Learning Management System Usage with Postgraduate School: An Application of UTAUT Model

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Abstract
The study examined the relationship between selected factors (performance expectancy, effort expectancy, social influence and facilitating condition) and students' intention to use the learning management system (LMS). In addition, this study investigated the factors predicting students' intention to use the LMS at postgraduate school, University Putra Malaysia. The study was exclusively conducted at the Faculty of Educational Study of University Putra Malaysia. It was a quantitative study in which questionnaires were distributed to 277 respondents using a stratified random sampling technique. SPSS Version 22 was employed to analyze the data; the result of the study showed that performance expectancy (r = .69, p< .01), effort expectancy (r = .60, p< .01), social influence (r = .61, p< .01), and facilitating condition(r = .42, p< .01), were significantly related to students' intention to use the LMS. However, the result also discovered that performance expectancy (β = .436, p <.05), social influence (β = .232, p <.05), and effort expectancy (β = .193, p <.05) were strong predictors of students' intention to use the LMS. The analysis further revealed that (R^2) is 0.054 which means that 54% of variation in the dependent variable is explained by the entire predictor variables entered into the regression model. Understanding the factors that affect students' intention to use the LMS could help the LMS managers and lectures to develop the policies that may attract students to use the LMS.

Keywords: LMS, Postgraduate Students, Students' Intention, UPM, UTAUT Model

Introduction

The recent development in educational technology led to the use of the learning management system (LMS) in various higher institutions. The LMS was created and designed to increase the quality of teaching and learning as well as to simplify the method of interaction between teachers and students (Esther, 2008). According to Nichols (2003) the LMS is the combination of different types of e-learning tools that help teachers to make teaching and learning more efficient and effective. This indicates that the LMS is a platform which helps teachers and lecturers to deliver their lessons both in the face-to-face and online platforms. The LMS allows the teachers to collaborate, share, upload, and interact with students in an easy way, it also allows the students to download the materials and receive lectures online. However, the LMS has contributed positively to educational developments. For instance,

many colleges and universities have adopted this system in order to strengthen their quality of teaching and learning, to expose the learners with various technological skills, to increase collaboration among students and to make learning more flexible to the extent that students can learn without any limitations (Al-Zaidiyeen, Mei, & Fook, 2008; Asiri, bt Mahmud, Bakar, & bin Mohd Ayub, 2012).

In Malaysia, a report given by Masrom and Hussein (2008) showed that most of the universities are operating online mode and blended mode by using LMS. This encourages most of the public higher learning institutions to move from exclusively e-learning to blended learning (Haron, Abbas, &Rahman, 2012). Different types of LMS have been utilized by various universities in Malaysia. For example, University Putra Malaysia has recently introduced a new LMS called Putra Blended Learning Assistive System and Technology (PutraBlast). The LMS was introduced to improve the quality of teaching and learning among both lecturers and students, it allowed the lecturers to create their own course information, it is used by lecturers to share class materials and activities easily. Some lecturers used the platform to get in touch with their students. As a result of this new LMS, the instructors would be able to monitor, manage, and access students' activities; they could also be able to observe how frequent the students engage with online activities.

Despite the features and advantages of using the LMS in University Putra Malaysia context, there is limited study conducted regard to the students' intention to use this new LMS. Therefore, this study was carried out to investigate the relationship between independent variables (performance expectancy, effort expectancy, social influence and facilitating condition)and dependent variable (students' intention to use the LMS), as well as investigating the factors predicting students' intention to use the LMS in Malaysia. The study was specifically conducted at the Faculty of Educational Study of University Putra Malaysia. Unified Theory of Acceptance and Use of Technology (UTAUT) was employed to explain and predict the relationship between variables. The result may be helpful by not only giving theoretical contribution and experimental validation of UTAUT, but also significantly help the faculty members, lecturers, LMS managers and University Putra Malaysia management to determine the factors influencing students' intention to use the LMS (PutraBlast).

