EFFECTS OF SYSTEM'S AND USER'S CHARACTERISTICS ON E-LEARNING USE: A STUDY AT UNIVERSITI MALAYSIA SARAWAK

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The benefits of an e-learning system will not be maximised if learners do not use the system. This study was conducted with 26 postgraduate students at a faculty in Universiti Malaysia Sarawak taking an on-campus course supplemented with an e-learning system. The purpose of the study was to determine which factors were related to intention to use an e-learning system as a supplementary learning tool. The factors investigated were system characteristics such as functionality, interactivity and response rates; user characteristics incorporating computer self-efficacy and Internet experience; perceived usefulness and perceived ease of use. The findings of the study showed that the participants viewed the e-learning system characteristics positively especially in terms of functionality and interactiveness. However, the response rate for the e-learning system was not up to expectations. Most of the participants believed that they were capable of using the e-learning system to accomplish their learning tasks and have adequate Internet use experience. Intention to use the e-learning system for supplementary learning was positively related to the participants' computer self-efficacy. Computer

self-efficacy was also positively related to perceive usefulness of an e-learning system and perceived ease of use. All three systems characteristics of functionality, interactivity and response rate were related to perceived usefulness. Therefore, in developing an e-learning system, the system developers have to consider ensuring the system is easy for the user to handle and improve the system's functionality, interactivity and response rates. Developers, designers, and institutional purchasers of e-learning systems should also ensure compatibility between system features and user requirements to enhance technology adoption for e-learning. Furthermore, to maximize the benefits of e-learning system, educational institution should demonstrate the use of the technology and provide instructional material to ease students' learning of the technology. In addition, it should describe how the technology would benefit students and assist them learn the course content or achieve other learning goals. Recommendations for future studies are also included in the conclusion of the paper.

INTRODUCTION

E-learning has become increasingly popular for teaching and learning. E-learning systems such as WebCT (www.webct.com) and Blackboard (www.blackboard.com) are popular among educators and can integrate a variety of functions. For example, these systems can incorporate instructional materials using audio, video and text, e-mail, online discussions, forums, quizzes and assignments and the World Wide Web (Web). Instructional delivery and communication between instructors and students can be conducted synchronously (at the same time) or asynchronously (at different times), offering a variety of instructional aids, communication methods and flexibility in terms of place and time of instruction.

Many educational institutions have invested in e-learning. For example, WebCT (2001) reported that over 2200 postsecondary institutions were using its product to offer online education. In the

United Kingdom, the HEFCE has published its e-learning strategy, which sets out strategies and implementation plans for supporting e-learning in higher education institutions. It was reported to be allocating 33 million pound sterling in capital funding for e-learning (HEFCE, 2005).

Although educational institutions have invested heavily in e-learning, the benefits of such systems will not be realized if learners fail to use the system. For example, according to a survey of distance learning programs in higher education in 1999, 16% of students enrolled in courses using distance learning in 1998 failed to complete their courses. Why is it that some student use e-learning systems and others do not? Such information is of benefit to those designing e-learning and may suggest actions that can be taken to promote greater use of e-learning.

Furthermore, although e-learning are increasingly used, little research has been associated with student use of e-learning when the system is used as a supplementary learning tool for a traditional class. Additionally, much of the research has examined outcome differences between on-line and traditional classes or offered anecdotal experiences of teachers or learners (Spooner, Jordan, Algozzine, & Spooner, 1999) and seldom examined system characteristics associated with e-learning use (Carswell & Venkatesh, 2002).

Given the resources invested in e-learning, it seems reasonable to investigate if students intends to use such system for supplementary learning within an on-campus course and what factors could influence such an intent.

TECHNOLOGY ACCEPTANCE MODEL (TAM)

TAM theory is useful to explain the usage behaviour of ICT (Davis, 1989). The theory built upon Fishbein and Ajzen's (1975) theory of reasoned action that asserts that beliefs could influence attitudes,

which lead to intention to use and finally actual use. The assumptions on which the TAM is based comprised of:

When end users perceive the target system as one that is easy to use and nearly free of mental effort, then they may have a favourable attitude toward using the system.

