Available online at www.sciencedirect.com

ScienceDirect

Procedia - Social and Behavioral Sciences 103 (2013) 852 – 859

Procedia
Social and Behavioral Sciences

13th International Educational Technology Conference

Students' attitudes towards computer-assisted language learning

Mojgan Afshari*, Simin Ghavifekr, Saedah Siraj & Duan Jing

Department of Educational Management, Planning and Policy, Faculty of Education, University of Malaya, 50603 Kuala Lumpur, Malaysia
mojganafshari@um.edu.my

Abstract

Faculty of languages and linguistics at university of Malaya in Malaysia has invested substantially to introduce students to computer-based language learning materials and to integrate technology into existing curriculum. The purpose of this study was to examine the attitudes of students towards use of computer-assisted language learning (CALL). Data was collected from 100 students using a survey questionnaire. Findings of this study indicated that students had moderate attitudes towards CALL. Moreover, study results indicated that perceived usefulness, perceived ease of use, and subjective norms were significant predictors of computer attitudes. Implications for student training and suggestion for further research were provided.

Keywords: Computer assisted language learning, computer attitude, perceived usefulness, perceived ease of use

1. Introduction

Many researchers believe that integrating information and communication technology in education supports pupils in their own constructive thinking and engages them in cognitive operations (Teo, 2006). Pemberton, Borrego and Cohen (2006) conducted a study on using interactive computer technology to enhance learning and found that the use of ICT creates a powerful learning environment and intrinsically motivate students to learn and participate in classroom activities. In line with this idea, Wright (2008) stated that academic learning accompanied by computer technology offers students much more confidence and interest in the process

* Corresponding author.
E-mail address: mojganafshari@um.edu.my

doi:10.1016/j.sbspro.2013.10.407

of exploring and learning knowledge. It would seem that computer technology is an important tool to support new ways of teaching and learning. It can be used to develop students' skills for cooperation, communication, problem solving and lifelong learning (Voogt, 2008).

Nowadays, computers have been recognized as a valuable instrument in teaching modern foreign languages in universities. Lee (2000) stated that using computer in second language instruction can improve practices for students through experiential learning, motivate students to learn more, enhance student achievement, increase authentic materials for study, encourage greater interaction between teachers and students and students and peers, emphasize individual needs, escape from a single source of information and, enlarge global understanding. It is clear that the field of English as a Second Language can be enhanced through the use of computer technology.

Teo (2006) found that students' attitudes towards computer have an influential role on their acceptance to use the computer as a learning tool and their future behaviours towards the computer such as using it for further study and vocational purposes. Similarly, Zhang (2011) stated that students' attitudes towards the computer-assisted language learning (CALL) can be considered as a key predictor in terms of successful application of computer to language learning. Moreover, Ajzen and Fishbein (1977) stated that ''attitudes toward targets will predict multiple-act criteria, provided that the attitudinal and behavioural entities involve the same target elements'' (p. 981). It would seem that awareness of students' attitudes toward computers can be ''a critical criterion in the evaluation of computer courses and in the development of computer-based curricula'' (Woodrow, 1991, p. 165). Therefore, computer attitudes should be considered as key constructs in predicting technology acceptance for future use.

Several models were developed to help in predicting technology acceptance. Among these models, the Technology Acceptance Model (TAM) is the most popular (McCoy, Galletta, & King, 2007). It is testable and has received substantial empirical support for being robust and parsimonious in predicting technology acceptance and adoption in various contexts and using a variety of technologies (Teo, 2009) (Fig.1). This study used this model to understand students' attitudes and the factors that influence these attitudes. The successful integration of computers in education is largely affected by students' attitudes and their willingness to embrace the technology (Pektas & Erkip, 2006). Studying students' attitudes can help us to answer some questions relating to acceptance and usage of technology in teaching and learning.

