

Factors Affecting Students' Utilization of Learning Management System: A Case Study

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ABSTRACT

The advent of e-learning technology has recently made the teaching and learning feasible on the Internet. E-learning is essentially any form of education that is facilitated by the Internet and its technologies used the World Wide Web to support instruction and to deliver course content. The purpose of this paper was to identify the students' utilisation of Learning Management System (LMS) namely, i-Learn at University Teknologi MARA (UiTM). The research examines four factors affecting the utilization of LMS which are technology competency, accessibility of i-Learn, lecturers' initiative and students perceive usefulness toward the utilization of i-Learn. The research employed the quantitative methodology. The respondents are the final year student of computing department at Faculty of Computer and Mathematical Sciences. Findings revealed that the level of utilization of i-Learn features is acceptable where score (Mean=2.94). Thus, the highest mean refers to technology competency (Mean = 3.16) followed by lecturers' initiative (Mean = 3.10), students' access to i-Learn (Mean = 3.00) and the lowest is students perceive usefulness toward utilization of i-Learn (Mean = 2.89). This studies also showed the correlation between factors affecting the utilization of i-Learn with the utilization of i-Learn features. Four hypotheses were analysed and tested where three were accepted and

one was rejected. The result showed that "equationeditor" and develop content within i-Learnare preferred as an additional tool, contributed as the highest mean (Mean = 3.05) and (Mean = 3.04) respectively. Finally, recommendations for future improvements of LMS were also discussed. In line with the current educational situation, this study findings can be guidelines for other universities that practiced web-based learning to improve the existing learning managementsystem.

Keywords: *Learning Management System; blended learning; students, utilization*

INTRODUCTION

Technology enables people to have seamlessly interaction with others regardless of time and space. Internet has become a great medium used as online system in current education environment. For instance, Learning Management System (LMS) allows educators and students to utilize instructional materials, make class announcements, submit and return course assignments and provide greater communication between students within a class and the educators through multi-modal methods of communication.

A LMS is a software application or a web-based technology, enabling the management and delivery of content and resources to students. Typically, learning management system to provide educators with ways to create and deliver content, monitor the participation of students, and evaluate performance. LMS can also provide students with the ability to use interactive features such as a long discussion, video conferencing, and discussion forums. In addition, it facilitates administration, documentation, tracking and reporting programs and events.

LMS is the web that are including the courses that containing electronic tools consisting a discussion board, files, electronic mail, assessment, tutorial, e-learning program, quizzes, announcement, drawer, groups discussion and assignment project (Beer & Jones, 2009; Patricio et al., 2017). The benefit of the LMS is intrinsically linked to the business case for e-learning. Traveling cost are saving, time are spent to learn will be reduced and more immediate response to learning needs all required the learning portfolio of an organisation to include learning material (Howard, 2003).

Brown and Johnson (2007) concluded that there are five benefits of LMS features which are centralized learning environment to ensure consistency, tracking and reporting for enhanced performance, immediate capabilities evaluation, continuous product and service proficiency for employees who interact with customers and clients, and regulatory and legal compliance. They added that LMS makes all types of training content, developmental content, and performance content available to individuals 24/7 from any location with web access. Multiple users can access the LMS at any given point in time.

As institutions increase the number of online course offerings, more faculties will need to learn to teach using an LMS. Therefore, understanding the potential benefits of adopting an LMS is relevant to institutions. A perceived benefit of using an LMS is the ability to instruct online using a variety of modalities to meet learners' diverse needs (Mullinix & McCurry, 2003; Ahmed Younis Alsabawy et al., 2016). A challenge for instructors is providing differentiated instruction. An LMS permits faculty to incorporate multimedia elements including audio recordings, music, video, text, interactivity, and sequencing (Klemm, 1998).

Research done by Dabbagh (2004) said that the under utilization of LMSs, by both instructors and learners, results in a lack of robustness to offer extensive support for learning. Jones et. al (1995) suggest learning efficacy could be enhanced by improving learner awareness of metacognitive knowledge.

There is many research related to the factors to the success utilisation of Learning Management System. Volery & Lord (2000) stated that, the demand for e-learning course is increasing. The need for identifying factors is important to ensure the usage among students. Effective implementation of an e-learning initiative requires many factors including technological, pedagogical, and individual factors. However, the lack of theoretical or conceptual frameworks in many past studies dealing with the effectiveness of e-learning system resulted in inconsistent results and therefore more studies need to continuously done.

