Abstract

Background/Objectives: Learning Management System (LMS) is one of the popular approaches in teaching and learning process. Learning and communicating in electronic way provides solutions for higher education institutions. Despite of that situation, understanding the effectiveness and efficiencies of the systems towards students’ satisfaction are required. The effectiveness is concerned since the study is focusing on the effectiveness and the efficiencies of the system.

Methods/Statistical Analysis: The method used is a questionnaire where the questions were sent through email randomly to the students at higher education institutions in Malaysia. There are about 200 questionnaires being email and only 150 respondents have answered the questionnaire. The data is analysis by using frequency methods to identify the value and percentage together with mean, mode, median and standard deviation. Addition analysis is using linear regression. The analysis is to identify the relationship of the variable.

Findings: Based on the analysis, the effectiveness and efficiency of the LMS are a concern to achieve students’ satisfaction. In order to satisfy the student, the institution must identify the capabilities of LMS that will be used and also the expenses the institution must invest in the system.

Applications/Improvements: The effectiveness and efficiencies of the system can identify and helps to solve potential problems.

Keywords: Effectiveness, Efficiencies, E-Learning, Learning Management System, Satisfaction

1. Introduction

E-learning technology represents a good opportunity to reduce the digital divide and to ensure faster and higher development trends. E-learning has a well developed approach to the creation and sequencing of contents based single learner, self paced learning objects. Nowadays, the way of delivering a cause of study through some electronic media is dramatically increased. Computer based system increases efficiency and reduces the risks involved in any mode of the activity. Further the technologically mediated two ways of communication between teacher and student. Though, this situation has given a thought to a modern institution in providing Learning Management System (LMS) to handle teaching and learning activities without the restriction of time or distance based on research from Epping. In this paper, the study is being done to identify the effectiveness and the efficiencies of LMS towards student’s satisfaction has been evaluated.

2. Learning Management System

Nowadays, the advancement of web based technology is to develop the powerful software system such as LMS that is to enhance learning in a variety of environments. LMS is based on the principle of e-learning platform ultimately aim to effectively accomplish the instruction which could be optimized for supporting important instructional activities such as instructional management, interaction, evaluation and information guidance. In other words, LMS is not just a tool that provides users with convenient facilities such as sending email, distributing handouts or keeping an online grade book. Essentially, an LMS provides an automated mechanism for delivering course content and tracking learner program. LMS also allows students to view multimedia lectures, communicate with their teachers and each others in teaching the communities, download course material, take online quizzes and submit homework and assignment.

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The effectiveness and efficiency access of learning methods are achieved by the concepts and methodologies of technology based learning that increase the use of e-learning. LMS has been widely used in higher education institutions due to various advantages, including flexible learning times and bundles distance education. Therefore, these studies address the following questions:

RQ1: How effective the LMS system being used by the students?
RQ2: How efficient the LMS system being used by the students?
RQ3: How satisfied the LMS system being used by the students?
RQ4: How effective and efficient is LMS could satisfy the students?

The questions are classified by these categories in identifying the effectiveness, efficiency and satisfaction.

3. Methodology

This study used a survey method to evaluate the LMS among students from a few higher education institutions in Malaysia. The questionnaire used in this study was adapted a few questionnaires from the Computer System Usability Questionnaire (CSUQ) by using 5 likert scale namely strongly disagree (1), disagree (2), natural (3), agree (4) and strongly agree (5). The questionnaire consists of 24 questions which divided into 3 elements to evaluate the LMS for effectiveness, efficiency and satisfaction. The element of effectiveness has 7 questions, efficiency has 10 questions and satisfaction has 10 questions to evaluate the LMS.

The questionnaire was divided into various categories that are demographic profile, usage of LMS, effectiveness, efficiency and satisfaction. For this study, the questionnaire was distributed by email to 200 respondents randomly at a higher education institution in Malaysia where 150 have given their feedback. The data also have gone through a cleaning process, where all null data have been removed in order to ensure the analysis produce a clear result. The data were analyzed by using descriptive analysis of frequencies approach and regression to see the correlation between the elements. This is to ensure that the study produces more related and acceptable answer to the study.

A demographic is related to participant background such as gender, age, year of study and level of study. The analysis uses frequency to identify the percentage of the participants. Table 1 shows the percentage of the participants that responds to the questions.

In Table 1, gender shows that 40.7% of the respondents are male and 59.3% are female. While most of the respondents that respond to the questions is aged between 20 to 30 years old that shows 80.7%. Meanwhile, about 43.3% was studied in the second year and 68.7% study at degree level.

Followed by the questions on usage of the LMS, the analysis is to identify the capabilities in using web based learning, identify the institution by using LMS and period of years the institution is using the system. The result is based on the frequency as shown in Table 2. The result shows that 92.7% of the respondents said that they are familiar in using web based learning. Moreover, about 94% agree that their institution is using the LMS for teaching and learn-

### Table 1. Demographic profile

| Profile                  | N = 150 | %  |
|--------------------------|---------|----|
| Gender                   |         |    |
| Male                     | 61      | 40.7|
| Female                   | 89      | 59.3|
| Age                      |         |    |
| < 20 years               | 29      | 19.3|
| 20-30 years              | 121     | 80.7|
| 31-40 years              | 0       | 0   |
| 41 years ≥               | 0       | 0   |
| Year of study            |         |    |
| Year 1                   | 46      | 30.7|
| Year 2                   | 65      | 43.3|
| Year 3                   | 28      | 18.7|
| Year 4                   | 11      | 7.3 |
| Education                |         |    |
| Foundation/Certificate   | 3       | 2.0 |
| Diploma                  | 40      | 26.7|
| Degree                   | 103     | 68.7|
| Master                   | 4       | 2.7 |

