

FACTORS INFLUENCING THE SUCCESS OF LEARNING MANAGEMENT SYSTEM (LMS) ON STUDENTS' ACADEMIC PERFORMANCE

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ABSTRACT

E-learning systems have gained substantial attention in the educational world. One of them is the Learning Management System (LMS), a pedagogical platform that is based on web technology. The LMS enables instructors to share materials, organize lessons and assessments, and virtually communicate with students to support the learning and teaching process. The aim of this study is to investigate the factors related to LMS that influence students' academic performance. Quantitative data from 20 respondents at a large Malaysian university are obtained from a 12-item questionnaire. Findings showed that effectiveness of the LMS system and students' motivation significantly correlated with their academic performance success. The findings suggest that instructors need to pay a greater role in motivating students to use the LMS via innovative and creative means.

Keywords: E-Learning, LMS

Introduction

The evolution of the Learning Management Systems or LMS has made teaching and learning a lot more practical, exciting and innovative in higher education. The LMS provides the means and ways for universities to manage and administer courses (Godwin-Jones, 2012). It is mainly a type of application which allows students to obtain materials from lectures, discussions, assessments and as a medium of virtual interaction between instructors and other students (Goh et.al 2013; West, Waddoups, & Graham, 2007; Ronn & Teasley, 2009). Learning is blended and complemented by this tool as instructors can mend or add on to knowledge given using other means besides what is already given in the classroom. Hence learning and teaching takes on a different level which is virtual and online.

In addition, LMS makes it possible for instructors to choose the right kind of blended learning to suit the lessons. For example, the instructor can break the boredom of a classroom session by introducing chat, video conference and discussion boards, depending on how effective the system is in that particular higher institution. By applying this way of teaching, students become more eager to learn the subject as the method is different from the traditional ways or styles of teaching. Furthermore, it increases the level of communication among students and the instructor. Students will not face with the problem of missing out on class lectures and activities as they will be able to access the learning activities and recorded lectures through LMS. By doing this the students are able to access knowledge at their own level of comfort besides encouraging independence and a self-paced learning style. Students' motivation can be heightened as they are able to manage their learning using the platform. O'Leary (2002) and Breen et al. (2003) mentioned that effective feedback through LMS by the instructor is one of the main factors which can make students feel more motivated in engaging with the online-based system.

However, using the LMS is one part of the process. The effectiveness of the LMS is another important aspect as it will aid the students in making their learning process smoother. Often times complaints are heard from both instructors and students that they could not access the LMS due to connectivity problems or the fact that they needed to maneuver themselves to get to know the system better. More often than not, the platform needs to be user-friendly. Not only that, according to Cavus et.al (2007) the LMS will be more effective if there are advanced built-in

collaborative tools, as they help the process of online learning become more effective than the existing LMS system in most universities. However, whether or not the LMS tool is useful, it still depends on the way the tool is used in a given course and if the tool aids the user to achieve the desired course outcomes. Students will need to know how to use the system to enhance their learning practices. The lack of knowledge and interest in utilizing the system among students can also make the LMS become less effective. The instructor henceforth plays a vital role in motivating the students to access it and make it interactive. Adzharuddin & Ling (2013) stated that in order to measure the success of student's academic performance in relation to LMS is to know how the tool influences them. Hence the objective of this paper is to examine the factors that contribute to the success of the learning management system that has influenced the students' academic performance. The paper is guided by the following research questions:

1. Is there a statistically significant correlation between students' motivation and academic performance when using LMS successfully?
2. Is there a statistically significant correlation between the effectiveness of LMS and students' academic performance?

The paper also outlines the following hypotheses which are congruent to the research questions and objective of the study. Motivation and effectiveness of the system act as the dependent variable (DV) and students' academic performance acts as the independent variable (IV).

- H1: There is no statistically significant correlation between students' motivation and academic performance when using LMS successfully.
- H2: There is no statistically significant correlation between the effectiveness of the LMS and students' academic performance.

Literature Review

Learning Management Systems

The Learning Management Systems (LMS) have been widely used by many institutions across the globe. Every institution has varied kinds of LMS which are used as a medium of interaction to allow the students to communicate with their instructors outside the classroom. As cited by Forouzesh, & Darvish (2012), LMS is defined in Latent Semantics Analysis (LSA) webpage as

“...an infrastructure that presents and manages the educational content and also determines and evaluates the educational object or individual and organizational study purposes; it also follows up the trend of improvement towards the fulfillment of those purposes in addition to collecting and presenting data in order to appraise learning process of an organization as a whole unit”.

