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The Acceptance of E-Learning Environment amongst Engineering Technology Students

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Abstract

The purpose of the study was to determine the engineering technology students' acceptance of e-learning environment as well as to explore the challenges in the implementation of e-learning environment from their perspectives. 80 engineering technology students from mechatronic, robotics and refrigeration departments of University of Kuala Lumpur Malaysia France Institute were selected to be the sample of the study. They were given questionnaire on acceptance of e-learning which comprised 41 items with eight sections that include demographics, ICT infrastructure availability and accessibility, information technology literacy, e-learning experiences, e-learning acceptance, course pedagogy, e-learning function and training necessities. The data was analyzed using descriptive statistics such as frequency and percentage. The findings revealed that there was no significant difference among the three departments in all components of the acceptance of e-learning. However, it is suggested that e-learning should be the alternative approach in teaching and learning among engineering technology students since face-to face remained as their preference.

Keywords: e-learning, students' acceptance, engineering technology.

1. Introduction

The implementation of electronic learning (e-learning) has been widely used among several tertiary institutions in Malaysia since 1998 (Syed Othman, 2002) including Universiti Tun Abdul Razak (UNITAR) as the pioneer of the program. The importance of e-learning in education has made greatest changes in the learning and teaching direction which also goes inline with the advancement in technology. O'Malley (1999) commented that e-learning has become the educational medium of the future that opens the society views on obtaining knowledge. E-learning is considered as a system which is supported by electronic hardware and software (Muhammad Rais & Yusup, 2004) and covers online learning, virtual learning, distributed learning, network and web-based learning (Naidu, 2006). The use of network information and communications technology can also be classified as e-learning.

The students' acceptance of e-learning can be defined as how the students demonstrate their readiness within the community in employing information technology for the given designed task (Dillon & Morris, 1996). E-learning consists of variety activities in teaching and learning that include the ability to learn by doing, receiving feedback, continually refine students'understanding and build knowledge when using educational technology (Brandsford et al. 1999). Nevertheless, the study on students' acceptance in the Malaysian context is not fully explored despite the fact that e-learning is increasingly used in the most Malaysian tertiary institutions (Bibiana Lim et al. 2008). It has become the justification of implementing this study among engineering technology students.

2. Factors Influencing the Implementation of E-Learning

Some factors which influence the implementation of e-learning are related to technical, human, system, and cultural factors are found to affect the acceptance of the e-learning as

well as the perception of the usefulness of e-learning (Jaflah & Sharifa, 2010). This is agreed by Bibiana Lim et al. (2008) who have listed similar factors specifically related to the acceptance of e-learning among students. As such, students' and teachers' characteristics, technology support (Poon et al., 2004), institutional support (Latifah & Ramli, 2005), curriculum management (Selim, 2005), and online forum discussion (McDonald, 2001).

Students' satisfaction with time, flexibility of the system, technology self-efficacy, motivation,

The importance of having good quality of technology support could also reflect on the students' acceptance of e-learning. The infrastructure must be well maintained and up-to-date in order to meet the users' expectation (Selim, 2005). A reliable system with minimal technical problem could create a better e-learning environment. To achieve the said standard of system, the institutions have to give support in providing better technology facilities including accreditation system, copyright system, human and technical support (Poon et al. 2004).

Another factor that is also vital to the curriculum management which gives a transition in the learning mode. The curriculum should be designed according to the requirement of the system which consist of a variety of support services for students (Selim, 2005).For instance, using online forum would create an interactive teaching and learning strategy. The opportunity of changing ideas would enable them to enhance the understanding in the subject matter as well as retaining longer knowledge information (Bibiana Lim, 2008).

3. E-Learning at Universiti Kuala Lumpur Malaysia France Institute (UniKL MFI)

At UniKL MFI, e-learning is called eLearningSpace@UniKL. It is a Learning Management System based on *Moodle* VLE, developed from a social constructivism perspective. The e-learning space can be accessed through the URL of http://elearn.mfi.edu.my . It provides range of functionalities to allow teaching and learning content creation and delivery, communication and collaboration and assessment. *Moodle* enables lecturers and instructors to enhance their face-to-face teaching and their students' learning by providing an online environment to distribute materials and encourage collaboration and interaction both within and outside the classroom. Some of the functions of eLearningSpace are downloadable teaching materials (notes, video etc), interacting activities (assignments, quizzes etc) and social activities (chat, forum etc).