Hence, this research study will examine students' utilization of Learning Management System (LMS) portal as a tool to support their

learning needs. In addition, this research will focus on the critical elements that must be considered when assessing a LMS. The need for assessment is important from time to time to ensure a successful delivery of LMS and to address the under-utilization problems that the current LMS is facing.

BACKGROUND OF STUDY

University Teknologi Mara (UiTM) has developed Learning Management System as a non line learning platform for the students to learn and interact among themselves and instructors. This LMS, known as i-Learn is refers to learning management system for e-learning in UiTM. i-Learn Centre, together with the UiTM Academic Affairs Division, are stirring towards the Blended Learning by introducing its concept to UiTM students and lecturers in 2011. The project involves lecturers and students both at the main campus and branch campuses.

Relevant to recent technological advancement, i-Learn system acts as a platform that supports the teaching and learning process in UiTM for full time students. i-Learn allows instructors to update or upload any learning materials regarding the course. The class can be accessed any where and anytime via Internet. Under this program, students are expected to study independently but are required to attend the physical classes for lecture session.

THEORETICAL FRAMEWORK

The theoretical framework of the research involved four main independent variables as refer to NorHapiza (2014). These 4 independent variables are (1) Students' technology competencies, (2) Students' access to i-Learn, (3) Lecturers' initiative, and (4) Students' perceived usefulness towards i-Learn. The dependent variable was the student level of utilization the i-Learn.

Figure 1 elaborates the interconnection of these variables in the development of the theoretical framework. This research study was conducted to determine the utilization of i-Learn LMS by UiTM student. There are four possible factors that may influence the level of utilization of i-Learn.

Therefore, these are the factors that will be observed for the research purposes and their level of influence towards the subject matter would be determined. Each component was measured. A statistical analysis would be conducted to examine the level of students' utilization of i-Learn.

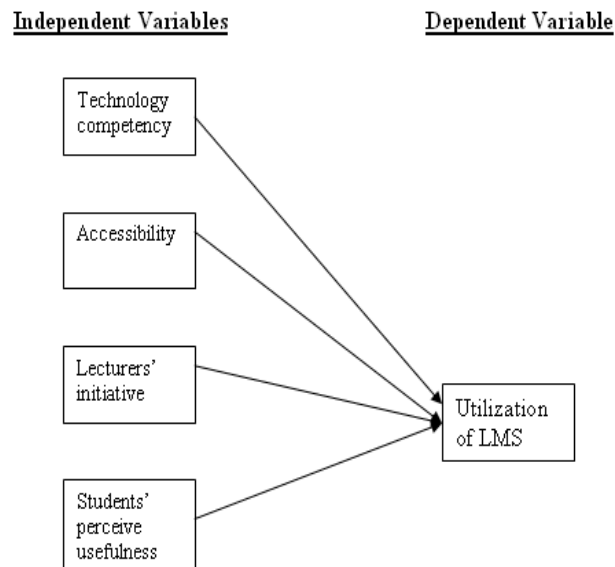


Figure 1: The Theoretical Framework

The aim of the study is to define the factors of affecting the utilization of i-Learn features. Below are the details of the objectives:

1. To identify i-Learn features most utilized by student and the level of utilization of i-Learn features.
2. To determine which factors affecting the student utilization of i-Learn.
3. To analyze the relationship between factors affecting the utilization of i-Learn with student utilization of i-Learn features.
4. To propose the additional tools needed to enhance the use of i-Learn.

Therefore, the research methodology was formulated to address each of the following primary objectives to determine the factors affecting the use of i-Learn features. Based on the theoretical framework, these hypotheses were also developed:

H1: If technology competency is higher, then student utilization of i-Learn features will improve. H2: If student access to i-Learn is higher, then student utilization to i-Learn features will improve. H3: If lecturers' initiative is higher, then student utilization to i-Learn features will improve.

H4: If students perceive usefulness is higher, then student utilization to i-Learn features will improve.

RESEARCH METHODOLOGY

This research studied learning management system that was adopted by Malaysian universities that offered undergraduate fulltime programs. The subjects of this research were final year students enrolled in Computing department at Faculty of Computer and Mathematical Sciences in UiTM Shah Alam.

The instrument used in this research is Survey of Utilization of i-Learn among UiTM students survey instrument. This instrument was designed to measure the levels of utilization among the students. This instrument was adapted from Ahmad Fauzi et al. (2010).

