PRINT: ISSN 0972-0073 ONLINE: ISSN 2456-6802
Anthropologist, 16(3): 487-494 (2013)
DOI: 10.31901/24566802.2013/16.03.07

Exploring Adult Learners' Preferences toward Online Learning Environments: The Role of Internet Self-efficacy and Attitudes

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KEYWORDS Educators. Curriculum. Environment. Internet. Distance Learning

ABSTRACT One of the most challenging tasks faced by educators utilizing web technology today is improving the level of student satisfaction with the curriculum and learning environment. Therefore surveying adult learners' learning preferences linked to learning environments is very essential. This study explores the role of internet self-efficacy and attitudes toward online learning in adult learners' preferences toward online learning environments. The sample included 178 public employees enrolled in in-service master program at the Department of Public Policy and Management of a university in northern Taiwan. The three instruments employed to assess learners' Internet self-efficacy (ISS), attitudes toward online learning (AOL), and preferences toward online learning environments (POL) all revealed high reliability. The results indicated that public employees' internet self-efficacy and attitudes toward online learning were important predictors of their preferences toward online learning environments. Further researches into learners' preferences for online courses designed for in-service professional development, and suggestions about the format and content of online courses are strongly recommended.

INTRODUCTION

Distance learning, which has different settings from conventional classrooms, allows learners who have employment and family to update knowledge and skills related to their job by saving travel costs and allowing a flexible schedule (Ryan 2001; Park and Choi 2009; Mpezeni et al. 2013). The key ingredient of constructing the online educational environment used by adults is the needs of adult learners (Cercone 2008). One of the most challenging tasks faced by online educators today is improving the level of student satisfaction with the curriculum and learning environment (Dogan 2013). There has been much research about online learning enhancing adult learners' learning outcomes (Chu 2010; Ke and Xie 2009; Youn 2007; Calik 2013). However, their learning preferences are rarely explored, making it difficult to design and deliver effective instruction. Understanding online learners' preferences should be one of the best ways to inform future online curriculum design.

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With the advent of technology, the number of distance programs for adult learners delivered online in higher education has steadily increased over the last few years. In addition to necessary hardware and software, successful learners in online programs are expected to be proficient in using the technology (Mupinga et al. 2006).

Internet self-efficacy, which indicates learners' self-perceived confidence and expectations of using the internet, has been the focus of online learning studies (Smarkola 2008; Wu and Tsai 2006; Psycharis et al. 2013). For example, Chu and Tsai (2009) found that adult learners with higher internet self-efficacy were more preferable to learn in online environments. Kao and Tsai (2009) also concluded that teachers with higher internet self-efficacy were more positive to developmental web-based learning. Therefore, the investigation of adult learners' internet self-efficacy is examined in this study.

Apart from online self efficacy, researchers also indicated that learners' attitudes toward online learning have been linked to course success (Ausburn 2004; Reisetter et al. 2007). Some of the studies explored the relationship between attitudes toward a new technology and its acceptance and usage (Lu et al. 2008; Wang 2013); others sought to measure learners' attitudes toward computers and the Internet (Tsai and Lin 2004). Little is known about online adult learn-

ers' attitudes regarding their learning. In this study, the attitudes toward online learning are investigated.

In sum, understanding adult learners' preferences toward online learning environment, as well as their Internet self-efficacy of and attitudes can help to effectively design the learning content and enhance learning outcomes (Neuhauser 2002). As such, this study aims to explore adult learners' preferences toward online learning environments, especially in relation to their Internet self-efficacy and attitudes toward online learning.

Purpose of the Study

The purpose of the study was to determine if internet self-efficacy and attitudes toward online learning were significant predictors of in-service adult learners' preferences toward online learning environments. The research questions for this study were as follows:

What are the in-service adult learners internet self-efficacy, attitudes toward online learning and preferences toward online learning environments?

What are the relationship among in-service adult learners internet self-efficacy, attitudes and preferences toward online learning environments?

Can in-service adult learners internet self-efficacy and attitudes toward online learning be used as significant predictions to explain their preferences toward online learning environments?