Literature Review
Emergence of Learning Management System (LMS)
Learning management system (LMS) formally known as WebCT was first established by the university instructor at the University of British Columbia. WebCT uses learning management system or standard Web-based shell(Bates & Sangra, 2011). According to the IEEE Learning Technology Standard Committee a web-based learning system can be referred to as ''a learning technology system that uses Web-browsers as the primary means of interaction with learners, and the internet or an intranet as the primary means of communication among its subsystems and with other systems''(Ngai, Poon, & Chan, 2007, p. 252).A study conducted by Ngai et al. (2007) investigated the factors influencing the use of WebCT in teaching and learning revealed that students who used web-based learning had more courage and motivation to learn than those who did not use web-based learning. Despite the benefits of this system many universities could not afford due to cost and difficulties in maintaining. For instance, Juhary (2014) mentioned that many universities refused to adopt the WebCT due to difficulties in maintenance and expensive licensing. Therefore, they moved to free LMS platform like Moodle. The second generated LMS is Blackboard, which swallowed WebCT within a short period of time. The Blackboard was created in 1997 by Pittinsky and Chasen. A study conducted by Bradford, Porciello, Balkon, and Backus

(2007)revealed that more than 70 percent of higher learning institutions in the United States used Blackboard as their LMSs. It was also reported by Embi (2011) that only two Malaysian universities use Blackboard as their LMSs, the first one is public university; Universiti Tun Hussein Onn, and the second one is private university, Sunway University College.

Students' Intention to Use LMS
Behavioral intention (students' intention) is divided into two categories: the first one is favourable behavioral intention which refers to a situation where users accept the technology, connect with the administrators, showing positive attitudes toward technology, increased in using technology, and ready to engage in any activities that relate to that technology (Lakhal, Khechine, & Pascot, 2013). While the second category is unfavourable behavioral intention; this refers to a situation where users show dissatisfaction about the technology and believed not to accept and intervene in any activities related to that technology (Teo, 2013).However, in an attempt to investigate the students' intention on the use of technology (WebCT), a study was conducted by Lam, Lo, Lee, and McNaught (2011), indicated that only 14.8% of the students were able to use LMS properly due to the lack of good of intention toward using technology. This shows that students are not willing to be involved in activities related to technology. In Malaysia, a study was carried out by Baleghi-Zadeh, Ayub, Mahmud, and Daud (2014) on LMS utilization among Malaysian higher education students and found that there was a strong relationship between perceived usefulness, perceived ease of use, subjective norm, and students' intention to use the LMS. The findings of the study conducted by Teo and Noyes (2014) revealed that performance expectancy, effort expectancy and social influenced had strongly influenced the students' intention to use technology, whereas facilitating condition had no significant influenced on behavioral intention to use technology.

Users' Intention to Use Technology Model, Conceptual Model and Hypothesis Development
Several models have been developed to measure the students' behavioral intention to use technology. In the year 2003, Venkatesh, Morris, Davis, and Davis offered a unified model called Unified Theory of Acceptance and Use of Technology (UTAUT). According to these authors, "UTAUT is a definitive model that synthesizes what is known and provides a foundation to guide future research in this area" (Venkatesh et al., 2003, p. 467). The model consists of four core constructs and has been utilized in various studies related to users' intention to use technology. It is also developed from the Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), Motivational Model (MM), Theory of Planned Behavior (TPB), Model Combining the Technology Acceptance Model and Theory of Planned Behavior (C-TAM-TPB), Model of PC Utilization (MPCU), Innovation Diffusion Theory (IDT), and Social Cognitive Theory (SCT). The UTAUT model was utilized in this study because it was recognized by many scholars and considered as the most accepted model for evaluating students and lectures intentions to accept and use technology in teaching and learning. For instance, according to the Dwivedi, Rana, Chen, and Williams (2011), the UTAUT is the most commonly used to study acceptance and usage of information and communication technology.

The conceptual research model for this paper was developed based on the UTAUT model. However, this model consists of four constructs or determinants of students' intention to use the LMS as shown in Figure 1 below. In this paper, the research model hypothesizes that students' intention to use the LMS is influenced by performance expectancy, effort expectancy, social influence and facilitating condition as illustrated in Figure 1 below:
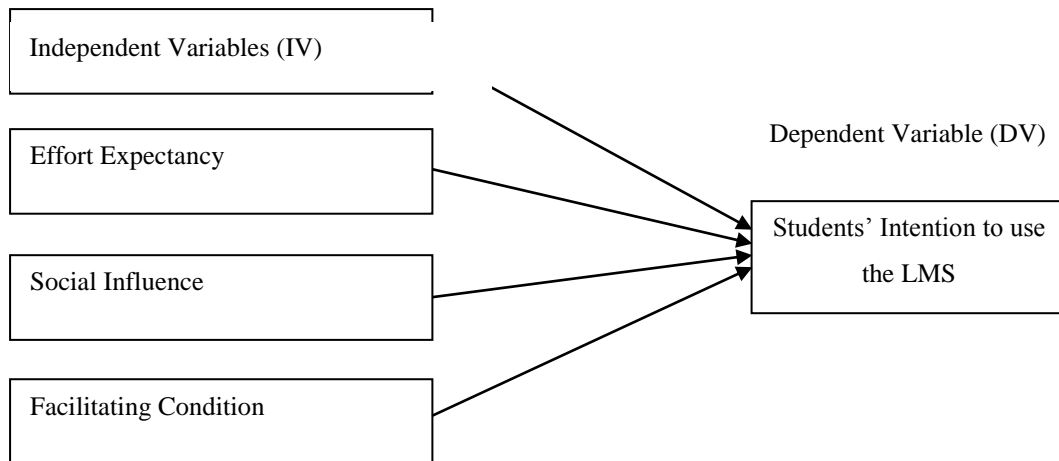
Figure 1: Research Model