Firstly, the researcher conducts pilot test and the overall reliability is 0.91. As mentioned by Dancy and Reidy (2002), the Cronbach Alpha values that were above 0.70 is considered a good reliability, therefore, this research instrument could be considered as having good reliability. After the validation and verification, then the questionnaire was distributed to the respondents.

The research study is carried out on a stratified sampling method whereby the respondents are obtained from each stratum. The aim is to obtain a sample that is representative of the population to increase the efficiency and to decrease the error in the estimation (Powell, 1998).

Approximately, 200 sets of questionnaires were distributed via online to the respondents' email. 106 of questionnaires distributed were returned. The responses were measured by using Likert scale. Likert scale is a measurement scale that has a four-response category ranging from "strongly disagree" to "strongly agree", which requires the respondents to indicate the degree of agreement or disagreement to each series of statements in the questionnaire.

DEMOGRAPHIC PROFILES

The summary of the general demographic profile of the 106 respondents used for this survey is 71.7% of the respondents are female and 28.3% are male.

Most of the respondent have computer (96.2%) and the remainder did not own computer (3.8%). The survey shows that 87.7% of them have access to the Internet at home, while 12.3% cannot access Internet at home. Furthermore, the survey shows that 91.5% respondents used i-Learn for learning and 8.5% respondents did not used i-Learn for learning.

Most of the respondents aged between 19 – 22 years old (94.6%). The next age group, with a percentage (5.4%), is those aged between 23–25 years old. There are no respondents that aged above 25 years old.

FINDINGS

Firstly, this section describes the findings of the main specific questions pertaining to the assessment of features of i-Learn. This section is divided into three-sub sections which are:

1. Communication features
2. Group and Collaborative features and (iii) Assessment and Assignment features.

The overall mean score for *communication features* was 2.84, and the standard deviation was 0.7. Items related to course documents and content

has the highest mean (M=3.21, SD=0.643). While the lowest mean is, item related to chat (M=2.50, SD=0.796). Detailed information on five items is shown in Table 1.

Table 1: Students' Utilization of Communication Features

Attributes	Mean (M)	Standard Deviation (SD)
1) Discussion Board/Forum	2.59	0.766
2) Chat (asynchronous)	2.50	0.796
3) Announcements	3.07	0.606
4) Course Documents and content	3.21	0.643
5) E-mail	2.82	0.687
Overall Mean	2.84	0.7

The overall mean score for group and collaborative features was 2.79, and the standard deviation was 0.779. Items related to feed back among peers have the highest mean (M=2.80, SD=0.749). While the lowest mean item is related to work in-group online (M=2.77, SD=0.808). Detailed information on all items was shown in Table 2.

Table 2: Students' Utilization of Group and Collaboration Features

Attributes	Mean (M)	Standard Deviation (SD)
1) Ability to work in groups online	2.77	0.808
2) Offer group feedback among peers	2.80	0.749
Overall Mean	2.79	0.779

The overall mean score for assessment and assignment features was 3.2, and the standard deviation was 0.717. Items related to online quiz have the highest mean (M=3.40, SD=0.643). While the lowest mean item is related to i-monitoring (M=3.04,SD=0.755). Detailed information on all items was shown in Table3.

Table 3: Students' Utilization of Assessment and Assignment Features

Attributes	Mean (M)	Standard Deviation (SD)
1) Online Quiz	3.40	0.643
2) Assignment submission	3.15	0.753
3) Checking progress (i-Monitoring)	3.04	0.755
Overall Mean	3.2	0.717

A further analysis of the results of the students' utilization of i-Learn was done by using a detailed assessment weighted scoring. Each criterion is given a score based on the metrics specified by Genove and Mercoda (2010). From the results, an overall score of **2.94** was given to the utilization of i-Learn features which has a quantitative interpretation of acceptable. The utilization of i-Learn features was given a rating of acceptable rating in which scores ranging from 2.5 to 2.99 was given.

Findings illustrate that students scored a very good level for the component of students' utilization of assessment and assignment features. In contrary, Group and Collaborative features, and Communication features was at the level of acceptable respectively. The lowest score is group and collaborative features which value is 2.79. The scoring range for students' utilization of i-Learn features is illustrated in Table 4.

Table 4: Level of Students' Utilization of i-Learn Features

Features	Range of Score	Score	Levels of Utilization
Communication	2.50 to 2.99	2.84	Acceptable
Group and Collaborative	2.50 to 2.99	2.79	Acceptable
Assessment and Assignment	3.00 to 3.49	3.2	Very Good
Overall	2.50 to 2.99	2.94	Acceptable

Furthermore, the analysis of percentage of respondents utilizes overall i-learn features showed that 30.8% of students' utilization of i-Learn features received an acceptable score. 23.7% of the students utilize the i-Learn features at poor score range. Likewise, 23.4% of the respondent recorded at the very good level. However, only 6% of the respondents recorded at excellent score range. The results are shown in Table 5.

