New Learners' Experiences in Using e-Learning Technology in the Open University Malaysia

Latifah Abdol Latif
Open University Malaysia ◆ Malaysia ◆ latifah@oum.edu.my

Ramli Bahroom
Open University Malaysia ◆ Malaysia ◆ ramli@oum.edu.my

Ng Man San
mslymy@oum.edu.my

ABSTRACT

As an attempt to reduce the high attrition rate among its new students, Open University Malaysia (OUM) has been encouraging learners to use e-learning technology and digital learning materials for their studies and interaction with the university's academic staff. This paper reports the findings of a study that examined new learners' experiences at OUM in using e-learning technology and digital learning materials. The study was based on 438 usable questionnaires completed by a random sample of new learners. The constructs used include perceived usefulness, perceived ease of use, computer self-efficacy and anxiety. The study found that new learners at OUM were generally receptive towards e-learning technology and digital learning materials. Usage of mobile devices for downloading study materials such as HTML modules, i-Lectures and i-Radio learning segments ranged from high for laptops and mobile phones to moderate for MP3 and MP4 players to low for tablet computers. There is no significant difference in e-learning technology usage between older and younger cohorts. An interesting finding of the study was that perceived usefulness was the only significant factor influencing the use of technology while other factors including attitude were not. Finally, the study found that there are significant barriers to e-learning usage, principal among them are technology and academic support, time, and accessibility.

INTRODUCTION

Most universities are adopting e-learning for the realization of a 'learning society' and the development of innovative human resources for a 'knowledge society'. This is because e- learning renders learning activities more effective and efficient by taking away the constraints of time and location. Additionally, e-learning provides convenient and speedy access to learning content, tools and related infrastructure and it opens up new possibilities for combining learning with other personal and life activities in ways which are adapted to the needs and preferences of the learners. Such features of e-learning are believed to be the solution to one of the key challenges posed by a 'knowledge society', that is how to engage the population in lifelong learning.

Open University Malaysia (OUM) is no exception to adopting e-learning, more so when it is an open and distance learning institution which carries a mission of democratizing education and upholding the motto 'University for All'. In order to maintain its enrolment growth and to sustain its efforts to become the best ODL institution, OUM has made e-learning as one of its strategic thrusts. Thus, OUM has been increasingly conscious of its investment in e-learning. It is always looking for clear evidence of the value that e-learning brings to learners, staff and the institution. It is also emphasising on the importance of e-learning to deliver quality experiences for learners and staff while at the same time to meet its social and governmental obligations.

OUM has invested in a number of e-learning and digital learning materials for learners to use and to engage with their lecturers for effective learning. These include Learning management system, known as myVLE, CD-ROMs with multimedia content, HTML modules, i-Lectures and i-Radio learning segments (Abdullah Sanusi A, 2001; Latifah A.L & Ramli B., 2003; Latifah A.L et al. 2006). With so much priority and significance placed on e-learning technology and digital learning materials, it is essential for the university to monitor how learners are accepting and using them in their studies. This paper reports the findings of a study that examined new learners' experiences in using these e-learning technology and digital learning materials at OUM.

Objectives of Research

The objectives of this research are to obtain an empirical-based understanding of:

(a) Learners' perceptions towards e-learning materials and technology, learners' actual usage of e-learning materials and technology, learners' feedback on the barriers, challenges and prospects of improving e-learning; and

(b) The relationship between learners' perceptions and actual usage of e-learning materials and technology.

The findings would provide useful insights and guidelines in the formulation of new strategies to enhance the effectiveness of e-learning in an ODL environment.

Scope of Study

The study was confined to new learners enrolled in a compulsory university course at Open University Malaysia (OUM), i.e. "Learning Skills for Open and Distance Learners". The e-learning materials and technology used in the course include LMS, HTML modules, iRadio, iLectures, and online discussion.