### Table 2. The usage of LMS

| Categories                           | N = 150 | %  |
|--------------------------------------|---------|----|
| Familiar with web based learning     |         |    |
| yes                                  | 139     | 92.7|
| no                                   | 11      | 7.3 |
| Do institution using LMS             |         |    |
| yes                                  | 141     | 94.0|
| no                                   | 9       | 6.0 |
| Period in years the institution using LMS |   |    |
| 1 year                               | 21      | 14  |
| 2 year                               | 23      | 15.3|
| 3 year                               | 16      | 10.7|
| > 4 years                            | 90      | 60.0|
ing. Meanwhile, almost 60% shows most of the institution has used the LMS more than four years. This shows that LMS has been used quiet sometimes in Malaysia.

4. E-Learning at Higher Education Institution in Malaysia

The increase of ICT infrastructure has offered an opportunity for the institution to use the internet as a communication medium for more effective and efficient access of learning materials and e-learning, where it has become a crucial resource for the institution. In this study, there are questions that regarding the type of e-learning which being used at the respondent higher education institution. The result is presented in the pie chart of Figure 1, where e-learning is classified by percentage.

The result in this study shows that about twenty eight types of LMS were identified which being used at the Malaysia higher education institution. These are based on the answers given by the respondents that respond to this questionnaire. Based on the result, the highest percentage software used is Moodle that shows 19% which is the highest percentage among others. Moodle is an open source web based software package to create, update and deliver online courses and other instructional communication tools. Since it has a modular structure, programmer can also script additional modules for different educational purpose. The design of Moodle is based on socio-constructivist pedagogy. Essentially, the tool’s ability to backing an inquiry and discover the approach of online learning process. Therefore, Malaysia higher education institutions also show the highest percentage for Moodle as one of LMS tools that could provide a comfortable process of teaching and learning.

5. The Effectiveness and Efficiency of LMS

The effectiveness and efficiency of the system are important to ensure the process of teaching and learning abilities to deliver the content of learning. Furthermore, efficiencies are the ratio of output to input while effectiveness is concerned with outputs. For this study, the analysis by using mean, median, mode and standard deviation to identify the effectiveness, efficiencies and satisfaction. The questions for this analysis are based on selection of five scales that are strongly disagree (1), disagree (2), natural (3), agree (4) and strongly agree (5) where Table 3 shows the result.

Based on Table 3, the result shows that for effectiveness and efficiency of the mean value is more than 3 in using LMS at a higher education institution. This can conclude that students are agreed that LMS in Malaysia have been used effectively and efficiently. In addition, the result has answered the research question for RQ1. It related to effectiveness and the results of mean shows that the LMS is being used effectively. RQ2 refer to the efficiency of LMS also shows that student aware with the efficiencies of the LMS at their institution in helping their studies. Based on RQ3, the students satisfied with the LMS provided by their institution. Overall results, the students have agreed that the system used at their institution helps them in doing their assessments effectively and efficiently. Furthermore, the systems provide them a comfortable environment of studies and able to
satisfy their requirement in learning and accessing the information from the systems.

In order to identify the relationship of the variable, linear regression analysis was used for RQ4 testing. A regression analysis was performed with efficiency and effectiveness as an independent variable and satisfaction as the dependent variable. Table 4 presents the regression result of \( R^2 = 0.612 \). \( R^2 \) is a measure of the amount of variability in one variable that is shared by others\(^{11}\). Therefore, the result is supported. It shows that efficiency and effectiveness are supported to satisfy the students in by using LMS.

### 6. Discussion

The intention of this study is to identify how effective LMS used for the process of teaching and learning at higher education institution in Malaysia. Besides, the study also intends to identify how much LMS could satisfy the students in a process of learning. This study has identified various types of LMS being applied at a higher education institution in Malaysia. Moodle is the preferable tools since it shows the highest percentage. Institution need to select a suitable system so that it can easily manage and satisfy their users. It also facilitates educating the students, especially improving their skills in operating computer and access the internet. Hence, the system is concerned to identify the result related to effectiveness, efficiencies and satisfactions where the results are based on the average. Besides, the students have agreed that the LMS system at their institution helps them in their studies.

### 7. Conclusion and Recommendations

The study intention is to identify the satisfaction of students in using LMS at their institution and to evaluate the effectiveness and efficiencies of LMS. LMS is useful for the institution to manage the process of teaching and learning in higher education. But, still the system has to pass evaluation phase in order to see the improvement on the existing practices. The situation will also cater the entire expenses center around the using of the packages that include subscription, hosting and upgrading of the system from time to time. Besides, these systems are not only used for distance education but also in actual education type where there exists face to face interaction. Hence, the evaluation of such systems seen as an important issue to increase the quality of education\(^{12}\).

Proper adoption of the system should be enhanced by identifying the facilities and the capabilities of the institution in handling the system. The system should be tested from time to time in a process of identifying the potential of the system.

The success of the system required a powerful server to support the sources. It should protect carefully to avoid data loss so as to gain students’ confidence in using the system.
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