Table 5: Percentage of Respondent Utilize Overall i-Learn Features

Levels of Utilization	Score	Total Respondent	(%)
Unacceptable	1.0 to 1.99	17	16.1
Poor	2.0 to 2.49	25	23.7
Acceptable	2.50 to 2.99	33	30.8
Very Good	3.0 to 3.49	25	23.4
Excellent	3.50 to 4.0	6	6

Secondly, to determine which factors contribute to the utilization of i-Learn, four possible factors that might influence the level of utilization of i-Learn have been tested using descriptive statistical analysis.

Students' technology competency is an important factor to be studied which related to independent variable *Technology Competency* in the theoretical framework. From the results, the overall mean for the students' technology competency is **3.16**. Meanwhile the standard deviation is 0.6. Items related to students' frequently use the Internet get the highest mean (M=3.45, SD=0.649). While the lowest mean item is related to students' feel confident about the Internet skill used where means is (M=2.95, SD=0.523). These results indicated that the respondents were technologically competent and efficient in the used of high computer technology since the mean score for students' technology competency was above 3.0.

The survey also asked the respondents on *students' access to i-Learn* which related to independent variable *Accessibility* in the theoretical framework. From the results, the overall mean for the students' access to i-Learn is **3.0**. Meanwhile the standard deviation is 0.660. Items related to students' having Adobe Acrobat Reader on computer (M=3.19, SD=0.678) has the highest mean. While the lowest mean is, item related to question "My Internet speed is sufficient" (M=2.85, SD=0.673).

Based from the respondents' perception about *Lecturers' initiatives*, the highest mean was item related to lecturers always including important information in i-Learn (M=3.24, SD=0.626). Meanwhile item related to lecturer gives many activities in the forum was the lowest mean (M=2.88, SD=0.713).

From the results, the overall mean for lecturers' initiatives is **3.1**. Meanwhile the standard deviation is 0.626. *Students' perceive usefulness* of i-Learn is the fourth possible factors that may influence the level of utilization of i-Learn. Based from the survey, item students' feel that i-Learn is easy to use has the highest mean (M=3.18, SD=0.582). While the lowest mean is item related to student feeling bored when using i-Learn (M=2.29, SD=0.780). From the results, the mean for the students' access to i-Learn recorded overall mean was **2.89**. Whereas, the standard of deviation was 0.641.

As a summary, the over all mean for studies factors shown in Table 6. This consists of the means factors utilization of i-learn. The highest means for the factors utilization of i-Learn is technology competency (M=3.15, SD=0.421). Obviously, this result indicates that many peoples nowadays use technology as a medium for any learning activities.

Table 6: The Factors Affecting the Utilization of i-Learn

Factors	Mean (M)	Standard Deviation (SD)
Technology Competency	3.15	0.421
Students' Access of i-learn	3.0	0.499
Lecturers' initiative	3.09	0.565
Students' Perceived Usefulness	2.89	0.386
Overall	3.03	0.335

Further analysis of studies shows the relationship between the four factors students utilization of i-Learn. Hence, four hypotheses is being tested using Pearson Correlation analysis. All data has been tested for normality using box plot before proceeding for Pearson correlation. The box plot revealed that the distribution was approximately normally distributed. Below is the discussion of details.

Hypothesis 1: *If student technology competency is higher, then student utilization of i-Learn features will improve.*

The relationship between technology competency with the utilization of i-Learn features is not significant where $p > 0.05$. The Pearson correlation shows that the relationship between technology competency and utilization

of i-Learn was found to be positively and very weak related ($r = 0.108$). Thus, as technology competency rises, then students' utilization of i-Learn features will not improve. Therefore, this indicates that hypothesis 1 (H1) is not accepted. The result is shown in Table 7.

Hypothesis 2: *If student access to i-Learn is higher, then student utilization to i-Learn features is will improve.*

The relationship between success access to i-Learn with the utilization of i-Learn features is statistically significant where $p < 0.05$. The Pearson correlation shows that the relationship between accessibility of i-Learn and utilization of i-Learn was found to be positively and weakly related ($r = 0.225$).

Thus, as success access to i-Learn rises, then students' utilization of i-Learn features will improve. Therefore, this indicates that hypothesis 2 (H2) is accepted. The result is shown in Table 7.

