance of e-learning tools. To accomplish this, survey data from students using e-learning in educational context were empirically analyzed based on the TAM (Park et al., 2016) with regard to key factors in the usage of e-learning.

By examining e-learning adoption in South Korea, this research attempts to fill a void in understanding of user-adoption criteria and attitudes toward e-learning. Similar to previous research of Human Computer Interaction (HCI) interactions and internet of things, user's attitudes and perspectives are very crucial elements affecting the diffusion of e-learning, including online tools (Park, Cho, Han, & Kwon, 2017). Therefore, this research intends to investigate important factors that stimulate learners to make use of

e-learning for their education and investigate how these key elements contributing to forecasting the general adoption of e-learning devices by combining them with TAM.

Literature review

Trends of e-learning

E-learning is defined as internet-based learning that uses online media, knowledge sharing, and guidance to support learners' demands, free of space and time barriers (Engelbrecht, 2005; B. C. Lee et al., 2009; Yoo et al., 2012). Ultimately, e-learning positively impacts both business and academia, for example, through cost reduction, sharing of the latest information, and quick and proactive feedback (Ryan et al., 2016). The e-learning approach has been widely used since the 1990s to achieve educational goals around the world, and e-learning tools have become important in the educational market. Businesses and academic institutions have resultantly accepted e-learning (Alavi & Leidner, 2001; B. C. Lee et al., 2009; Nortvig et al., 2018).

Today, more than in the past, information and communication technologies develop and change rapidly. At the same time, the amount of refined knowledge and information is quickly rising, the amount of information changes rapidly, and the social environment demands lifelong learning in all areas of society (Brown, Kerwin, & Howard, 2013; Keren & Fridin, 2014). Accordingly, educational institutions and research providers supply online consulting, task-based learning, and lessons to meet learners' diverse demands (Cho & Tobias, 2016; Lancellotti, Thomas, & Kohil, 2016; Olsson, Mozelius, & Collin, 2016; Park & Kwon, 2016).

Previous studies have indicated that online technical infrastructure, learner motivation, perceived psychological factors, and student characteristics are important determinants of e-learning performance and outcome (Dillon & Gunawardena, 1995; Leidner & Jarvenpaa, 1993; Nortvig et al., 2018; Volery & Lord, 2000). Recent research has examined the broad factors that impact user acceptance of e-learning (Cho & Tobias, 2016; B. C. Lee et al., 2009; Roca & Gagne, 2008). However, less empirical research has fully explored the relationship between the TAM and e-learning (Park et al., 2017). The majority of previous studies investigated what affects instructors' acceptance of e-learning tools (Fedynich, Bradley, & Bradley, 2015; Hu, Clark, & Ma, 2003; J. Lee, 2014; Myers, Bennett, Brown, & Henderson, 2004). Additionally, many educational institutions have linked e-learning with instructor motivation, such as willingness to incorporate e-learning and curriculum contents (B. C. Lee et al., 2009; Nortvig et al., 2018; Ryan et al., 2016). In this study, therefore, we attempt to add to the literature by investigating how TAM relates to e-learning. In other words, in response to the void of previous studies on the psychological factors for adopting e-learning, this study investigated intention to use e-learning by examining the TAM.

Technology Acceptance Model in e-learning

Davis (1986) developed the TAM to describe online tools or technologies and service-usage behavior (Davis, 1986, 1989). TAM describes and forecasts user perception and approach toward and acceptance of a new information technology, product, and service (Davis, 1989; Davis, Bagozzi, & Warshaw, 1989). Previous research has suggested that the TAM has been accepted with regard to the understanding of technology or service acceptance (Venkatesh, Morris, Davis, & Davis, 2003). A number of studies have also indicated positive correlations between user acceptance of specific technologies and their usage behavior (Kwon, Park, & Kim, 2014; Park, Kim, Kim, & Kwon, 2018). As per the theory of reasoned action from the field of social psychology, the outcome of a specified behavior is determined by the strength of one's intent to engage in the behavior along with that person's attitude about it (Fishbein, 1979; Madden, Ellen, & Ajzen, 1992).