MATERIAL AND METHODS

Sample and Sampling Procedure

The participants of this study were drawn from public employees enrolling in in-service master program at the Department of Public Policy and Management of a university in north Taiwan. The final sample comprised of 178 in-service students from the university, of which 116 (65.20%) were male and the remaining 62 (34.80%) were female. Among these participants, 37 (20.80%) were under 30 years old, 85 (47.70%) were 31-40 years old, 56 (31.50%) were over 41 years old. These in-service students also had different amounts of internet experience, with 90 (50.60%) spending less than 6 hours per week online, 31 (17.40%) spending 7-18 hours, and 57 (32%) more than 19 hours per week. In addition, all participants had actual experiences of online learning in this study.

Instruments

To assess in-service adult students' internet self-efficacy, attitudes and preferences toward online learning, three instruments were implemented in this study. The internet Self-efficacy Survey (ISS), was used from Kao and Tsai's (2009). They proposed two factors of internet self-efficacy, including a total of 16 items. The details of the two scales are as follows:

1. Basic Self-efficacy Scale: measuring adult learners' perceived confidence at a basic level of using the internet, such as using internet-related tools. That is, the higher the scores, the better basic self-efficacy toward the internet. A sample item of this scale is "I feel confident of printing the content of a Website."

2. Advanced Self-efficacy Scale: assessing adult learners' perceived confidence and self-expectations of Internet-based interaction or advanced usages of the internet. In other words, the higher the scores, the more perceived confidence about advanced usage of the internet. A sample item of this scale is "I feel confident of playing online games on the internet."

The attitude toward Online Learning Survey (AOL) administered in this study was developed on the basis of Yeh et al. (2011). These items of the AOL were included after consulting with two experts in educational technology. The details of the three scales are as follows:

1. *Perceived Usefulness Scale:* Assessing perceptions of the extent to which adult learners perceive that the impact of online learning are positive and useful. A sample item of this scale is ''I think online learning can help my learning more interesting".
2. *Perceived Ease of Use Scale:* Assessing the extent to which adult learners perceive that online learning is easy to use. A sample item of this scale is, ''I think it is easy for me to use online learning on the internet."
3. *Willingness Scale:* Measuring perceptions of the extent to which adult learners perceive actual practice and willingness to use online learning. A sample item of this scale is, ''I think I would be glad to use online learning in the future."

The preferences toward Online Learning Survey (POL) administered in this study were developed on the basis of some relevant studies (for example, Chu and Tsai 2009; Lee and Tsai 2005). These items of the POL were included after consulting with two experts in educational technology. The details of the five scales are as follows:

1. *Ease of Use Scale:* Measuring perceptions of the extent to which adult learners prefer that the online learning environments are easy-to-use. A sample item of this scale is, "When navigating in the online learning environments, I prefer that they are easy to navigate."
2. *Multiple Sources and Interpretations:* Exploring perceptions of the extent to which adult learners prefer that the online learning environments contain various information sources and interpretations. A sample item of this scale is, "When navigating in the online learning environments, I prefer that they can provide a variety of relevant web links."
3. *Student Negotiation Scale:* Assessing perceptions of the extent to which adult learners prefer to have opportunities to explain and modify their ideas to other students in the online learning environments. A sample item of this scale is, "In the online learning environments, I prefer that I can ask other students to explain their ideas."
4. *Critical Judgment Scale:* Assessing perceptions of the extent to which adult learners prefer to have opportunities to critically evaluate information in online learning environments. A sample item of this scale is, "In online learning environments, I prefer that I can evaluate the features of various information sources."
5. *Reflective Thinking Scale:* Measuring perceptions of the extent to which adult learners prefer to have the opportunities to promote critical self-reflective thinking in the online learning environments. A sample item of this scale is, "In the online learning environments, I prefer that I can think deeply about my own understanding."

Data Analysis

Factor analysis, correlation analyses, ANOVA, and regression analyses were conducted as the statistical methods in this study. Each scale included five items, presented in a 5-point Likert type scale, ranging from 5 (strongly agree) to 1(strongly disagree). The factor analysis was utilized to reveal the scales of the instruments on students' ISS and AOL and POL. Moreover, in response to the research questions, correlation analysis was employed to examine the relationship between ISS and AOL or POL and AOL. Then, through a stepwise multiple regression analysis, students' Internet self-efficacy and attitudes toward online learning were viewed as predictors to explain their preferences toward online learning.

