

Assessing the Acceptability of Adaptive E-Learning System

Vainny Tobing¹, Muzaffar Hamzah², Suaini Sura and Hanudin Amin³

School of Informatics Science, Labuan, Malaysia

¹(vee_tobing@yahoo.com)

²(muzzmail@yahoo.com)

³(hanudin@ums.edu.my)

Abstract

AEL based on students' knowledge-level contribute many benefits to its users. The study on such system is vital as currently, most AEL only consider student's preferences, interest, and browsing behaviour when investigating student's behaviour for personalized services. Further, compared to previous studies on AEL system, user's acceptance towards this type of system, however, has not been assessed and understood thoroughly. In order to get more experience about the acceptance of AEL system that tailored learning content based on students' knowledge-level, a survey consisting of 314 students have been conducted. Based on TAM, this study proposed a conceptual model of AEL system acceptance. The result of regression analysis shows a positive indication on the acceptance of such system among students with the adaptability feature affect student's intention to use the system. The study provides insight into the usefulness of an AEL system based on students' knowledge-level. Moreover, it is an important step towards a better understanding on the user's intention to use the system in the future as it gives a more intensive view of the AEL system users.

Keywords: Adaptive e-Learning, Knowledge-level, Technology Acceptance Model (TAM)

1. INTRODUCTION

Due to the ability of adaptive e-learning (AEL) system in providing an individualized learning to each of its users, the learning system has become an increasingly useful tool to improve the quality of education in our evolving society (Brusilovsky, 1996). Despite the benefits offered by AEL system which tailored it learning content according to students' knowledge-level, the acceptance of such system among students has not been tested. The purpose of this study is to assess the acceptance of AEL system among students and indirectly examine the preparation of students in adopting AEL into their learning activity. It focuses in predicting the system future usage (acceptance) and to assist the system future development. This is so as according to DeLone & McLean (1992), user acceptance is an important primary measure of system success.

The acceptance is measure by employing the Technology Acceptance Model (TAM) proposed by Davis (1989) because the model provides an adequate foundation to evaluate students' preparation and readiness for the AEL system. Since adaptability feature is claimed to be an added value of AEL, thus the feature is predicted as the external stimulus that affects students' acceptance toward the system. Understanding the acceptance of AEL with the influenced of adaptability feature should be considered as an critical issue because it will determine the importance and usefulness

of integrating adaptability into any electronic-based learning system in the future.

2. THEORETICAL BACKGROUND

2.1 Technology Acceptance Model (TAM)

TAM is one of the theoretical models that attempts to predict a person's intention to accept and use IS technology (Davis, 1989; Davis *et al.*, 1989). Igbaria & Iivari (1995) conclude that the TAM is one of the simplest, easiest to use, and most powerful computer usage models. The following is the figure of TAM.

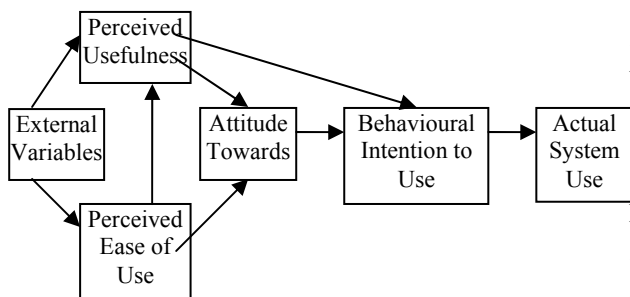


Figure 1: Technology acceptance model (TAM)

Based on the figure 1, TAM posits that the behavioural intention on system usage is determined by individual's attitude in using the system and perceived usefulness. Davis (1989), Chen *et al.* (2002) and Chen *et al.* (2007) said that behavioural intention is a powerful determinant and a predictor of performing actual behaviour. In the case of system adoption, this behavioural intention is claimed to be a powerful determinant and predictor of actual system usage. Attitude towards the system is jointly influenced by perceived usefulness and perceived ease of use.