UniKL MFI introduces e-learning to encourage a more flexible approach to learning and teaching. Students will have more controlled of the learning process as the can study at their own pace, anytime, anywhere. E-learning encourages students to be more active learners and the use of technology helps students to explore resources and construct their own meanings. As for lecturers, e-learning enables them to use multiple forms of media and caters it for a wider variety of learning styles and also to communicate with students.

involvement, cognitive engagement and their anxiety are considered affecting the acceptance of e-learning among them (Poon et al. 2004). On the other hand, teachers should play their role in making the e-learning a successful. Positive attitude towards e-learning and the willingness of sharing knowledge with students could promote highly interactions among students in using e-learning in their learning process (Bibiana Lim et al. 2008).

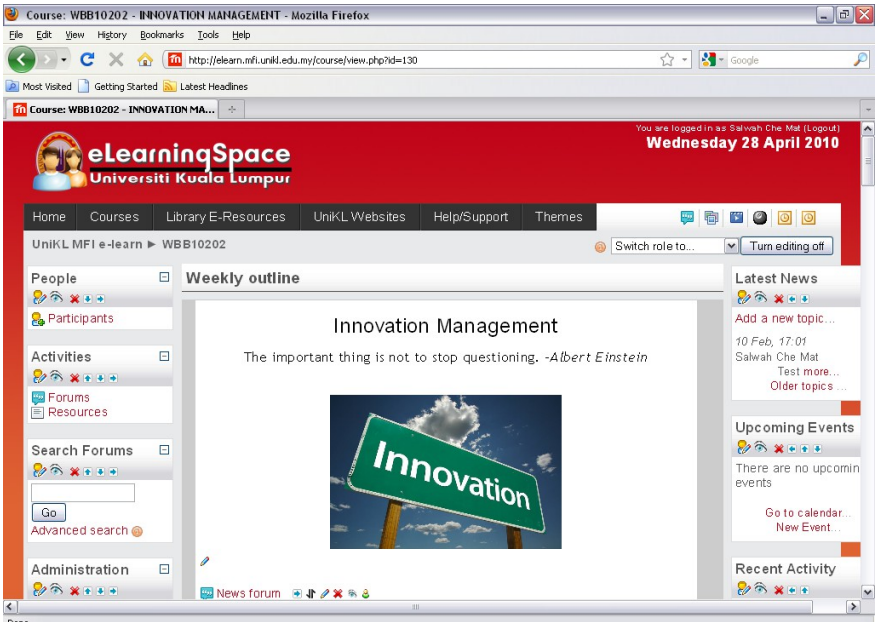

Fig. 1. The screenshot of *eLearningSpace@UniKL Interface*

4. Research Objectives

The research was conducted to achieve the following objectives:

a) To report the engineering technology students' feedback on ICT infrastructure and accessibility
b) To identify the engineering technology students' e-learning experience based on their understanding the definition of e-learning and e-learning history
c) To identify the acceptance of e-learning among engineering technology students
d) To identify the influence of course discipline on e-learning among engineering technology students

5. Methodology

A total of 80 engineering technology students from mechatronic, robotics and refrigeration departments of Universiti Kuala Lumpur Malaysia France Institute were selected to be the sample of the study with no preference to program, gender or academic year.

The questionnaires where adopted from Chow et al. (2007) research entitled "*Student Acceptance on e-Learning in UiTM Pulau Pinang*" The questionnaire comprises of 41 items with eight sections as shown in Table 1. The data were analyzed using descriptive statistics such as frequency and percentage.

Section 1 is classified to collect the respondents' profile on demographics factors namely gender, and program level. Questions in Sections 2 to 5 are identified as the factors affecting student acceptance on e-learning. Sections 6 to 8 are group collect data as means of providing recommendations on e-learning implementation to the university. This paper covers only the findings of Sections 1 to 6.

Table 1. *Number of questions and response categories according to sections in questionnaire*

Section	Description	Types of Response Category
1	To investigate gender, course discipline and program level of respondent	Nominal
2	To investigate ICT infrastructure availability and accessibility to respondents inside and outside campus	Ordinal: 4 Point Likert Scale
3	To investigate computer and internet literacy of respondent	Ordinal: 4 Point Likert Scale
4	To investigate the e-learning experiences of respondents	Nominal
5	To investigate the e-learning acceptance of respondents	Ordinal: 4 Point Likert Scale
6	To investigate the influence of course pedagogy on e-learning acceptance of respondents	Ordinal: 5 Point Likert Scale
7	To determine the e-learning functions desired by respondents	Ordinal: 4 Point Likert Scale
8	To determine the training necessity of respondents to increase e-learning acceptance	Ordinal: 4 Point Likert Scale

6. Results and discussion

6.1. Respondents' Profile

Table 2 presents the demographics of the respondents. There are a total of 80 respondents taking part in this survey. 76% of the respondents are male respondents while the rest were female respondents.