LMS has been used several years for the purpose of organizing learning material, observing the progress of the user whether it meets the particular goal which has been set, used as a platform to manage the content and information of the learning process (Szabo & Flesher, 2002, cited in Watson & Watson, 2012). The advancement of technology allows the instructor to use LMS as medium of interaction with students especially in sharing notes, online discussion, etc. Basioudis et.al (2012) state that the growth of technology gives a betterment and contribution to the LMS in education.

It is important to understand how technology can affect behavior. Theories such as the Theory of Reasoned Action (TRA) by Fishbein & Ajzen (1975) and the Technology Acceptance Model (TAM) by Davis (1986) help to explain human motivations behind technology use. The Theory of Reasoned Action (TRA), which was first proposed by Fishbein & Ajzen (1975), is based on the notion of understanding the human forms of behavior. Similarly, Davis, Bagozzi, & Warshaw (1989) explained that this theory was developed to indicate human normal behavior across domains. Based on Ramayah et. al (2009), TRA was used widely and vastly to determine human behavior on how they perceived and used technology. TRA model consists of three main instruments which are behavioral intention, attitude and subjective norm. The theory hypothesizes that the behavioral intention of performing a particular action is determined by individual and social factors. While the individual factor is represented by the individual attitude towards the behavior, the social factor is determined by subjective norm (Ajzen & Madden, 1986). In TRA, it is believed that the degree of actual behavior is mainly based on the user's intention. Hence, the user's behavioral intention is a decision to be involved in performing the action or not (Liker & Sindi, 1997). Theory of Reasoned Action (TRA) also assumes that an individual's beliefs in regards to objects indirectly relate to behavioral intentions. An individual's beliefs refer to his or her understanding about a certain object. Therefore,

the entire individual's beliefs constitute the informational foundation which determine the individual's intentions and behavior toward performing a certain task (Fishbein & Ajzen, 1975).

Likewise, the Technology Acceptance Model (TAM), which was developed by Davis (1986) based on Fishbein & Ajzen model TRA, is also widely being used in the field of technology (King & He, 2006). The model indicates the acceptance of computers among users. It is based on five types of construct which are perceived usefulness, perceived ease of use, attitude towards use, behavior intention to use, and system use. According to the model, perceived usefulness is where the individual believes that using a system will boost up their performance (Davis et.al, 1989, as cited by Ngai et.al 2007). The 'perceived ease of use' is based on the individual's effort in assessing the system while 'behavior intention to use' is supposed to capture the motivational factors of users which affect a special behavior (Davis et al., 1989). 'Subjective norm' is the influence of people who are important to us in our minds to accept or to reject something. (Venkatesh & Bala, 2008). Hence, it is vital for instructors to know what motivates students to access the LMS system and how the effectiveness of the technology contributes to their academic performance.

Motivation and LMS usage

Studies have shown the positive relationship between motivation and students' learning performance. Potter and Johnston (2006) stated that students with high achievement in their studies are those with high level of motivation and they tend to put extra effort in ensuring that they achieve their goals. Thus, they would gain more if they engage in LMS to aid their learning and comprehension. According to Peltier et al. (2003, 2007, as cited by Eom et al, 2012) the success of LMS is also due to the instructor role itself in guiding and motivating the students to use LMS as medium of interaction, besides getting information for a particular subject. Marks (2005) said interaction between instructor and students is very crucial compared to students-student's interaction as students will become motivated to use the tool., Eom et al (2006) found the factors affect students learning outcomes mostly rely on learning styles and instructor feedback, compared to other four factors which are self-motivation, course structure, instructor knowledge and facilitation.

On the other hand, a study by Ahmad Assaf (2013) states that feedback from the instructor is not sufficient enough to give an overall view of the particular course in order to boost students' motivation in accessing the LMS. Other factors that could help increase learner motivation include creating awareness on learning theories which could be implied in the course, analyzing and deliberating things which could help the students to be successful academically, and ensure that they will get chances to communicate with their instructors and peers by using the web-based platforms.