According to many studies, perceived usefulness and perceived ease of use are the two important factors in determining the use of information system as these factors will

generate attitude and intention towards system use (Chen *et al.*, 2002; Legris *et al.*, 2003; Pituch & Lee, 2006; Roca *et al.*, 2006; Ngai *et al.*, 2007; Chakraborty *et al.*, 2007). Further, perceived ease of use directly affect perceived usefulness. Perceived usefulness is defined as the degree to which a person believes that using the new technology will enhance his or her performance, and perceived ease of use is the degree to which a person believes that using the technology is free of effort (Davis, 1989). Therefore, in the present study, the perceived usefulness of AEL system is defined as the degree to which the user believes that using the system would enhance his/her learning performance, whereas, the perceived ease of use is defined as the degree to which the user believes that using the AEL system will be free of effort.

The significant relationship between perceived usefulness and perceived ease of use had been justified in many studies, for instance, study by Lee (2006) in investigating the factor influence the adoption of an e-learning system. The empirical result found in Lee (2006) showed that perceived ease of use significantly and positively affect perceived usefulness. Other than that, study by Ngai *et al.* (2007) in determining the acceptance of WebCT showed that the ease of use of WebCT directly affects the usage of it. Both of these major drivers of technology acceptance are influenced by many external variables such as system characteristics and user characteristics. TAM proposed that the effect of external variables is completely mediated by user's beliefs. In another words, the external variables are expected to influence 'attitude toward' and 'behaviour intention to use' new technology by affecting beliefs toward the system that consist of perceived usefulness and perceived ease of use.

2.2 AEL based on students' knowledge-level

AEL is generally defined as an e-learning system that can adapt e-learning content to meet the characteristic(s) of individual users (Gu & Sumner, 2006; Vu Minh Chieu *et al.*, 2006). Adaptive system uses the information about a particular user, reflects in user record, to adapt the information and/or links presented to that user. Basically, learning content can be adapted whether to student learning style, preferences, cognitive style, or knowledge-level (Mosston & Ashworth, 1990; Srisethanil & Baker, 1995; Beaumont & Brusilovsky, 1995; Brusilovsky, 1996; Brusilovsky, 2001; Ary *et al.*, 2006). As for this present research, the focus is on accommodating the learning content based on student's current knowledge-level in subject being learned. This adaptation works by providing the student with the most appropriate learning content, which has been customized into distinguished learning modules, according to their knowledge-level. Therefore, based on the above definition of adaptation and also by taking into account the general and specific definition of an AEL system, e-learning adaptation in the present research context is defined as the process of changing or providing e-learning content that suits to student's knowledge-level.

There are two components that can be adapted within an AEL system which are content pages (content-level adaptation or adaptive presentation) and links pages (link-level adaptation or adaptive navigation) (Beaumont & Brusilovsky, 1995; Brusilovsky, 1996). Content-level adaptation is used to solve the problem of hypermedia system that being used by different classes of user, whereas, link-level adaptation is used to provide navigation support and prevent users from getting lost in hyperspace (Brusilovsky, 1996; Brusilovsky, 1997; Brusilovsky, 1999). Attention is given to the

content-level adaptation in order to adapt the AEL content based on students' knowledge-level. Student's knowledge-level pertaining to the domain presented in e-learning appears to be the most important feature of the user that needs consideration for an adaptation support (Chen *et al.*, 2006). Four of the five operational criteria proposed by Brusilovsky (1999) are focussed in order to facilitate adaptive supports in an AEL system. These four operational criteria are as follows:

- i) Adaptive presentation of learning content – at any given time during the learning process, the learner is provided with learning contents that are appropriate to his/her present competence.
- ii) Adaptive use of pedagogical devices – at any given time during the learning process, the learner is encouraged to do learning activities that are appropriate to his/her present competence.
- iii) Adaptive communication support – for any learning discussion, the learner is suggested with peers who are appropriate to help him/her overcome his/her own difficulties.
- iv) Adaptive problem solving support – for any problem solving session, the learner is supported with appropriate feedback (e.g. hints) to solve the problem effectively.

3. CONCEPTUAL MODEL AND HYPOTHESES

Figure 2 illustrates the TAM-based model examined in the study. It asserts that the intention to use AEL system is a function of its perceived usefulness, perceived ease of use, and adaptability feature. Intention is the extent to which the user would like to reuse AEL in the future.