When end users perceive the system as one that is helpful to their job, then they may have a positive attitude toward the system used.

When users have a favourable attitude toward the target system, they may use the system frequently and intensely, which means that the system developed is successful.

TAM has been widely applied to studies of technology use. TAM has been used to predict computer adoption with two key beliefs of perceived usefulness and perceived ease of use (Davis, Bagozzi, & Warshaw, 1989). Davis et al. (1989) state that the two beliefs dimensions of perceived ease of use and perceived usefulness can impact on intention to use a technology application. According to Pituch and Lee (2004), these belief constructs are central to TAM and are routinely included in technology acceptance studies.

Davis (1993) defined perceived usefulness as "the degree to which an individual believes that using a particular system would enhance his or her job performance" and perceived ease of use as "the degree to which an individual believes that using a particular system would be free of physical and mental effort" (p. 477).

Perceived ease of use also directly affects perceived usefulness, with both of the use beliefs affecting computer technology adoption. TAM also suggests that external factors may be important determinants of the usefulness constructs of TAM.

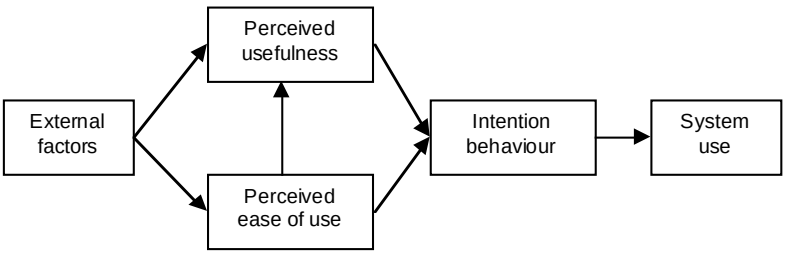

Figure 1: The technology acceptance (TAM) model

The external factors shown in Figure 1 consist of system characteristics and user characteristics and are discussed below.

SYSTEM CHARACTERISTICS

Since Davis et al. (1989) proposed TAM, system characteristics have been posited as directly affecting user beliefs and technology acceptance in various contexts (Ruth, 2000; Venkatesh & Davis, 1996). A variety of information technology system characteristics have been proposed and examined, of which three of importance are system functionality, system interactivity and system response (Kerka, 1999; Pallof & Pratt, 1999; Seels & Glasgow, 1998; Selim, 2003).

System functionality refers to the perceived ability of an e-learning system to provide flexible access to instructional and assessment media permitting students to access course content, turn in assignments, and complete tests and quizzes online. E-learning system also allows the user or the system to integrate various types of media (audio, video, and text) for instructional purposes (Seels & Glasgow, 1998).

An effective e-learning system must also provide interactivity. The keys to the success of e-learning process are the interactions among the students, the interactions between lecturers and students

and the collaborative learning resulting from the interactions (Pallof & Pratt, 1999). Most e-learning systems allow for interactions using e-mails and discussion rooms.

Furthermore, an e-learning system will not be considered as useful or easy to use if it has slow response time. Limited bandwidth and slow modem can hamper the delivery of sound, video and graphics and make the e-learning experience to be one that is frustrating for both students and lecturers (Kerka, 1999).

USER CHARACTERISTICS

Users' characteristics are another important set of external variables that should be considered for instructional technology to work effectively (Heinich, Molenda, Russell, & Smaldino, 1996). Learners perceive of the e-learning system differently due to individual attributes and these attributes may be related to technology usage. Some studies have shown that users' characteristics have an impact on intention to use technology (Davis et al., 1989). Kerka (1999) has reported that learner success in distance education setting has been found to depend on the ability to cope with technical difficulty, and technical skills in computer and Internet navigation.

One example of user characteristics is self-efficacy. Self-efficacy reflects one's beliefs about his or her ability to perform certain tasks successfully (Bandura, 1977). Specifically, computer self-efficacy, reflects one's beliefs about the ability to use computers effectively (Compeau & Higgins, 1995b). Past research has shown that self-efficacy may influence performance or behaviour (Compeau & Higgins, 1995a, Compeau, Higgins, & Huff, 1999), including behavioural intention (Tan & Teo, 2000; Venkatesh, 1999). Venkatesh and Davis (1996) also found that computer self-efficacy and perceived ease of use are related and that computer self-efficacy influences participation of adult learners in Web-based distance education.