2. Literature review

Many researchers believed that computer technology is the ideal tool to enhance students' learning in English. Beatty (2003) defined computer-assisted language learning (CALL) as "any process in which a learner uses a computer and, as a result, improves his or her language" (p.7). Warschauer (1996) stated that computers help students to learn English in three ways: computer as tutor (offers tutoring to students), computer as stimulus (improves synthetic and analytic thinking of students), and computer as tool (e.g. grammar checking, word processing, collaborative writing, and Internet). It is clear that the computer should be integrated into teaching and learning process. Computer technologies can enhance interpersonal and communication skills and can provide opportunities for cooperative learning. Hence, using computers not only increase instructional effectiveness and efficiency, but also promote positive social interactions and enhance students' motivation for learning (Afshari et al., 2007).

According to Teo (2006), attitudes toward technology play a crucial role in the adoption of instructional technology and students' learning in the classroom. Attitude is also considered as one of the affective variables in the success of implementing technology in the second or foreign language learning process. In line with this idea, Ayres (2002) conducted a study on students' attitudes toward CALL and reported that 80% of the students believed that CALL is relevant to their needs, 77% of the students agreed that CALL gives useful information, and 66% of the students thought that more CALL should be used in their learning. Moreover, he added that

attitude is one of important factors which promote or inhibit the successful implementation of any initiative. Hence, it is important to examine students' attitudes toward computer at different stages of development.

In addition, several attitude theories and models have confirmed the relationship between attitude and behaviour. In 1980, Ajzen and Fishbein introduced The Theory of Reasoned Action (TRA) and stated that behavioural intent of a person determine his performance of a particular behaviour and this behavioural intent is identified by two things, attitude and the subjective norms within which a person operates, i.e. the cultural norms of the organization. Marcinkiewicz and Regstad (1996) conducted a study on the influence of subjective norm on computer use and found that subjective norm is most predictive of computer use, alongside self-competence, perceived relevance and innovativeness. Moreover, Pan, Sivo and Brophy (2003) and Teo and his colleagues (2008) reported that there is a positive relationship between subjective norm and attitudes.

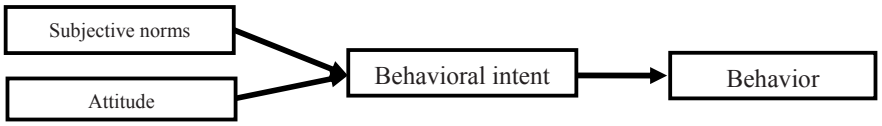

Figure1: Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1980).

Davis et al. (1989) developed the Technology Acceptance Model (TAM), based on the Theory of Reasoned Action. TRA is general whereas TAM relates to technology; TAM takes this model and derives from it two variables which determine attitude (Gilbert & Kelly, 2005). These variables are perceived usefulness, and perceived ease of use. Perceived usefulness refer to the extent to which people believe a technology will help them to do a better job, and perceived ease of use shows the ease or lack of effort to actually use it (Davis, 1989). When people believe that computer is easy to use, nearly free of mental effort, and helpful to learning; then they may have a favorable attitude toward using computer to learn English. It can be predicted that such people may use computer technologies frequently and intensely. Moreover, Moon and Kim (2001) hypothesized that perceived ease of use related to perceived usefulness.

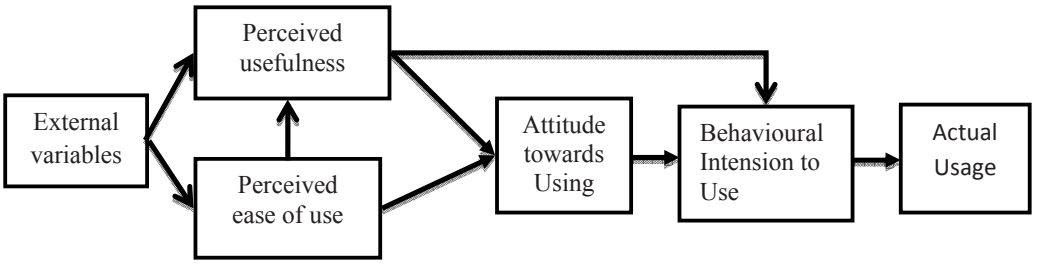

Figure2: Technology acceptance model (Davis 1989)