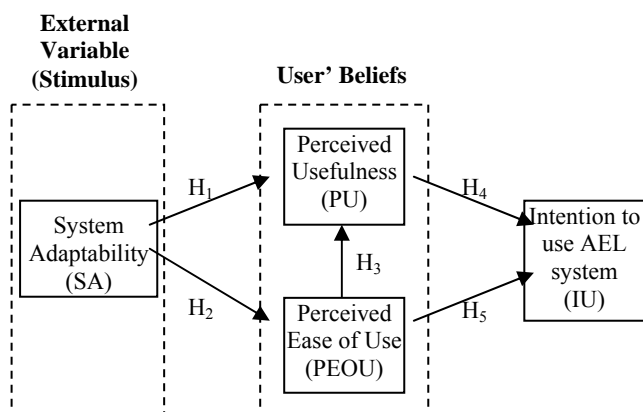


Figure 2: TAM-based conceptual model

According to many researchers, adaptability could increase students' learning activity and their understanding on subject learns (Jih, 1996; Cantoni *et al.*, 2004). Conceivably, there is likelihood that the students will accept e-learning due to these reasons. Specifically, the researcher predicts that because of the benefits offers by AEL system, student will find the system as a useful and easy to be used. Thus, there is likelihood that the students' intention to use AEL system would increase through the mediating effect of perceived usefulness and perceived ease of use. Hence, system adaptability is hypothesized as being indirectly related to intention to use AEL system through perceived usefulness and perceived ease of use. This prediction is supported by McCormack & Jones (1998) as according to them the extent to which a student will use a particular e-learning system is often based on their belief on the system usefulness and ease of use. Additionally, perceived ease of use directly influences perceived usefulness of AEL system. Accordingly, the following hypotheses are proposed:

- H1:** System adaptability has a significant positive relationship with the perceived usefulness.
- H2:** System adaptability has a significant positive relationship with the perceived ease of use.

- H3:** Perceived ease of use has a significant positive relationship with perceived usefulness.
- H4:** Perceived usefulness has a significant positive relationship with intention to use AEL system.
- H5:** Perceived ease of use has a significant positive relationship with intention to use AEL system.

Figure 2 also envisage that the 'attitude' component is excluded from that TAM-based conceptual model in predicting AEL system acceptance. This is because Davis *et al.* (1989) have found that the influence of attitude on IS use disappeared when perceived usefulness was considered to predict system intention to use. According to Yang & Yoo (2004), the validity and reliability of model constructed without attitude as a mediating effect have been well supported by various studies. One of it is the study by Chen *et al.* (2007) where they found that there is no significant relationship existed between attitude and behavioural intention to use web-based learning system. Thus, it is relevant to exclude attitude as a mediating effect on intention to use the system in the present model.

4. RESEARCH METHODOLOGY

4.1 Instrument development

The survey instruments consisted of 15 items (listed in Appendix A) to assess four constructs of the TAM-based conceptual model. Items for perceived usefulness and perceived ease of use were adapted from previous studies in TAM research area and were refined to make them specifically relevant to the present study. Specifically, the items were adapted from Davis (1989), Yi & Hwang (2003) and Ngai *et al.* (2007). Whereas, items for adaptability and intention to use were self-developed by reviewing previous literatures related to AEL as the

researcher unable to locate previously validated items that matched these present research components of interest. These four constructs were measured on a five-point Likert scale ranging from '1' as 'strongly disagree' to '5' as 'strongly agree'. The scale is adapted from Saade *et al.* (2007).

4.2 Sample and data collection

The research methodology was based on empirical data collected through a questionnaire survey of students enrolled in Universiti Malaysia Sabah (UMS), one of the universities base in Malaysia. The sample population comprises of 483 undergraduate students from the School of Informatics Science (SSIL) of UMS who never have the experience in using AEL system before. From 483 students, 314 have voluntarily participated in the present study. The main reason of selecting this student as the population is because the AEL system is in Differentiation domain. Differentiation is part of the topic learn in Basic Mathematic (IT1113) course taken by the SSIL student.

Before the questionnaire is used in the actual survey, the questionnaire is pre-tested for its reliability, relevant, and validity. The questionnaire is disseminated randomly to the target population through Sample Random Sampling (SRS) technique. The respondents who completed the questionnaire did so voluntarily with no reimbursement for their participation. SRS technique is used in order to avoid biases in answering the questionnaire (Ary *et al.*, 2006).