Table 2. Demographic of the respondents

Gender	Number of Respondents	Percentage of respondents
Male	61	76%
Female	18	24%
Total	80	100%

Table 4. The overall percentage of responses for computer literacy and internet literacy

Item	Never (%)	Sometimes (%)	Fairly Often (%)	Very Often (%)	Total (%)
Frequency of using computer	5.9%	39.4%	37.4%	17.3%	100.0%
Frequency of using internet	6.4%	31.7%	33.0%	28.9%	100.0%

6.2 ICT Infrastructure Availability and Accessibility

Table 3 presents the respondents' feedback on ICT infrastructure availability and accessibility inside and outside UniKL MFI. Feedbacks were obtained on accessibility of ICT infrastructure inside and outside UniKL MFI in terms of computer availability, internet availability and internet speed. More than half of the respondents agree that ICT infrastructure is accessible outside UniKL MFI but not inside UniKL MFI. 66% of respondents disagree with accessibility of internet inside UniKL MFI and 89% of respondents are not satisfied with internet speed inside UniKL MFI. Respondents are more satisfied with the internet speed outside UniKL MFI compared to inside UniKL MFI.

Table 3. Respondents' feedback on ICT infrastructure availability and accessibility inside and outside campus

Item	Disagree (%)	Agree (%)	Total (%)
Accessibility of computer inside UniKL MFI	66.0	34.0	100
Accessibility of internet inside UniKL MFI	73.0	27.0	100
Satisfactory internet speed inside UniKL MFI	89.0	11.0	100
Accessibility of computer outside UniKL MFI	44.0	56.0	100
Accessibility of internet outside UniKL MFI	31.0	69.0	100
Satisfactory internet speed	33.0	67.0	100

6.3 ICT Literacy

Table 4 presents the investigation on computer and internet literacy of respondents. In overall, all of the respondents know how to use the computer functions such as word processing, computer games, graphic/photo processing, technical software and programming. All of the respondents are familiar with the internet functions such as searching information online, online chatting, emailing, online banking and blogging. Thus, all of the respondents are considered computer and internet literate.

6.4 e-Learning Experience

The e-learning experiences of respondents are being studied under two aspects; namely respondents' understanding on the definition of e-learning, and the e-learning usage history of respondents.

(a) Understanding on the definition of e-learning

Three definitions of e-learning from difference sources were included in the questionnaire to assess the respondents' understanding of e-learning. Table 6 shows the percentage of responds on the three different definitions. In general, an overall of 51% of the respondents understands all three definitions. In terms of preference over the three e-learning definitions, it is observed that most respondents prefers definition 3 ("e-Learning" is learning using information and computer technology) followed by definition 1 ("e-Learning" is learning activities based on any electronic format) and lastly definition 2 ("e-Learning" refers to internet technologies used to deliver a broad array of solutions that enhance the instructional process).

(b) e-Learning usage history

Table 6 presents the percentage of responds on the various e-learning experiences. It is observed that most respondents have experiences in downloading lecture notes online (87%), followed by finding information online for coursework (86%), answering quiz online (49%), communicating with lecturer using e-mail or e-forum (35%) and lastly accessing digital library online (33%).

In general, there are more than half of the respondents (58%) who possess e-learning experiences. There are 33% of them who never perform either one of the e-learning functions stated in Table 6. This indicates that those with and without e-learning experiences are almost equally distributed among the respondents.

Table 5. Preference of respondent on e-learning definition

e-Learning Definition	Yes (%)	No (%)	Unsure (%)	Total (%)
Definition 1 (www.technology.com)	70.0	6.0	24.0	100
Definition 2 (Poon et al., 2004)	61.8	15.8	22.4	100
Definition 3 (Author's definition)	76.0	9.0	15.0	100

Table 6. The percentage of respondents possessing e-learning experiences

Item	Yes (%)	No (%)	Unsure (%)	Total (%)
To access digital library online	33.0	58.0	9.0	100
To find information online for coursework	86.0	8.0	6.0	100
To download lecture notes online	87.0	9.0	4.0	100
To communicate with lecturer using e-mail or e-forum	35.0	49.0	16.0	100
To answer quiz online	49.0	42.0	9.0	100
Overall e-learning experiences	*58*	*33*	*9*	*100*

6.5 e-Learning Acceptance

The e-learning acceptance of students is assessed based on preference over face-to-face teaching, group study after class, ability to understand written instruction, classroom discussion and acceptance on new technologies. Respondents with low e-learning acceptance prefer face-to-face learning, group study after class, assistance in understanding written instruction, classroom discussion and resistant to new technology. It was observed that the respondents have strong preference for face-to-face teaching (97.4%), group study after class (90.9%), prefer assistance in understanding written instruction (62.5%), classroom discussion (84.6%) and resistant to new technology (33.3%).