According to previous literature on e-learning, the instructors' ability and commitment are key driving factors that affect student trust (Dillon & Gunawardena, 1995; Webster & Hackley, 1997). Perceived usefulness (PU), perceived ease of use (PEU), attitude (ATT), and intent to use (ITU) are also important factors that affect adoption of technology and services (Davis, 1989; Davis et al., 1989). Previous studies have referenced the TAM research model to predict technology adoption. The TAM has been an especially effective tool in examining user acceptance of mobile or Internet-based platforms (Chen, Lee, & Chen, 2005; Kwon et al., 2014; M. K. O. Lee, Cheung, & Chen, 2005; Liaw, Huang, & Chen, 2007; Rauniar, Rawski, Yang, & Johnson, 2014; Roca & Gagne, 2008; Sun, Tsai, Finger, Chen, & Yeh, 2008).

Existing studies using TAM have proposed the reliability and trustworthiness of TAM in analyzing user perceptions (Park, 2013). TAM research has confirmed a broad range of novel technologies, service tools, and information communication instruments (Park & del Pobil, 2013; Park et al., 2017). However, few studies have concentrated on understanding the adoption of e-learning (Park et al., 2016).

Research model and hypotheses

Research model

Based on the previous TAM and e-learning literature, we suggest that research is needed to analyze the intent to use e-learning. The research model consists of four independent factors, two key variables, and a final dependent variable (intent to use e-learning). The four independent variables were chosen through in-depth interviews with 30 users and students who had experienced e-learning in South Korea. Participants were asked to write the motivational factors that affected their use of e-learning.

The four independent variables were instructor characteristics, teaching materials, perceived mobility, and perceived connectedness. *Teaching materials* are defined as teaching contents that may be more or less suited to e-learning (Lancellotti et al., 2016; B. C.

Lee et al., 2009). *Instructor characteristics* is a measure of the extent to which instructors provide feedback, guidance, and consideration for learners (B. C. Lee et al., 2009; Park & Kwon, 2016). Learners also enjoy interacting with other students and sharing knowledge through e-learning (Montrieux, Vangestel, Raes, Matthys, & Schellens, 2015). In this research, *perceived connectedness* is defined as the extent to which learners feel they are connected with other people, contents, and resources (Park & Kwon, 2016; Shin, 2010; Shin & Kim, 2008). Learners' feelings of connection to other learners could be positively related to intent to use e-learning. Finally, *perceived mobility* is defined as users' awareness of the portability of a certain service or technological environment (Huang, Lin, & Chuang, 2007; Kwon et al., 2014). Mobility allows swift response, convenient use, and convenient access to online services through Internet-based networks anytime and anywhere. Perceived mobility thus positively impacts perceived ease of use (Liang, Huang, Yeh, & Lin, 2007).

PU and PEU are the two key variables in this study. PU is the extent to which learners are convinced that a service or system will improve their outcomes (Davis, 1989; Park & Kwon, 2016). PEU is the degree to which users trust that utilizing a certain e-learning tool will be convenient and useful (Davis, 1989; Kwon et al., 2014). TAM theory and related literature indicate that PU is an important factor that affects intent to use e-learning (B. C. Lee et al., 2009; Park et al., 2017; Shin & Choo, 2011). In this research, ITU is the dependent variable. The research model is shown in Figure 1.

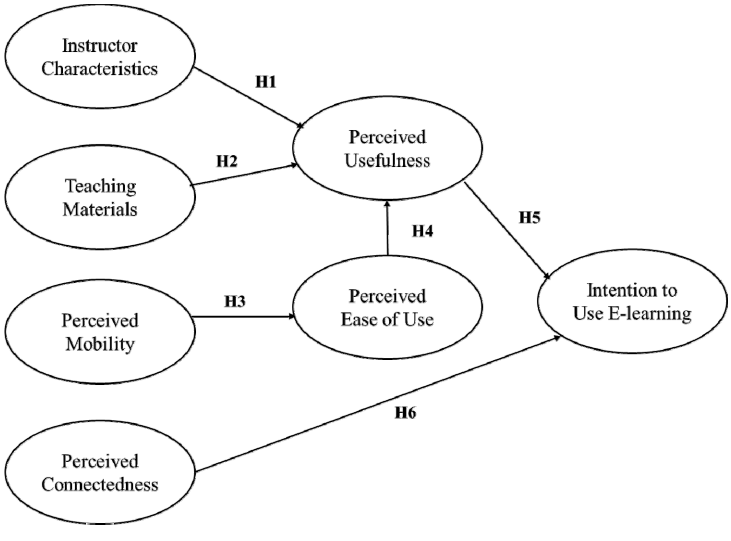

Figure 1. Proposed research model.

