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Abstract

Over the past few years, the prevalence of web-based applications in school and at home makes learning and teaching through the Internet become an inevitable way in education. With great potentials for enriching all kinds of educational applications, web-based instruction is becoming an impressive apparatus for learning resource delivering. In this study, an asynchronous web-based language learning (AWBLL) system is employed in a vocational-technical college in Taiwan to support undergraduate English as a foreign language (EFL) learning. Drawing on the concepts from theory of reasoned action, technology acceptance model and social cognitive theory, this study proposed a comprehensive model and developed an instrument for measuring students' intentions to use AWBLL Systems. The research findings indicate that students in EFL show great readiness to and positive intentions towards the system for EFL courses and exposed a possible benefit from its use in the long run. However, they also convey some negative opinions of the AWBLL system, suggesting additional improvement of the relative underlying factors of AWBLL technology. The results can proffer useful suggestions for web-based language learning, as well as serve as instrumental guidelines for web-based system to be effectively implemented with care to avoid attenuating students' interests and activations.

Keywords: English as a foreign language, web-based instruction, asynchronous web-based language learning, technology acceptance model, social cognitive theory

1. Introduction

The dazzling speed of information and communication technology (ICT) advancement changes our living styles dramatically. The prevalence of web-based applications in school and at home makes learning and teaching through the Internet become the most popular way in education. Computer use and Internet access can provide a flexible option for information and knowledge acquisition and may further improve education quality. The conveniences of web-based learning systems in education applications are many: it can be used at anytime and anywhere; it is easy to update the learning material; it can foster the interaction between the learner and the teacher in several ways; it can include

multiple media such as text, audio, graphics, video and animation; it allows learners to form learning communities (Warschauer and Healey, 1998). In addition, it can improve learning efficiency and help to achieve the purpose of lifelong learning. The broad access to the Internet creates a novel medium for education and training. The use of the World Wide Web (WWW) as an instructional tool, in particular, has been regarded as an alternative education form which provides a solution for current instructional problems and creates an innovative education environment. In Taiwan, the Ministry of Education (MOE) initiated many projects with the purposes of enhancing English proficiency by setting up web-based learning facilities for all Taiwanese people to learn without the constraint of time and space. To carry out the projects, many universities and colleges in Taiwan has developed web-based learning environment for their current courses, especially for English as a foreign language (EFL) classes.

Although web-based environments provide flexibility in time, space and distance and are well recognized by students, a few students report feeling isolated, lack of motivation or lack of support and feedback, which consequently leads to dropping out of the web courses. Nevertheless, since the Internet is a new medium (for system developers, instructors and students alike) for learning material delivering and skills/knowledge learning, the mechanisms are not completely understood and the relative theoretical backgrounds are also not well established. That necessitates researchers in several disciplines to make efforts to justify what factors actually influence students' intention to use web-based learning system, how the influence level of each factor on students' perceptions as well as the causes and effects in such a virtual learning environment. As the wide spread of web-based language learning courses continues to impact students over around the world, it is important to gain a better understanding of the influencing factors to improve instruction and students' learning. Moreover, the integration of Internet technology with language learning has shifted the focus from teacher-centred classroom toward learner-centred environment which empowers the learner with the control over the lesson content and the learning process (Fotos and Browne, 2004). In this regard, students' belief, attitude and behavioral intentions towards the usage of web-based information technology (IT) in language learning need to be carefully investigated. This study contributes to the literature in MIS and computer-assisted language learning (CALL) research archives by carefully identifying what factors influence students' inclinations and deliberately constructing a comprehensive conceptual framework to validate the influence level of each factor on students' behavioral intentions toward web-based language learning environments.

In short, given the inevitability of web-based applications in language teaching and learning, it is critical that educators in all sorts of educational institutions understand better the elements contributing to the successes and possible risks of web-based language learning systems. The study seeks to identify the underlying factors and causal relationships in predicting EFL students' intentions to use an asynchronous web-based language learning system (AWBLL), the results can provide useful suggestions to system developers, program directors and faculty members to make effective actions to improve students' learning performance via web-based learning systems. The research questions thereby stand out clearly: To what extent do the students intent to use such a web-based

language learning system? What are the influencing factors of students' intentions to use web-based language learning? What are the associated relationships between the proposed antecedents, perceived factors, and the intentions to use web-based language learning systems?

