Assessing Organizational Support and System Characteristics of Learning Management System : Views from Malaysian Higher Education Undergraduate Student

[a]Sousan BALEGHI ZADEH, [b]Ahmad Fauzi MOHD AYUB, [c]Rosnaini MAHMUD, [d]Shaffee MOHD DAUD

[abcd]*Faculty of Educational Studies, Universiti Putra Malaysia*

[bc]*Institute of Mathematical Research, Universiti Putra Malaysia*

s_baleghi@yahoo.com, afmy@upm.edu.my, rosnaini@upm.edu.my; shaffee@upm.edu.my

Abstract: Learning management system (LMS) is a kind of software that supports teaching and learning activities. Today, the number of educational institutions equipped with LMS is increasing. However, there are many factors that make students reject or accept this kind of technology. The present study assessed two characteristics of LMS (organizational support and system characteristics) in views of students. These two characteristics were assessed by three variables (technical support, system interactivity and system functionality). The respondents of the present study were 216 undergraduate students of faculty of education in Universiti Putra Malaysia. The result of the study revealed that in views of the respondents, organizational support was moderate, while system characteristics were high.

Keywords*:*Learning Management System, System Characteristics, Organizational Support

1. Introduction

One of the popular concepts that ICT has produced in the realm of education is e-learning (Hernandenz et al., 2011; Šumak, Heričko, & Pušnik, 2011). There are many definitions for e-learning. Some of them are broader and encompass different types of ICT, while the others are narrower. For example, Hill and Wouters (2010) have defined e-learning as "use of ICTs (e.g. Internet, Intranet, CD-Rom, interactive TV, teleconferencing, computer conferencing and char) to deliver instruction to learner" (p.204). However, some definitions of e-learning are narrower. For example, according to O'Mahony (2004) and Chang (2008) e-learning refers to any form of instruction delivered just through the web. Systems that conduct e-learning are different and have various names, such as online systems, virtual systems, learning management systems and so on (Piotrowski, 2010). To avoid getting confused, in the present study the term learning management system (LMS) is used for any kind of e-learning systems. LMS is one of the most popular software in that its usefulness in higher education institutions is widely increased (Chang, 2008; Dutta, Roy, &Seetharaman, 2013). Learning management system is a kind of information system that supports teaching and learning (Dutta et al., 2013). In fact, it organizes and provides tools through which students will be able to download learning contents, build, and deliver online learning environments (Piña, 2012). One of the most important benefits of LMS is to generate and manage reports on learners and assessment results (Theis, 2005). Besides, through the features of LMS, instructors and students can convey instructional materials, send notice to class, submit assignments, and interact with students (Lonn & Teasley, 2009). In fact, this information system combines technology features and pedagogy (Ioannou & Hannafin, 2008).

Although investing on LMS in institutional education is enhancing, research has reported that faculty and teachers are not interested in using technology (Chang, 2008; Hadjipavli, 2011).There are many factors which may affect LMS utilization of students and lecturers. However, Davis,

Bagozzi, and Warshaw (1989) suggest that organizational characteristics and system characteristics are the crucial factors that may influence information system utilization. Technical support which is sometimes called facilitating support (Venkatesh & Bala, 2008) belongs to organizational characteristics. Technical support assists users to solve problems they encounter when they are working with an information system (Ngai et al., 2007). This factor enhances user satisfaction and has a critical influence on beliefs of users in accepting or rejecting an information system (Igbaria, Guimaraes & Davis, 1995). There are several studies in the LMS environment which indicate that technical support had a significant effect on LMS utilization. For example, Ngai et al. (2007) investigated the acceptance of LMS among undergraduate and postgraduate students of seven universities in Hong Kong with a sample size of 1263 and found out that technical support had a significant effect on LMS utilization. In another study, Sánchez and Hueros (2010) also examined LMS acceptance (Moodle) among students of business management and educational sciences in the University of Huelva (Spain) with a sample size of 226. The results of this research revealed that technical support had a significant effect on system utilization.