Performance Expectancy
Performance expectancy is defined as the degree to which an individual believes that using the system will help him or her to attain gains in job performance (Venkatesh, Morris, Davis, & Davis, 2003, p. 447). In the view of Davis, Bagozzi, and Warshaw (1989), performance expectancy/perceived usefulness is the degree to which workers perceived that using a particular technology will increase the quality of their job. A study conducted by Raman and Don (2013) showed a significant relationship between performance expectancy and behavioral intention to use technology. Several past studies have recognized the power of the performance expectancy in determining the intention, acceptance and use of technology in both intended and compulsory settings (Dwivedi et al., 2011; Venkatesh, Morris, Davis, & Davis, 2003). Thus, based on the literature, the following hypotheses are proposed:
H1. Performance expectancy has a significant positive relationship with the students' intention to use the LMS
H2. Performance expectancy has a significant positive influenced on students' intention to use the LMS

Effort Expectancy
Effort expectancy is defined as the degree of ease associated with the use of the system (Venkatesh, Morris, Davis, & Davis, 2003, p. 450). Based on the past studies, effort expectancy was found to be same with perceived ease of use of Technology Acceptance Model (TAM), and in most cases it was found to have a significant positive relationship with the users' actual use of ICT (Ifinedo, 2006). Several past studies indicated that effort expectancy had a significant influenced in determining students' intention or use of technology (Abelson, 2008; Almarashdeh, Sahari, Zin, & Alsmadi, 2010; Bakar, Razak, & Abdullah, 2013). This shows that students are ready to use technology as long as they understand the technology is easy and effortless to use. Thus, based on the literature, the following hypotheses are proposed:
H3. Effort expectancy has a significant positive relationship with the students' intention to use the LMS
H4. Effort expectancy has a significant positive influence on students' intention to use the LMS

Social Influence
Social influence refers to the degree in which an individual perceives that important others

believe he or she should use the new system (Venkatesh, Morris, Davis, & Davis, 2003, p. 451). Sometimes social influence can be environmental factors that influence individuals. A study conducted by Oye, Iahad, and Rahim (2014), and Raman, Don, Khalid, and Rizuan (2014a)revealed that social influence had a strong relationships with behavioral intention. Based on the previous studies, social influence was found to have a significant effect in determining students' intention to use technology (El-Gayar, Moran, & Hawkes, 2011; Pardamean & Susanto, 2012).This shows that lecturers, friends and other colleagues are critical factors in determining students' intention to use LMS. Based on the literature, the following hypotheses are proposed:

H5. Social influence has a significant positive relationship with the students' intention to use the LMS

H6. Social influence has a significant positive influence on students' intention to use the LMS

Facilitating Condition

Facilitating conditions refers to the degree in which an individual believes that an organizational and technical infrastructure exists to support the use of the system (Venkatesh, Morris, Davis, & Davis, 2003, p. 453). Facilitating condition considered to be anything within the environment that can help technology usage (Venkatesh et al., 2003). However, previous studies showed that facilitating condition was among the important factors influencing the students' intention to use technology (Bakar et al., 2013; Deng, Liu, & Qi, 2011; Khechine, Lakhal, Pascot, & Bytha, 2014). This indicates that the better the technical infrastructures and institutional materials as seen by the learners, the more learners accept and uses technology in their daily activities. Thus, for the purpose of this study, the following hypotheses are proposed:

H7. Facilitating condition has a significant positive relationship with the students' intention to use the LMS

H8. Facilitating condition has a significant positive influence on students' intention to use the LMS

Methodology

This is a quantitative research in nature, conducted among the Faculty of Educational Studies University Putra Malaysia students where data were collected through a set of questionnaire. A total of 297 questionnaires were physically distributed to the postgraduate students and 282 questionnaires were successfully returned back. However, 277 sets of questionnaires were valid for analysis. The questionnaire was divided into three sections:

(i) Demographic information consists of the following: program, gender, age, and semester.