RESULTS

Factor Analysis

To clarify the structure of ISS, AOL and POL, the principle component analysis was utilized as the extraction method, with the rotation method of Varimax with Kasier normalization. An item was retained only when it loaded greater than 0.5 on the relevant factor and less than 0.5 on non-relevant factor. The alpha value of the whole ISS, AOL and POL questionnaires are 0.94, 0.84, and 0.98 respectively, and factors explained 74.37%, 82.08%, and 84.85% of variance totally. By and large, the factor loadings scales were considered to be sufficiently reliable for assessing in-employment students' Internet self-efficacy, attitudes and preferences toward on-line learning.

In examining the ISS, the principle component analysis was utilized as the extraction method, with the rotation method of Varimax with Kasier normalization. An item was retained only when it loaded greater than 0.5 on the relevant factor and less than 0.5 on non-relevant factor. As a result, the initial 16 items were reduced to 11 items, with two factors: "Basic self-efficacy (with 6 items)" and "Advanced self-efficacy (with 5 items)." The factor loadings for the items of these two scales are shown in Table 1. In addition, the whole ISS questionnaire, indicating that these scales could be considered as adequately reliable for gauging adult learners' Internet self-efficacy.

The same process of principle component analysis was utilized. Thus, the initial 18 items were reduced to 13 items. The latest version of the AOL consisted of 13 questionnaire items with three scales, namely, perceived usefulness, perceived ease of use, and behavior. The reliability coefficients for the three scales of the AOL, re-

spectively were 0.90 (perceived ease of use, 5 items), 0.88 (willingness, 4 items) and 0.73 (perceived usefulness, 4 items). The factor loadings for the retained items are shown in Table 2. Therefore, these scales are deemed to be sufficiently reliable for assessing adult learners' attitudes toward online learning.

Table 1: Rotated factor loadings and Cronbach alpha values for ISE scales

Scale	*Factor 1*	*Factor 2*
Factor 1: Basic self efficacy, α=0.93		
Basic 1	0.849	
Basic 2	0.836	
Basic 3	0.763	
Basic 4	0.773	
Basic 5	0.685	
Basic 6	0.691	
Factor 2: Advanced self efficacy, α=0.90		
Advanced 1		0.721
Advanced 2		0.761
Advanced 3		0.786
Advanced 4		0.868
Advanced 5		0.759
Percentage of variance	64.98	9.39

Overall α=0.94. Total variance explained is 74.37%

Table 2: Rotated factor loadings and Cronbach alpha values for AOL scales

Scale	*Factor 1*	*Factor 2*	*Factor 3*
Factor 1: Perceived ease use, α=0.90			
Ease use 1	0.766		
Ease use 2	0.790		
Ease use 3	0.806		
Ease use 4	0.804		
Ease use 5	0.770		
Factor 2: Willingness, α=0.88			
Willingness 1		0.830	
Willingness 2		0.839	
Willingness 3		0.799	
Willingness 4		0.709	
Factor 3: Perceived usefulness, α=0.73			
Usefulness 1			0.671
Usefulness 2			0.721
Usefulness 3			0.631
Usefulness 4			0.683
Percentage of variance	48.08	10.63	9.36

Overall α=0.84. Total variance explained is 82.08%

The same process of principle component analysis was utilized. The latest version of the POL consisted of 24 questionnaire items with five scales, namely, critical judgment, negotiation, ease use, reflective, and multiple. The reliability coefficients for the five scales of the POL, respectively were 0.94 (critical judgment, 5 items), 0.96 (negotiation, 5 items), 0.94 (ease use, 5 items), 0.95 (reflective thinking, 5 items) and 0.95 (multiple sources, 4 items). The factor loadings for the retained items are shown in Table 3. Therefore, these scales are deemed to be sufficiently reliable for assessing adult learners' preferences toward online learning.