System characteristics encompass different variables such as system functionality and system interactivity (Davis et al., 1989; Pituch & Lee, 2006). Indeed, system functionality assesses the flexibility and quality of LMS features from the users' point of view, e.g. whether LMS is equipped with features through which students can send their assignments, download the contents of syllabus, take quizzes, use a variety of media such as audio, text and video and so on (Pituch & Lee, 2006; Selim, 2003). System interactivity refers to interaction among instructors and students in the process of learning and teaching (Pituch & Lee, 2006). The LMS should be equipped with features such as forum, email and chat room, through which students and teachers can interact with each other. Indeed, this factor assesses the interaction between lecturers and students (Pituch & Lee, 2006). There are several studies which indicate that system functionality and system interactivity had a significant effect on system usage. For example, Pituch and Lee (2006) investigated the influence of system characteristics (system interactivity and system functionality) on LMS utilization among 251 Taiwanese college students and found out that both system interactivity and system functionality had a significant effect on LMS utilization. Moreover, these variables obtained a high mean value. Wang and Wang (2009) also investigated the influence of system characteristics among 268 university instructors of Taiwan and revealed that system characteristics had a significant effect on LMS utilization. The outcomes of this research also indicated that system characteristics obtained a high mean value. The main purpose of the present study is to assess organizational characteristics and system characteristics of learning management system of Universiti Putra Malaysia (PutraLMS) in views of undergraduate students.

2. Research Objectives

i. To assess technical support of PutraLMS in views of students.
ii. To assess system interactivity of PutraLMS in views of students.
iii. To assess system functionality of PutraLMS in views of students.

3. Research Methodology

The population of the present study was full-time undergraduate students of faculty of educational studies of Universiti Putra Malaysia (UPM) in the second semester of the academic year 2012-2013. The students were selected through cluster sampling with a sample size of 216. The design of the present research is also descriptive.

4. Research Instrument

The variables of the present study were technical support, system interactivity, and system functionality and they were measured through a questionnaire with 23 items. Technical support is intended to measure services assisting undergraduate students of education at UPM to solve hardware and software problems with PutraLMS. The six items used to measure this construct were adopted from Sánches and Huerous (2010), and Ngai et al. (2007). The second construct is

system interactivity. This construct is used to measure the ability of PutraLMS in providing facilities for interaction. This entails interaction among undergraduate students themselves, interaction between lecturers and students, and collaboration in learning which results from these interactions. This construct includes seven items adopted from Pituch and Lee (2006) and also self-developed items. It should be noted that self-developed items refer to items which were created by authors according to the definition of the variables. The last construct is system functionality which assesses undergraduate students' perception of flexibility of PutraLMS (UPM) in accessing instructional and media. This construct consists of 10 items adopted from Selim Ahmed (2010), Pituch and Lee (2006), and self-developed items. All items for this construct were measured through 5-point Likert-scale items labelled as 1 (strongly disagree), 2 (disagree), 3 (not sure), 4 (agree) and 5 (strongly agree). Two experts of the faculty of education at UPM examined the content validity of the questionnaire and their comments were followed. Reliability of the questionnaire was measured by Cronbach's alpha. Reliability of each variable was: technical support (.90), system interactivity (.91) and system functionality (.82). Since some items of the questionnaire were self-developed, its content validity was examined by four experts of education at Universiti Putra Malaysia.

5.0 Research findings

The results of the present study are based on descriptive study. The variables of the study are technical support, system interactivity, and system functionality.