2. Literature Review

2.1 Web-Based Language Learning

The use of information technology (IT) for second language instruction has been burgeoning for the past two decades. In this study, the researchers use asynchronous web-based language learning (AWBLL) as the scope to discuss the adoption of web-based technology/systems in EFL classrooms. A web-based language learning environment integrates the use of multimedia with web-based technologies and has become a new trend for language teaching and learning. Related research has proved that the natures of equality, communicativeness, and interactivity of the Internet and the Web has positive effect on stimulation of students' active involvement and positive attitude toward learning in a web-based setting (Ortega, 1997).

From the view of integrative approach, the Internet can not only integrate image, sound, graphics and text to help students understand the course subjects, but also to integrate the four language skills (reading, writing, speaking, and listening) together in one piece of language learning courseware (Warschauer and Healey, 1998). Due to the interactivity and ubiquity of the Internet and the unlimited accessibility and media richness of the Web, language teachers start to develop instructional materials which embrace the information on the Web to help students to improve their language skills and proficiency. Generally, the Internet and WWW has changed the instructional mode from computer-assisted type into web-based setting (Taylor and Gitsaki, 2004).

Students' perceptions, belief, and attitudes regarding computer-assisted language learning have been the concern of many studies (e.g., Ayres 2002; Beauvois, 1998). From the prior works of computer-assisted and web-based language learning disciplines, we can collectively induced that students' belief, attitude, and behavioral intentions to the use of web-based language learning systems might be greatly influenced by some special natures of web-based learning environment (system characteristics) and emotional factors (perceived enjoyment and negative affect) and students' intrinsic and extrinsic motivations and belief (social influence and self-efficacy, perceived usefulness, and perceived ease of use).

Given that web-based language learning applications are more and more important for next generation language education, study was so to be initiated to explore what factors and how the influence levels may impact students' intentions to use web-based language learning systems. In this study, the web-based education system of interest will focus mainly on an asynchronous web-based language learning (AWBLL) settings which mean

that the course can be delivered without the simultaneous presence of the teacher and students and the WWW becomes a storage of already prepared lecture while the Internet plays the role as the delivery medium. Students can access the learning environment virtually through the Internet and retrieve the learning material from the WWW without time and space constraint. That is not to say the issue concerning synchronous web-based language learning systems is not important, but it is far beyond the empirical settings of this study and will be pursued in our future study.

2.2 Theoretical Background

2.2.1 The Characteristics of AWBLL

Applying web-based technology in language education has created a valuable learning environment and has impressed language learners and instructors. In such a cyberspace, AWBLL can provide interactivity, flexibility and repetitive exposure to enhance learning efficiency considerably. One of the main advances brought by the integration of technology into language learning curriculum is the increased interaction. Since learning is part of social activities and learning process can be highly influenced by social interactions with others, learning activities enable students not only to cooperate with each other but also to enhance learning efficiency through active interaction with people around them. Interaction is cited as one of the most important components in leading to a successful system design for web-based education systems. Thus, understanding how to effectively improve the interactivity is crucial for system designers and instructors to realize why or why not a web-based learning system can be successful.

From the viewpoint of second language acquisition (SLA), related literature has presented the significance of students' active involvement in interactions with native speakers or other students of the target language during their language learning process. As for language learning in web-based settings, it is believed that the establishment of positive relationships between teachers and students plays an essential role in fostering students' positive perceptions of the learning environment as well as the creation of a positive online classroom atmosphere.

In addition, the students who would voluntarily take web-based language learning usually have different needs concerning their learning situation and each of the students possesses different study pattern comparing students in the conventional classroom, therefore, a highly flexible environment would be necessary in order to accommodate a variety of students' needs and language proficiency levels. Studies have suggested that building flexibility into learning environments can fully support students' various learning styles, interests, and skill levels, and consequently draw forth students' positive attitude towards learning. Furthermore, compared to human instructors, computers and web-based systems have higher tolerance of students' errors and provide them with the opportunities to practice repeatedly until the mastery of the language is acquired. Schneider (2004) indicates that one of the benefits derived from computer mediated language learning is that students can repeat exercises whenever necessary and get instant

feedback. In other words, in web-based environment, students have more opportunities to access learning materials repeatedly which would translate into better chances for comprehension.