Potter et.al (2006) mentioned that students who perform well in studies are those who have high level of motivation as they put extra effort in their own learning. Studies have shown that the biggest contribution of student success is due to students' own self-motivation and goals which could make them feel eager to gain success in academia. LMS is one of the factors which could make students more motivated in the learning process as it is more attractive and interactive as the students can get to experience many applications (O'Leary, 2002). However, the LMS should not be the only medium used to make learning and teaching effective. In their study, Breen et al. (2003, as cited by Potter et.al 2006) found that a combined approach is more effective compared to online teaching only, where they recommend both online and face-to-face interaction especially for undergraduate's students.

Effectiveness of the LMS

The effectiveness of LMS can greatly contribute to student motivation in learning and using the system. Cavus et.al (2007) in their study, mentioned that collaborative studies can give a big impact on e-learning system. They based their study on the cognitive theory, situated learning theory, and constructivist learning that synchronous collaboration via LMS gives room to students to construct their own learning. They tested 58 students in the teaching of the Java programming language and the results showed greater success rate when LMS was combined with an advanced collaborative tool while teaching the particular topic in a Web-based environment. Cavus et.al also claimed that LMS is sufficient but the lack of some features can make it less effective. Hence, usage of advanced collaborative tools in the LMS could benefit students as it will make them feel the "real" classroom atmosphere. Their study confirmed existing theories on collaborative learning that suggest the utilization of one another's knowledge and skills as a means to gradually

move toward independent problem solving. Furthermore, the findings indicated that students who used advanced collaborative tools are more successful in their academic performance than those who used traditional tools. The collaborative tools used together with LMS enabled the students to record discussions with the instructor and save them in their computers. They can listen to their earlier discussions by playing back the recording. This way, the students' engagement increases thus helps in making learning become more effective.

Bailey (1993) draws a general outline in their study on how the LMS should be developed in order for it to become more effective. The author stated that in order for the objective of the course to be achieved, the lesson plan must be standardized and congruent with students' learning abilities. The assessment grades should be easily accessed by students, and the lesson must be impactful on students' performance. According to Bostock (2000) (as cited in Greasley, et al.2014, p.975) important features that should be amended in LMS are the chat feature where the user is able to chat with those who are online (CMC), lecture notes, learning material, case study, exercises, computer assisted assessment (CAA) and course management facilities to control access and submission of work by students. But in order to measure the effectiveness of LMS towards students' academic performance, some aspects should be taken into consideration such as how the students utilize LMS daily especially in completing their tasks and assignments or as reference. These functions could be utilized and leave a greater impact on the user. Hence, this research hopes to discover to what extent motivation plays a role in influencing students' academic performance when LMS is used and how the effectiveness of the system improves the students' academic performance.

Methodology

The study employed a quantitative research design in which a 12-item questionnaire was developed and given to a convenience sample of 20 university students. Respondents were asked to indicate the items on a five-point Likert scale ranging from strongly disagree, disagree, neutral, agree and strongly agree. All the items in the questionnaire were presented in English language. The questionnaire also contained a few demographic information items such as age, faculty/institutions, level of studies and CGPA. (The questionnaire is attached in the appendix section). The questionnaire measures the level of motivation in students and effectiveness of the

LMS system. The survey was adapted from Basioudis et.al's (2012) study on student perceptions of the usefulness of the LMS, and Sánchez et.al's (2010) study on motivational factors that influence the acceptance of Moodle using TAM.

Cronbach's Alpha (R) Test of Reliability was used to measure the reliability of the instrument. According to Sekaran & Bougie (2013), reliability is tested to ensure that the instrument is free from error. Reliability is being measured in every research to ensure consistency in the results produced (Ahmad Assaf, 2013). The value of Cronbach Alpha showed a reliability index of more than 0.500. The first variable which is 'motivation' shows 0.703 while the second independent variable shows 0.678. A reliability test which has more than 0.70 value is considered reliable and the questionnaire is authentic (Leech, Barrett and Morgan., 2008). Ahmad Assaf (2013) asserts that reliability must be measured in every research to ensure the results are consistent. As for content validity, the questionnaire was validated by the experts in this field. This was important to know that the questionnaire measured what it needed to measure by the researcher (Cavus et.al, 2007). Data analysis was done by means of multiple regression analysis to measure the relationship between the independent variables and dependent variable. The regression coefficients indicate the relative importance of each of the independent variables in the prediction of the dependent variable.