4.3 Experimental treatment

Respondents were asked whether they have any priori experience in using AEL system to verify that respondents only comprises of students who never use AEL system before. The respondents with

experience in using AEL were omitted from this study. Then, they were given a brief (ten minutes) demonstration of the learning system. The researcher informed the respondents regarding the objective of the study. Immediately following this demonstration, respondents were given a brief (one hour) period to experience the AEL system. During this session, respondents were allowed to perform any type of learning activities provided within the system.

4.4 Data analysis method

The data gathered from the valid questionnaire were transferred directly into personal computer. Analyses were performed using the Statistical Package of Social Science (SPSS) Version 11.0. The analyses used involved frequency analysis, reliability analysis, factor analysis, and regression analysis. Further, the research hypotheses is analyzed based on the series of linear regression analyses performed to estimates the path coefficients (standardized regression weight, β) associated with the TAM-based conceptual acceptance model of AEL system.

5. ANALYSIS AND RESULTS

5.1 Descriptive statistics

A total of 314 undergraduate students has participated in the survey with majority of the respondents are third years of study. Of the respondents, 56.1% are female students while 43.9% are male.

5.2 Analysis validity and reliability

Construct validity is assessed through principal component analysis using varimax rotation. Table 1 showed the result of PCA after varimax rotation and the value for

Cronbach's α for each of the respective factors.

Table 1: Results of PCA and Cronbach's α from reliability analysis

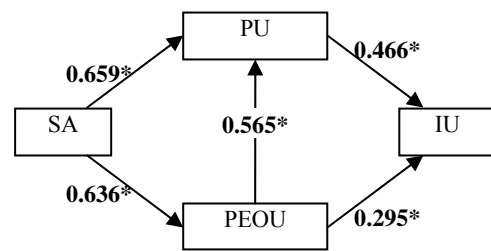
Variables	Component			
	Factor 1 SA	Factor 3 PU	Factor 2 PEOU	Factor 4 IU
SA1	0.389	0.384		
SA2	0.584			0.361
SA3	0.766	0.332		
SA4	0.629	0.384		
SA5	0.737			
SA6	0.720			
SA7	0.597			0.456
PU1		0.647		0.458
PU2		0.756	0.291	0.295
PU3		0.815		
PEOU1			0.757	
PEOU2		0.310	0.757	
PEOU3			0.846	
IU1				0.779
IU2	0.326			0.731
Cronbach's α	0.8602	0.8386	0.8429	0.7681

The result from PCA on 15 suggested variables has extracted four factors which are "system adaptability", "perceived usefulness", "perceived ease of use", and "intention to use AEL system". As suggested by Stevens (1992) factor loading greater than 0.3 is used for a sample size greater than 300. The result shows that all fifteen variables perfectly load into their own respective factor (factor loading value exceed 0.3), thus, it has verify that the variables measures exhibit sufficient validity and proved that that the variables claimed by the researcher are well predicting the factors. Table 1 also presents the value of Cronbach's α where the α -value for each of the respective factors is greater than the minimum threshold level which is 0.6 (Uma Sekaran, 2003; Malhotra, 2004). Thus, it

indicates that the variables used in the study are reliable and consistent.

5.3) Results of regression analysis

Regression analysis is conducted to assess the relationship between predictors (independent variable) and outcomes (dependent variables). Figure 3 illustrates the graphical presentation of the β -value for each of the variables.



indicates that $p < 0.001$

Figure 3 Graphical representations of β -values

Figure 3 shows that SA has a significant positive relationship with PU ($\beta = 0.659, p < 0.001$) and PEOU ($\beta = 0.636, p < 0.001$). This indicates that both H1 and H2 are accepted. In addition, PEOU also has a significant direct effect on PU ($\beta = 0.565, p < 0.001$). Hence, H3 is supported. Finally, figure 3 also presents that PU as well PEOU have a significant positive relationship with IU with the β -value is equal to 0.466 and 0.295 respectively. Therefore, H4 and H5 are well accepted in this study.