Another user characteristic that may impact on e-learning is Internet experience. A learner's prior technical skills in using the Internet may affect e-learning use. Some studies have shown that prior computer experience has an influence on the intent to use a variety of technology applications including microcomputer (Igbaria, Guimaraes, & Davis, 1995), Internet banking services (Tan & Teo, 2000) and distance education (Kerka, 1999).

RESEARCH MODEL

This study investigated technology adoption among postgraduate students at a faculty in a Malaysian public university using the model shown in Figure 2. This model is based on TAM and has been empirically supported by some studies in computer-based instruction and distance learning (Agarwal & Prasad, 1999; Davis, 1993; Igbaria & Zinatelli, 1997). This model suggests that e-learning system's and user's characteristics as external factors can impact on beliefs construct of perceived usefulness and perceived ease of use. The system characteristics consist of system functionality, system interactivity and system response while the user attributes are made up of computer self-efficacy and Internet experience. Perceived ease of use and perceived usefulness are hypothesized to be mediating factors in the use of e-learning system for supplementary learning.

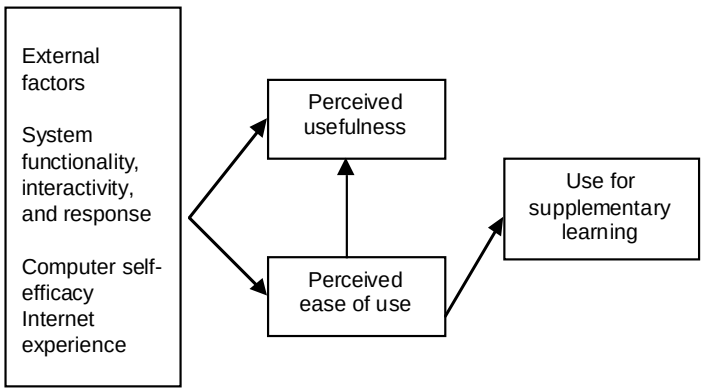

Figure 2: A model for e-learning use in this study

Accordingly, the research model in Figure 2 involves testing three sets of hypotheses. The general and specific hypotheses are as follows:

H1: Use of e-learning for supplementary learning is positively affected by the use belief, systems characteristics, and individual attributes

Specifically, the use for supplementary learning is positively influenced by perceived usefulness (H1a), perceived ease of use (H1b), system functionality (H1c), system interactivity (H1d), system response (H1e), self-efficacy (H1f), and Internet experience (H1g).

H2: Perceived usefulness is positively influenced by perceived ease of use, systems characteristics, and user attributes

Specifically, perceived usefulness is positively affected by perceived ease of use (H2a) the system factors of functionality (H2b), interactivity (H2c), and response (H2d), and the user characteristics of self-efficacy (H2e) and Internet experience (H2f).

H3: Perceived ease of use is positively influenced by system and individual characteristics

Specifically, perceived ease of use is positively and directly affected by the system characteristics of functionality (H3a), interactivity (H3b), and response (H3c), and the user characteristics of self-efficacy (H3d) and Internet experience (H3e).

METHODS

Participants in this study were 26 students who had completed a course on Cognition and Learning at the postgraduate level in a public university in Malaysia. There were 12 males and 14 females. All of them have first degrees in various fields of sciences, social sciences and humanities. Most of the participants worked during the day time and attended class during the evenings. The students took the course in the second semester of the 2004-2005 academic calendar. The students completed a questionnaire at the end of the course. The e-learning component of this course was carried out by the second author using the QuickPlace learning system and involved students discussing on six discussions over a period of 14 weeks.