Literature Review

E-Learning

E-learning was introduced to OUM since its inception in 2000. During the early years, the focus was more directed towards developing the learning management system and e-learning materials to complement the print modules, as support for self-managed learning. Due to the limited bandwidth, CD-ROMs were developed to include some multimedia content into the courses. To add the interactivity and currency in content, WebCT was used then as the platform for e- learning (Abdullah Sanusi, A, 2001; Latifah A.L. & Ramli, B., 2003). Initially, participation in e-learning was encouraged by allocating 5% marks to the final grade of a course when learners engaged themselves in the discussion groups facilitated by course tutors. In order to integrate e-learning with its campus management system, WebCT was changed to myLMS, OUM's own home-grown e-learning platform. In the early stage, the use of the new myLMS was specifically aimed at achieving short-term goals of obtaining good coursework and examination grades by capitalizing on the online discussion forum and course content (Latifah, A.L., et al. 2006). In 2008, a comparative study on the ability, experience and perception of use of ICT in education between OUM and European learners was carried out, and the results revealed that the OUM learners fared better in terms of the use of ICT but lower in terms of ability. Both are equally positive towards the use of ICT. However, OUM learners showed a higher preference for face-to-face and teacher-led learning (Latifah, A.L. et al. 2008). The impact of learners' skills, usage and perception of ICT on e-learning was later looked into and it was revealed that in order to increase the use of e-learning, learners' perception and skills of ICT need to be improved (Latifah, A.L., et. al. 2009). Since then numerous initiatives were introduced to close the existing gaps, resulting in the present status of e-learning in OUM.

Theoretical Models

Various models have been developed to measure and explain the acceptance and usage of technology. One of the most widely accepted measurement tools is the Technology Acceptance Model or TAM (Davies, 1989). TAM originates from the theory of reasoned action, TRA (Fishbein & Ajzen, 1975). TRA proposes that belief affects attitude, which influences intention; while intention in turn brings about change in behaviour. TAM adapts this belief-attitude-intention-behaviour relationship and further postulates that two beliefs (perceived ease of use and perceived usefulness) are key in determining user acceptance of ICT. Perceived ease of use is supposed to influence perceived usefulness, which has a direct effect on both attitude and intention. In TAM, two items were used to measure usage of e- learning. The first refers to the frequency of use and the second refers to the number of hours learners spend on e-learning (Davies, 1993). Compeau, Higgins and Huff (1999) developed a model based on Bandura's Social Cognitive Theory (as cited in Gardner & Amoroso, 2004) to study the influences of self-efficacy, performance and personal outcome expectations, effect and

anxiety on computer usage. They found that self-efficacy explained 18% of the variance in an individual's usage. A relationship between personal outcome expectations and use was not supported. However, Venkatesh, et al. (2003) found that self-efficacy and anxiety do not directly influence behavioural intention and suggested that these variables may be antecedents for one of the independent variables in their Unified Theory of Acceptance and Use of Technology (UTAUT).

Methodology

Research Model and Hypothesis

In light of the above literature review, an integrated research model adopted from three theoretical models: the TAM model (1989), the model by Compeau, Higgins and Huff (1999) (referred to in this study as CHH model), and the UTAUT model (2003) was used in this study. The proposed model is as shown in Figure 1.