6. DISCUSSION AND CONCLUSION

Through the regression analysis performed in the study, it is found that adaptability feature affect the usefulness of AEL system. Specifically, adaptability made student's learning more effective and increases their learning performance. This has attested the justification stated by many researchers regarding on the benefits and

usefulness of adaptability based on students' knowledge-level such as Cantoni *et al.* (2004), Chen *et al.* (2006) and Waite *et al.* (2007). The result also supported the first research hypothesis of the present study that is system adaptability has a significant positive relationship with the perceived usefulness. Besides that, system adaptability also found to influence students' belief on the system ease of use. Therefore, the second research hypothesis which stated that system adaptability has a significant positive relationship with perceived ease of use is accepted.

Apart from this, it also found that system adaptability and perceived ease of use has a positive relationship with perceived usefulness whereby system adaptability contributes highly compared to perceived ease of use. This is consistent with other previous studies on TAM, such as the study done by Davis (1989) and Szajna (1996), where the studies also found that there is a significant direct effect of perceived ease of use on perceived usefulness. The present finding indicates that the third research hypothesis is well accepted. Furthermore, the study also found that both of the student's beliefs which are perceived usefulness and perceived ease of use of the AEL system has a significant positive direct effect on the students' intention to use the system. This means that students' intention to use AEL system increased as their belief on the system usefulness and ease of use increased. The result appears to confirm the statement by McCormack & Jones (1998) that the extent to which a student will use a particular electronic-based learning system is often based on their belief towards the system usefulness and ease of use. This is similar to the findings obtained by several researchers who conducted study pertaining to the acceptance of other IS technology with the application of TAM. Such researchers are Davis (1989), Szajna (1996), Pituch & Lee

(2006) and Ngai *et al.* (2007). Thus, the fourth and fifth research hypotheses has been accepted in this present study.

As the conclusion, system adaptability contributes to the acceptance of AEL system. This system characteristic indirectly influenced students' intention to use AEL system by significantly affect students' belief on AEL system usefulness and ease of use. Hence, both of these beliefs is found to be significantly influence the acceptance of AEL system with perceived usefulness contributes greatly on the intention to use AEL system than the component of perceived ease of use. This implies that, the ease of use of a learning system is not the major determinant of the system acceptance. The result similar to the finding obtained from the study conducted by Deng *et al.* (2004) and Lee (2006) where perceived usefulness is a stronger predictor of students' intention to use the AEL system compared to perceived ease of use. Further, the regression model created during the analysis is found to be significant. As illustrated in figure 3, the standardized regression weight, β are significant with $p < 0.001$. Thus the TAM-based conceptual model which was developed to explain the acceptance of AEL system has been successfully tested and validated. This implies that the developed conceptual acceptance model of AEL system is significant in explaining AEL system acceptance.

REFERENCES

- [1] Ary, D., Jacobs, L. C., Razavieh, A. and Sorensen, C. (2006). *Introduction to Research in Education*. (7th edition). Belmont, California: Thomson-Wadsworth.
- [2] Beaumont, I., and Brusilovsky, P. (1995). Adaptive educational hypermedia: From ideas to real systems. *Proceedings of ED-*

MEDIA'95 - World conference on educational multimedia and hypermedia. June 17-21, 1995. Graz, Austria. 93-98.

[3] Brusilovsky, P. (1996). Methods and techniques of adaptive hypermedia. *User Modelling and User Adapted Interaction.* **6**, 2, 87-129.

[4] Brusilovsky, P. (1997). Efficient techniques for adaptive hypermedia. *Lecture Notes in Computer Science.* Berlin: Springer-Verlag Vol. 1326: 12-30.

[5] Brusilovsky, P. (1999). Adaptive and Intelligent Technologies for Web-based Education. In Rollinger, C. & Peylo, C. (eds.). *Special Issue on Intelligent Systems and Teleteaching.* Vol. 4: 19-25.

[6] Brusilovsky, P. (2001). Adaptive hypermedia. *User Modeling and User Adapted Interaction.* **11**, 1/2, 87-110.

[7] Cantoni, V., Cellario, M. & Porta, M. (2004). Perspectives and challenges in e-learning: Towards natural interaction paradigms. *Journal of Visual Languages and Computing.* **15**, 5, 333-345.