2.2.2 Learner's Belief and Intentions towards AWBLL

Technology acceptance model (TAM) has been the most widely used model since its introduction in 1980s. TAM, developed by Davis (1989), is derived from the Fishbein and Ajzen's Theory of Reasoned Action (TRA) and is developed to explain and predict the individual's acceptance of information technology. The main concept of TRA is that an individual's behavior is determined by his/her attitude toward carrying out that behavior; furthermore, the attitude toward behavior is influenced by individual's beliefs about the possible outcomes resulted from performing the behavior and the evaluations of the value of the possible outcomes (Fishbein and Ajzen, 1975). According to TRA, the intention to perform has direct influence on the actual behavior because people usually behave according to their intentions to do it in an appropriate context and time. TAM adopts TRA's main concept to explain the individual's IT adoption behaviors. It proposes that perceived usefulness and perceived ease of use of IT are the two important determinants in predicting individuals' acceptance and use of IT. According to Davis (1989), perceived usefulness is defined as "the degree of which a person believes that using a particular system would enhance his or her job performance" and perceived ease of use refers to "the degree of which a person believes that using a particular system would be free of effort".

Consistent with TRA, TAM posits that individuals' actual system usage is determined by behavioral intentions, and the behavioral intentions are determined by attitudes toward using. Both perceived usefulness and perceived ease of use have direct effect on attitude toward using and other external variables on behavioral intentions is fully mediated by these two beliefs of usefulness and ease of use. Since TAM was developed for tracing the impact of external factors on internal belief, attitude, and intentions, IS researchers have conducted plenty of studies that utilized the technology acceptance model as a base to identify other determinants and relationships specific to particular IT usage in various contexts. These studies have proved that TAM is a powerful model in studies of the determinants of information technology acceptance.

In TAM related research, motivational variables have been identified to be important determinants and predicators on users' intentions toward system usage. Davis, Bagozzi, and Warshaw (1992) identified perceived usefulness to be extrinsic motivation and enjoyment to be intrinsic motivation in their study to examine the relationships between motivational variables and usage intentions. Enjoyment is defined as "the extent to which the activity of using the computer is perceived to be enjoyable in it's own right, apart from any performance consequences that may be anticipated (Davis et al., 1992)." Concerning web-based learning, according to a survey conducted by Taylor et al. (2004), students reported that the use of the Web had made the course more enjoyable which results in their willingness of continuing to use the Web as learning tool to assist language learning process.

According to TRA, in addition to the individual's perceptions and beliefs, social influences may affect behavior. In the TRA model, social influence is named "subjective norm", defined as a "person's perception that most people who are important to him think he should or should not perform the behavior in question" (Fishbein et al., 1975), and is identified as a direct determinant of behavioral intentions in TRA. From this perspective, students may choose to use web-based language learning system not because that they perceive learning via web-based environment would be useful or enjoyable but because that they perceive the pressure from the people important to them, such as teachers, classmates, and parents.

2.2.3 Students' Learning Cognitions on AWBLL

Social cognitive theory (SCT) is based on the concept that personal factors, environmental factors, and behavior are reciprocally interrelated. Thus, individual would explain, choose, and influence environment with cognitive factors in addition to being affected by environments. Moreover, behavior can be influenced by environment; in the meantime, environment can be changed by behavior. Furthermore, cognitive and personal factors affect behavior, and in turn, are influenced by behavior (Bandura, 1986; Compeau et al., 1995).

Bandura (1986) defined self-efficacy as "generative capability in which cognitive, social, and behavioral sub-skills/knowledge must organised into integrated courses of action to serve innumerable purposes." According to the definition, self-efficacy seems to be a construct which can be viewed as part of SCT for the reason that there is a reciprocal interrelationship between cognitive process and behavior change in self-efficacy theory, in addition, self-efficacy is identified to be the key factor to judge whether or not an individual can complete a task successfully with his/her own capabilities. Self-efficacy can be achieved when the learner possess the confidence to perform certain tasks. In the context of this study, self-efficacy is interpreted as learner's self-confidence in his or her ability to learn language through web-based learning system.

Many behaviors are perceived to have positive outcome, but are not pleasant to perform. Thus, the most important determinant concerning learners' behavior is affect. Affect can be referred to aspects of emotion, feeling or mood (Arnold and Brown, 1997) and is the direct emotional response to the performance of behavior. Affective factor in second language learning is not a new concern. Although affect can hardly be described scientifically, the majority of research regarding second language learning process focuses on the variables concerning with the emotional side of human behavior (Brown, 2000). It is believed that more attention on affective factors would result in more effective language learning. Therefore, when considering the affective side of language learners, instructors should pay more attention on how to overcome the problems caused by negative emotions as well as how to use positive emotions to enhance learning efficiency (Arnold et al., 1997).