Findings and Discussion

RQ1: Is there a statistically significant correlation between students' motivation and academic performance when using LMS successfully?

A simple linear regression was calculated to predict the students' academic performance based on their level of motivation. A significant regression equation was found ($F(1,18) = 80.474, p < .001$), with an R^2 of .817. Students level of motivation is equal to $.707 + .797$ academic performances. See Table 4 below.

Table 4: Results of simple linear regression on the students' academic performance based on their level of motivation.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.904 ^a	.817	.807	.24236

a. Predictors: (Constant), M_IV

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.727	1	4.727	80.474	.000 ^b
	Residual	1.057	18	.059		
	Total	5.784	19			

a. Dependent Variable: DV_All

b. Predictors: (Constant), M_IV

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.707	.326		2.171	.044
	M_IV	.797	.089	.904	8.971	.000

a. Dependent Variable: DV_All

RQ2: Is there a statistically significant correlation between the effectiveness of LMS and students' academic performance?

A simple linear regression was calculated to predict the academic performance based on the effectiveness of the LMS (see Table 5 below). A significant regression equation was found ($F(1,18) = 39.108, p < .001$), with an R^2 of .685. The effectiveness of the system is equal to $1.357 + .626$ academic performances. Sekaran & Bouige (2013) mentioned that multiple regression is vastly being used in research to measure the character of the relationship between the independent variable and dependent variable.

Table 5: Results of simple linear regression on the students' academic performance based on their effectiveness of the LMS system

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.828 ^a	.685	.667	.31826

a. Predictors: (Constant), ES_IV

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.961	1	3.961	39.108	.000 ^b
	Residual	1.823	18	.101		
	Total	5.784	19			

a. Dependent Variable: DV_All

b. Predictors: (Constant), ES_IV

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.357	.364		3.733	.002
	ES_IV	.626	.100	.828	6.254	.000

a. Dependent Variable: DV_All

A Pearson product-moment correlation coefficient was computed to assess the relationship between the attribution of success (motivation and effectiveness of the system) and students' academic performance. There was a positive correlation between the two variables, $r = 0.899$, $n = 20$, $p = 0.001$ (See Table 6). Overall, there was a strong, positive correlation between attribution of success (motivation and effectiveness of the system) and students' academic performance. Increases in the level of motivation and effectiveness of the system significantly correlated to students' academic performance. Thus, this study rejects the null hypotheses and accepts the alternative hypotheses that there is a correlation between the variables.

Table 6: Correlation coefficient of the relationship between the attribution of success (motivation and effectiveness of the system) and students' academic performance.

		DV_All	ALL_IV
DV_All	Pearson Correlation	1	.899**
	Sig. (2-tailed)		.000
	N	20	20

ALL_IV	Pearson Correlation	.899**	1
	Sig. (2-tailed)	.000	
	N	20	20

** . Correlation is significant at the 0.01 level (2-tailed).

Conclusion

In conclusion, this study suggests that there is a relationship between motivation and effectiveness of the system and students' academic performance when using LMS. Thus, LMS leaves a great impact on users in their learning process. The results of this study supports the research by Ahmad Assaf.A, (2013) who found that that LMS helps students perform better when the instructor is able to use this medium in guiding them virtually. In addition, this study suggests that students' level of motivation is important in order to make their learning more effective and meaningful. Students's motivation level in learning and in using LMS will decrease if the students are unable to cope with the LMS themselves due to several factors such as unavailability of the instructor to assist. Moreover, the absence of collaborative tools mentioned by Cavus et.al (2007) will lead to the sluggish utilization of LMS by students.

In order to ensure the students' learning process to work smoothly, it is advisable for the university to ensure all instructors to be knowledgeable in handling LMS (Marks, 2005). The instructor plays a greater role in motivating the students to access the LMS, thus encouraging them to utilize it as a medium to obtain information on a particular subject (Eom et al, 2006).

While findings of the study are not open for generalizations due to the small sampling size, they give some understanding of the benefits of LMS. Instructors will be more aware of students' participation in LMS as it allows instructors to track the progress of the students individually or on specific matters. Moreover, the instructor will be able to manage activities via the calendar and share them with the students. This will enable the students to read the topic beforehand and be ready for the discussion in class. Not only that, the outcomes of this study will assist in helping the instructor to know the barriers which have caused little participation of students' in LMS.

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