[8] Chakraborty, I., Hu, P. J. & Cui, D. (2007). Examining the effects of cognitive style in individuals' technology use decision making. *Decision Support Systems.*

[9] Chen, C. M., Liu, C. Y. & Chang, M. H. (2006). Personalized curriculum sequencing utilizing modified item response theory for web-based instruction. *Expert Systems with Applications.* **30**, 2, 378-396.

[10] Chen, I. J., Yang, K., Tang, F., Huang, C. & Yu, S. (2007). Applying the technology acceptance model to explore public health nurses' intention towards web-based learning: A cross-sectional questionnaire survey. *International Journal of Nursing Studies.*

[11] Chen, L., Gillenson, M. L. & Sherrell, D. L. (2002). Enticing online consumers: an extended technology acceptance perspective. *Information & Management.* **39**, 8, 705-719.

[12] Davis, F. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly.* **13**, 3, 319-338.

[13] Davis, F. D., Bagozzi, R. P. & Warshaw, P. R. (1989). User acceptance of computer technology: a comparison of two theoretical models. *Management Science.* **35**, 8, 982-1003.

[14] DeLone, W. H. & McLean, E. R. (1992). Information system success: The quest for the dependent variable. *Information System Research.* **3**, 1, 60-95.

[15] Deng, X., Doll, W. J., Hendrickson, A. R. & Scazzero, J. A. (2004). A multi-group analysis of structural invariance: an illustration using the technology acceptance model. *Information & Management.* **42**, 3, 745-759.

[16] Gu, Q. & Sumner, T. (2006). Support personalization in distributed e-learning systems through learner modeling. *Proceedings of the 6th International Conference on Advanced Learning Technologies (ICALT'06).* 24-28 April 2006. Volume 1, 610-615.

[17] Igarria, M. & Iivari, J. 1995. The effects of self-efficacy on computer usage. *Omega.* **23**, 6, 587-605.

[18] Jih, H. J. (1996). The impact of learners' pathways on learning performance in multimedia Computer Aided Learning. *Journal of Network and Computer Applications.* **19**(2): 367-380.

- [19] Lee, Y-C. (2006). An empirical investigation into factors influencing the adoption of an e-learning system. *Information & Management*. **30**, 5, 517-541.
- [20] Legris, P., Ingham, J. & Colletette, P. (2003). Why do people use information technology? A critical review of the technology acceptance model. *Information & Management*. **40**, 3, 191-204.
- [21] Malhotra, N. K. 2004. *Marketing Research: An Applied Orientation*. (4th edition). New Jersey: Prentice-Hall, Inc.
- [22] McCormack, C. & Jones, D. (1998). *Building a Web-Based Education System*. Boston: John Wiley & Sons, Inc.
- [23] Mosston, M. & Ashworth, S. (1990). *The Spectrum of Teaching Styles: From Command to Discover*. New York: Longman.
- [24] Ngai, E. W. T., Poon, J. K. L. & Chan, Y. H. C. (2007). Empirical examination of the adoption of WebCT using TAM. *Computers & Education*. **48**, 2, 250-267.
- [25] Pituch, K. A. & Lee, Y. K. (2006). The influence of system characteristics on e-learning use. *Computers & Education*. **47**, 2, 222-244.
- [26] Roca, J. C., Chiu, C. & Martinez, F. J. (2006). Understanding e-learning continuance intention: An extension of the Technology Acceptance Model. *International Journal of Human-Computer Studies*. **64**, 8, 683-696.
- [27] Saade, R. G., Nebebe, F. & Tan, W. (2007). Viability of the "Technology Acceptance Model" in Multimedia Learning Environments: A Comparative Study. *Interdisciplinary Journal of Knowledge and Learning Objects*. **3**, 2, 175-184.
- [28] Srisethanil, C. & Baker, N. (1995). ITS-Engineering: Providing Adaptive Teaching in the Engineering Tutor. *Frontiers in Education Conference, 1995*. Vol. 1, 1-4 November 1995.
- [29] Stevens, J. P. (1992). *Applied Multivariate Statistics for the Social Sciences*, (2nd edition). Hillsdale, NJ: Erlbaum.
- [30] Szajna, B. (1996). Empirical evaluation of the revised technology acceptance model. *Management Science*. **42**, 1, 85-92.
- [31] Uma Sekaran. (2003). *Research Methods for Business: A Skill Building Approach*. (5th edition). Kundli, India: John Wiley & Sons (Asia) Ptd. Ltd.
- [32] Vu Minh Chieu, Dao Thi Viet Anh & Pham Khac Hung. 2006. An operational approach for analyzing ICT-based constructivist and adaptive learning systems. *2006 International Conference on Research, Innovation and Vision for the Future (RIVF'06)*. 12-16 February 2006. Ho Chi Minh City, Vietnam. 177-186.
- [33] Waite, S. J., Wheeler, S. & Bromfield, C. (2007). Our flexible friend: The implications of individual differences for information technology teaching. *Computers & Education*. **48**, 1, 80-99.
- [34] Yang, H. D. & Yoo, Y. (2004). It's all about attitude: revisiting the technology acceptance model. *Decision Support System*. **38**, 1, 19-31.
- [35] Yi, M. Y. & Hwang, Y. (2003). Predicting the use of web-based information systems: self-efficacy, enjoyment, learning goal orientation, and the technology acceptance model. *International Journal of Human-Computer Studies*. **59**, 4, 431-449.