(ii) Students' intention to use the LMS was measured with five items adapted from Lwoga and Komba (2015). This dimension was measured by using five point Likert scales ranging from 1 "strongly disagree" to 5 "strongly agree" (See Appendix 1).

(iii) Factors influencing students' intention to use the LMS; these include: performance expectancy, effort expectancy social influence, and facilitating condition were adapted from Venkatesh et al. (2003) and Wang and Wang (2009). All the dimensions were measured using five point Likert scale from 1 "strongly disagree" to 5 "strongly agree" (See Appendix 1).

The data were analyzed by using correlation and multiple regressions. SPSS Version 22 was employed to analyze the proposed hypotheses. However, before testing the hypotheses

the questionnaire was validated by an expert from the field of educational technology. SPSS Version 22 was also used to determine the reliability coefficients of measurement items. The reliability of the instrument was acceptable considering the Cronbach's alpha coefficient ranges from 0.876 to 0.954.

Table 1: Cronbach'sAlpha Coefficient of the Dimensions

Constructs	Cronbach's Alpha Value
Behavioural intention (students' intention to use PutraBlast)	.932
Performance expectancy	.954
Effort expectancy	.930
Social influence	.876
Facilitating condition	.884

Result

Table 2 below illustrates the demographic information of the postgraduate students, where 19.5% of the respondents were PhD students, 31.4% of the respondents were Master of Science students while the majority of respondents (49.1%) were students of master of education. However, more than two third (76.2%) of the respondents were female and 23.8% of respondents were male. Most of the respondents in this survey ranging between ages of 26-35 years old (52%), followed by 25 and below years old (285%), followed by 36-45 years old (15.9%), while 46 and above years old had few respondents (3.6%). Additionally, the students in second semester had a higher percentage (26.7%), followed by students in the third semester (26%), and the fourth semester students (24.5%). Students in the first semester (21.3%) were almost the same with those in third and fourth semester. Meanwhile, students in fifth (1.1%) and sixth semester (.4%) had few respondents.

Table 2: Demographic Information about Postgraduate

Demographic Information	Frequency (f)	Percentage (%)
Program		
PhD.	54	19.5
Msc.	87	31.4
MEd.	136	49.1
Gender		
Male	66	23.8
Female	211	76.2
Age		
25 and below	79	28.5
26- 35 years old	144	52.0
36-45 years old	44	15.9
46 and above	10	3.6
Semester		
1.00	59	21.3
2.00	74	26.7
3.00	72	26.0
4.00	68	24.5
5.00	3	1.1
6.00	1	.4

Hypotheses testing

The Pearson product-moment correlation (Pearson correlation coefficient) was employed to explore the relationship between performance expectancy, effort expectancy, social influence and facilitating condition (independent variables) and students' intention to use LMS. The results of the relationship between the four variables and students' intention to use LMS are illustrated in Table 3. The hypotheses (H1 performance expectancy $r = .69$, p< .01), (H3 effort expectancy $r = .60$, p< .01), (H5 social influence $r = .61$, p< .01), and (H7 facilitating condition $r = .42$, p< .01) were all supported.

Table 3: Summary of the Correlation Matrix of Students' Intention to Use the LMS and Four Independent Variables

	Behavioral Intention	Performance Expectancy	Effort Expectancy	Social influenced	Facilitating condition
Behavioral Intention	1				
Performance Expectancy	.695**	1			
Effort Expectancy	.604**	.653**	1		
Social influenced	.618**	.644**	.642**	1	
Facilitating condition	.423**	.482**	.651**	.530**	1

Multiple regression analysis was conducted to answer the remaining hypotheses. The main purpose of multiple regressions is to measure the relationship between two or more predictors and a criterion variable. The results indicated that performance expectancy ($\beta = .436$, p <.05), effort expectancy ($\beta = .193$, p <.05) and social influence ($\beta = .232$, p <.05), had positively influenced students' intention to use the LMS.