Although the TAM has been validated and has been examined its importance on the adoption of innovation since 1989, studies on its application in education is limited. Venkatesh (2000) suggested that "Future research should examine mandatory usage contexts to test the boundary conditions of the technology acceptance model" (p. 358). The purpose of this study is to use TAM model to examine students' attitudes towards computers. This study extends the TAM by including an additional user-related variable (subjective norm). The objective of this study was achieved by answering the following hypotheses:

Hypothesis 1: There is a positive relationship between perceived ease of use of computers and students' attitudes

toward CALL;
Hypothesis 2: There is a positive relationship between perceived usefulness of computers and students' attitudes toward CALL;
Hypothesis 3: There is a positive relationship between subjective norm and students' attitudes toward CALL;
Hypothesis 4: There is a positive relationship between Subjective Norm and perceived usefulness of computers;
Hypothesis 5: There is a positive relationship between a student's perceived ease of use of computers and her/ his perceived usefulness of computers.

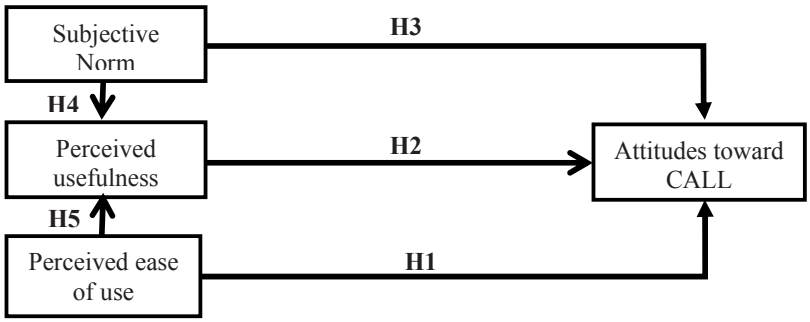

Figure 3: proposed research model

3. Methodology

A structural equation modeling (SEM) approach was used in this study to develop a model that shows the relationships among four variables: subjective norm, perceived usefulness, perceived ease of use, and attitudes toward CALL. Also, a quantitative method was utilized to collect data from students at the Faculty of Languages and Linguistics in University of Malaya.

Participants were 100 students at the Faculty of Languages and Linguistics in University of Malaya. They were selected from undergraduate (42%) and postgraduate students (58%). Among the participants, 21% were male while 79% were female. In terms of age, 43% of respondents were within the 23-25 age range, 31% were within the 18-22 age range, 22% were within the 26-30 age range, and 4% were more than 30. Almost every student had access to a computer at home (99.9%) and majority of them (67%) had much competence in using computer. Approximately 80 % of the respondents used computers daily and 86% of students reported that they did not use computer-assisted language learning lab in faculty.

A survey questionnaire was administered to the participants who volunteered for this study. The instrument was composed of 22 statements on attitude, 7 statements on PU, 3 statements on PE, 2 statements on SN. Participants gave their opinions to each statement on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Participants from various field of study completed the survey questionnaire provided by the researchers. The purpose of the study and its potential usefulness explained clearly for participants. Those who wished to participate were assured about confidentiality of their responses. Further, the enumerators provided those participants with briefing on how to fill the questionnaire. The enumerators checked the questionnaire for completeness immediately upon return. On average, each participant took not more than 20 min to complete the questionnaire.

4. Data analysis

1.1 Test of the measurement model

To review the reliability and validity of the measures, a confirmatory factor analysis was carried out. The results of the measurement model have been shown in Table 1. All factor loadings are above 0.85 and range from 0.85 to 0.99. Together, the principal component analysis showed that these three factors in the proposed model explained 87% of the total variance. All standardised regression weights are above 0.85. The multiple square correlations (R^2) of all items ranged from 0.73 to 0.99, indicating that these items were explained by their predictors at a range from 73% to 99%. Also, Convergent validity of these instruments was calculated.