Hypotheses

Hypothesis 1. B. C. Lee et al. (2009) suggest that instructors' characteristics and teaching materials affect PU. In particular, the instructor's guidance style impacts learners' motivation, active participation, and the positivity of their attitude toward e-learning environments (J. Lee, 2014; Park & Kwon, 2016; Webster & Hackley, 1997). Also, some education and TAM studies have suggested that instructors' competencies are positively related to two outcomes: perceived use of e-learning and academic performance (J. Lee, 2014; Park & del Pobil, 2013). Based on this logic, the following hypothesis is suggested:

H1. Instructors' characteristics relate positively to learners' PU of e-learning.

Hypothesis 2. Previous studies demonstrated that the learning level on demand positively predicts perceived usefulness (Lederer, Maupin, Sena, & Zhuang, 2000; Nortvig et al., 2018). In e-learning environments, learner-oriented contents and services that accurately supply learners with a level of understanding will promote PU (Lancellotti et al., 2016; Park & Kwon, 2016). Specifically, course design impacts learner enjoyment, achievement, and their perceived use of learning system (Gray & Diloreto, 2016; J. Lee, 2014). Therefore, the following hypothesis is suggested:

H2. Teaching materials relate positively to learners' PU of e-learning.

Hypothesis 3. Perceived mobility (PM) positively impacts the PEU of mobile-oriented, tool-based environments (Kwon et al., 2014; Siau & Shen, 2003). PM allows quick, simple, and adaptive learning through online networks, such as wireless system (Gray & Diloreto, 2016). For example, Park and del Pobil (2013) showed that perceived rapid system quality is associated with online service usage. PM is also related to user satisfaction and quality level in a mobile-based scenario (Huang et al., 2007; Kwon et al., 2014). The following hypothesis is proposed:

H3. PM relates positively to PEU in e-learning.

Hypothesis 4. According to TAM research, PEU affects PU directly or indirectly (Venkatesh & Davis, 2000). Park et al. (2017) proposes that PEU is one of the most important factors of PU and satisfaction with online systems. Based on previous studies, this study proposes that PEU positively impacts PU in e-learning environments (Pituch & Lee, 2006). Therefore, the following hypothesis is suggested:

H4. PEU regarding e-learning positively impacts PU of e-learning.

Hypothesis 5. PU determines learners' use intentions concerning a specific technology or services (Davis et al., 1989). Prior study has demonstrated that PU positively affects

intent to use e-learning tools (Liaw, 2008). As the positive relationship between PU and intention to use has been established (Davis, 1989; Park & Kwon, 2016; Park et al., 2017). The following hypothesis is proposed:

H5. Learners' PU positively impacts their intent to use e-learning.

Hypothesis 6. Perceived connectedness (PC) is a key factor that affects users' intent to use the e-learning environment. Individuals prefer to share knowledge through interacting with other students. E-learning systems are efficient environments for interaction with learners and instructors, and users can subsequently benefit from interactive learning tools based on active feedback (Gray & Diloreto, 2016; Jaggars & Xu, 2016; Jennings & Angelo, 2006; Muirhead, 2004). Connectedness with other learning resources and instructors also contributes to the user's intent to use e-learning (Kwon et al., 2014; Shin & Kim, 2008). The following hypothesis is suggested:

H6. PC positively impacts intent to use e-learning.

Research method

Data collection and measurements

This study used a cross-sectional survey. A survey was conducted at a university in South Korea in May 2016. The subjects were undergraduates enrolled in management courses, who all had experience using e-learning curriculum and contents (n = 213). All participants in the data collection had experience of at least five online courses and using e-learning (Gray & Diloreto, 2016). First, in-depth interviews with 30 students with e-learning class participation experience were conducted to validate the research variables. Then, data related to the variables were collected via survey. Two translators carefully translated items from English to Korean, and two academic professors of business administration and educational research reviewed the items. The survey was distributed to 260 students, and complete responses were received from 213, for a total response rate of 81.9% (82 women and 131 men). The average age of respondents was 22, and all were of Korean nationality.