5.1 Overall Mean

Table 1 indicates the overall mean of the variables of the study (technical support, system interactivity and system functionality). Among the three variables, system functionality obtained the highest mean (Mean = 3.83, SD = .53). This is followed by system interactivity (Mean = 3.53, SD = .74) and technical support (Mean = 3.35, SD = .67). The next section will discuss in detail items used to measure all the variables in this study

Table 1. Overall Mean of Variables

Factors	Number of items	Mean	SD
Technical Support	6	3.35	.67
System Interactivity	7	3.53	.74
System Functionality	10	3.83	.53

S.D.: standard deviation

5.2 Technical Support

When using any information system, technical support refers to assist users to solve problems they encounter when they are working with an information system (Ngai et al., 2007). Table2 indicates the mean and standard deviation of six items of technical support whereby the highest mean refers to PutraLMS offers good technical support (Mean = 3.42, S.D. = .820) followed by the manual on the operation of PutraLMS is sufficient(Mean = 3.38, S.D. = .887). There are two items which shared the same mean, which refers to e-mail inquiries to the technical support group when facing technical problem while using PutraLMS (Mean =3.35, SD = .799) and there is a hotline for fixing user problems (Mean = 3.35, S.D. = .787). Overall, the respondents felt that technical support is sufficient for them to use PutraLMS during their study period.

Table 2: Technical Support

Items	**Source**	**Mean**	**SD**
A hotline for fixing user problems is available at any time in PutraLMS.	Sánches & Huerous, 2010	3.35	.787
I can rely on the technical support group while using PutraLMS.	Self-developed	3.28	.823

Email inquiries to the technical support group can be made when there is a technical problem while using PutraLMS.	Sánches & Huerous, 2010	3.35	.799
Web-based inquiries can be made when there is a technical problem while using PutraLMS.	Sánches & Huerous, 2010	3.34	.853
The manual on the operation of PutraLMS is sufficient.	Ngai, Poon & Chan, 2007	3.38	.887
PutraLMS offers good technical support.	Sánches & Huerous, 2010	3.42	.820

TS: technical support; S.D: standard deviation

5.3 System Interactivity

Interactivity is an important aspect when users interact with information system. Therefore, system interactivity is the ability of the system to provide opportunities for interaction among users (Pituch & Lee, 2006). This section will describe students' perception towards the ability of PutraLMS in providing facilities for interacting among students, the interactions between lecturers and students, and collaboration in learning which grows out of these interactions. Analysis towards seven items shows that the highest mean refers to students' perception towards PutraLMS enabling interactive communication between lecturers and students (Mean = 3.65, S.D. = .93) followed by PutraLMS enabling them to receive comments (Mean = 3.61, S.D. = .86) and features of collaborative learning in PutraLMS (Mean = 3.60, S.D. = .90) (refer to Table 3). Overall, the students felt that PutraLMS provide features that enable them to interact among the colleagues and lecturers.

Table 3: System Interactivity

Item	Source	Mean	S.D.
PutraLMS enables interactive communication between lecturers and students.	Pituch & Lee, 2006	3.65	.93
I can see the features of collaborative learning (e.g. group work) in PutraLMS	Self-developed	3.60	.90
The communication tools (email, forum, chatroom, etc.) in PutraLMS are effective.	Pituch & Lee, 2006	3.51	.90
PutraLMS enables me to receive my lecturers' comments.	Self-developed	3.61	.86
PutraLMS enables interactive communication among students.	Pituch & Lee, 2006	3.49	.90
I can share my knowledge with my classmates through PutraLMS.	Pituch & Lee, 2006	3.53	.87
My lecturers often communicate with us through PutraLMS.	Pituch & Lee, 2006	3.37	1.07

SI: system interactivity; S.D.: standard deviation

5.3 System Functionality

System functionality is flexibility of an information system (Pituch & Lee, 2006). Therefore, this section will investigate students' perception of flexibility of PutraLMS in accessing instructional and assessing media. The construct of system functionality was measured by 10 items. The highest mean refers to the capability of PutraLMS to print course materials (Mean = 4.33, S.D. = .714). Students also felt that they can access PutraLMS from any place (Mean = 4.14, S.D. = .851) and it offers flexibility in learning regarding time (Mean = 4.08, S.D. = .742)

Table 4: System Functionality

Items	Source	Mean	S.D.
I can print course materials through PutraLMS.	Selim, 2010	4.33	.714
PutraLMS offers flexibility in learning regarding time.	Pituch & Lee, 2006	4.08	.742
I can access PutraLMS from any place.	Pituch & Lee, 2006	4.14	.851