Table 3: Rotated factor loadings and Cronbach alpha values for POL scales

Scale	*Factor 1*	*Factor 2*	*Factor 3*	*Factor 4*	*Factor 5*
Factor 1: Critical judgment, α=0.94					
Critical 1	0.821				
Critical 2	0.789				
Critical 3	0.626				
Critical 4	0.804				
Critical 5	0.733				
Factor 2: Negotiation, α=0.96					
Negotiation 1		0.753			
Negotiation 2		0.766			
Negotiation 3		0.803			
Negotiation 4		0.732			
Negotiation 5		0.704			
Factor 3 Ease of use, α=0.94					
Ease 1			0.692		
Ease 2			0.757		
Ease 3			0.731		
Ease 4			0.757		
Ease 5			0.642		
Factor 4 Reflective thinking, α=0.95					
Reflective 1				0.615	
Reflective 2				0.758	
Reflective 3				0.756	
Reflective 4				0.691	
Reflective 5				0.573	
Factor 5 Multiple sources, α=0.95					
Multiple 1					0.517
Multiple2					0.713
Multiple 3					0.730
Multiple 4					0.740
Percentage of variance	65.76	7.56	5.08	3.51	2.94

Overall α=0.98. Total variance explained is 84.85%

Background Differences on All Scales

In this study, t-test and ANOVA tests were employed to examine the background differences on the ISS and AOL and POL scales. The result in this study expressing that no significant differences were found on all scales in both genders. Furthermore, we categorized the adult learners' respondents into three major groups: <30 years, 31-40 years, and >41 years. The ANOVA tests shown in Table 4 indicated that age played

Table 4: In-service adult learners' Internet self-efficacy and attitude and preferences toward online learning among different age groups

Age group	*(1) Less than 30 years (mean, SD)*	*(2) 31-40 years (mean, SD)*	*(3) 41+ years (mean, SD)*	*F(ANOVA)S cheffe Test*
Basic self-efficacy	6.28(0.86)	5.75(0.99)	5.51(1.04)	7.06***(1)>(2)>(3)
Advanced self-efficacy	6.05(1.21)	5.10(1.31)	4.91(1.41)	9.48***(1)>(2)>(3)
Perceived usefulness	5.95(0.90)	5.60(0.91)	5.69(0.81)	2.03(n.s)
Perceived ease	5.91(0.98)	5.57(0.83)	5.50(0.74)	1.15(n.s)
Willingness	5.50(1.05)	5.21(1.05)	5.27(0.84)	1.15(n.s)
Ease of use	6.03(0.81)	5.65(0.94)	5.69(0.88)	2.49(n.s)
Multiple sources	5.99(0.85)	5.81(0.88)	5.82(0.79)	0.64(n.s)
Student negotiation	5.94(0.82)	5.66(0.88)	5.78(0.85)	1.36(n.s)
Reflective thinking	6.01(0.76)	5.86(0.81)	5.87(0.72)	0.55(n.s)
Critical judgment	5.88(0.79)	5.80(0.83)	5.62(0.88)	1.29(n.s)

Note: *** p <0.001

a role in the ISS scales. The post hoc comparisons indicate that adult learners under 30 year-old have stronger Internet self-efficacy than 31-40 years and 41+ years-old adult learners. These comparisons indicated that younger adult learners had stronger Internet-related using confidences than elder adult learners.

In this study, the amount of the adult learners' on-line learning experiences was categorized into three groups: < 6 hours, 7-12 hours, and13+hours. Then, the analyses between different on-line learning experience groups and their ISS and AOL and POL were conducted, with the results presented in Table 5.

The ANOVA tests showed that online learning experience played a statistically significant role in all scales of ISS ($p < 0.001$), AOL ($p < 0.05$) and POL ($p < 0.05$), except that no statistical significance on the perceived usefulness of AOL and critical judgment of POL. These comparisons indicate that adult learners who spent more time using the Internet had better internet self-efficacy, more favorable attitudes such as ease of use and willingness toward online learning, and stronger preferences toward online learning than those with less experience using the internet.

Correlations of Internet Self-Efficacy, Attitudes and Preferences toward Online Learning

The Pearson correlation coefficients among the questionnaire scales are presented in Table 6. The relationships between the ISS, AOL and the POL indicated that all of the variables were significantly positively correlated with each other ($r > 0.35$, $p < 0.01$). These results support that the adult learners expressing higher Internet self-efficacy and positive attitudes toward online learning would display stronger preferences toward online learning environments. In particular, adult learners' responses on the perceived ease scale were relatively highly correlated with those on the all scale of POL ($r > 0.55$, $p < 0.01$). It seemed

Table 5: In-service adult learners' Internet self-efficacy and attitude and preferences toward online learning among groups of different Internet experiences