2.3 Hypotheses Development

Davis, Bagozzi, and Warshaw (1989) suggested that technology use intentions are predicted by perceived usefulness and perceived ease of use. Although the original formulation of TAM included attitude as a construct mediating the effects of beliefs on intentions, subsequently attitude was dropped from the specification of TAM (Agarwal and Karahanna, 2000). Drawing on the concepts from TRA, TAM and SCT, this study proposed a comprehensive model and developed an instrument for measuring students' intentions to use this system. As Figure 1 shown in section 4, the conceptual framework hypothesizes that perceived enjoyment (PE) and AWBLL system characteristics (SC) are underlying determinants of perceived usefulness (PU) and perceived ease of use (PEOU) of AWBLL; negative affect (NA) and social influence (SI) are underlying determinants of self-efficacy (SE), while the constructs (i.e., PU, PEOU, SI, and SE), in turn, influence behavioral intentions to use the technology. The core theme is then structured as that PU, PEOU, SI and SE have direct effects on individual's behavioral intentions to use IT and other external variables including, PE, SC, and NA on behavioral intentions is fully mediated by these four constructs of beliefs on the behavioral intentions to use AWBLL. Because TAM is used as the baseline model of this study, the hypothesized relationships in TAM will be verified in the context of AWBLL. Therefore, the following hypotheses are proposed:

H1: Perceived Usefulness (PU) has a direct effect on Behavioral Intentions (BI) to use AWBLL.
H2a: Perceived Ease of Use(PEOU) has a direct effect on Behavioral Intentions(BI) to use AWBLL.
H2b: Perceived Ease of Use (PEOU) has a direct effect on Perceived Usefulness (PU).
Venkatesh (1999) argued that users who perceive training experience to be enjoyable are more likely to perceive the system to be easier to use and the perceived ease of use has positive effect on behavioral intentions to use the system. Yi and Hwang (2003) extended the technology acceptance model by incorporating motivation variables in order to predict the use of web-based information system and the results indicated that enjoyment has significant effect on usefulness and ease of use. Thus, the following hypotheses are proposed:

H3a: Perceived Enjoyment (PE) has a direct effect on Perceived Usefulness (PU).
H3b: Perceived Enjoyment (PE) has a direct effect on Perceived Ease of Use (PEOU).
In TAM related research, system characteristics have been examined to be external variables towards users' acceptance of information technology through the mediation of perceived usefulness and perceived ease of use. Davis (1993) suggested that system characteristics can be fully mediated by TAM model on usage behavior. Igabaria, Guimaraes, and Davis (1995) confirmed in their study the effects of system characteristics on perceived usefulness and ease of use. Based on the prior research, the following hypotheses are proposed:

H4a: System Characteristics (SC) of AWBLL have direct effect on Perceived usefulness (PU).
H4b: System Characteristics (SC) of AWBLL have direct effect on Perceived Ease of Use (PEOU).

Taylor and Todd (1995) suggested that self-efficacy has significant indirect influences on behavioral intentions. Compeau, Higgins, and Huff (1999) developed a model to test the influence of computer self-efficacy on computer usage and the finding showed that self-efficacy has significant positive influence on use. Ma and Liu (2005) found that Internet self-efficacy has a significant impact on behavioral intentions to use web-based electronic medical records. Based on the previous studies, the following hypothesis is proposed:

H5: Self-Efficacy (SE) has a direct effect on Behavioral Intentions (BI) to use AWBLL.
According to TRA, the direct effect of social influence to behavior intentions is attributed to individual's belief about the necessities of performing certain behavior for the reason that someone who is important for him/her or hold an influential position in his/her decision making process would think he/she should do it regardless of the consequential outcomes. Moreover, within the concept of SCT, self-efficacy is based on the reciprocal relationship between cognitive and behavioral concept which can be influenced by environmental factors, such as social pressure and peer influence. Therefore, the following hypotheses are proposed:

H6a: Social Influence (SI) has a direct effect on Behavioral Intentions (BI) to use AWBLL.
H6b: Social Influence (SI) has a direct effect on Self-Efficacy (SE).
In IS related research, the findings concerning the influence of affective factor to system usage were mixed. Pare and Elam (1995) conducted a study regarding the adoption of personal computer and concluded that anxiety has a negative effect for user to utilize system softwares. Compeau et al. (1999) tested the influence of anxiety on computer usage and the result showed that there is no significant influence exists. However, in a web-based language learning environment supported by AWBLL, students can benefit from the non-threatening environment to support their learning. In other words, the asynchronous web-based language learning technology may provide students a more comfortable environment which would effectively reduce negative affect and result in the confidence reinforced to improve their language proficiency (Schneider, 2004). Thus, the following plausible hypothesis was proposed:

H7: Negative Affect (NA) has a direct effect on Self-Efficacy (SE).