Hypothesis 3: *If lecturers' initiative is higher, then students' utilization to i-Learn features will improve.*

The relationship between lecturers' initiative with the student utilization of i-Learn features is statistically significant where $p < 0.05$. The Pearson correlation shows that the relationship between lecturers' initiative and student utilization of i-Learn was found to be positively and weakly related ($r = 0.290$). Thus, as lecturers' initiative rises, then students' utilization of i-Learn features will improve. Therefore, this indicates that hypothesis 3 (H3) is accepted. The result is shown in Table 7.

Hypothesis No.4: *If students perceive usefulness is higher, then student utilization to i-Learn features will improve.*

The relationship between students perceive usefulness with the student utilization of i-Learn features is statistically significant where $p < 0.05$. The Pearson correlation shows that the relationship between students perceive usefulness and utilization of i-Learn was found to be positively and weakly related ($r = 0.381$). Thus, as students perceive usefulness rises, then students' utilization of i-Learn features will improve. Therefore, this indicates that

hypothesis 4 (H4) is accepted. Table 7 below shows the overall studied factors towards the students' utilization of i-Learn. The result shows that students perceived usefulness has the strongest relationship with students' utilization of i-Learn.

Table 7: Correlation between the Studied Factors with Students' Utilization of i-Learn Features

Factors	Students' Utilization of i-Learn Features
Students' Technology Competency	0.108
Students' Access to i-Learn	0.225
Lecturers' Initiatives	0.290
Students' Perceived Usefulness	0.381

Further analyses were conducted to investigate the relationship between the four factors using the Pearson correlation test as in Table 8. All the variables were significant related, except the relationship between technology competency with lecturers' initiative is not significant because the value of p more than 0.05.

Table 8: Correlation between the Studied Factors

	Technology Competency	Access to i-Learn	Lecturers' Initiatives	Students' Perceived Usefulness
Technology Competency	1	.613**	.145	.248*
Access to i-Learn	.613**	1	.307**	.460**
Lecturers' Initiatives	.145	.307**	1	.334**
Students' Perceive Usefulness	.248*	.460**	.334**	1

Five items used for suggested of additional tools for i-learn. Based on the result survey, the highest of mean is (M=3.05, SD=0.749) for equation editor that able to type mathematical symbol and develop content i-Learn means also highest (M=3.04, SD=0.713). The lowest means is about real-time video communication (synchronous) with lecturer, (M=2.71, SD=0.896). The overall result can be seen in Table 9.

Table 9: Additional Tools for i-Learn

Attributes	Mean (M)	Standard Deviation (SD)
Receive important alert/messages from i-learn to hand phone.	2.95	0.818
Develop content within i-Learn (ex: collaborative, WEB 2.0 TOOLS, presentations, blogs, wiki)	3.04	0.713
Equation editor (able to type mathematics symbols)	3.05	0.749
Meet online with peers in class in chat room	2.82	0.855
Real-time video communication (synchronous) with lecturer	2.72	0.896
Overall	2.92	0.676

DISCUSSIONS

As a general summary, the study showed that the score indicated that the levels of students' utilization the i-Learn was acceptable which only 16.1% score indicate unacceptable. There is about 6% of the score indicates excellent level of utilization on i-Learn but the percentage was still small. Meaning that there is still a lot of improvement should be taken into an action plan to ensure the excellent level of student utilization of i-Learn will be achieved. On the other hand, the result showed that all the features are important to ensure the quality and the success of LMS for learners to complete their learning process successfully in their studies. However, there are feature that was underutilize by students which is chat features. It has the lowest mean which is 2.50.

Regarding the first objective, there are three main features in i-Learn, which include (1) communication features (2) group and collaborative (3) assessment and assignment. These features are basic features that LMS should have to support student in their study. All features received an acceptable score from the students. The feature that most utilize by students was assessment and assignment features. The mean was 3.2 and the score indicated that the level of students' utilization the feature was very good.

However, the Group and Collaborative features receive the lowest score rated by students with mean equal to 2.79. Hence, i-Learn implementation should apply more Group and Collaborative features in their system. Some of the features that i-Learn should add as collaboration features are discussion forums, chat, wikis, blog, journal, group community *etc.* as suggested by Kavi(2017).