The questionnaire consisted of four main sections. The first section was to determine the participants' perceptions of the e-learning system characteristics of system functionality (six items), system interactivity (three items), and system response (three items). The second section measured the participants' perceptions of users' characteristics of Internet experience (seven items) and computer self-efficacy (six items). The third section looked at the usefulness construct of perceived ease of use (six items) and perceived usefulness (six items). The last section measured the participants' use of the e-learning system as a supplementary course tool (two items). All the items in the questionnaire have four choices of

responses, "strongly agree", "agree", "disagree", and "strongly disagree".

The 39 items in this questionnaire was sourced from various research such as Bailey and Pearson (1983: System response), Chau (1996: Use for supplementary learning), Davis (1989: Perceived ease of use and Perceived usefulness), Gefen, Straub, & Boudreau (2000: Perceived ease of use and Perceived usefulness), Pituch and Lee (2004: System functionality and system interactivity), Tan and Teo (2000: Self-efficacy and Internet experience) and Venkatesh and Davis (1996: Use for supplementary learning).

Due to the small number of participants in this study it was not possible to conduct structural equation modelling techniques, which requires sample size of 100 to 200 (Gefen, Straub, & Boudreau, 2000). Therefore data were only analyzed using Pearson Moment Correlations.

RESULTS

Descriptive results

The reliability of the questionnaire measured based on the Cronbach _ ranged from 0.614 to 0.851. Table 1, shows the descriptive statistics and _ values for the eight sections of the questionnaire. In general, the reliability levels of the various sections of the questionnaire were acceptable. Furthermore, while students' perceptions varied, students generally had favourable perceptions of the e-learning system system's characteristics, had internet experience, were confident in using the system, expressed positive views of perceived ease of use and perceived usefulness of the system and intend to use the system for supplementary learning.

Table 1
Descriptive statistics for the questionnaires data

Construct	Mean	Standard deviation	α-value
System characteristics			
System functionality	3.359	0.336	0.614
System interactivity	3.295	0.552	0.798
System response	2.756	0.615	0.777
User characteristics			
Self-efficacy	3.006	0.446	0.772
Internet experience	3.137	0.463	0.789
Perceived ease of use	3.026	0.364	0.782
Perceived usefulness	3.109	0.422	0.851
Use for supplementary learning	3.231	0.474	0.651

Note: 1 = "strongly disagree", 2 = "disagree", 3 = "agree", and 4 = "strongly agree"

SYSTEM FUNCTIONALITY

The overall mean of response to system functionality was 3.359 with standard deviation of 0.336 (refer Table 2). Generally, the participants felt that the e-learning system was functional. In particular, they felt that learning system offers flexible learning environment, the course materials are well-organised and well-presented, and learners have control of his or her learning. However, the learning system at present was only used for sending in assignments and not for online assessment, possibly accounting for the lower rating for this aspect of the learning system.

Table 2
Responses to items on "system functionality"

Item	System functionality	SD	D	A	SA	Mean	Std Dev
1.	The Web-based learning system allows learner control over his or her learning activity	0 (0.0)	1 (3.8)	15 (57.7)	10 (38.5)	3.3462	0.5616
2.	The Web-based learning system offers flexibility in learning as to time and place	0 (0.0)	0 (0.0)	8 (30.8)	18 (69.2)	3.6923	0.4707
3.	The Web-based learning system offers multimedia (audio, video, and text) types of course content	0 (0.0)	1 (3.8)	15 (57.7)	10 (38.5)	3.3462	0.5616
4.	The Web-based learning system provides a means for taking tests and turning in assignments	1 (3.8)	4 (15.4)	15 (57.7)	6 (23.1)	3.0000	0.7483
5.	The Web-based learning system can present course material in a well-organized and readable format	0 (0.0)	0 (0.0)	15 (57.7)	11 (42.3)	3.4231	0.5038
6.	The Web-based learning system can clearly present course content	0 (0.0)	1 (3.8)	15 (57.7)	10 (38.5)	3.3462	0.5616

SYSTEM INTERACTIVITY

On the whole the e-learning system was interactive (mean=3.295, standard deviation = 0.552), providing for effective communication between students and lecturer and also among the students themselves (refer Table 3).