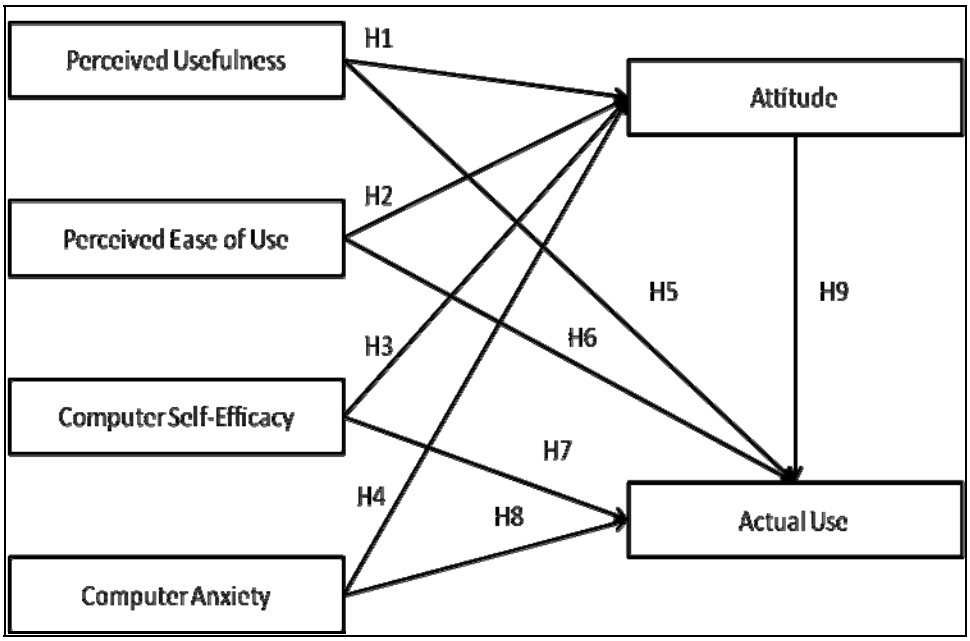
Based on the model, a total of nine (9) null hypotheses were formulated as follows:

H1: Perceived usefulness has no impact on attitude towards e-learning materials and technology

H2: Perceived ease of use has no impact on attitude towards e-learning materials and technology

H3: Computer self-efficacy has no impact on attitude towards e-learning materials and technology

Figure 1: The Integrated Model of TAM, CHH and UTAUT



H4: Computer anxiety has no impact on attitude towards e-learning materials and technology

H5: Perceived usefulness has no impact on actual use of e-learning materials and technology

H6: Perceived ease of use has no impact on actual use of e-learning materials and technology

H7: Computer self-efficacy has no impact on actual use of e-learning materials and technology

H8: Computer anxiety has no impact on actual use of e-learning materials and technology

H9: Attitude has no impact on actual use of e-learning materials and technology

Sample Size

The sample size determined for the study was 600 new OUM learners out of the total population of 1,839 new learners who are taking the course, "Learning Skills for Open and Distance Learners" in May Semester of 2011.

Questionnaire and Data Collection

The research instrument incorporates five constructs. The first three constructs, i.e. perceived usefulness, perceived ease of use and attitude, were adapted from the TAM, while the fourth and fifth constructs, i.e. computer self-efficacy and computer anxiety, were adapted from the CHH and UTAUT models.

The questionnaire for the study was designed to collect the following categories of data: (a) demographic and other socioeconomic data such as age, sex, race, degree programmes; (b) five constructs given in Table 1; (c) usage of e-learning technology; and (d) issues related to e-learning materials and technology.

For measuring the five constructs for e-learning technology, learners were asked to provide responses to 15 statements based on a five-point Likert scale, i.e. 1 (Strongly Disagree); 2 (Slightly Disagree), 3 (Neutral), 4 (Slightly Agree) and 5 (Strongly Agree).

Table 1: Five Constructs of the Integrated Model

No.	Construct	Statements/Items
I	Attitude towards e-learning technology	1. Using e-learning technology is a good idea. 2. Using e-learning technology is beneficial for learning. 3. Using e-learning technology is innovative for learning.
II	Perceived usefulness towards e-learning technology	1. Using e-learning technology has improved my learning performance. 2. Using e-learning technology has added value to my study. 3. Using e-learning technology makes my learning more engaging.
III	Perceived ease of use towards e-learning technology	1. E-learning Technology is easy to learn. 2. E-learning Technology is easy to master. 3. E-learning Technology is easy to use.
IV	Computer self-efficacy	1. I use the computer for data analysis. 2. I use the computer for preparing reports. 3. I use the computer for searching information.
V	Computer anxiety	1. I hesitate when using technology because I am afraid I will make mistakes. 2. I avoid using unfamiliar technology. 3. I am afraid I will break or damage the technology device that I am using.

