English Language & Literature Teaching, Vol. 21, No. 4 Winter 2015

Smart Learning for English Learning: Exploring Learner and Learning Environmental Attributes*

Hee-Jung Jung
(Chosun University)

Jung, Hee-Jung (2015). Smart learning for English learning: Exploring learner and learning environmental attributes. *English Language & Literature Teaching, 21*(4), 17-36.

An innovation in English learning has been consistently introduced to many learners and educators. One of the new methods is smart learning to facilitate English learning in today's society. However, there is little empirical research investigating learners' behavior, particularly the adoption intention of smart learning. Thus, this study proposes a research model based on the Theory of Planned Behavior and Social Cognitive Theory in order to examine English learners' behavioral intention to use smart learning. The proposed research model incorporates learner attributes (Attitude, Experience, Self-Efficacy, and Anxiety) and learning environmental attributes (Facilitating Condition, Social Influence, and Interactivity), as well as their impact on English learners' intention to use smart learning. The partial least squares (PLS) approach was employed to analyze 331 English learners using smart learning. The results indicate that all the variables with exception of Anxiety had a significant impact on intention to use smart learning for English study. The findings of this study imply that smart learning is gaining its momentum in English education. Moreover, learners and learning environmental attributes should be considered to better understand English learners' behaviors.

[smart learning/learner attributes/learning environment]

I. INTRODUCTION

Learning environments have changed radically in the last 30 years due to the development of computer technology and the Internet. The advancement of wireless communication networks and mobile devices has enabled learners to access digital

* This study was supported by research fund from Chosun University, 2015

resources and interact with technological applications without being limited by either location or time (Hwang & Chen, 2013). Smart learning ('s-learning' hereafter) environments can be defined as physical environments that promote better and faster learning by enriching the learning context with context-aware and adaptive digital devices to stimulate learners to understand and deal with context and to interact with others (Koper, 2014). In addition, the smart language-learning environment actively provides the necessary learning guidance or supportive tools to language learners in the right place, at the right time, and with the right information (Hwang, 2014).

Recently, popular mobile devices (e.g., smartphones and tablet computers), wireless communication networks, and sensing technologies (e.g., RFID, GPS, and QR codes) have fulfilled the basic requirements of growing smart language learning environments. Using these technologies, learning systems are able to detect and collect reliable learning contexts of language learners as well as the learners' interactions with the online learning environment. Hence, it is important to understand such factors in order to design and develop s-learning systems to support learning in real-world contexts in smart ways (Koper, 2014). Diverse research on s-learning is being carried out following the research on e-learning and m-learning, but so far, little research has focused on learner attributes and learning environment attributes that affect the intention to use s-learning for language learning. That is, previous studies of s-learning have focused mainly on descriptive aspects or applications of s-learning in various learning contexts (Jung, 2013). Thus, it is significant to have an in-depth understanding of learners and language learning environments that are experiencing rapid changes to develop more effective language learning tools and methods. In this regard, the present study is motivated by the following two important trends in the English-learning environment:

- The increasing attention in smart technologies for the English learning
- The need for empirical study examining the impact of EFL learners and learning environments on learners' intention to use s-learning

Therefore, the main objective of this study is to propose and empirically test a research model that incorporates learner attributes and learning environment attributes to explain learners' behavioral intention to engage in s-learning in the context of English learning. In this study, learner attributes include attitude, past experience, self-efficacy, and anxiety. Learning environment attributes include facilitating condition, social influence, and interactivity. With this study, a more complete theoretical understanding of learners and learning environments is provided. In addition, the attributes of the intention to use smart applications for English learning are discussed.

II. LITERATURE REVIEW

1. Smart language learning environments

The rapid innovation of computer and communication technologies is speeding up the growth of s-learning environments. The attention of technology-enhanced language learning has moved from web-based learning to m-learning and from m-learning to s-learning (Liu, Tan, & Chu, 2010). Although researchers' definitions of s-learning vary, Lee, Kim, and Chung's (2013) research classified the change of s-learning characteristics into three factors: "(1) the change of communication, (2) the change of production, sharing, and combination of information, and (3) the change of access to information and the change of information use" (p. 63). They summarized the common major characteristics of s-learning from previous research as follows: (1) personalized learning, (2) collaboration, (3) mutual support, (4) participation tasks, (5) sharing tasks, (6) learning resources organization, (7) overcoming of time and space limits, (8) creation of learning materials, (9) use of social networking, and (10) non-linear learning (Lee et al., 2013).

Smart language learning is a new concept for developing more powerful and helpful language learning environments than those offered by the existing technology-enhanced language learning approaches, by incorporating new technologies and new criteria for language learning (Hwang, 2014). Smart technologies offer various exciting opportunities for a wide variety of language learners with different levels of prior knowledge, different backgrounds, and different interests. They make it easier to adapt content to the learner and personalize instruction and learning support. This supports that suitable adaptation is a hallmark of s-learning behavior (Spector, 2014). This language learning environment includes features to stimulate engagement, effectiveness, and efficiency. Such features include support for collaboration, personalization, and motivation.