Table 1
Sample Demographics (n = 213)

Item	Frequency	%
Gender		
Male	131	61.5
Female	82	38.5
Age		
19-20	71	33.3
21-22	71	33.3
23-24	54	25.3
25~26	15	7.0
26+	2	1.1
Year in college		
Freshman	80	37.6
Sophomore	79	37.1
Junior	28	13.1
Senior	26	12.2

Measurement items were adopted from prior validated research. The study model consisted of seven variables: instructor characteristics, teaching materials, perceived mobility, perceived connectedness, perceived usefulness, perceived ease of use, and intent to use e-learning. Survey participants responded on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). Table 2 lists all measurement items.

Table 2
Measurement: Questionnaire Items

Construct	Items	Measures
Instructor characteristics	IC1	The instructor provides high-quality instruction.
	IC2	The instructor provides information on learning progress.
	IC3	The instructor delivers instructions clearly.
Teaching materials	TM1	E-learning provides me with sufficient teaching materials.
	TM2	E-learning provides me with teaching materials that are easy to use.
	TM3	E-learning provides me with teaching materials that fit with the learning objectives.
Perceived mobility	PM1	Mobility is one of the most outstanding advantages of e-learning.
	PM2	It is convenient to use e-learning context anytime-anywhere.
	PM3	The mobility of e-learning makes convenient use possible.
Perceived connectedness	PC1	I feel nice when I can access e-learning at my convenience.
	PC2	I feel like being connected to the real classroom because I can see feedback that I want.
	PC3	I feel emotionally comforted because I can learn something interesting with e-learning.
Perceived usefulness	PU1	E-learning improves my learning performances.
	PU2	E-learning helps me accomplish my learning effectively.
	PU3	E-learning provides useful services and knowledge to me.

Construct	Items	Measures
Perceived ease of use	PEU1	E-learning methods are easy to understand.
	PEU2	E-learning is easy to use.
Intention to use e-learning	IUE1	I prefer e-learning to traditional learning.
	IUE2	I will recommend e-learning classes to other learners.
	IUE3	I am willing to participate in other e-learning opportunities.

Note. From Davis (1989), Huang et al. (2007), B. C. Lee et al. (2009), Nowak & Biocca (2003), Shin & Shin (2011), Yenisey, Ozok, & Salvendy (2005).

Results

Model validation

Table 3 shows the results of confirmatory factor analysis and reliability testing. The validation method suggested by Fornell and Larcker (1981) was analyzed for validity and convergent reliability (Hair, Black, Babin, & Anderson, 2006). The table summarizes internal validity and convergent reliability results. Cronbach's α was above the recommended reliability of 0.7, indicating high reliability and validity (Guilford, 1965; Hair, Anderson, Tatham, & Black, 1998). That is, all components of the study are considered reliable. Additionally, the factor loading value is above 0.30, and the model can therefore be considered trustworthy (Tabachnick & Fidell, 1996). Further, prior research has suggested that structural equation modeling (SEM) results require a composite reliability above 0.70 and average variance greater than 0.50 for studies with more than 200 samples. The results confirm items' stable validity. For SEM analysis, as recommend in previous studies (Anderson & Gerbing, 1988), this study acquired a data collection larger than 200 for reliability (Hair et al., 2006).

In addition, the overall fit indices of the research model were satisfactory. The fit indices of the research model were: $\chi 2/d.f. = 2.730$, incremental fit index = 0.918, normed fit index = 0.916, comparative fit index = 0.917, Tucker Lewis index = 0.901, and root mean-square error of approximation = 0.049 (Bentler & Bonett, 1980; Hair et al., 2006). All correlations between constructs should be lower than the values of the square roots of the Average Variance Extracted (AVE) values (Fornell & Larcker, 1981). This research model satisfied all these standards (see Tables, 3, 4, and 5).

Table 3

Internal Validity and Convergent Reliability

Construct	Item	Internal validity		Convergent reliability		
		Cronbach's alpha	Item-total correlation	Factor loadings	Composite reliability	Average variance extracted
Instructor characteristics	IC1	0.861	0.860	0.755	0.871	0.693
	IC2		0.897	0.838		
	IC3		0.896	0.867		
Teaching materials	TM1	0.829	0.871	0.699	0.856	0.673
	TM2		0.837	0.631		
	TM3		0.881	0.966		
Perceived mobility	PM1	0.872	0.856	0.741	0.751	0.900
	PM2		0.912	0.839		
	PM3		0.909	0.913		
Perceived connectedness	PC1	0.812	0.922	0.900	0.878	0.716
	PC2		0.914	0.914		
	PC3		0.706	0.534		
Perceived usefulness	PU1	0.921	0.915	0.839	0.930	0.815
	PU2		0.926	0.894		
	PU3		0.948	0.913		
Perceived ease of use	PEU1	0.907	0.956	0.897	0.912	0.839
	PEU2		0.957	0.922		
Intention to use e-learning	IUE1	0.882	0.901	0.833	0.926	0.740
	IUE2		0.907	0.876		
	IUE3		0.890	0.821		