Convergent validity refers to a set of variables that presume to measure a construct (Kline, 2005). It can be tested using: average variance extracted (AVE) and factor loading. According to Hair et al. (2006), AVE and factor loading on a factor more than or equal 0.5 indicate a high convergent validity. The average variance extracted (AVE) ranged from 0.78 to 0.99 which were above the minimum level of 0.5 (Fornell & Larcker, 1981). Moreover, construct reliability was measured. As shown in Table 1, the construct reliabilities ranged from 0.77 to 0.99 which exceeded the minimum level of 0.7 (Chin, 1998). It would seem that the measures have adequate reliability and convergent validity.

Table 1. Results for the measurement model

Latent Variable	Manifest Variable	Factor Loading (>0.50)*	CR (t-Value)	SRW	R^2	AVE (≥0.5)	Construct Reliability (CR)
Subjective Norm	SN1	0.99	50.976 ***	0.99	0.98	0.99	0.99
	SN2	0.99		0.99	0.98		
Perceived usefulness	PU1	0.85	13.452 ***	0.85	0.73	0.78	0.97
	PU2	0.89	14.890 ***	0.88	0.78		
	PU3	0.87	14.40 ***	0.87	0.76		
	PU4	0.90	15.668 ***	0.89	0.80		
	PU5	0.91	16.111 ***	0.90	0.82		
	PU6	0.89	15.328 ***	0.89	0.79		
	PU7	0.89	15.302 ***	0.89	0.79		
	PU8	0.93		0.93	0.86		
Perceived ease of use	PEU1	0.91	14.980 ***	0.91	0.83	0.81	0.96
	PEU2	0.89	13.839 ***	0.88	0.78		
	PEU3	0.91	14.793 ***	0.90	0.82		
	PEU4	0.90		0.89	0.81		
Attitudes towards CALL	Affective	0.99		0.99	0.99	0.97	0.77
	Cognitive	0.98	48.994 ***	0.98	0.96		
	Behavioral	0.99	53.297 ***	0.98	0.97		

SRW: Standardized Regression Weight.
Average variance extracted= AVE= (Σλ2) /n
Construct reliability = CR= (Σλ) 2 / (Σλ) 2 + (Σδ)

Furthermore, this study assessed the discriminant validity. Discriminant validity is considered adequate when the variance shared between a construct and any other construct in the model is less than the variance that construct shares with its measures (Fornell et al. 1982). The variance shared by any two constructs is obtained by squaring the correlation between the two constructs. The variance shared between a construct and its measures

corresponds to average variance extracted. Discriminant validity was assessed by comparing the average variance extracted for a given construct with the square of correlation between that construct and all other constructs. According to Table 2 in all cases, the AVE was greater than the square of correlation between the two factors which indicate that all variables meet the requirements of discriminant validity.

Table 2: Square of correlation between constructs

	Computer Attitude	Subjective Norm	Perceived Usefulness	Perceived Ease of Use
Computer Attitude	1	0.77	0.97	0.98
Subjective Norm	0.77	1	0.73	0.74
Perceived Usefulness	0.97	0.73	1	0.96
Perceived Ease of Use	0.98	0.74	0.96	1

A variety of indices such as the $\chi 2$ statistics, comparative fit index (CFI), Tucker-Lewis index (TLI), Goodness-of-Fit index (GFI), and root mean square error of approximation (RMSEA) can be used to obtain a comprehensive model fit (Hair et al., 2006). The level of acceptable fit and the fit indices for the proposed research model has been indicated in Table 3. Based on these criteria, we can conclude that the measurement has a good fit.

Table3: Fit indices for the measurement model

Model fit indices	Values	Recommended guidelines	References
$\chi 2$	449.57	Non-significant	Klem (2000), Kline (2005), McDonald and Ho (2002)
CFI	0.92	≥0.9	Klem (2000), McDonald and Ho (2002)
TLI	0.91	≥0.9	Klem (2000), McDonald and Ho (2002)
GFI	0.94	≥0.9	Klem (2000), McDonald and Ho (2002)
NFI	0.92	≥0.9	Klem (2000), McDonald and Ho (2002)
RMSEA	0.072	<0.08	McDonald and Ho (2002)