Regarding the second objective of there search, to determine factors affecting the utilization of i-Learn features, the study shows that the highest mean was students technology competency which followed by lecturers' initiative, students' access to i-Learn and the lowest mean was students perceived usefulness. From the findings, it indicates that the students felt that a good level of technology competency is the motivating factor for them to utilize the i-Learn. This is supported in a study by Ahmad Fauzi et al. (2010) which stated that computer skills are an important factor in the technological environment.

This finding also revealed that student felt their lecturer plays an important role to initiate and motivate them to use i-Learn. Researcher concludes that students are dependent on lecturer to actively use the i-Learn LMS. This is inline with are search done by Fresen (2007) which identified that lecturer interaction with students as one of the factors in student utilization of web-based learning.

Regarding the student access to i-Learn that refers to the accessibility of the LMS system, researcher believes that network problem can affect the use of i-Learn features. Observation study from NorHapiza et. al (2014) revealed that network problem can create annoying when the students need to submit assignment or participating in discussion. As stated by the study, student who is frustrated with the network problem will felt bored to use LMS when this situation happens.

The lowest mean among all the factors studied was students perceived usefulness. People will perceive usefulness if they believe it will help them perform their task better. This indicates that if students believe that i-Learn LMS is useful, they will likely to enjoy the class. Study done by Gautreau (2011) reported that students' enjoyment is a critical factor for utilizing the online learning. Researcher assumed that this situation probably related to the lacking of students' time management and attitude.

Regarding the third objective, several analyses were conducted to see the relationship between the studied factors towards students' utilization of i-Learn features. The hypotheses testing was conducted and the result showed that 3 hypotheses are accepted and 1 rejected as shows in Table 10. This indicates that not all the factors contributed to the utilization of i-Learn.

Table 10: Correlation Between Factors Affecting the Utilization of i-Learn with Utilization of i-Learn Features

Hypotheses	P value	Result	R value
H1	0.269	Not significant, Positively, very weak	0.108
H2	0.008	Significant, Positively, weak	0.255
H3	0.003	Significant, Positively, weak	0.290
H4	0.000	Significant, Positively, weak	0.381

The result above showed that three hypotheses (H2, H3, H4) are significant and H1 is not significant therefore it was rejected. This finding is contrary with research done by NorHapiza et. Al (2014) which identified that Students' Technology Competency factor was correlate significantly with the utilization of LMS features.

Furthermore, the findings revealed that Student Perceived Usefulness has the highest mean among the correlation between the Studied Factors with Students' Utilization of i-Learn Features. This finding is supported () a research done by Jowathi (2014) that indicated perceived usefulness has a significant influence on attitude towards using the LMS.

Regarding the fourth objectives, this study revealed that the students felt it is important for them to have a good equation editor and a good content of e-learning materials to ensure the effectiveness of blended learning. Students also agreed that learning through a mobile is an added value because most of the students carry handphones. Important alert messages regarding the course can be sent directly to their mobile. For instance, when lecturer uploads material, students get the alert and can immediately login to i-Learn. The feedback from the survey also agreed that alert should be sent to their handphones or emails. Isshametal (2010) found that learning through mobile is convenient to the respondents since the SMS sent are brief and powerful.

Moreover, students agreed that online chatting (synchronous) should be added. Currently, the chatting features are being done using asynchronous communication. Hrastinski (2008) in his study stated that until recently e-learning mainly relied on asynchronous for teaching and learning. However, with the advance of current technology have led to growing popularity of synchronous communication.

Interestingly in his research, he found that if students seldom meet face-to-face with lecturer and only rely on asynchronous communication, it would result on student feel isolated and not part of the group. The drawback of using asynchronous chatting is that it could prolong over long times. It may take hours, days or even weeks for peers or lecturer stores pond. Nevertheless, asynchronous has several advantages. For instance, when synchronous meeting cannot be scheduled because of other commitment, asynchronous can be an advantage. Students can leave comment and check later for the feedback. Therefore, researcher suggested that synchronous and asynchronous communication for e- learning should be merged.

CONCLUSIONS

The adoption of a learning management system into learning practices is increasing in higher education (Anuwar, 2008). There is various form of Learning Management System either self-developed by the university or outsource to vendor. The existence of LMS does not guarantee the success of students' utilization of the portal. LMS are often underutilized by students' (Mitropoulou et. al, 2007). Hence, this study was conducted to access the current LMS adopted by UiTM.

Based from the findings, this research is beneficial for University Technology Mara (UiTM) to enhance the current i-Learn system. It can contribute as a guideline for UiTM for attract more students' utilizing the i-Learn features. The research can also be used for other universities that practiced web-based learning to improve the existing learning managementsystem.

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