Internet experience	*(1) Less than 6 hours (mean, SD)*	*(2)7-12 hours (mean, SD)*	*(3) 13+ hours (mean, SD)*	*F(ANOVA)*	*Scheffe Test*
Basic self-efficacy	5.46(1.05)	5.70(0.91)	6.35(0.75)	15.68***	(3)>(2)>(1)
Advanced self-efficacy	4.85(1.52)	5.36(1.00)	5.79(1.06)	9.11***	(3)>(2)>(1)
Perceived ease	5.52(0.96)	5.94(0.71)	5.86(0.79)	4.19*	(2)>(1)
Perceived usefulness	5.22(0.96)	5.54(0.89)	5.39(0.83)	2.00(n.s)	
Willingness	5.10(0.95)	5.48(1.12)	5.48(0.93)	3.48*	(3)>(1)
Ease of use	5.56(0.91)	5.68(0.90)	6.06(0.820	5.69**	(3)>(1)
Multiple sources	5.74(0.86)	5.76(0.88)	6.09(0.77)	3.43*	(3)>(1)
Student negotiation	5.61(0.88)	5.70(0.85)	6.01(0.80)	4.00*	(3)>(1)
Reflective thinking	5.77(0.74)	5.86(0.84)	6.11(0.75)	3.56*	(3)>(1)
Critical judgment	5.67(0.79)	5.72(0.97)	5.92(0.82)	1.56(n.s)	

Note: *p< 0.05, ** p<0.01, *** p<0.001

Table 6: Correlation of the In-service adult learners' Internet self-efficacy and attitude toward online learning and preferences toward online learning

Scale	*Ease of use*	*Multiple sources*	*Student negotiation*	*Reflective thinking*	*Critical judgment*
Basic self-efficacy	0.57**	0.51**	0.49**	0.48**	0.48**
Advanced self-efficacy	0.49**	0.41**	0.42**	0.35**	0.38**
Perceived Ease	0.64**	0.61**	0.63**	0.60**	0.55**
Perceived Usefulness	0.35**	0.36**	0.48**	0.35**	0.36**
Willingness	0.55**	0.59**	0.58**	0.61**	0.51**

Note: ** p<0.01

that adult learners with more positive perceptions might tend to reveal their stronger preferences such as ease of use and negotiation toward online learning environments.

Stepwise Multiple Regression Estimates for Predicting Learners' Attitudes toward On-line Learning

The stepwise multiple regression was used to make predictions about adult learners' preferences toward online learning environments. The outcome variables were the POL scales (ease of use, multiple sources, student negotiation, reflective thinking, critical judgment), and the ISS and AOL were processed as the predictors. To conduct the regression model for each scale of POL, only the ISS and AOL scales with significant relationships to it were selected for regression analyses. In other words, the regression analysis was performed to evaluate the predictive effects of the ISS scales (basic self-efficacy, advanced self-efficacy) and the AOL scales (perceived usefulness, perceived ease, willingness) on each scale of POL. The results were illustrated in Table 7.

The regression analysis revealed that the perceived ease ($t=7.32$, $p<0.001$) of the AOL and basic self-efficacy ($t=5.02$, $p<0.001$) of the ISS were the significant predictors in explaining 48% of adult learners' ease of use of the POL. This shows that adult learners with more positive perception of ease toward online learning and higher Internet self-efficacy would well perceive the preferences of ease of use toward online learning environments. In addition, perceived ease ($t=5.79$, $p<0.001$) and perceived usefulness ($t=2.71$, $p<0.01$) of the AOL and basic self-efficacy ($t=3.15$, $p<0.01$) of the ISS were also the significantly positive predictors for students negotiation of POL. Totally, the all factors accounted for 46% of variance. That is, adult learners who

Table 7: Stepwise regression model of predicting adult learners' preferences toward online learning (n=178)