In addition, smart language learning environments support constructivism, which is one of the fields that teaching and learning has paid attention to over the past 10 years. This theory is based on the theoretical background where learner-oriented s-learning can be most effectively realized (Lee et al., 2013). As constructivists emphasize, smart language learning does not have to deliver knowledge in a formal way. Rather, it can provide various and open learning experiences through the Internet and technological applications to promote autonomous and creative thinking (Jung, 2014). Moreover, constructivism focuses on interaction among learners, between learners and instructors, and between learners and teaching materials (Chu, 2006; Lee et al., 2013). Reflecting this, smart language learning enhances learning performance by promoting interacting

among learners and resources with SNS and media.There are several variables representing s-learning environment. For example, Jung (2013) claims that personalization, ubiquity, openness, interactivity, and variety are classified as s-learning environment attributes. Other studies in various contexts also suggest that factors such as facilitating condition and social (or peer) influence should be included in explaining individuals' adoption of new technology (Venkatesh, Morris, Davis, & Davis, 2003).

Furthermore, compared to the situation in traditional web-based e-learning, the place for learning has changed from a fixed area to a moving area like the subway or park, and users included learners who were familiar with digital devices in a broad age range, from young adults to children. The once restricted interaction with teachers changes to simultaneous communication with teachers and collaboration with a peer group. In addition, digital textbooks and e-lectures stimulate learner-centered language learning, with the result that learning methods change from the acquisition of structural knowledge to discovering and cooperating in discourse context (Song, 2006; Lee et al., 2013).

2. Learner attributes

Language learners adopt new technologies due to various reasons. Prior studies (e.g., Noh, Ju, & Jung, 2011) claim that various factors representing learner characteristics have a crucial impact on the adoption of new technology, including s-learning. For example, Jung (2006) found that learner attributes such as self-directed learning, confidence, participation and enjoyment have a positive influence on e-learning adoption and performance. Similar results were found in Choi's study (2006) in the context of mobile English learning. In addition, Park (2013) investigated the impact of smartphone on learning attitude and vocabulary capability. The results show that cooperative learning with smartphone leads the higher performance outcomes than individual learning. That is, interactivity learning increases the efficiency and effectiveness of English learning.

Other studies also emphasized the importance of learner attributes in explaining the adoption of s-learning. For example, Shin and Kim (2011) suggested three constructs, including self-efficacy, learning relevance and subjective norm as influencing factors on ease of use and usefulness of s-learning. The results indicate that self-efficacy and learning relevance had a positive impact on ease of use while subjective norm was not significant on ease of use. Regarding usefulness, learning relevance and subjective norm were significant, but self-efficacy was not. Both ease of use and usefulness had a significant impact on adoption intention of s-learning. These studies confirm that learner attributes are a crucial component in explain learner behavior with respect to the

adoption intention of new technology in language learning.

3. Previous research on smart language learning

Because s-learning for language learning is a relatively recent trend, there is little study investigating various aspects of s-learning in the context of language learning (Shin & Kim, 2011). Some previous studies have emphasized the role of information technology (IT), particularly computers and the Internet, in language learning. For example, Kim (2010) studied three EFL teachers in elementary, middle, and high school, respectively, who used Twitter microblogging with their students. This qualitative case study yielded findings about the teachers' interaction patterns with students, which were noticeably different on Twitter. The results showed that Twitter enables good writing practice for students of any age and provides a valuable opportunity for them to spontaneously use English for authentic purposes.

Further, Begum (2011) investigated the potential of smartphone SMS as a language learning tool in L2 English classrooms. While the potential for SMS-based instruction was revealed, a number of problems were also disclosed: cost, small screen size, text inputting difficulties, and lack of teacher training. Liu, Tan, and Chu's (2010) study focused on the use of QR codes to determine user location. Pilot testing of the QR-based system was undertaken over a period of four weeks by 20 university students playing two games, one of which involved an online virtual tutor. The results of a questionnaire indicated that most of the participants found the application easy to use and useful for assisting language learning.

Still, most of the previous studies focused on the improvement of discrete linguistic skills with smart technologies by using experimental methods. For example, Cavus and Ibrahim (2008) described the experimental use of smartphone SMS to teach English vocabulary to university students. Their survey indicated very high approval of the system. All participants expressed enjoyment of learning out of class with the help of their smartphones. Callan (1994) explored the effects of word processing with tablet PCs, compared to handwritten texts, to improve English writing skills. The results suggested better organization, improved essay writing with spell-check and grammar-check features, and greater flexibility due to the mobility of the tablet PC. In addition, Hwang and Chen (2013) described English learning in a situated learning environment by primary school children who used tablet PCs to listen to lessons and record their reading of basic words and completion of simple sentences. The experimental group made significantly higher gains in their English vocabulary acquisition as well as listening and speaking skills compared to the control group. Other researchers introduced programs to teach English with smart technology. For example, Jolliet (2007) designed a

collaborative model for teaching beginner-level language learners via smartphones based on an inventory of 50 basic vocabulary modules and related short dialogues organized around daily-life themes. Kim (2003) described a course syllabus and the processes involved in converting a face-to-face university level English syntax course to a tablet PC-assisted course, designing a tablet PC program, creating multimedia contents and their integration, and combining face-to-face teaching with students' self-study via the tablet PC program.