4.2 Test of the structural model

Several indices were examined to test the structural model. Findings indicated a good model fit ($\chi 2$= 425.23, P< 0.001, GFI=0.92, AGFI=0.94, CFI=0.91, NFI=0.916, TLI=0.925, and RMSEA=0.071). The results of the hypothesis test and path coefficients of the proposed research model have been shown in Figure 4. Findings indicated that all hypotheses were supported by the data. All the hypotheses were significant indicating PU significantly influenced students' attitudes toward CALL (b = 0.52, P < 0.05), supporting hypothesis H2. SN was found to be significant in influencing PU (b = 0.24, P< 0.05) and attitudes toward CALL (b = 0.18, P < 0.05), thus supporting hypotheses H4 and H3. PEU was significant in influencing PU (b = 0.34, P< 0.05) and CA (b=0.28, P < 0.05), thus supporting hypotheses H5 and H1.

Two endogenous variables were tested in the research model. Students' attitudes toward CALL were predicted by SU, PU, and PEU, resulting in an R2 of 0.67. This means that 67% of variance in the students' attitudes towards CALL was explained by SU, PU, and PEU. PU was significantly determined by SN and PEU. About 29% of variance in PU was explained by SN and PEU.

5. Discussion and conclusion

The purpose of this study was to identify students' attitudes towards CALL. The study found that students had moderate attitudes toward CALL (M=2.45). Moreover, this study identified the key determinants of attitudes towards CALL. Study results indicated that students' PU and PEU were key factors of their attitudes towards CALL. Both variables (PU and PEU) had a direct and significant effect on students' attitudes towards CALL. Moreover, PU and PEU had a very strong correlation with attitudes towards CALL, indicating that as students' perceptions of computer attributes (PU and PEU) improve, their attitudes will be enhanced as well. The result of this section is consistent with prior theoretical arguments made by Davis (1989) and previous studies in which TAM examined (Teo et al., 2007; Masrom, 2007). Furthermore, findings of this study indicated that SN can be a determinant of students' attitudes towards CALL. SN had a direct and indirect effect on students' attitudes towards CALL.

According to Chang et al. (2012), training should be provided for learners to learn not only computer skills, but also a positive attitude. Training can encourage students to use computers with CALL applications as much as possible in their learning. Computer lab and language lab should be opened to students as many hours as possible. Furthermore, the university should encourage lecturers to integrate more computer technology into their teaching and curriculum design. Lecturers should believe that CALL–based ESL course can be more effective than traditional one. They should be familiar with CALL applications and software in order to give technical support to the students and provide the best way to integrate CALL into their ESL course design.

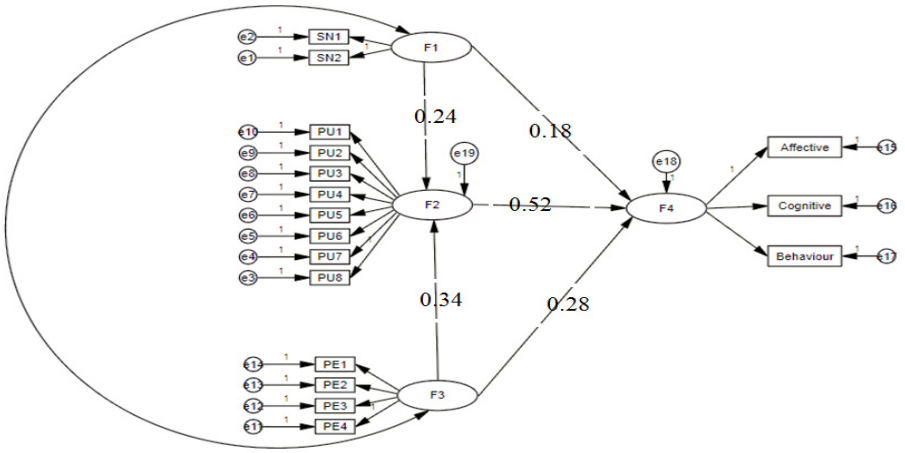

Figure 4: Structural model

References

Afshari, M., Bakar, K. A., Luan, W. S., Samah, B. A., & Fooi, F. S. (2009). Factors affecting teachers' use of information and communication technology. *International Journal of Instruction*, 2(1), 77-104.