The questionnaire was uploaded online and the 600 selected respondents were contacted via e-mail and given a link to access and complete the said questionnaire. The entire operation of online data collection was carried out during the months of May to June, 2011. Learners were given a description of the e-learning materials and technology that were used for the "Learning Skills for Open and Distance Learners" module, as shown in Table 2.

Out of the 600 selected respondents, 500 learners responded of which 438 completed questionnaires were usable, thereby giving an effective response rate of 73%. The respondents were full-time employees either in the private or public sector from all the 13 states in the country. The mean age of the respondents was 32.7 years. The "19-29" age group formed 40.2% of the sample, with the two remaining age groups of "30-39" and "over 40" representing 40.9% and 18.9%, respectively. Female respondents represented 53.4% of the sample; slightly outnumbering their male counterparts. The undergraduate degree programmes taken up by the respondents were in the fields of nursing, business, education, social sciences and science and technology.

Table 2: Descriptions of E-Learning Materials and Technology

E-Learning Materials	E-Learning Technology
HTML Modules	my VLE
i-Radio learning segments	i-Radio (Internet radio station)
i-Lectures	CD-ROM
Online forum discussions	myVLE
Text messages	Mobile learning (mobile phone)

Results

Reliability and Validity of Instrument

As noted earlier, the five constructs chosen for this study were perceived usefulness, perceived ease of use, attitude, computer anxiety, and computer self-efficacy. Before deciding to use these constructs for analysis, the item ratings for the computer anxiety construct were also reversed in order to be in consistent order with the other four constructs. Next, the items representing all the five constructs were evaluated. This was done by examining their item-to-total correlations as suggested in Blaikie (2003). It was found that these correlations for all items exceeded the value of 0.8, which were above the recommended minimum level of 0.4. All the items were retained and further reliability test was carried out. The data was then factor analysed using both exploratory and confirmatory analyses. The factor analysis revealed that the Cronbach's Alpha values were in the region of 0.885 to .952 for the five constructs, which exceeded the minimum value of 0.7 as recommended in Nunnally (1988). Based on these test results, the five constructs were considered reliable.

The next test was to evaluate whether the measurement model for the five constructs provided a good fit to the actual data used. A total of five indices were used for the evaluation. The results as reported in Table 3 show reasonably goodness-of-fit indices ($\chi 2/df$= 2.29, NFI= .973, CFI = .985 and PCFI=.760, all of which exceeded the minimum recommended thresholds (Hair, et al., 2006); the value of RMSEA =.054 was less than the maximum allowed. These test results demonstrated that the measurement model and the instrument were acceptable for this study.

Table 3: Goodness of Fit Indices (n=438)

Indices	Observed Values	Desired Range
Chi-square/df (X^2/df)	2.290	Less than 3.0
Normal fit index (NFI)	0.973	> 0.90
Comparative fit index (CFI)	0.985	> 0.90
Parsimony Comparatives-of-fit Index (PCFI)	0.760	> 0.50
Root Mean Square Error of approximation (RMSEA)	0.054	< 0.07

The research instrument was also evaluated from the perspectives of two criteria namely (a) convergent validity; and (b) discriminant validity. Convergent validity refers to the degree to which two measures of constructs that theoretically should be related,

are in fact related. To establish convergent validity, it was necessary to evaluate whether or not the item loadings on their respective five constructs exceeded the value of 0.5 (Hair, et al., 2006). To meet this goal, the instrument was subjected to confirmatory factor analysis (CFA) using the AMOS version 16.0 software to produce the factor loadings. It was found that the factor loadings as indicated by the standardised coefficients ranged from 0.787 to 0.969, thus suggesting convergent validity for the measurement instrument. The instrument was also evaluated for discriminant validity. Discriminant validity refers to the extent to which a construct is distinct from the other constructs. To establish discriminant validity, the average variance extracted (AVE) for a construct should exceed the shared variance (or square of the correlations) between two constructs (Fornell & Larcker, 1981). As indicated in Table 4, this condition was met and therefore discriminant validity for the research instrument was established.