To be brief, previous studies of s-learning have been limited particularly in terms of explaining learners and environments. In other words, most of them have focused on developing and experimentally testing new technological applications to improve discrete skills. They have generally focused on the s-learning technology itself instead of understanding the whole picture of s-learning environments. Against this background, the present study examines learner attributes and learning environment attributes to explain the behavioral intention to engage in s-learning in the context of English learning.

4. Theory of Planned Behavior & Social Cognitive Theory

The acceptance and effective utilization of Information Systems (IS) by individuals and organizations are areas of research that have gained importance in recent years. The Theory of Planned Behavior (TPB) was developed by Icek Azjen in 1981 as an extension of the Theory of Reasoned Action (TRA), which was also developed by Azjen. The TPB includes three core constructs to predict intention and behavior in certain settings: attitude toward behavior (the feeling someone has towards something), subjective norm (perceived or actual social pressure to perform a behavior), and perceived behavioral control (PBC) (perceived ease or difficulty of performing a behavior). PBC has been related to other constructs, such as self-efficacy (found in The Social Cognitive Theory), where an individual believes he or she has control over a behavior and can actually carry it out using his or her skills. Attitude, subjective norm, and PBC all have a direct influence on intention (Ajzen, 1991).

Social cognitive theory (SCT) is a widely accepted, empirically validated model of individual behavior. It is based on the premise that behavior is influenced by environmental factors such as social pressures or unique situational characteristics, and cognitive and other personal factors (Compeau & Higgins, 1995). Bandura (1977, 1986) initially developed SCT with an emphasis on the acquisition of social behaviors. SCT emphasizes that learning occurs in a social context and that much of what is learned is gained through observation.

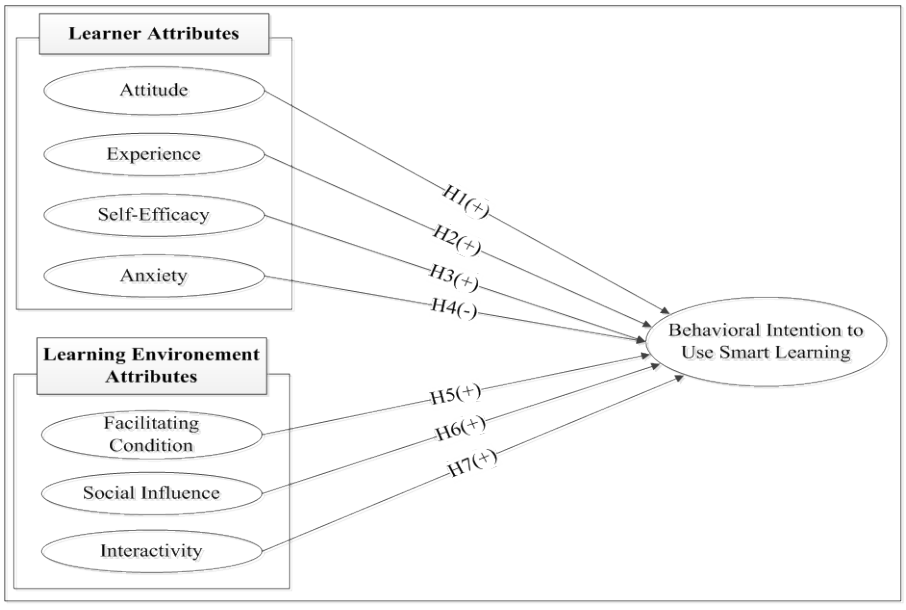
According to Bandura's (1986) triadic reciprocal causation model, individuals choose the environments in which they exist in addition to being influenced by those

environments. Furthermore, behavior in a given situation is affected by environmental or situational characteristics, which are in turn affected by behavior. Finally, behavior is influenced by cognitive and personal factors. In short, Bandura (1986) underscores the mutual influence between three sets of factors: personal factors (e.g., cognitive, affective, and biological events), the environment, and behavior. Self-efficacy is unique to SCT, although other theories such as the TPB have added this construct at later dates. Self-efficacy refers to the level of a person's confidence in his or her ability to successfully perform a behavior. Self-efficacy is influenced by a person's specific capabilities and other individual factors, as well as by environmental factors (Compeau & Higgins, 1995).

III. RESEARCH MODEL WITH HYPOTHESES

Figure 1 shows the proposed research model with hypotheses. This model highlights the importance of the variables, Learner Attributes and Learning Environment Attributes, as they pertain to learners' behavioral intention to use s-learning for English study, on the basis of a literature review (e.g., Zangyuan, 2003; Song, Kim, & Jung, 2009) and data from s-learning users.

FIGURE 1
Research Model



The data from s-learning users suggest constructs influencing the reason for using s-learning for English study. Four constructs are suggested as Learner Attributes: Attitude, Experience, Self-Efficacy, and Anxiety. In addition, three constructs, Facilitating Condition, Social Influence, and Interactivity, are proposed in the research model as Learning Environment Attributes. These seven constructs have a positive impact on learners' behavioral intention to use s-learning for English.