Table 4

Fit Indices of the Research Model

Fit indices	Values	Recommended level	Sources
$\chi 2/df$	2.730 ($p < .01$)	< 3.0	Bagozzi and Yi (1988)
NFI	0.916	> 0.90	Bentler and Bonett (1980)
IFI	0.918	> 0.90	Browne and Cudeck (1993)
CFI	0.917	> 0.90	Fornell and Larcker (1981)
TLI	.901	> 0.90	Fornell and Larcker (1981)
RMSEA	0.049	< 0.080	Jöreskog and Sörbom (1996)

Table 5

Results of Discriminant Validity

Construct	1	2	3	4	5	6	7
1. Instructor characteristics	0.832						
2. Teaching materials	0.561	0.820					
3. Perceived mobility	0.317	0.209	0.949				
4. Perceived connectedness	0.375	0.268	0.736	0.846			
5. Perceived usefulness	0.567	0.432	0.501	0.527	0.902		
6. Perceived ease of use	0.557	0.478	0.494	0.456	0.738	0.915	
7. Intention to use e-learning	0.215	0.239	0.564	0.337	0.337	0.261	0.860

Hypotheses testing

SEM is known as a superior analysis method for investigating large samples of data (Anderson & Gerbing, 1988; Hair et al., 2006). For our data (n = 213), SEM is suited for the purpose of statistical power based on a large sample. As summarized in Table 6, all the hypotheses regarding e-learning and psychological motivation factors are supported, except H2 and H5. In greater detail, instructor characteristics (β = .226, CR = 4.042, p < .001) and perceived ease of use (β = .582, CR = 13.486, p < .001) positively impact perceived usefulness. Thus, hypotheses 1 and 4 are confirmed. Perceived mobility is also positively related to perceived ease of use (β = .573, CR = 8.275, p < .001), so hypothesis 3 is supported. Finally, perceived connectedness (β = .635, CR = 12.510, p < .001) was shown to have a positive influence on intent to use e-learning, therefore, hypothesis 6 is supported. However, teaching materials did not have a significant effect on perceived usefulness (H2, p > .1), and perceived usefulness did not have an impact on intention to use e-learning (H5, p > .1). Therefore, all hypotheses, excluding H2 and H5, were supported.

Table 6

Hypothesis Test Results

Hypotheses	β	SE	CR	p value	Supported
H1: IC → PU	0.226***	0.056	4.042	.000	Yes
H2: TM → PU	0.022	0.062	0.346	.730	No
H3: PM → PEU	0.573***	0.069	8.275	.000	Yes
H4: PEU → PU	0.582***	0.043	13.486	.000	Yes
H5: PU → IUE	0.021	0.059	0.360	.719	No
H6: PC → IUE	0.635***	0.051	12.510	.000	Yes

***p < 0.001. **p < 0.01. *p < 0.05.

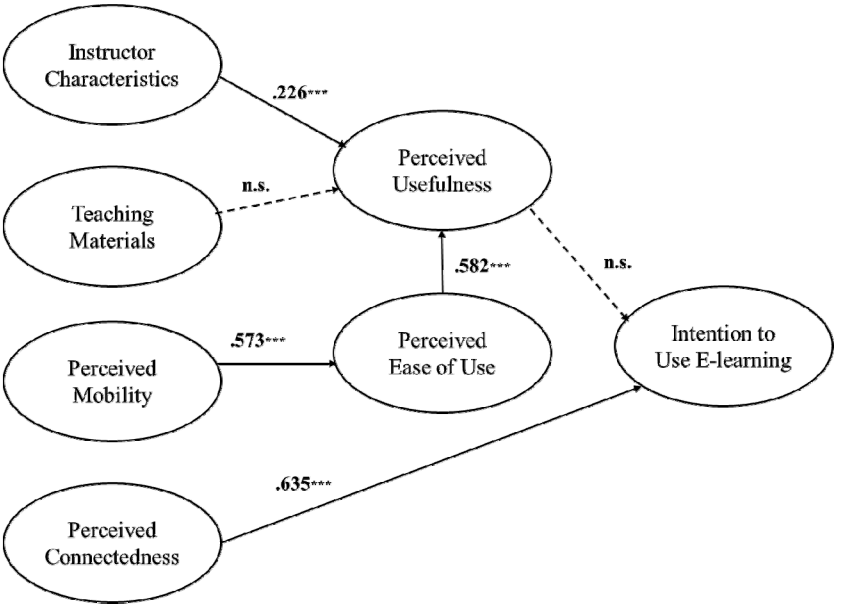

Figure 2. Summary of the results.