Table 4: Multiple Regression on the Students' Intention to Use LMS

	Model	Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.976	.166		5.880	.000
	Performance Expectancy	.367	.049	.436	7.469	.000
	Social Influence	.237	.060	.232	3.966	.000
	Effort Expectancy	.199	.067	.193	2.985	.003
	Facilitating Condition	-.035	.053	-.037	-.668	.505

Therefore, hypotheses H2, H4, and H6 were supported as shown in Table 4. However, the facilitating condition ($\beta = -.037$, p <.05) had no significant influence in determining students' intention to use the LMS. Thus, hypothesis H8 was not supported as shown in Table 4. The analysis further revealed that (R^2) is 0.054 which indicates that 54% of variation in the dependent variable is explained by the entire predictor variables entered into the regression
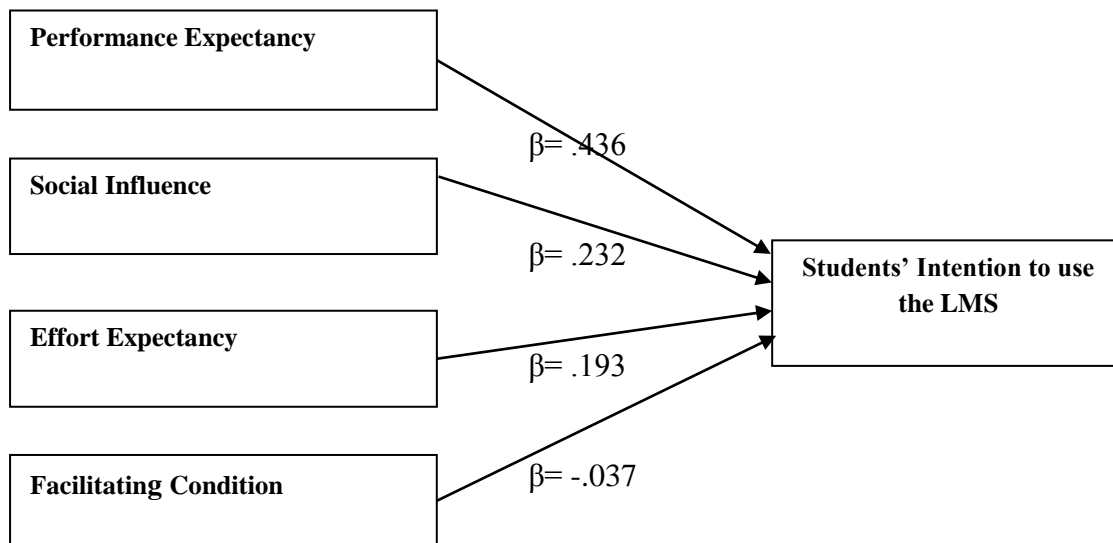
model.

Figure 2: Results of Multiple Regression Analyses

Discussion
The result of this study indicated that performance expectancy was significantly related to the students' intention to use the LMS. This indicates that if the performance expectancy increases, students' intention to use the LMS may likely increase. This finding is in similar to the finding of Raman and Don (2013) who found that performance expectancy had significantly related to students' behavioral intention to use learning management system software. The study further indicated that performance expectancy was the strongest factor in determining students' intention to use the LMS. Therefore, students with higher performance expectancy are more likely to accept and use LMS. This result supported the study by (Abelson, 2008; Ibrahim, 2010; Juhary, 2014; Khechine et al., 2014; Lwoga & Komba, 2015), revealed that performance expectancy was the strongest critical factor affecting students' intention to use technology.

The study revealed that effort expectancy had a significant relationship with the students' intention to use the LMS. This indicates that students may have intentions to use the LMS when it is easy and effortless to use. This result is almost the same with study conducted by Almarashdeh et al. (2010), and Ifinedo (2006) who found that effort expectancy/perceive ease of use had a strong relationship with the behavioral intention to use technology. However, this study revealed that effort expectancy was one of the factors affecting students' intention to use the LMS. This result is parallel to the study conducted by Al-Adwan and Smedley (2013), Bakar et al. (2013) and Lwoga and Komba (2015) who indicated that effort expectancy had significantly influenced students' intention to use technology.