The first attribute proposed in the research model is related to English learners. Zangyuan (2003) and Shih, Chu, and Hwang (2010) claimed that many learner attributes are important to innovative adoption for English learning. Such attributes include Attitude, Experience, Self-Efficacy, and Anxiety, which have been shown to have a positive and significant influence on English learners' behavioral intention to use new technology (Shih, Chu, & Hwang, 2010). Thus, the proposed research model includes four learner attributes as variables as a direct impact of learners' behavioral intention to use s-learning.

The second attribute in the research model is Learning Environment. Every technology utilized in education has a unique environment. Song et al. (2009) claimed that unique aspects of learning environments have a crucial impact on learners' intention to use technology. Therefore, the research model includes three constructs—Facilitating Condition, Social Influence, and Interactivity—to investigate the key factors influencing behavioral intention to use s-learning for English study.

Attitude is defined as the individual user's positive or negative feelings about performing the target behavior (Davis, 1989). If learners have a positive feeling about using s-learning for English study, their behavioral intention to use such systems would be high. Several theories, including the Technology Acceptance Model (TAM), have verified the relationship between attitude and behavioral intention. Thus, the following hypothesis is developed:

H1: Attitude has a positive impact on Behavioral Intention to Use S-Learning for English study.

Dickerson and Gentry (1983) claimed that Experience is a psychological construct defined as the amount of time that English learners spend studying in Internet-based learning environments such as s-learning environments. There is a positive relationship between prior experience and one's behavioral intention to use a new technology (Wang et al., 2003). Therefore, the following hypothesis is proposed:

H2: Experience has a positive impact on Behavioral Intention to Use S-Learning for English study.

Bandura (1995) defined Self-Efficacy as users' confidence that they have knowledge and skills to complete a specific task successfully. Based on this definition, Self-Efficacy in this study is learners' confidence that they have knowledge and skills to use s-learning for English study. If learners have such confidence to engage in s-learning, their intention to use s-learning should be greater. Thus, H3 is proposed as follows:

H3: Self-Efficacy has a positive impact on Behavioral Intention to Use S-Learning for English study.

Anxiety has a powerful impact on learners' psychological behavior. Anxiety is defined as arousing concerned or emotional consequences when it comes to performing a behavior (Venkatesh et al., 2003). In an s-learning context, it is understandable that English learners who are less worried are much more likely to participate in s-learning for English than others who are more anxious. Thus, H4 is proposed as follows:

H4: Anxiety has a negative impact on Behavioral Intention to Use S-Learning for English study.

Venkatesh et al. (2003) defined Facilitating Conditions as the degree of an individual's belief that a technical infrastructure exists to support use of the system. Based on this definition, this study defines Facilitating Conditions as the extent to which EFL learners believe that there are necessary guidance and specialized instructions to use s-learning for English study. Prior studies (e.g., Vannatta & Fordham, 2004) have documented the importance of facilitating conditions, including training and supports, in explaining English learners' behaviors regarding a new technology. Thus, the following hypothesis is developed:

H5: Facilitating Conditions has a positive impact on Behavioral Intention to Use S-Learning for English study.

Social Influence implies an individual's perception that others believe he or she should use a particular system to do a job (Venkatesh et al., 2008). Several theories (e.g., TPB) claim that social influence or similar concepts such as subjective norm, are crucial in shaping individuals' behavior. The use of new technology, for various reasons, is often influenced by other users. English learners who use s-learning would affect others within the same social group. In addition, the relationship between social influence and individual behavior has been validated by prior studies. Thus, the following hypothesis is developed:

H6: Social Influence has a positive impact on Behavioral Intention to Use S-Learning for English study.

Interactivity is interaction between English learners and available learning resources in an s-learning environment. In s-learning, learners can interact with learning materials at any time and any place thru smart devices, such as smartphones. Prior studies (e.g., Jung, 2014) claimed that interaction is a crucial determinant impacting learners' behaviors for English study. If the s-learning environment provides a higher level of interaction with English learning resources than other environments, learners' intention to use s-learning would be positive. Therefore, H7 is proposed:

H7: Interactivity has a positive impact on Behavioral Intention to Use S-Learning for English study.

IV. RESEARCH METHODOLOGY

1. Participants

This study uses the sample in various educational levels (middle and high school, university students) in South Korea as the target population. This group embodies a large and diverse population representing frequent use of social media as well as s-learning for English study. In addition, the data were collected in various locations (e.g., schools and public places) in order to increase generalizability. Participants were solicited to answer the survey questionnaires. The survey was administered at 10 sites, including three public places (e.g., train and bus terminals, public library) and universities. A total of 348 responses were collected over a two-month period. Any responses containing either missing values or answers that were inappropriate for the study were discarded. Based on this rule, 17 responses were discarded due to incompleteness or missing values. Thus, 331 final responses were used to analyze the proposed research model.

Among 331 respondents, 54.1% were female. Over half of the participants were college/university students (51.1%) and have been using s-learning more than one year. In addition, 25.7% of the participants spend their study time with smart devices for English study more than five hours. Smartphone (60.7%) is mostly used device, followed by smart PC (50.5%), tablet PC (40.2%), and laptop computer (19.6%). The demographic characteristics of the participants are shown in Table 1.