3. Methodology

3.1 Research Design

A cross-sectional field survey was conducted with data collected from a technical-vocational college in Taiwan. The empirical stage of this study began with developing the relative constructs of students' intentions to use AWBLL and generate the relative measures as broad as possible. Then, an iterative interview process was applied for scales refinement. Next, using the partial least squares (PLS) method, a component-based structural equation modelling technique, to structure and to validate the casual relationships between the underlying determinants (perceived enjoyment, system characteristics, and social influence), affection factor (negative affect), belief (perceive

usefulness, ease of use, and self-efficacy), and the behavior intentions to use AWBLL systems. By considering the tangible expected outcomes of their perceptions and intentions, we expect to be able to assess the nomological and predictive validities of psychometric properties of these latent variables. The questionnaire included items worded with proper negation and a shuffle of the items to reduce monotony of questions measuring the same construct. The statistical analysis strategy involved a two-phase approach including the psychometric properties of all scales were first assessed through confirmatory factor analysis (CFA) and the structural relationships were validated by the bootstrap analysis.

3.2 Instrumentation

Previous research was reviewed to ascertain their fit with the conceptual definitions and ensure that a comprehensive list of measures were included. Those for perceived usefulness, perceived ease of use, and behavioral intentions to use were adapted in our model from previous studies on TAM. The construct of system characteristics was derived from the study of Davis et al. (1992). The scales for self-efficacy were based on the prior work of Compeau et al. (1999). The construct of social influence was adapted from Taylor et al. (1995). The measures for perceived enjoyment were captured using three items derived from Yi et al. (2003), and other constructs were derived from our underlying conceptualization regarding the research framework. The survey questionnaire consisted of two parts. The first recorded the subject's demographic information. The second recorded the subject's perception of each variable in the model proposed in this study. The demographic variables assessed were gender, age, major, experiences of English learning, and web usage. The second section asked each subject to indicate his or her degree of agreement with each item. Data were collected using a 7-point scales with the anchors 1 means strongly disagree; 4 is for neutral; and 7 indicate strongly agree, respectively.

As mentioned previously, the initial measurement item list of relative constructs in questionnaire was generated; an iterative personal interview process (including faculties, teaching assistants, and representative students) was conducted to refine the instrument. These interviews enabled the researchers to gauge the clarity of the items presented in the survey instrument, to assess whether the instrument was capturing the desired phenomena, and to verify that important aspects had not been omitted. Changes were made and several iterations were conducted; the process was continued until no further modification was needed. Feedback served as a basis for correcting, refining and enhancing the experimental scales. Some scales were eliminated, because they were found to represent essentially the same aspects as others with only slight wording differences. Some scales were modified because the semantics appeared ambiguous or irrelevant to the perceived acceptance of the web-based language learning system of interest.

3.3 Participants

This study was conducted in a well-known vocational-technical college located at the southern part of Taiwan. Sample data was collected from the students in this college. The subjects for this study were students who have taken EFL classes and have the experience to use the AWBLL system. Students who enrolled in an EFL course were coded and randomly selected from the administration affairs system of this vocational-technical college. This EFL course is a compulsory course for the students in the night college of this institute, so all 566 freshmen had to enrol in the course. The course is required as part of their undergraduate bachelors degree. Students taking the course are of different majors including nursing, business mangement, IT and management information systems, healthcare management, and biotechnology. The data was gathered by means of a self-administered questionnaire. The randomly selected students were self-administered the 34-item questionnaire after the mid-term examination to ensure that they have actually used the AWBLL system. For each question, respondents were asked to circle the response which best described their level of agreement. Finally, a total of 258 questionnaire out of the 283 distributed were collected, giving response rate of 91 percent. Forty participants gave incomplete answers and their results were dropped from the study. This left 218 sets of data for statistical analysis, a 77 % valid return rate. The profile of respondents is shown as in Table 1.