Table 3
Responses to items on "system interactivity"

Item	System interactivity	SD	D	A	SA	Mean	Std Dev
7.	The Web-based learning system enables interactive communication between instructor and students	0 (0.0)	4 (15.4)	9 (34.6)	13 (50.0)	3.3462	0.7452
8.	The Web-based learning system enables interactive communication among students	0 (0.0)	3 (11.5)	13 (50.0)	10 (38.5)	3.2692	0.6668
9.	The communi-cation tools in the Web-based learning system are effective (e-mail, discussion rooms etc)	0 (0.0)	1 (3.80)	17 (65.4)	8 (30.8)	3.2692	0.5335

SYSTEM RESPONSE

The system response was not highly rated by the participants (mean = 2.756, standard deviation = 0.615) as shown in Table 4. They generally perceived the response to be slow and the response time was inconsistent.

Table 4
Responses to items on "system response"

Item	System response	SD	D	A	SA	Mean	Std Dev
10.	When you are using the Web-based learning system, system response is fast	1 (3.8)	14 (53.8)	6 (23.1)	5 (19.2)	2.5769	0.8566
11.	In general, the response time of the Web-based learning system is consistent	0 (0.0)	10 (38.5)	11 (42.3)	5 (19.2)	2.8077	0.7494
12.	In general, the response time of the Web-based learning system is reasonable	0 (0.0)	6 (23.1)	17 (65.4)	3 (11.5)	2.8846	0.5883

COMPUTER SELF-EFFICACY

Table 5 shows that the participants perceived themselves to be generally confident in using the e-learning system (mean = 3.006, standard deviation = 0.446). They were confident of being able to use the e-learning system even if there were no one around to assist; if they have seen the ways their friends used the system. However, they do require an appropriate amount of time to complete the given task. They would require more than just online instruction in operating the system and a printed manual, initial face-to-face training and time to acquaint with the system would be useful.

Table 5
Responses to items on "computer self-efficacy"

Item	Computer self-efficacy	SD	D	A	SA	Mean	Std Dev
	I am confident of using the Web-based learning system:						
13.	even if there is no one around to show me how to do it	0 (0.0)	4 (15.4)	15 (57.7)	7 (26.9)	3.1154	0.6528
14.	even if I have only the online instruction for reference	0 (0.0)	7 (26.9)	13 (50.0)	6 (23.1)	2.9615	0.7200
15.	even if I have never used such a system before	0 (0.0)	8 (30.8)	14 (53.8)	4 (15.4)	2.8462	0.6748
16.	as long as I have just seen someone using it before trying it myself	0 (0.0)	4 (15.4)	16 (61.5)	6 (23.1)	3.0769	0.6276
17.	as long as I have a lot of time to complete the job for which the software is provided	0 (0.0)	3 (11.5)	19 (73.1)	4 (15.4)	3.0385	0.5277
18.	as long as someone shows me how to do it	1 (3.8)	3 (11.5)	17 (65.4)	5 (19.2)	3.0000	0.6928

INTERNET EXPERIENCE

The participants were generally able to use the Internet for various purposes with mean of 3.137 and standard deviation of 0.463 (refer Table 6). Most of them were frequent user of the Internet especially for gathering information and communicating.

Table 6
Responses to items on "Internet experience"

Item	Internet experience					Mean	Std Dev
Please indicate the extent to which you use the Internet to perform the following tasks:							
19.	Gather information	0 (0.0)	1 (3.8)	8 (30.8)	17 (65.4)	3.6154	0.5711
20.	Communicate (e.g., e-mail, chat)	0 (0.0)	1 (3.8)	12 (46.2)	13 (50.0)	3.4615	0.5818
21.	Download free software	1 (3.8)	7 (26.9)	12 (46.2)	6 (23.1)	2.8846	0.8162
22.	Watch video	0 (0.0)	13 (50.0)	6 (23.1)	7 (26.9)	2.7692	0.8629
23.	Listen to audio	0 (0.0)	9 (34.6)	8 (30.8)	9 (34.6)	3.0000	0.8485
24.	Span of Internet usage	0 (0.0)	3 (11.5)	17 (65.4)	6 (23.1)	3.1154	0.5883
25.	Frequency of Internet usage	0 (0.0)	2 (7.7)	19 (73.1)	5 (19.2)	3.1154	0.5159

PERCEIVED EASE OF USE

The e-learning was perceived to be easy to use. The mean for the six items was 3.026 with standard deviation of 0.364 (refer Table 7). The participants were able to master the system with time and have no major problems interacting with the system.