Dependent variables	*Predicting variables*	*B*	*S.E.*	*β*	*t*	R^2
Preferences toward web-based learning environment (Use)	Perceived ease	0.48	0.07	0.47	7.32***	0.48
	Basic self-efficacy	0.29	0.06	0.32	5.02***	
	Constant	1.37	0.35		3.95***	
Preferences toward web-based learning environment (Multiple)	Perceived ease	0.46	0.07	0.48	7.04***	0.42
	Basic self-efficacy	0.21	0.06	0.26	3.77***	
	Constant	2.03	0.34		5.89***	
Preferences toward web-based learning environment (Negotiation)	Perceived ease	0.41	0.07	0.42	5.79***	0.46
	Basic self-efficacy	0.18	0.06	0.21	3.15**	
	Perceived Usefulness	0.19	0.07	0.18	2.71**	
	Constant	1.38	0.38		3.69***	
Preferences toward web-based learning environment (Reflective)	Perceived ease	0.42	0.06	0.49	7.04***	0.40
	Basic self-efficacy	0.17	0.05	0.22	3.22*	
	Constant	2.51	0.32		7.82***	
Preferences toward web-based learning environment (Critical)	Perceived ease	0.25	0.09	0.26	2.92**	0.38
	Basic self-efficacy	0.21	0.06	0.25	3.60***	
	Willingness	0.19	0.07	0.23	2.74**	
	Constant	2.12	0.36		5.95***	

Note: ** p<0.01***, p<0.001

have positive perceptions such as usefulness and ease of use toward online learning and higher Internet self-efficacy would express stronger preferences for interaction with others in their online learning environments.

DISCUSSION

The empirical results show that the ISS and AOL and POL developed in this study were sufficiently reliable to assess the in-service adult learners' internet self-efficacy, attitudes and preferences toward online learning. In this study, no gender differences was found in all variables and age were found to be related to ISS, and internet learning experience had significant differences in the ISS and AOL and POL scales. Moreover, through stepwise regression analyses, some predictors for preferences toward online learning were also validated, particularly the perceived ease of the AOL and basic self-efficacy of the ISS in predicting POL, indicating that adult learners with positive attitudes of perceived ease toward online learning and higher confidences about using the Internet are more likely to show stronger preferences toward online learning environments.

CONCLUSION

Practical Implications

This study set out to explore the role of internet self-efficacy and attitudes toward online learning in adult learners' preferences toward online learning environments. The empirical results and its implications are consistent with findings of most studies related to adult learning with respect to gender. Both male and female adult learners exhibited similar levels of internet self-efficacy, attitudes and preferences toward online learning. Yet the researchers' findings also suggest that gender has no effect on adult students' preference toward internet related learning environments. This may due mainly to the fact that the correspondents were mostly mature, namely, their personal cognitive development have reached a stable stage, and abundant life experience may reduce the limitations caused by social constraints for women. Moreover, Internet environments are new to this population, and thus, gender and age effects related to previous training were kept to a minimum.

The researchers' findings also indicate that younger adult learners had higher confidences in using the Internet than elder adult learners. The findings also show that younger adult learners express better Internet self-efficacy than elder adult learners. The researchers' study did not show any significant influences on adult learners' attitude and preferences toward online learning among different age groups. This attest to the successful implementation of e-government approach of Taiwan to promote e-learning via various mandates and incentives to establish an online learning environment cater to the needs of public servants with different backgrounds.

In addition, the study found that adult learners who spent more time using online learning attained higher scores on basic self-efficacy and advanced self-efficacy of the ISS, perceived ease and willingness of the AOL and ease of use, reflective thinking, multiple sources and students negotiation of the POL. This seems to indicate that in-service adult learners' rich internet experience can help them develop better confidence, more positive attitudes and stronger preferences for factors affecting online learning environment. Namely, increasing positive internet experiences may help adult learners shape better internet self-efficacy, attitudes and preferences toward online learning. Thus, the importance of Internet experience should be highlighted for adult learners in participating online learning environments.

Adult Learners' ISS and AOL are Major Predictors of POL

The correlation analyses demonstrated that the adult learners' Internet self-efficacy and attitudes toward online learning were positively correlated with their preferences toward online learning environments. Adult learners with higher confidences using the internet and more positive attitudes toward online learning would express stronger preferences for online learning. Furthermore, the regression analysis revealed that adult learners' basic self-efficacy of ISS and perceived ease of AOL were the most significant positive predictors for the all scales of POL. This suggest that adult learners' preferences toward online learning was significantly influenced by their Internet self-efficacy and attitudes toward online learning.