Table 1. The profile of respondents

Variable	Classification	Freq.	%	Variable	Classification	Freq.	%
Gender	Male	86	39%	Learning Condition	Part time	152	70%
	Female	132	61%		Full time	66	30%
Major	Nursing	61	28%	Experience of Web usage	Less than 1 Yrs	29	13%
	Business Mgmt.	66	30%		1 to3 Yrs	57	26%
	IT/IS	39	18%		3 to 6 Yrs	88	40%
	Healthcare Mgmt.	32	15%		6 to 10 Yrs	39	18%
	Biotechnology	20	9%		More than 10 Yrs	5	2%
Average Age				21.79 Years			
Average years of language learning experience				9.36 Years			

4. Results

4.1 Measurement assessment

To ensure the phenomena captured, in this study, representing the constructs of the conceptual framework, the validity and reliability of the instrument were assessed by PLS method. PLS-Graph version 3.0 was applied for the statistical analysis. By using the procedure described in the prior work of Agarwal et al. (2000), the assessment of item loadings, reliability, and discriminant validity is performed for the reflective constructs through a confirmatory factor analysis (CFA). All of the reflective measures developed and operationalized definitions of constructs are based on the review of refereed theories, relative literature and researches in related field. The experts in the disciplines of EFL and distance learning were also invited to review all of the items of the instrument to reassure the content validity. The alpha-coefficients were used to represent for each of the constructs in the model proposed (Hair et al., 1998). In order to assure the confirmatory nature in the study, validity and reliability of the scales should be confirmed adequately. As shown in the following Table 2, all reflective items have significant factor loadings above 0.707, showing that more than half of the variance is captured by the consrtucts (Hair et al., 1998).

All constructs in the model exhibit good internal consistency as evidenced by their composite reliability scores. The composite reliability coefficients of all constructs in the proposed conceptual framework (Figure 1) are more than adequate, ranging from 0.89 for the construct of social influence to .96 for behavioral intentions to use the AWBLL system. To assess discriminant validity (Chin 1998), (1) indicators should load more strongly on their corresponding construct than on other constructs in the model and (2) the square root of the average variance extracted (AVE) should be larger than the inter-construct correlations. The percent of variance captured by a construct is given by its average variance extracted (AVE). To show discriminant validity, each construct square root of the AVE has to be larger than its correlation with other factors. As the results shown in the following Table 3, all constructs meet this requirement. Finally, the values for reliability are all above the suggested minimum of 0.7 (Hair et al. 1998). Thus, all constructs display adequate reliability and discriminant validity. All constructs share more variance with their indicators than with other constructs. Thus, the convergent and discriminant validity of all constructs in the proposed conceptual framework can be firmly assured.

Table 2. Results of Confirmatory Factor Analysis

Construct	Item	Loading	Mean	S.D.	Construct	Item	Loading	Mean	S.D.
Perceived Enjoyment	PE1	0.945	4.51	1.21	Perceived Usefulness	PU1	0.836	4.53	0.99
	PE2	0.946	4.55	1.24		PU2	0.883	4.46	1.01
	PE3	0.944	4.55	1.20		PU3	0.886	4.51	1.15
AWBLL System Characterics	SC1	0.836	4.80	1.11		PU4	0.884	4.50	1.08
	SC2	0.872	4.86	1.03		PU5	0.842	4.61	1.13
	SC3	0.867	4.92	1.12	Perceived Ease of Use	PEOU1	0.802	4.78	1.17
	SC4	0.859	5.01	1.14		PEOU2	0.861	4.40	1.12

	SC5	0.853	4.84	1.04		PEOU3	0.843	4.33	1.08
	SC6	0.845	4.94	1.09		PEOU4	0.868	4.60	1.16
Social Influence	SN1	0.873	4.39	1.16		PEOU5	0.862	4.66	1.11
	SN2	0.867	4.42	1.16	Self-efficacy	SE1	0.899	4.28	1.28
	SN3	0.798	4.85	1.31		SE2	0.894	4.45	1.18
	SN4	0.821	4.63	1.33		SE3	0.882	4.29	1.13
Negative Affect	NA1	0.836	3.67	1.32		SE4	0.868	4.54	1.23
	NA2	0.925	3.71	1.40	Behaviorial Intentions to use AWBLLS	BIU1	0.954	4.58	1.35
	NA3	0.877	3.84	1.31		BIU2	0.961	4.70	1.33
	NA4	0.812	3.95	1.36		BIU3	0.918	4.53	1.39