Table 4: Average Variance Extracted (AVEs) for Discriminant Validity Analysis (N=438)

Construct	Shared Variances	AVE
Attitude	0.026 - 0.790	0.912
Perceived usefulness	0.001 - 0.790	0.909
Perceived ease of use	0.038 - 0.529	0.902
Computer anxiety	0.009 - 0.042	0.845
Computer self-efficacy	0.042 - 0.303	0.818

Perception towards e-Learning Materials and Technology

The mean ratings for perceived ease of use, perceived usefulness, attitude, computer anxiety and computer self-efficacy for both e-learning materials and technology were computed. As shown in Table 5, the mean ratings for perceived ease of use and perceived usefulness of e-learning technology together with perceived usefulness of e-learning materials were moderately high at about 3.7-3.9 points on the five-point Likert scale; the ratings for computer self-efficacy and attitudes were higher with values between 4.1 and 4.2 points. The reported computer anxiety was 2.6 points, which was considered low. This finding is consistent with the high computer self-efficacy noted earlier. The first six indices suggest that learners had a positive perception towards e-learning. As computer anxiety was low, learners' positive perceptions towards e-learning were not affected by this construct.

A comparative analysis of the mean ratings for e-learning technology was carried out to gauge the perception levels across age groups. For this purpose, learners in the sample were classified into three broad categories, i.e. the "19-29", "29-39" and "40+" age groups. An ANOVA was carried out to assess whether or not there were significant differences in the perception levels among the two older groups against the youngest group.

Table 5: Mean Ratings of Constructs

Construct	Mean	Std. deviation
Computer self-efficacy of e-learning technology	4.2	0.789
Attitude towards use of e-learning materials	4.1	0.859
Attitude towards use of e-learning technology	4.1	0.853
Perceived usefulness of e-learning materials	3.9	0.878
Perceived usefulness of e-learning technology	3.9	0.846
Perceived ease of use of e-learning technology	3.7	0.865
Computer anxiety	2.6	1.116

As shown in Table 6, the mean ratings were significantly different for attitude and computer self-efficacy for both the two older groups against the younger 19-29 age group. For the perceived usefulness construct, the difference was only significant for the 40+ group. However, there was no significant difference between the older 40+ and the younger 19-29 group for perceived ease of use for e-learning technology. A detailed inspection of the figures revealed an interesting result. With the exception of perceived ease of use, the mean ratings for the older learners were in fact higher than the younger 19-29 cohort, suggesting that this group of learners perceived technology more favourably for e-learning. For computer anxiety, there was no significant difference in the mean rating between the older and the younger age groups.

Table 6: ANOVA Results of Mean Ratings for E-Learning Technology by Age Groups

Constructs (for e-learning)	Age group (I)	Age group (J)	Mean difference (I-J)	P-value
Attitude	19-29	30-39 40+	-.202 -.486	.050 (s) .000 (s)
Perceived usefulness	19-29	30-39 40+	-.158 -.364	.230 (ns) .004 (s)
Perceived ease of use	19-29	30-39 40+	-.009 -.189	1.000 (ns) .302 (ns)
Computer self-efficacy	19-29	30-39 40+	-.234 -.417	.014 (s) .000 (s)
Computer anxiety	19-29	30-39 40+	+.011 -.124	1.000 (ns) 1.000 (ns)

Another analysis using ANOVA was performed to determine whether or not there were significant differences in the usage of e-learning technology between the younger and older age groups of learners. As is evident in Table 7, time spent on the HTML module by the two older groups of learners was not significantly different from that of the youngest group. A similar usage pattern was also apparent for the other three remaining technologies, i.e. i-Radio, i-Lectures and online discussion forum. These results suggest

that older learners are just as likely to spend time using e-learning technology as their younger counterparts.