TABLE 1

Demographic characteristics (n = 331)

Category		Frequency	Percentage (%)
Gender	Male	152	45.9
	Female	179	54.1
Educational Level	Junior/high school	45	13.6
	College/university	169	51.1
	Post-graduate study	82	24.8
	Other	35	10.6
S-Learning Experience	< 6 months	27	8.2
	≥ 6, ≤ 1 year	89	26.9
	≥ 1, ≤ 2 years	130	39.3
	≥ 2 years	85	25.7
Study Time (per week)	< 1 hr.	19	5.7
	≥ 1, ≤ 3 hrs.	90	27.2
	≥ 3, ≤ 5 hrs.	137	41.4
	≥ 5 hrs.	85	25.7
Learning Contents (multiple responses)	Communication	76	23.0
	Exams	155	46.8
	English certification exams	193	58.3
	Other	22	6.6
Device Used for S-Learning (multiple responses)	Smart PC	167	50.5
	Smartphone	201	60.7
	Tablet PC	133	40.2
	Laptop	65	19.6
	Other	10	3.0

2. Development of measures and data collection

Items to measure latent constructs in the research model were mainly developed from the literature. For example, items to assess four constructs in learner attributes were adopted from Davis (1989) and Venkatesh et al. (2003). Three constructs in learning environment attributes were measured with items from other studies (e.g., Venkatesh et al., 2003; Jung, 2014). A total of 24 items were developed based on these studies. The sample responded with his/her level of agreement on a 7-point Liker-type scale, ranging from “1” (strongly disagree) to “7” (strongly agree).

3. Assessment of the measurement model

The data were analyzed using a Partial Least Squares (PLS) approach due to the exploratory nature of this study. SmartPLS 2.0 was the main tool for the analysis. Another benefit of taking the PLS approach is that it can analyze the measurement and

structure model simultaneously with a small sample size, providing ease of the analysis. Thus, the PLS approach is well suited for this study.

Before testing the proposed hypotheses, the measurement model was assessed for reliability and validity. Cronbach's alpha was used for testing reliability, while both convergent and discriminant validity were tested using individual loading and the comparison between the square root of Average Variance Extracted (AVE) and correlations among latent variables. The minimum acceptable value for Cronbach's alpha is 0.7 or greater (Nunnally, 1978). In addition, Chin (1998) claimed that individual items with loadings greater than 0.7 are considered acceptable to demonstrate convergent validity. In this study, all alpha values of the latent variables, ranging from 0.772 to 0.932, exceeded the threshold. Furthermore, individual item loadings exceeded the threshold (0.7), indicating that the measurement items had internal consistency as well as convergent validity. Table 2 shows the results of reliability and convergent validity.

TABLE 2

Results of convergent validity and reliability tests

Construct	Items	Loading	Cronbach's Alpha	AVE
Attitude	A1	0.776	0.829	0.587
	A2	0.769		
	A3	0.754		
Experience	E1	0.788	0.810	0.617
	E2	0.813		
	E3	0.755		
Self-Efficacy	SE1	0.864	0.932	0.701
	SE2	0.819		
	SE3	0.828		
Anxiety	AN1	0.877	0.875	0.759
	AN2	0.873		
	AN3	0.864		
Facilitating Condition	FC1	0.802	0.889	0.612
	FC2	0.787		
	FC3	0.758		
Social Influence	SI1	0.767	0.772	0.591
	SI2	0.784		
	SI3	0.756		
Interactivity	INT1	0.736	0.849	0.628
	INT2	0.862		
	INT3	0.774		
Behavioral Intention to Use S-Learning	BI1	0.779	0.920	0.676
	BI2	0.827		
	BI3	0.858		

Finally, the discriminant validity was assessed in order to examine the lack of a relationship among measures that theoretically should not be associated. To demonstrate the discriminant validity, the square root of AVE for each latent variable should be greater than the correlation between them. Table 3 shows the results of the discriminant validity test. Since the correlations did not exceed the square root of AVE value (the bolded numbers in a diagonal line), discriminant validity was justified.

TABLE 3

Squared intercorrelation among the study constructs

Construct	1	2	3	4	5	6	7	8
1. Attitude	**0.766**							
2. Experience	0.161	**0.786**						
3. Self-Efficacy	0.264	0.162	**0.837**					
4. Anxiety	0.194	0.281	0.275	**0.871**				
5. Facilitating Condition	0.059	0.272	0.184	0.282	**0.783**			
6. Social Influence	0.207	0.156	0.057	0.164	0.270	**0.769**		
7. Interactivity	0.290	0.391	0.320	0.310	0.289	0.173	**0.792**	
8. Behavioral Intention to Use S-Learning	0.287	0.381	0.207	0.485	0.304	0.289	0.156	**0.822**

Note: The square roots *of* AVE are shown in **bold**.