Table 3. Inter-correlation among constructs

Construct	# of Items	Construct								Composite Reliability
		PU	PEOU	SC	SE	NA	PE	SN	BI	
PU	5	0.867*								0.938
PEOU	5	0.564	0.847							0.927
SC	6	0.630	0.635	0.871						0.940
SE	4	0.533	0.753	0.626	0.886					0.936
NA	4	-0.199	-0.231	-0.244	-0.281	0.864				0.921
PE	3	0.684	0.560	0.654	0.629	-0.257	0.945			0.961
SI	4	0.500	0.640	0.601	0.616	-0.207	0.543	0.853		0.889
BI	3	0.645	0.624	0.671	0.641	-0.267	0.797	0.541	0.944	0.961

Diagonal elements are the square roots of AVE

4.2 Test of the Structural Model

The path coefficients and explained variances for the proposed model in this study are shown in Figure 1. Factor loadings of indicators of all constructs can be read between the lines as loadings in a principal components factor analysis. T-statistics and standard errors were generated by applying the bootstrapping procedure with 200 samples. All of the constructs in this study were modelled as reflective and most of the constructs in the model were measured using multiple indicators, rather than summated scales. Perceived usefulness, perceived ease of use, self-efficacy, and social influence account for 55.5% of the variance explained in behavioral intentions to use AWBLL systems. Perceived enjoyment, system characteristics, and perceived ease of use together explain 54.9% of the variance in perceived usefulness, while perceived enjoyment and system characteristics explain 44.9% of the variance in perceived ease of use. The construct of self-efficacy was contributed by social influence and negative affect with the explained variance of 44.4%. An F test is applied to test the significance of the effect size for the model as it explains all dependant variable are significant (p =.000). Therefore, overall, the model has strong explanatory power for the construct of "behavioral intentions to use AWBLL". The significant path coefficients, effect size, and the value of the R^2 all provide support for the proposed conceptual framework.
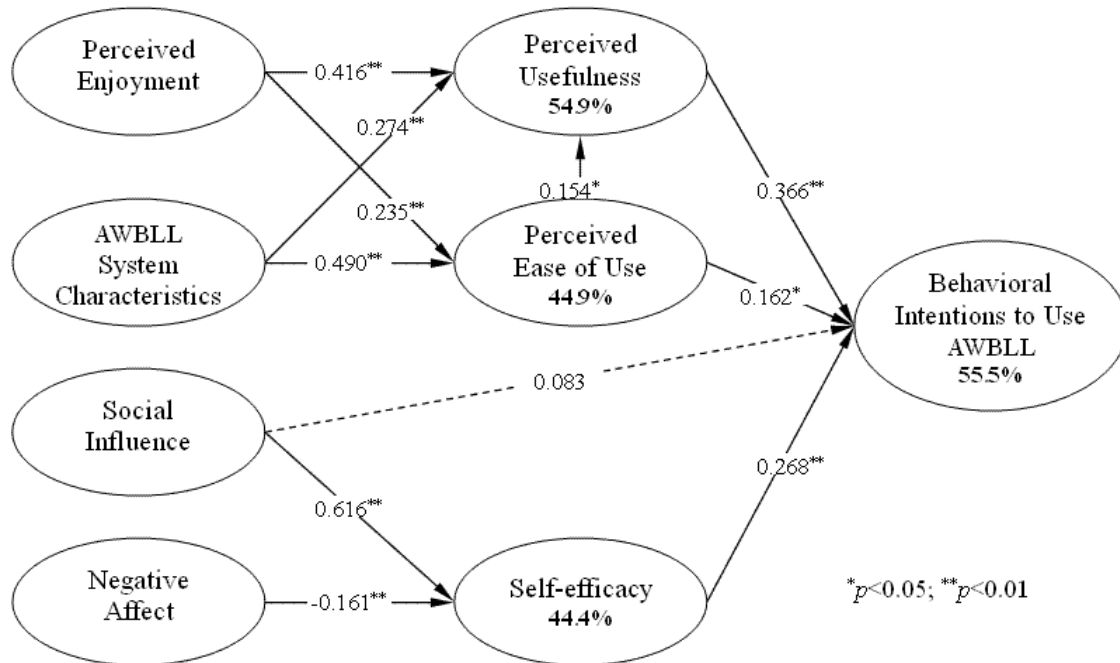
Figure 1. Conceptual model and Results of PLS Analysis