Table 7
Responses to items on "ease of use"

Item	Ease of use	SD	D	A	SA	Mean	Std Dev
26.	Learning to operate the Web-based learning system is easy for me	0 (0.0)	2 (7.7)	20 (76.9)	4 (15.4)	3.0769	0.4836
27.	I find it easy to get the Web-based learning system to do what I want it to do	0 (0.0)	5 (19.2)	17 (65.4)	4 (15.4)	2.9615	0.5987
28.	My interaction with Web-based learning system is clear and understandable	0 (0.0)	2 (7.7)	21 (80.8)	3 (11.5)	3.0385	0.4455
29.	I find the Web-based learning system to be flexible to interact with	0 (0.0)	3 (11.5)	20 (76.9)	3 (11.5)	3.0000	0.4899
30.	It is easy for me to become skilful at using the Web-based learning system	0 (0.0)	3 (11.5)	18 (69.2)	5 (19.2)	3.0769	0.5602
31.	I find the Web-based learning system easy to use	0 (0.0)	4 (15.4)	18 (69.2)	4 (15.4)	3.0000	0.5657

PERCEIVED USEFULNESS

The e-learning system was useful to the participants as shown in Table 8 (mean = 3.109, standard deviation = 0.422). The system helped them learn more productively and enabled them to complete the learning tasks faster.

Table 8
Responses to items on "usefulness"

Item	Usefulness	SD	D	A	SA	Mean	Std Dev
32.	Using the Web-based learning system will allow me to accomplish learning tasks more quickly	0 (0.0)	2 (7.7)	21 (80.8)	3 (11.5)	3.0385	0.4455
33.	Using the Web-based learning system will improve my learning performance	0 (0.0)	2 (7.7)	20 (76.9)	4 (15.4)	3.0769	0.4836
34.	Using the Web-based learning system will make it easier to learn the course content	0 (0.0)	4 (15.4)	16 (61.5)	6 (23.1)	3.0769	0.6276
35.	Using the Web-based learning system will increase my learning productivity	0 (0.0)	3 (11.5)	7 (61.5)	16 (26.9)	3.1538	0.6127

36.	Using the Web-based learning system will enhance my effectiveness in learning	0 (0.0)	3 (11.5)	18 (69.2)	5 (19.2)	3.0769	0.5602
37.	I find the Web-based learning system useful in my learning	0 (0.0)	2 (7.7)	16 (61.5)	8 (30.8)	3.2308	0.5870

USE FOR SUPPLEMENTARY LEARNING

In Table 9, the participants were reacted positively to the prospect of using the e-learning system (mean=3.231, standard deviation=0.474). They expressed a desire to use the system whenever possible to assist them learn in the course.

Table 9
Responses to items on "Use for supplementary learning"

		SD	D	A	SA	Mean	Std Dev
The web-based learning system as a supplementary course tool:							
38.	I will always try to use the Web-based learning system to do a learning task whenever it has a feature to help me perform it	0 (0.0)	0 (0.0)	19 (73.1)	7 (26.9)	3.2692	0.4523
39.	I will always try to use the Web-based learning system in as many cases/ occasions as possible	0 (0.0)	3 (11.5)	15 (57.7)	8 (30.8)	3.1923	0.6337

HYPOTHESIS TESTING RESULTS

H1: Use of e-learning for supplementary learning is positively affected by the use belief, systems characteristics, and individual attributes

The intention to use e-learning for supplementary learning was positively influenced by self-efficacy ($r = 0.529$, $p = 0.005$). However, the use of e-learning for supplementary learning was not related to perceived usefulness ($r = 0.389$, $p = 0.49$), perceived ease of use ($r = 0.019$, $p = 0.926$), system functionality ($r = 0.045$, $p = 0.827$), system interactivity ($r = 0.112$, $p = 0.587$), system response ($r = 0.269$, $p = 0.184$), and Internet experience ($r = 0.331$, $p = 0.098$).