66.7% of respondents find learning new technologies exciting and challenging but still their preferences are on the conventional teaching and learning method.

Table 7. e-Learning acceptance of respondents

Item	Disagree (%)	Agree (%)	Total (%)
Prefer face-to-face teaching	2.6	97.4	100
Prefer group study after class	9.1	90.9	100
Prefer assistant in understanding written instruction	37.5	62.5	100
Prefer classroom discussion	15.4	84.6	100
Resistant to new technologies	66.7	33.3	100

6.6 *Course Pedagogy*

Table 8 illustrates the influence of course discipline on e-learning acceptance of respondents.

The number of respondents who prefer no online learning or 25% online learning is more than the number of respondents who prefer 75% online learning or fully online learning for each type of courses. However, there are around 12.7% to 27.4% of the respondents who prefer to have equally online learning and classroom learning.

The percentage of respondents choosing 75% or 100% online learning according to course discipline in descending sequence is humanity, business, language, mathematics, science and lastly engineering.

The influence of teaching pedagogy (lecture, tutorial and workshop) on e-learning preference, an overall percentage of responses is summarised in Table 9. The e-learning preference according to teaching pedagogy is lecture, tutorial and workshop.

Table 8. Overall influence of course discipline on e-learning preference

Item	0% online learning (%)	25% online learning (%)	50% online learning (%)	75% online learning (%)	100% online learning (%)	Total
Engineering	52.7%	19.8%	12.7%	10.1%	4.6%	100%
Mathematic	48.1%	21.2%	15.4%	8.3%	7.1%	100%
Business	19.7%	26.8%	27.4%	12.1%	14.0%	100%
Language	35.4%	25.3%	21.5%	8.9%	8.9%	100%
Humanity	26.9%	19.2%	23.1%	16.7%	14.1%	100%

Table 9. Influence of teaching pedagogy on e-learning preference

Item	0% online learning (%)	25% online learning (%)	50% online learning (%)	75% online learning (%)	100% online learning (%)	Total
Lecture	35.7%	21.9%	20.2%	11.7%	10.5%	100%
Tutorial	35.2%	25.0%	20.3%	11.4%	8.1%	100%
Workshop	72.2%	15.2%	6.3%	3.8%	2.5%	100%

Conclusion

A survey has been conducted to investigate the effects of ICT infrastructure availability and accessibility, ICT literacy, e-learning experiences and course pedagogy on student acceptance on e-learning in UniKL MFI.

The discussion on demographic factors including gender and program are not elaborated in detail since each category of the factors is not distributed evenly.

The findings of this study showed that all respondents are ICT and internet literate but the university has to improve the ICT infrastructure and accessibility. The university has to take action on upgrading the computer and the internet connection in the campus.

70% of the engineering technology students understand the definition of e-learning and have used one of more e-learning applications.

Even though the engineering technology students are ICT and internet literate their acceptance of e-learning is low. It was found that they prefer conventional methods of teaching and learning compare to e-learning. Higher e-learning acceptance might be achieved with proper e-learning training and implementation schemes such as conducting awareness campaign and expose the students on the benefits of using e-learning. Lecturer should encourage the students to participate in forums, quizzes and discussions that are specifically created to increase interaction and out-of-the-box thinking.

On the other hand, the lecturers and institutes must first discover the methods of integrating e-learning with current teaching methods. Lecturers could illustrate their teaching creativity in virtual ways that are not achievable through conventional face-to-face lectures and make teaching and learning fun.

The course pedagogy on e-learning among engineering technology students based on the highest preferences to the lowest are humanity, business, language, mathematics, science and engineering. The students prefer the lecture to be conducted using e-learning, followed by tutorial and the least preference is workshop. According to Gudimetla et al. (2006), e-learning in engineering

in many aspects can be devoid of any inherent value if the instructional material is not adequately designed to facilitate learning at all levels. Teaching highly technical subjects using the common e-learning tools is a challenging task. The general rules that may apply to the arts and social sciences fail miserably in engineering.

The findings concluded that the e-learning can function as a channel of continuous interactions between lectures and students if necessary action is taken to create the students' awareness and acceptance.

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