PutraLMS offers different types of material (e.g., audio, video, and text) for every kind of course content.	Pituch & Lee, 2006	3.62	1.019
PutraLMS provides opportunity for taking tests.	Pituch & Lee, 2006	3.27	.957
PutraLMS presents course material in a well-organized manner.	Pituch & Lee, 2006	3.70	.958
PutraLMS clearly presents course contents.	Self-developed	3.93	.804
PutraLMS facilitates groupwork.	Self-developed	3.50	.857
PutraLMS provides opportunity for sending assignments.	Pituch & Lee, 2006	3.72	.893
The course material in PutraLMS is in a readable format.	Pituch & Lee, 2006	4.05	.649

SF: system functionality; S.D.: standard deviation

5. Discussion

Learning management system sometimes called e-learning platform, e-learning, online learning, and virtual learning emerged when instruction via network was conducted (Chang, 2008; Piotrowski, 2010). LMS provides a variety of opportunities for instructors and learners to increase their educational experiences (Holmes & Gardner, 2006). Today, LMS is widely used in higher education (Dutta, 2013). Nevertheless, the outcomes of many studies indicate that the quality of using LMS by students and faculties is limited (The Campus Computing Survey, 2008). For example, Lam, Lo, Lee, and McNaught (2012) investigated using LMS (WebCT) by undergraduate and graduate students in the Chinese University of Hong Kong and found that only 14.8 percent of the students used features for online discussion. According to Almarashdeh, Sahari, Mat Zin, and Alsmadi (2010), in almost all colleges of Malaysia, many lecturers use LMS just for transferring materials and never use communication features such as discussion board, wiki, chat room and so on. In another research, Embi, Hamat,and Sulaiman (2012) examined LMS utilization among 26 Malaysian university lecturers. The results of their study revealed that only two-thirds of lecturers used LMS, such that 65 percent of utilization was restricted to course delivery.

There are many factors affecting utilization of information system. However, system characteristics and organizational support can be considered as crucial factors that may affect system utilization (Davis et al., 1989; Venkatesh & Bala, 2008). In the present study, the mean value of three variables of technical support, system interactivity, and system functionality were measured. Among these variables, system interactivity and system functionality belong to system characteristics and technical support belongs to organizational system. In the present study, technical support obtained the lowest mean. This suggests that organizational support should increase assistance of students when they encounter hardware or software problems. Although system functionality and system interactivity obtained higher mean, it is suggested that system flexibility and system interactivity of PutraLMS improve.

This study has its own limitations. First the respondents of the study were full time students of faculty of education; therefore, the generalization of the findings should be done by care, because the backgrounds of part time students as well as students from other faculties may be different from full time students. Second, there are many variables such as perceived usefulness, perceived ease of use and subjective norm which may affect LMS utilization of users, but the present study was limited to investigating three variables (technical support, system interactivity and system functionality).

References

Almarashdeh, I. A., Sahari, N., Mat Zin, N. A., & Alsmadi, M. (2010). The success of learning management system among distance learners in Malaysian universities. *Journal of Theoretical and Applied Information Technology 21*(2), 80-91.

Chang, C. L. (2008). *Faculty perceptions and utilization of a learning management system in higher education* (Doctoral dissertation). Retrieved from ProQuest Dissertation and Theses database (UMI No. 3319031).

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science, 35*(8), 982–1003.

Dutta , A, Roy, R., & Seetharaman, P. (2013). Course management system adoption and usage: A process theoretic perspective. *Computers in Human Behavior, 29*, 2535–2545.

Embi, M. A., Hamat, A., Sulaiman, A. H. (2012). The use of learning management systems among Malaysian university lecturers. *The International Journal of Learning, 18*(4), 61-70.