Appendix A: Research questionnaire

SECTION A

Please select the appropriate answer.

- | | | | |
|---|---------------------------------|----------------------------------|-----------------------------------|
| 1. Program: | 2. Gender: | 3. Age: | 4. Year of study: |
| <input type="checkbox"/> HC12 Multimedia Technology | <input type="checkbox"/> Male | <input type="checkbox"/> 19 - 22 | <input type="checkbox"/> Year 1 |
| <input type="checkbox"/> HC13 E-Commerce | <input type="checkbox"/> Female | <input type="checkbox"/> 23 - 26 | <input type="checkbox"/> Year 2 |
| | | <input type="checkbox"/> > 26 | <input type="checkbox"/> Year 3 |
| | | | <input type="checkbox"/> > Year 3 |
-
- | | | |
|------------------------------|------------------------------|--|
| 5. PC ownership: | 6. Home internet Connection: | 7. Have you ever used an adaptive e-learning before? |
| <input type="checkbox"/> Yes | <input type="checkbox"/> Yes | <input type="checkbox"/> Yes |
| <input type="checkbox"/> No | <input type="checkbox"/> No | <input type="checkbox"/> No |

SECTION B

Please justify your level of agreement based on the statements below.

1 = Strongly disagree (SD), 2 = Disagree (D), 3 = Neutral (N), 4 = Agree (A), 5 = Strongly agree (SA)

System usefulness	SD	D	N	A	SA
1. The AEL system enhances the effectiveness of my learning	1	2	3	4	5
2. The AEL system improves my learning performance	1	2	3	4	5
3. Overall, I find the AEL system to be advantageous to my learning	1	2	3	4	5
System ease of use	SD	D	N	A	SA
1. Learning to use the AEL system is easy for me	1	2	3	4	5
2. The process of using the AEL system is clear and understandable	1	2	3	4	5
3. Overall, I believe that the AEL system is easy to use	1	2	3	4	5
System adaptability	SD	D	N	A	SA
1. The provided learning content suit to my current knowledge-level	1	2	3	4	5
2. The learning content which is presented according to my current knowledge-level improves my comprehension on the learning topic	1	2	3	4	5
3. The suggested students provided by the system gives me the possibility to learn with other students	1	2	3	4	5
4. The system assist me in deepen my understanding in topic learned as I exposed to a multiple perspectives of solution from other students suggested by the system	1	2	3	4	5
5. The self-test enable me to instantly evaluate my comprehension on topic learned	1	2	3	4	5
6. The feedback (hint) assists me to identify problem areas	1	2	3	4	5
7. The feedback (hint) assists me to solve the problem effectively	1	2	3	4	5
Intention to use the system	SD	D	N	A	SA
1. I intend to use the AEL system in the future as an alternative learning method other than class-based lecture	1	2	3	4	5
2. I intend to use the AEL in the future as an alternative learning method if I having problem in understanding the topic taught during class-based lecture	1	2	3	4	5