4. Structural model test

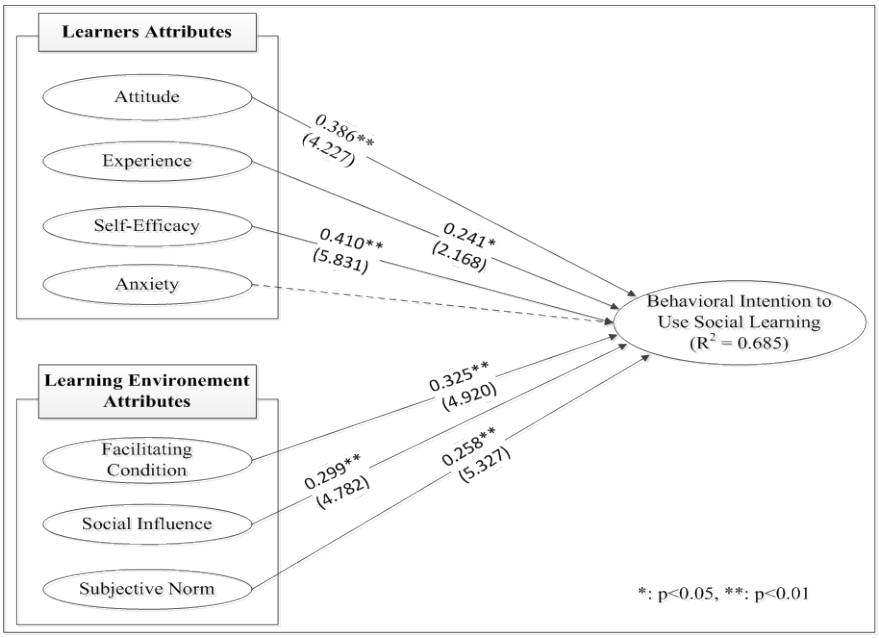
After the reliability and validity of the measurement model were demonstrated, each path in the research model was tested using structural equation modeling (SEM). The study used SmartPLS 2.0 in order to formulate the squared multiple correlation (R^2) for each endogenous variable. First, the standardized path coefficients (β) imply the strength of the causal relationships between two variables in the research model. Figure 2 illustrates support for positive relationships addressed in the proposed hypotheses, with the exception of Anxiety. The three variables in Learner Attributes (Attitude, Experience, and Self-Efficacy) had a positive significant effect on learners' Behavioral Intention to Use S-Learning. The path coefficient between Attitude and Behavioral Intention to Use S-Learning was 0.386 (t-value 4.227), which was significant at $p < 0.01$. Experience was significantly related to Behavioral Intention to Use S-Learning ($\beta = 0.241$, $p < 0.05$). Thus, H1 and H2 were supported. Also, Self-Efficacy ($\beta = 0.410$ $p < 0.01$) was found to be significant. Therefore, H3 was supported.

All three variables in Learning Environment Attributes (Facilitating Condition, Social Influence, and Interactivity) contributed to a significant positive effect on Behavioral

Intention to use s-learning. First, Facilitating Condition (β = *0.325, t-value 4.920*) was significant at p < 0.01, supporting H5. Social Influence and Interactivity had path coefficients of 0.299 and 0.258, respectively. Thus, H6 and H7 were supported at p < 0.01.

The squared multiple correlation (R^2) for each endogenous variable is important information that can confirm the research model. The value of R^2 measures the percent of variance in endogenous variable explained by each construct in the research model. Among the seven independent variables, all except Anxiety explained 68.5% of the variance in Behavioral Intention to Use S-Learning. This implies that 68.5% of information in Behavioral Intention to Use S-Learning can be explained by those six independent variables. Figure 2 shows a graphical presentation of the hypothesis test.

FIGURE 2
Structural Model



V. RESULTS

This study proposed a research model for investigating EFL learners' behavior regarding s-learning adoption intention. Two main attributes (Learner and Learning Environment) were included as key determinants of EFL learners' behavioral intention

to use s-learning. In Learner Attributes, four variables (Attitude, Experience, Self-Efficacy, and Anxiety) were proposed, while in Learning Environment Attributes, three variables (Facilitating Conditions, Social Influence, and Interactivity) were included. The data from 331 s-learning users were analyzed using SEM with SmartPLS 2.0. The results of the structural model analysis demonstrated that all hypotheses were statistically significant, with the exception of Anxiety.

Evidence supports the notion that EFL learners are more likely to use s-learning if they see it as combining well with their daily learning. H1 predicted a positive relationship between Attitude and Behavioral Intention to Use S-Learning. This hypothesis was supported with the second highest path coefficient. This result is supported by many prior studies (e.g., Davis, 1989). It is clear that EFL learners who have a positive attitude toward s-learning have a positive intention to use s-learning.

H2 proposed a positive relationship between Experience and Behavioral Intention to Use S-Learning. This hypothesis was supported, implying that EFL learners who have a positive experience with technology-enhanced learning would use s-learning as an innovative learning strategy. Prior studies (e.g., Wang et al., 2003) verified the positive relationship between experience of a certain technology and individual behavior. Finally, H3 proposed a positive relationship between Self-Efficacy and Behavioral Intention to Use S-Learning. This hypothesis was supported with the highest path coefficient, which implies that EFL learners have intentions to use s-learning because they can engage in English learning according to their own motivation in s-learning environments. The strong relationship between self-efficacy and intention is not surprising since this relationship has been confirmed in many IT adoption researches (Venkatesh et al., 2003). However, Anxiety was not significant, resulting in rejecting H4. This result implies that many EFL learners are competent in various technologies.