Table 7: ANOVA Results on Usage of E-Learning Technologies

Types of e-learning technologies	Age group (I)	Age group (J)	Mean difference (I-J)	P-value
HTML module	19-29	30-39 40+	-.739 +.283	.093 (ns) 1.000 (ns)
i-Radio	19-29	30-39 40+	+.261 +.178	.721 (ns) 1.000 (ns)
i-Lectures	19-29	30-39 40+	+.241 +.664	1.000 (ns) .166 (ns)
Online discussion forum	19-29	30-39 40+	-.704 +.108	.088 (ns) 1.000 (ns)

Usage of e-Learning Materials and Technology

As indicated in Table 8, the study found that a learner spent a total of 10.7 hours a week using e-learning for the "Learning Skills for Open and Distance Learners" course. This finding augurs well with the OUM's intention to offer online courses in the near future. The usage was primarily focused on the HTML module (35.5%), online discussion forum (30.8%), followed by i-Lectures (20.6%) and i-Radio learning segments (13.1%).

Table 8: Usage of E-Learning

Types of e-learning materials	% (hours per week)
HTML module	35.5% (3.8 hours)
Online discussion forum	30.8% (3.3 hours)
i-Lectures	20.6% (2.2 hours)
i-Radio learning segments	13.1% (1.4 hours)
Total for all types	100.0% (10.7 hours)

While it is noteworthy that, on average, a learner spent 10.7 hours using e-learning in a week, a fair proportion of the learners spent much less time on it. Table 9 shows that between 25.1% (one in four) and 39.7% (two in five) of the respondents did not use the i-Lectures and i-Radio learning segments. While the non-usage of the HTML module and online discussion forum was considerably less, the proportion of this group of learners is still substantially large at about 7%. The under-utilisation of e-learning is also revealed by the high proportions (i.e. 13.5% - 31.1%) of learners who used these technologies for only one to two hours a week.

Table 9: Usage of E-Learning Materials and Technology (%)

Usage (hours)	HTML module	Online forum	I-Lectures	i-Radio
	%			
0	6.6	6.2	25.1	39.7
1	20.5	29.0	30.1	31.1
2	20.5	22.4	19.2	13.5
3	13.0	11.4	7.3	5.3
4+	39.4	31.0	18.3	10.4
Total	100.0	100.0	100.0	100.0

Ownership and Usage of Mobile Devices

In an effort to bring e-learning towards ubiquitous learning, it is not adequate for the institution to merely develop and provide an e-learning system for the learners. Learners must also equip themselves with devices that can be used for e-learning. It is therefore essential for learners to have mobile devices such as laptop, mobile telephones, MP3 or MP4 players that can utilise the e-learning materials and technology that are accessible through the Internet via myVLE. Viewed in this context, ownership of mobile devices amongst OUM learners is notably high, with rates of 95.4 % for mobile telephones, 90.9% for laptop computers, 36.3% for MP3 players and 13.7% for MP4 players (Table 10). Tablet computers, still a relatively novel device, were owned by only 8.2% of the learners. These figures strongly suggest that there is a great potential for diffusing e-learning among all learners via the use of mobile devices, in particular mobile telephones and laptop computers.

Table 10: Ownership of Devices

Devices	Ownership (%)
Mobile telephone	95.4
Laptop	90.9
Desktop	56.8
MP3 player	36.3
MP4 player	13.7
Tablet computer (e.g. i-Pad)	8.2

Usage of Devices

The future for acculturating lifelong learning via e-learning among learners appears bright provided that attention is given to several key requisites, i.e. learners themselves take advantage of the e-learning materials and technology provided by OUM; and OUM takes the necessary steps to enhance and improve its e-learning system so that it is conducive to them. As a measurement indicator, learners in this study were asked whether or not they downloaded the i-Lectures and i-Radio learning segments. The study found that the

majority of learners had downloaded the materials into laptop computers, i.e. at 55.5% for iRadio learning segments and 61.2% for i-Lectures, respectively (Table 11). Downloads into desktop computers were less popular, with corresponding figures falling between 34.5% and 36.3% for i-Radio learning segments and i-Lectures, respectively. These figures demonstrate that a large number of learners did make use of e-learning for their learning purposes.