H2: Perceived usefulness is positively influenced by perceived ease of use, systems characteristics, and user attributes

The participants perceived usefulness was positively related to perceived ease of use ($r = 0.509$, $p = 0.008$) and system factors of functionality ($r = 0.396$, $p = 0.045$), interactivity ($r = 0.391$, $p = 0.048$), and response ($r = 0.372$, $p = 0.049$). Perceived usefulness was also positively influenced by user characteristics of self-efficacy ($r = 0.451$, $p = 0.021$) but not by Internet experience ($r = -0.133$, $p = 0.516$).

H3: Perceived ease of use is positively influenced by system and individual characteristics

Perceived ease of use was not influenced by system factors of functionality ($r = 0.176$, $p = 0.389$), interactivity ($r = 0.348$, $p = 0.082$), and response ($r = 0.307$, $p = 0.127$) and user characteristic of Internet experience ($r = 0.086$, $p = 0.678$). However, perceived ease of use was positively influenced by the user characteristics of self-efficacy ($r = 0.704$, $p = <0.00$).

DISCUSSION

The reliability levels of the various sections of the questionnaire were acceptable. The students generally had favourable perceptions of the e-learning system system's characteristics, had Internet experience, were confident in using the system, expressed positive views of perceived ease of use and perceived usefulness of the system and intend to use the system for supplementary learning.

Only the users' characteristic of self-efficacy was found to be related to their intention to use e-learning for supplementary learning. This finding was contradictory to those reported by Igbaria et al. (1995), Jackson, Chow and Leitch (1997), Pituch and Lee (2004) and Selim (2003) that stressed on the importance of system characteristics in influencing e-learning use outcomes. For example, Pituch and Lee (2004) found that system interactivity, in particular but also system response and system functionality directly influenced the intention to use e-learning system.

Perceived usefulness of an e-learning system was related to the students' perceptions of ease of use and system characteristics. Therefore, to develop an e-learning system that is useful to the students, the system developers have to consider how to make the system easy for the user to handle and also issues of system functionality, interactivity and response rates. For example, students who perceived that the system had good response time and allowed for student-controlled learning also indicated that the system was useful. Furthermore, students who indicated that the system allowed for more effective interactions between students themselves and student and instructor also perceived that he system will help them learn better.

The findings on system characteristics suggest that developers, designers, and institutional purchasers of e-learning systems should carefully consider the heeds and values of system users and ensure that the systems effectively meets these demands. Compatibility

between system features and user requirements can enhance technology adoption for e-learning systems (Carswell & Venkatesh, 2002).

Thus although some literature suggest that the use of well-designed e-learning system does not depend on previous Internet experience or self-efficacy (Pituch & Lee, 2004), this study suggest otherwise. Although in this study, the Internet experience did not have an effect on perceived ease of use, the more general computer self-efficacy did have an impact on perceived ease of use and usefulness. Students who had better computer self-efficacy tend to find the e-learning system easier to use. Therefore, to maximize the benefits of e-learning system, educational institutions should demonstrate use of the technology and provide instructional material that would ease student learning of the technology (Pituch & Lee, 2004). Additionally, these institutions should describe how the technology will benefit students and help them learn the course content or achieve other learning goals. Students who perceived the system as being able to help them learn expressed a greater intent to use the system.

CONCLUSIONS

This study is exploratory in nature and future studies can incorporate the following suggestions for improvement. First, more postgraduate students from other faculties should be incorporated in future studies. Second, the study data were self-reported. Future studies should employ more direct measures. For example, instead of self-reported intent to use, a direct measure of their actual use of the system should be employed. Third, measures of system and user attributes should be further validate to ensure reliable and valid scores of these constructs. Fourth, with more participants and more valid and reliable measurement of the constructs more vigorous statistical analyses such as path analyses can be used to provide a better understanding on the implementation of effective system

characteristics to enhance the use and educational value of e-learning system (Gefen et al., 2000).

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