Social influence had a significantly relation to students' intention to use LMS. This shows that lecturers play a significant role in determining students' intention to use the LMS. The finding is consistence with the study conducted by Oye et al. (2014), and Wang and Wang (2009), who stated that social influence was significantly related to the behavioral intention to use technology. However, the study further revealed that social influence had significantly influenced students' intention to use the LMS. This insinuates that students would decide to use the LMS due to the external inspiration such as peer pressure or lecturers' command. The findings of this study are in line with the findings reported by El-

Gayar et al. (2011), Pardamean and Susanto (2012), and Raman, Don, Khalid, and Rizuan (2014b)who suggested that social influence was one of the factors affecting students' intention to use technology.

Facilitating condition hypothesized to students' intention to use LMS and it was found to have a significant relationship with the students' intention to use an LMS. However, the study further revealed that facilitating condition had no significant effect in determining students' intention to use the LMS. This result implies that students believed technological infrastructure and institutional materials such as Internet, computer and wireless have nothing to do with their intention to use the LMS. This finding supported the study of Lwoga and Komba (2015), and Hsu (2013) who found that facilitating condition had no significant effect in determining the students' acceptance and use of technology.

Practical and theoretical implications and limitations

The results of this study have many implications that may help the LMS providers. They may understand students do not use the LMS just because it is simple and effortless to use, but rather because they believed it helpful for their studies. The result also indicated that performance expectancy was the most critical factor affecting students' intention to use LMS. This means that students' perception toward performance expectancy was positive. As such, the LMS developers should improve performance expectancy by creating awareness through the university website, social media, posters and library catalogues. Trainings and workshops on the benefits of using LMS should be provided to the students. The results suggest that students find LMS helpful in increasing their productivity and success in their academic activities as well as helping them to accomplish their task in time.

The finding about the effect of effort expectancy on students' intention to use the LMS is also important to LMS providers, university management and lecturers. The result shows that effort expectancy has a significant effect on students' intention to use the LMS. This indicates that the higher the effort expectancy the easier for students to use e-learning platform. Students might likely use the LMS if it is user friendly and effortless to use. The LMS developers should ensure that hardware and software are flexible and easy to access to as to attract the students' interest in using the LMS. However, the result indicated that peer pressure and lecturers' instruction might influence the students' intention to use the LMS. In regards to this, the university management, and faculty members should provide policies and strategies that will encourage the lecturers to use LMS in their teaching. This may also help the students to develop interest in using LMS. Furthermore, the university should provide a strong technological infrastructure and industrial material (such as Internet, computer and wireless) that are suitable for using the LMS. The university should adhere to the current technological innovations which can be adopted and make teaching and learning effective and efficient.

Moreover, for theoretical implications, the study contributed not only in determining the factors influencing students' intention to use LMS but also validating UTAUT in the University Putra Malaysia context, where only few studies attempt to investigate the factors influencing students' intention to use LMS. The study further contributes by revealing factor that does not have effect in determining students' intention to use LMS. This factor was facilitating condition which found to have no significant effect.

As in the case of all empirical studies where limitations need to be stated and discussed, this study has the following limitations. First, the study was limited to the postgraduate students, specifically from Faculty of Educational Studies, University Putra Malaysia which

makes it difficult to be generalized to other Faculties around the university. Secondly, the study used survey research design where data were physically distributed to and collected from postgraduate students, specifically Faculty of Educational Studies, University Putra Malaysia.

Conclusions and future research

This study has investigated the relationship between selected factors (performance expectancy, effort expectancy, social influence and facilitating condition) and students' intention to use LMS as well as determined the factors influencing students' intention to use LMS. The selected factors (performance expectancy, effort expectancy, social influence and facilitating condition) were adapted from the Unified Theory of Acceptance and Use of Technology (UTAUT).The UTAUT model has been chosen to use in this study because it is the most commonly used to study intention, acceptance and usage of technology across various institution (Dwivedi et al., 2011).

The findings indicated that all the selected factors were significantly related to the students' intention to use LMS. The results further revealed that performance expectancy, effort expectancy, social influence had significantly influenced students' intention to use the LMS. Meanwhile the facilitating condition had no significant influenced on students' intention to use LMS. However, the findings of this study could be utilized by the LMS providers, university management, faculty members and lecturers identify factors affecting students' intention to use LMS. This may help them to develop appropriate policies and strategies that can encourage long-term usage of the LMS.

Based on the findings and implications of this study, future research therefore should be conducted in order to overcome the limitation of this empirical research. Future research should include interview, observation, to broaden the understanding of the factors affecting students' intention to use LMS. In addition, future research should investigate the actual use of LMS among the postgraduate students. Moderating variables such as gender, age and experience should also add to in the future research.

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