Table 11: Usage of Devices

Devices	Download i-Radio learning segment (%)	Download i-Lectures (%)
Mobile telephone	15.8	-
Laptop	55.5	61.2
Desktop	34.5	36.3
MP3 player	11.9	-
MP4 player	6.6	-
Tablet computer (e.g. i-Pad)	-	6.8

Factors Affecting Attitude towards and Usage of e-Learning

The next step was to identify the factors that have an impact on the attitude towards and usage of e-learning technology. A multiple regression analysis (Table 12) found four factors (perceived usefulness, perceived ease of use, computer self- efficacy and computer anxiety) had positive and significant impacts on attitude towards e-learning (with an R-square of 74.4% and p-values < .05).

Table 12: Factors Affecting Attitude towards E-Learning (n=438)

Variable	Unstandardised Beta Coefficient	Standardised Beta Coefficient	p-value
Constant	.519		.000
Perceived usefulness (H1)	.681	.689	.000
Perceived ease of use (H2)	.123	.116	.000
Computer self-efficacy (H3)	.128	.133	.000
Computer anxiety (H4)	-.038	-.051	.041

Dependent variable = Attitude; R-squared = 74.4%

In another regression analysis, it was found that only perceived usefulness had a significant impact on usage of e-learning technology, but with a very low R-square of 6%, implying that attitude is not a significant factor in affecting the usage of e-learning. This finding was in line with an earlier study carried out by Latifah, et al. (2008) but was not consistent with the TAM theory.

In summary, the results of the hypotheses testing are as follows:

H1: Perceived usefulness has an impact on attitude towards e-learning materials and technology

H2: Perceived ease of use has an impact on attitude towards e-learning materials and technology

H3: Computer self-efficacy has an impact on attitude towards e-learning materials and technology

H4: Computer anxiety has an impact on attitude towards e-learning materials and technology

H5: Perceived usefulness has an impact on actual use of e-learning materials and technology

H6: Perceived ease of use has no impact on actual use of e-learning materials and technology

H7: Computer self-efficacy has no impact on actual use of e-learning materials and technology

H8: Computer anxiety has no impact on actual use of e-learning materials and technology

H9: Attitude has no impact on actual use of e-learning materials and technology

Barriers and Challenges to e-Learning

Despite the various institutional efforts that have been initiated towards an effective e-learning system, learners still face many challenges. A Seriousness Index (SI) was developed to measure the extent of the seriousness of the barriers to using e-learning, measured on 1-5 scale, ranging from 1: Not Serious to 5: Most Serious. As can be observed in Table 13, the mean SI values of the top 5 barriers ranged from 3.43 to 3.54, thus signalling the need to reduce or eliminate the impact of these barriers.

Table 13: Seriousness Index (SI) for Barriers to Using E-Learning

Barrier/Issue	Mean rating
Technology and academic support	3.54
Time and effort required	3.50
Interface, navigation and platform	3.48
Awareness of availability of learning materials	3.47
Costs involved for devices and Internet access	3.43

DISCUSSION

It is gratifying to note that new OUM learners are generally receptive towards e-learning technology and digital learning materials. This is seen by their low anxiety and positive perceptions for perceived usefulness and ease of use, computer self-efficacy and attitude towards e-learning. Learners also reported a reasonably high usage of laptops, and mobile phones, and a moderate usage of other devices like MP3, MP4 players and tablet computers, for downloading study materials such as HTML modules, iLectures and iRadio learning segments.