Ajzen. I., & M. Fishbein (1977). Attitude-behavior relations: a theoretical analysis and review of empirical research. *Psychological Bulletin*, 84, 888-.918.

Ajzen, I., & Fishbein, M. (1980). Understanding attitudes and predicting social behaviour.

Beatty, K. (2003). *Teaching and researching: Computer-assisted language learning*: Pearson Education.

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

Davis, F.D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *Journal of MIS Quarterly*, 13(3), 319-340.
Fornell, C. & Larcker, D. F. (1981). Structural equation models with unobservable variables and measurement errors. *Journal of Marketing Research*, 18(2), 39–50.
Gilbert, J., & Kelly, R. (2005). Frontiers and frontlines: metaphors describing lecturers' attitudes to ICT adoption. *Educational Technology & Society*, 8 (3), 110-121.
Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E. & Tatham, R. L. (2006). *Multivariate Data Analysis*. New Jersey: Prentice-Hall International.
Kline, R.B. (2005). *Principles and practice of structural equation modeling*. New York: Guilford Press.
Lee, L. (2004). Learners' perspectives on networked collaborative interaction with native speakers of Spanish in the US. *Language Learning & Technology,* 8(1), 83-100.
Masrom, M. (2007). *Technology acceptance model and e-learning*.
Marcinkiewicz, H. R., & Regstad, N. G. (1996). Using Subjective Norms To Predict Teachers' Computer Use. *Journal of Computing in Teacher Education*, 13(1), 27-33.
McCoy, S., Galletta, D. F., & King, W. R. (2007). Applying TAM across cultures: the need for caution. *European Journal of Information Systems*, 16(1), 81-90.
Moon, J.-W., & Kim, Y.-G. (2001). Extending the TAM for a World-Wide-Web context. *Information & Management*, 38(4), 217-230.
Sivo, S., & Brophy, J. (2003). Students' Attitude in a Web-enhanced Hybrid Course: A Structural Equaadon Modeling Inquiry. *Journal of Educational Media & Library Sciences*, 41(2), 181-194.
Pektaş, Ş. T., & Erkip, F. (2006). Attitudes of design students toward computer usage in design. International *Journal of Technology and Design Education*, 16(1), 79-95.
Pemberton, J. R., Borrego, J., & Cohen, L. M. (2006). Using interactive computer technology to enhance learning. *Teaching of Psychology*, 33(2), 145-147.
Teo, T. (2006). Attitudes toward computers: A study of post-secondary students in Singapore. *Interactive Learning Environments*, 14(1), 17-24.
Teo, T., Lee, C. B., & Chai, C. S. (2008). Understanding pre-service teachers' computer attitudes: applying and extending the technology acceptance model. *Journal of computer assisted learning*, 24(2), 128-143.
Chang, S.-L., Shieh, R. S., Liu, E. Z.-F., & Yu, P.-T. (2012). Factors influencing women's attitudes towards computers in a computer literacy training program. *The Turkish Online Journal of Educational Technology* , 11(4), 177-187.
Warschauer, M. (1996). Motivational aspects of using computers for writing and communication. *Telecollaboration in foreign language learning*, 29-46.
Venkatesh, V. (2000). Determinants of perceived ease of use: Integrating control, intrinsic motivation, and emotion into the technology acceptance model. *Information systems research*, 11(4), 342-365.
Wright, J. M. (2008). Web-based versus in-class: An exploration of how instructional methods influence postsecondary students' environmental literacy. *The Journal of Environmental Education*, 39(2), 33-46.
Woodrow, J. E. (1991). A comparison of four computer attitude scales. Journal of Educational Computing Research, 7(2), 165-187.
Voogt, J. (2008). IT and curriculum processes: Dilemmas and challenges International handbook of information technology in primary and secondary education (pp. 117-132): Springer.
Zhang, S. (2011). Attitudes of ESL students toward the use of computer-assisted language learning (CALL) in a University in China.