H5, H6, and H7 were proposed in order to test the relationship between three variables (Facilitating Conditions, Social Influence, and Interactivity) in Learning Environment Attributes and Behavioral Intention to Use S-Learning. These hypotheses were supported, suggesting that EFL learners think that well-organized technical supports, peer influence, and seamless interaction between learners and learning materials from s-learning are significant compared to other learning environments for English study, which positively affects Behavioral Intention to Use S-Learning. These findings support previous studies (e.g., Jung, 2014) claiming that EFL learners adapt to new learning environments, including s-learning, due to the unique attributes of learning environment.

Ⅵ. CONCLUSION

1. Implications

This study underlines the uniqueness of s-learning for EFL learners, which may help English educators and developers understand English learners' behaviors. The proposed research model provides a reasonable framework for understanding why EFL learners may or may not have the intention to use s-learning as an innovative learning environment. Instead of focusing on the technological attributes influencing EFL learners' behaviors, the proposed research model includes learner attributes and learning environment attributes. This approach is valuable because, in the investigation of new technology in English learning, the focus is too often placed on technical aspects.

This study's distinctive contribution to s-learning for English education study is that it developed a research model based on actual users of s-learning for English study. In other words, this study theorizes EFL learners' behavior in the context of s-learning. Second, this study gives English educators a better understanding to predict EFL learners' behavior from a non-technical perspective. This approach is valuable in terms of clarifying the innovation-decision process at the individual and learning environmental level in which the attributes of individuals and learning environments are evaluated rather than the technology's attributes. Furthermore, the results of this study can benefit English learners and educators who are considering adopting s-learning with respect to important factors derived from learners and learning environments that lead to EFL learners' behavioral intention to use s-learning.

In terms of managerial implications, this study shows that s-learning for English study is rapidly gaining impetus in English education. EFL learners with a clear understanding of innovation in education are better positioned to move their efficiency and effectiveness in English learning from the traditional English learning environment to one that fully integrates s-learning into learners' daily routines. English educational institutions that are considering providing s-learning services to learners should further move to better educate and train educators in a manner that allows them to look for and respond to emerging technologies more quickly. In other words, these English educational institutions must devote more time and resources to creating IT awareness so that their members become more opportunistic and attain a competitive advantage. In addition, the results of this study contribute to s-learning businesses in terms of types of s-learning environment they should focus on. For example, s-learning service providers may promote their services by utilizing "word-of-mouth" marketing strategy since social influence is a big factor for EFL learners in adopting s-learning. Finally, the government continuously supports new technologies in education with clear understanding of learner

behaviors to provide more effective and efficient ways of language learning.

2. Limitations and future study

Regardless of its important implications, this study contains some limitations. First, the investigation takes place at one point in time rather than over time. Thus, the strength of the findings is limited. In addition, the generalizability of this study would be increased by gathering data from more EFL learners representing other countries and specific English learning contexts. Third, even though this study developed the measurement items based on previous studies, there is a chance of misspecification of the constructs that may be a possible limitation. In addition, each latent variable was assessed with three to four measurement items, which may limit the reliability and validity of the measurement items. Finally, this study focused on behavioral intention to use s-learning as dependent variables. Thus, it is difficult to conclude if the relationship between behavioral intention to use s-learning for English study and actual usage of s-learning is valid from this study.

Based on these limitations, this study offers many opportunities for future study in English education. For example, future study should gather more data from culturally diverse groups in order to not only validate the results, but also test group difference since EFL learners in different countries may have different perspectives on their behavior. This study investigated only several variables categorized into Learner Attributes and Learning Environment Attributes. Therefore, other attributes and variables that may influence learners' behavioral intention to use s-learning need to be examined. Finally, future research should consider either the potential mediating or moderating effect. For example, each path in the research model could vary based on gender or age.

REFERENCES

Azjen, I. (1981). *Attitudes, personality, and behavior*. Milton-Keynes, England: Open University Press & Chicago, IL: Dorsey Press.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179-211.

Bandura, A. (1977). *Social learning theory*. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1986). The explanatory and predictive scope of self-efficacy theory. *Journal of Clinical and Social Psychology, 4*(3), 359-373.

Bandura, A. (1995). Exercise of personal and collective efficacy in changing societies. In

A. Bandura (Ed.), *Self-efficacy in changing societies* (pp. 1-45). New York: Cambridge University Press.

Begum, R. (2011). Prospect for cell phones as instructional tools in the EFL classroom: A case study of Jahangirnagar University, Bangladesh. *English Language Teaching, 4*(1), 105–115.

Callan, S. (1994). Can the use of hand-held personal computers assist transition students to produce written work of excellent quality? *Wentworth County Board of Education*, Ontario, Canada.

Cavus, N., & Ibrahim, D. (2008). MOLT: A mobile learning tool that makes learning new technical English language words enjoyable. *International Journal of Interactive Mobile Technologies, 2*(4), 38–42.

Chin, W. (1998). The partial least squares approach for structural equation modeling. In G. A. Marcoulides (Ed.) *Modern methods for business research* (pp. 295-336). Hillsdale, NJ: Lawrence Erlbaum.