Previous studies have attested to the advantages of web-based learning over traditional ways of learning for adults pursuing continuing education for their professional development. Future researches in this venue could follow up and capitalize on the results of this study to further investigate in details the interrelations among factors in adult learners' online learning. In this study, the basic self-efficacy of ISS interacted well with the perceived ease of AOL in explaining the ease of use, multiple sources, students' negotiation, reflective thinking and critical judgments of POL. The research encourages more use of SEM in future researches to examine the interaction among variables in the extended TAM.

ACKNOWLEDGEMENTS

Funding of this research work is generously supported by grants from the National Science Council, Taiwan. The grant numbers are: NSC 99-2410-H-128-019-MY2, NSC 101-2511-S-218-006-MY1.

REFERENCES

Ausburn LJ 2004. Course design elements most valued by adult learners in blended online education environments: An American perspective. *Educational Media International,* 41(4): 327-337.

Calik M 2013. Effect of technology-embedded scientific inquiry on senior science student teachers' self-efficacy. *Eurasia Journal of Mathematics, Science and Technology Education,* 9(3): 223-234. doi: 10.12973/eurasia.2013.931a

Cercone K 2008. Characteristics of adult learners with implications for online learning design. *AACE Journal,* 16(2): 137-159.

Chu RJ 2010. How family support and internet self-efficacy influence e-learning outcomes among higher aged adults: Analysis of gender and age differences. *Computers and Education,* 55(1): 255-264.

Chu RJC, Tsai CC 2009. Self-directed learning readiness, internet self-efficacy and preferences towards constructivist internet-based learning environments among higher-aged adults. *Journal of Computer Assisted Learning,* 25(5): 489-501.

Dogan Y 2013. Teachers and students' benefiting from computers for instructional purposes: Bursa example. *Anthropologist,* 16(1-2): 133-143.

Kao CP, Tsai CC 2009. Teachers' attitudes toward web-based professional development, with relation to Internet self-efficacy and beliefs about web-based learning. *Computers and Education,* 53: 66-73.

Ke F, Xie K 2009. Toward deep learning for adult students in online courses. *The Internet and Higher Education,* 12: 136-145.

Lee MH, Tsai CC 2005. Exploring high school students' and teachers' preferences toward the constructivist Internet-based learning environments in Taiwan. *Educational Studies,* 31: 149-167.

Mpezeni L, Mpofu J, Shumba A 2013. Challenges faced by lecturers in teaching quantitative courses at a distance: A case of Harare Region of the Zimbabwe Open University. *Anthropologist,* 15(3): 255-263.

Mupinga DM, Nora RR, Yaw PC 2006. The learning styles, expectations, and needs of online students. *College Teaching,* 54: 185-189.

Neuhauser C 2002. Learning style and effectiveness of online and face-to-face Instruction. *The American Journal of Distance Education,* 16(2): 99-113.

Park JH, Choi HJ 2009. Factors influencing adult learners' decision to drop out or persist in online learning. *Educational Technology and Society,* 12(4): 207-217.

Psycharis S, Chalatzoglidis G, Kalogiannakis M 2013.Moodle as a learning environment in promoting conceptual understanding for secondary school students. *Eurasia Journal of Mathematics, Science and Technology Education,* 9(1): 11-21.

Reisetter M, LaPointe L, Korcuska J 2007.The impact of altered realties: Implications of online delivery for learners' interactions, expectations, and learning skills. *International Journal of E-Learning,* 6(1): 55-80.

Ryan S 2001. Is online learning right for you? *American Agent and Broker,* 73(6): 54-58.

Smarkola C 2008. Efficacy of planned behavior model: Beliefs that contribute to computer usage intentions of student teachers and experienced teachers. *Computers in Human Behavior,* 24(3): 1196-1215.

Tsai CC, Lin CC 2004. Taiwanese adolescents' perceptions and attitudes regarding the Internet: Exploring gender differences. *Adolescence,* 39: 725-734.

Wang TS 2013. Design and assessment of joyful mobile navigation systems based on TAM and integrating learning models applied on ecological teaching activity. *Eurasia Journal of Mathematics, Science and Technology Education,* 9(2): 201-212.

Wu YT, Tsai CC 2006. University student's Internet attitudes and Internet self-efficacy: A study at three universities in Taiwan. *CyberPsychology and Behavior,* 9: 441-450.

Youn S 2007. Invisible motivation of online adult learners during contract learning. *The Journal of Educators Online,* 4(1): 1-22.