In addition, the study found that there was no significant difference in e-learning technology usage between older and younger cohorts of learners, a finding that is not quite in line with others reported in the literature (Czaja & Sharit, 1998; Wagner, Hassanein & Head, 2010). Overall, all these findings reflect, to a certain extent, the university's success in addressing issues commonly associated with e-learning and lifelong learning in an ODL environment.

With regards to use of e-learning technology, the regression analysis found that perceived usefulness was the only significant factor, and that the other factors including attitude were not significant. These findings strongly suggest the importance of ensuring the usefulness of e-learning technology in order to achieve acceptable take up rate. This requires a thorough review of the relevancy and usefulness of the e-learning materials and technology to ensure the effectiveness of e-learning.

The non-significant factors such as attitude in influencing e-learning technology usage suggest that learners in an ODL environment are receptive to using any e-learning tool that is presented to them as long as it is deemed useful for their learning. This perhaps stems from the likelihood that most ODL learners acknowledge the importance of e-learning technology in achieving educational success, irrespective of their attitude and perceptions towards it.

With regards to e-learning barriers, OUM will have to put in greater efforts in making e-learning easy to use and ensuring that it improves learning. It is quite common for learners to give up e-learning due to lack of technology support. Technology factors include competency in the use of the tools of the course, such as online discussion, file uploads and downloads; collaboration tools as well as online library databases. Access must be kept simple, all interfaces should be kept intuitive, and in case of problems, it should be easy for learners to access support.

Another critical factor in e-learning success is time management. Learners need to create a study environment, understand their individual learning styles, and balance personal obligations with the demands of the course.

CONCLUSION

In conclusion, the study found that new OUM learners are generally receptive towards e-learning technology and digital learning materials. Usage of mobile devices for downloading study materials such as HTML modules, i-Lectures and i-Radio learning segments ranges from high for laptops and mobile phones to moderate for MP3 and MP4 players to low for tablet computers. There is no significant difference in e-learning technology usage between older and younger cohorts of learners. An interesting finding of

the study is that perceived usefulness is the only significant factor in influencing the use of technology while other factors including attitude are not. The study found that there are significant barriers to e-learning usage, principal among them are technology and academic support, time, and accessibility.

The implications of the above findings can be summarised as follows: They augur well for the use of technology in reducing the high attrition rates of new learners at OUM. There is also a high potential for the use of mobile devices for e-learning. The well-documented digital technology gap between "digital natives" (younger learners) and "digital migrants" (older learners) does not exist among new OUM learners. This homogeneity in the level of usage will make it relatively easier for OUM to implement its e-learning strategies for these learners. OUM needs to further enhance the usefulness and relevancy of its e-learning materials and technology to further enhance their usage. A plethora of digital materials have been developed to assist learners in their learning, however, these materials need to be pushed to learners as some of them, are not aware of the availability of such materials. Initiatives such as 'pushing' digital materials which include i-lectures, worked examples and many others via the use of QR codes and mobile phones have been implemented for some selected courses; especially those that are labelled as high risk courses, i.e. where the failure rates are generally higher compared to other courses. The latest and probably the most important initiative is the "Instant Feedback System" known as iFEED project which is currently in progress. iFEED is a sit-in database system that helps push instant formal feedback to learner's academic query when learning subjects that are equipped with iFEED features. The primary aim of iFEED is to provide timely and concrete formal feedback to learners so as to maximize their learning experience and create the feeling of success. It is extremely important for new learners to go through a positive e-learning experience right from the first day; it will shape the whole of the learners' journey until graduation.

In moving forward, OUM's will soon venture into the use of open educational resources (OER), whereby academics will browse through the existing OER sites for suitable learning materials for use in the subjects that they are teaching. At the same time learners can also browse through the whole spectrum of available learning materials as supplements to their modules. Making available useful learning materials in different formats will allow learners to pick and choose the ones that suit them best, and this will enhance self-managed learning among the working adults. Finally, OUM needs to help learners overcome a number of barriers if it wants to maximise the potentials of using e-learning at the university.

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