Choi, E. J. (2006). *Study on self-directed learning English vocabulary using mobile*. Master thesis, Chungang University.

Chu, H. (2006). Interactional modifications in text-based chats between Korean and Japanese students. *English Language & Literature Teaching, 12*(2), 1-18.

Compeau, D. R., & Higgins, C. A. (1995). Computer self-efficacy: Development of a measure and initial test. *MIS Quarterly, 19* (2), 189-211.

Davis, F. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319-340.

Dickerson, M. D., & Gentry, J. W. (1983). Characteristics of adopters and non-adopters of home computers. *Journal of Consumer Research, 10*(2), 225-235.

Hwang, G. (2014). Definition, framework and research issues of smart learning environments – A context-aware ubiquitous learning perspective. *Smart Learning Environments, 1*(4), 1-14.

Hwang, W-Y., & Chen, H. (2013). Users' familiar situational contexts facilitate the practice of EFL in elementary schools with mobile devices. *Computer Assisted Language Learning, 26*(2), 101–125.

Jolliet, Y. (2007). M-learning: A pedagogical and technological model for language learning on mobile phones. In J. Fong & F-L. Wang (Eds.), *Blended learning* (pp. 327–339). New York: Cambridge University Press.

Jung, H. J. (2009). Impacts of smart learning attributes on intention to use smart learning for English learning. *The Linguistic Association of Korea Journal, 21*(3), 301-317.

Jung, H. (2014). Ubiquitous learning: Determinants impacting learners' satisfaction and performance with smartphones. *Language Learning & Technology, 18*(3), 97–119.

Kim, H-S. (2010). Three teachers' initial efforts to use Twitter for teaching English in public schools. *Multimedia-Assisted Language Learning, 13*(2), 129–154.

Kim, I. (2003). The development of the PDA-based multimedia contents for teaching an English syntax course. *Multimedia-Assisted Language Learning, 6*(2), 9–34.

Koper, R. (2014). Conditions for effective smart learning environments. *Smart Learning Environments, 1* (5). 1-17.

Lee, J., Kim, T., & Chung, J. (2013). Study on communication of characteristics smart learning from UX perspective. *International Journal of Smart Home, 7*(6). 59-72

Liu, T., Tan, T., & Chu, Y. (2010). QR code and augmented reality-supported mobile English learning system. In X. Jiang, M-Y. Ma, & C-W. Chen (Eds.), Workshop of Mobile Multimedia Processing 2008, *Lecture Notes in Computer Science*, 5960 (pp. 37–52).

Noh, K. S., Ju, S. H., & Jung, J. T. (2011). An exploratory study on concept and realization conditions of smart learning. *Journal of Digital Convergence, 9*(2), 79-88.

Nunnally, J. C. (1978). *Psychometric theory (2nd ed.)*, New York, McGraw-Hill.

Park. J. Y. (2013). *A Study on the effects of smart-phone application along with types of learning on university students' vocabulary ability and learning attitudes*. Master Thesis, Ewha Womens University.

Shih, J. L., Chu, H. C., & Hwang, G. J. (2010). An investigation of attitudes of students and teachers about participating in a context-aware ubiquitous learning activity. *British Journal of Educational Technology*, *42*(3), 373–394.

Shin, H. K., & Kim, Y. A. (2011). A study on the factors affecting smart learning – Focusing on the moderating effect of learning time. *Journal of the Korea Industrial Information Systems Research, 16*(5), 93-105.

Song, Jeong-Weon. (2006). The effects of Internet-based English practice on listening and reading. *English Language & Literature Teaching, 12*(2), 195-214.

Song, Y. M., Kim, S. H., & Jung, H. J. (2009). The effect of m-learning environment on perceived usefulness, satisfaction, and performance in English learning. *Business Education Review, 57*, 275–302.

Spector, J. (2014). Conceptualizing the emerging field of smart learning environments. *Smart Learning Environments, 1* (1), 1-10.

Vannatta, R., & Fordham, N. (2004). Teacher dispositions as predictors of classroom technology use. *Journal of Research on Technology in Education, 36*(3), 253-271.

Venkatesh, V., & Bala, H. (2008). Technology acceptance model 3 and a research agenda on interventions. *Decision Sciences, 39*(2), 273-315.

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.

Wang, Y., Sereno, J. A., Jongman, A., & Hirsch, J. (2003). FMRI evidence for cortical modification during learning of Mandarin lexical tone. *Journal of Cognitive Neuroscience*, *15*(7), 1019–1027.

Zangyuan, O. (2003). The application of adaptive learning environment on oxidation-reduction reactions Web-title. *International Journal of Instructional Media*, *30*, 383–405.

Examples in: s-learning, language learning
Applicable Languages: English
Applicable Levels: Secondary, Higher education

Hee-Jung Jung
Dept. of English Education
College of Education, Chosun University
309 Pilmun-daero Dong-gu
Gwangju 61452
Tel: +82-62-230-6217
Email: jung@chosun.ac.kr

Received in October 15, 2015
Reviewed in November 26, 2015
Revised version received in December 5, 2015