Discussion and conclusion

This study can provide a framework for adoption for examining how effective the motivational factors of learners are in accomplishing e-learning selection and increasing learner satisfaction. The findings suggest that perceived mobility, perceived connectedness, and instructor quality play a significant role for students in acceptance of e-learning systems and their context. This research demonstrates that learners who view the e-learning context as more convenient with regard to interaction and mobility are more likely to demonstrate intent to use e-learning. Additionally, students who view their instructors as likely to provide feedback and guidance are more likely to demonstrate intent to use e-learning. These findings are consistent with the theoretical background (Imamoglu, 2007; B. C. Lee et al., 2009; Liaw, 2008; Littlejohn, Falconer, & Mcgill, 2008). Therefore, this study suggests that institutions should focus on connectedness, mobility, and instructor support in order to strengthen adoption among South Korean learners.

The research results suggest practical contributions for e-learning educational policy researchers. From the educational policy viewpoint, the findings of this study can be utilized as an instruction for enhancing current e-learning infrastructures and launching new e-learning tools, researchers and providers should examine how to optimize intention to use from e-learning users (Nortvig et al., 2018). Based on the results, this study suggests knowledge for the Korean educational industry. The developers of e-learning services

should aim to provide mobile and a linked feedback community and the interfaces for the usability of the online learning platforms by considering learner-oriented strategy, rather than a learning material-oriented strategy in the e-learning services designing procedures (Lancellotti et al., 2016; J. Lee, 2014). This research presents that an easily connectable and mobilizing infrastructure is required to enhance the learners' intention to use and usefulness of e-learning (J. Lee, 2014; Potter, 2015; Ryan et al., 2016).

The lack of a significant relationship between teaching materials and perceived usefulness may be related to trends in e-learning platforms in South Korea. For example, using online teaching textbooks in e-learning environments is not common in South Korea. Thus, the majority of students may not feel the positive relationships among the teaching materials, perceived usefulness, and adoption of e-learning (B. C. Lee et al., 2009; J. Lee, 2014; Park et al., 2017). In addition, learners did not consider the teaching materials and usefulness of e-learning interface to be related to learning performance and merit, and rather determined connection with other students for collective intelligence (Lancellotti et al., 2016; Park & Kwon, 2016; Potter, 2015; Ryan et al., 2016).

There are several limitations to this research, which provide direction for future research. First, the sample is entirely South Korean. The determinants of an e-learning system may be different in South Korea than in other countries. E-learning is used worldwide, so the study results may not be applicable to other countries or educational environments. This study suggests evidence regarding e-learning adoption in the Korean educational context. Cross-national e-learning adoption research may reveal more conclusive statements regarding online education generally.

Second, this study did not consider any other variables that can be combined with the ultimate dependent variable, e-learning adoption. Critical factors may exist between TAM variables. For example, users' learning motivation (Nortvig et al., 2018), student identity (Barber, King, & Buchanan, 2015; Baxter & Haycock, 2014), curriculum design (Cheng & Chau, 2016; J. Lee, 2014), and educator-learner relationship (Cho & Tobias, 2016) could be analyzed to investigate the adoption of e-learning (Nortvig et al., 2018).

Third, the effect sizes were somewhat modest (Kwon et al., 2014). Future research conducted with a larger sample would provide more decisive results regarding the determinants of e-learning adoption as it relates to perceived usefulness, perceived ease of use, and learner motivation and behavior.

Despite these limitations, this research has important implications with respect to explaining the mechanisms by which learners choose to adopt e-learning systems and for understanding the relationship between e-learning and the TAM. We expect that the study results will stimulate continued research in investigating the determinants of e-learning adoption, as well as contribute to expanded utilization of TAM, which helps both e-learning practitioners and researchers study the growth of e-learning.

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