Hadjipavli, E. (2011). *An examination of Cypriot teachers' concerns regarding the adoption of a learning management system in secondary education* (Doctoral dissertation, North central University, Arizona, USA).Retrieved from ProQuest Dissertations and Theses database. (UMI No 3467400)

Hernandez, B., Montaner, T., Sese, F. J., & Urquizu, P. (2011).The role of social motivations in e-learning: How do they affect usage and success of ICT interactive tools? *Computers in Human Behavior*, *27*(6), 2224-2232.

Hill, N. S., & Wouters, K. (2010). Comparing apples and oranges: Toward a typology for assessing e-learning effectiveness. In H. Liao, J.J. Martocchio, & Joshi, A. (Eds.), *Research in personnel and human resources management: Volume 99* (pp. 201-242) Bingley, UK: Emerald.

Holmes, B., & Gardner, J. (2006).*E-learning: Concepts and practice*. London: Sage Publications.

Igbaria, M., Guimaraes, T., & Davis, G. B. (1995).Testing the determinants of microcomputer usage via a structural equation model. *Journal of Management Information Systems, 11*(4), 87–114.

Ioannou, A. & Hannafin, R. (2008). Deficiencies of course management systems: Do students care*? The Quarterly Review of Distance Education, 9*(4), 415–425.

Lam, P., Lo, J., Lee, J., & McNaught, C. (2012). Evaluations of online activities based on LMS logs. In R. Babo & A. Azevedo (Eds.), *Higher education institutions and learning management systems* (pp. 75-93). Hershey, PA: Information Science Reference.

Lonn, S., & Teasley, S. D. (2009). Saving time or innovating practice: Investigating perceptions and uses of learning management systems. *Computers & Education*, *53*(3), 686-694.

Ngai, E. W. T., Poon, J. K. L., & Chan, Y. H.C. (2007).Empirical examination of the adoption of WebCT using TAM. *Computers & Education*, *48*(2), 250–267.

O'Mahony, C. (2004). E-learning component evolution and integration: A case study. *International conference on computers in Education2004*. Retrieved September 2012 from http://plum.yuntech.edu.tw/icce2004/Theme3/083_OMahany.pdf.

Piña, A. A. (2010). An overview of learning management systems. In Y. Kats (Ed.), *Learning management system technologies and software solutions for online Teaching* (pp. 1-19). Hershey, PA: Information Science Reference.

Pituch, K. A., & Lee, Y-K. (2006). The influence of system characteristics on e-learning use. *Computers & Education, 47*(2), 222-244.

Piotrowski, M. (2010). What is an e-learning platform? In Y. Kats (Ed.), *Learning management system technologies and software solutions for online teaching: Tools and applications* (pp. 20-36). Hershey, PA: Information Science Reference.

Sánchez, R. A., & Hueros, A. D. (2010). Motivational factors that influence the acceptance of Moodle using TAM. *Computers in Human Behavior*, *26*(6), 1632–1640.

Selim Ahmed, H. M. (2010).Hybrid e-learning acceptance model: Learner perceptions. *Decision Sciences: Journal of Innovative Education*, *8*(2), 313- 346.

Selim, H. M. (2003). An empirical investigation of student acceptance of course websites. *Computers & Education, 40*(4), 343-360.

Šumak, B., Heričko, M., & Pušnik, M. (2011). A meta-analysis of e-learning technology acceptance: The role of user types and e-learning technology types. *Computers in Human Behavior*, *27*(6), 2067-2071.

The campus computing survey 2008, Retrieved May 2012 from:http://www.campuscomputing.net/survey-summary/2008-campus-computing-survey.

Theis, J. G. (2005). *Perceived learning and performance needs of organizations seeking a learning management system* (Doctoral dissertation, The University of Minnesota, USA). Retrieved from ProQuest Dissertations and Theses database. (UMI No 3167659)

Venkatesh, V., & Bala, H. (2008). Technology acceptance model 3 and a research agenda on interventions. *Decision Sciences*, *39*(2), 273-315.

Wang, W-T., & Wang, C-C. (2009). An empirical study of instructor adoption of web-based learning systems. *Computers & Education*, *53*(3), 761-774.