Given the evidences shown above, PLS results provide strong support for the Hypotheses H1, H2a, and H2b effectively drawn from the measurement of the TAM. This finding is consistent with that obtained by Davis et al. (1989). Hypotheses H3a, H3b, H4a, and H4b are also firmly supported by the significant path coefficients. That is the underlying determinants, PE and SC, would apparently influence students' perceptions on the usefulness and ease of use of the AWBLL system. System developers might have to collaborate with instructors to design and implement an AWBLL system with good interaction, flexibility, friendly interface, and a joyful language learning cyberspace to facilitate students' willingness to use AWBLL. Contrary to our predictions, the path from SI to BI (H6a) is not significant. The interesting findings are worth of pursuing in our future study to clarify the insignificant predicting effect of SI to BI and the strong effect to SE as a mediator with respect to BI. Besides, hypotheses H5, H6b, and H7 are also strongly supported: SE has strong significant effects on BI (H5); and the constructs of SI and NA are significant external predictors for SE (H6b and 7). These results suggest that university staffs (program directors and instructors) might then have to take more time and efforts to preach peer collaborative practices, help students lower the negative affects, and effectively cultivate their self-confidence to use AWBLL systems.

5. Implications and Conclusions

The importance of web-based instruction to language education has increased significantly over the past few years. In order for the successes and effective implementations of AWBLL systems, it is vital for researchers to cumulate efforts from the continuations of rigorous scientific approaches, educational theories, and well-targeted procedures and techniques in the web-based language learning research fields.

This empirical study was motivated by a broad interest in understanding students' behavior intentions toward web-based language learning usage. However, before considering the implications, it is important to acknowledge the limitations of this study. First, the sample has a bias toward the data source gathered from the respondents in only one college, which may not represent the opinions in other colleges and/or universities in Taiwan. Second, the research was conducted in Taiwan, the findings in the study might not hold true in other countries. Thus, the valid instrument was developed using the large sample gathered from only one vocational-technology college in Taiwan, a confirmatory analysis and cross-cultural validation using another large sample gathered elsewhere is required for improving the generalizablity of the instrument. Hence, other samples from different areas or nations should be gathered to confirm and refine the factor structure of the instrument, and to assess its reliability and validity. These issues are worth of further pursuance in our future study.

Drawn from the empirically results, this study provide interesting insights into the applicability of some of the relative constructs, with respect to explaining cognitions, motivations, belief, and intentions of students in using the AWBLL system. The research findings suggested general adequacy and applicability of the proposed conceptual framework in this web-based language learning settings. In addition, this study employed a rigorous scale development procedure to establish an instrument to weigh up students' behavioral intentions to use web-based language learning systems. Web-based learning program directors, system developers and instructors can make the best of this AWBLL instrument for understanding of students' inclinations and take necessary corrective actions to improve. Besides making an overall assessment, the instrument can be adapted to compare students' perceptions and intentions for different web-based learning systems with specific factors (i.e. learner interface, learning community, content, and personalization). The proposed conceptual framework might also be tailored to counterpart the specific research or practical needs of specific computer aided instruction (CAI) environment. The generality of the results can also serve as a useful theoretical basis for the comparative analyses in the future. The contributions of this study are fivefold including:

1. Integrating prior works concerning web-based instruction based on TRA, TAM and SCT.
2. Identifying the relative cognition, and belief constructs that will significantly influence students' behavioral intentions to use AWBLL.
3. Establishing a new model for measuring user's cognitions, belief, and intentions to use AWBLL.
4. Justifying the influence levels of underlying determinants for the intentions to use AWBLL.
5. Providing a useful instrument for web-based language learning system designers and instructors on planning and implementing AWBLL systems.

In conclusion, the main theme in this paper was to enrich our understanding of students' behavioral intentions toward web-based language learning system usage. Given the undeniable reality that IT is ubiquitous in all sorts of educational contexts, such research has value for theory development as well as for practice. Future research, in different

samples and longitudinal studies, are necessary. The validity of a measure cannot be truly established on the basis of a single study. Measure validation requires the assessment of the measurement properties over a variety of samples in similar and different contexts. In the future, an instrument for measuring students' intentions to use a synchronous web-based learning system should also be developed. More attention also can be directed toward understanding the antecedents and consequents of other web-based instruction systems.

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