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ACCEPTANCE OF LEARNING MANAGEMENT SYSTEM AMONG UNDERGRADUATE COMPUTER SCIENCE STUDENTS USING EXTENDED TECHNOLOGY ACCEPTANCE MODEL (ETAM)

Article Particulars
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V. RACHEL
Research Scholar, Department of Educational Technology
Bharathiar University, Coimbatore, Tamil Nadu, India

Dr. M. PARTHASARATHY
Assistant Professor, Department of Educational Technology
Bharathiar University, Coimbatore, Tamil Nadu, India

Abstract

Information and Communication Technology (ICT) is playing a major role in today's teaching learning process. The internet has rapidly changed the way of learning from desktop to online based learning. Many higher educational institutes have introduced the Learning Management System (LMS) to facilitate the face to face learning process. There are so many LMSs available in the market and MOODLE is one of the most emerging open source LMS that is used in educational sector developed by an Australian Scientist, Martin Dougiamas. The extended technology acceptance model proposes that perceived ease of use, perceived usefulness, attitude toward usage, behavioural intention to use, self-efficacy and access control predict usage of technology and the intent to use and usage of LMS for users. This study's aim focuses on the acceptance of LMS among undergraduate Computer Science student using Extended Technology Acceptance Model (ETAM).

Keywords: *Learning Management System, Extended Technology Acceptance Model, Information and Communication Technology*

Introduction

Information and Communication Technology's rapid development has made ICT imperative. The interest in ICT has drawn significant research interest (Dutton,2004),, and more importantly, ICT contributes directly to the significant changes in teaching and learning that have been occurring in regards to e-learning(Radcliffe,2002). A new paradigm that makes use of ICT in education is known as e-learning. Therefore, higher educational institutes around the world have started to amend their strategies to adopt technologies that assist in achieving their pedagogical goals. E-learning is commonly defined as the intentional use of ICT in teaching and learning (Naidu, 2003).

Among the ICT tools LMS is the one that is incorporated into the education sector. LMS is one of the rapidly-emerging technologies that is widely used in higher education. There are so many LMS available but among them Moodle is the best emerging LMS as it is open source and easy to incorporate. LMS are also known as course management system, virtual learning environments and e-learning courseware (Gibbons, 2005).

A successful implementation of LMS should highly consider academics who will use such systems for teaching. The aim of this research is to find whether the students have accepted the LMS with the framework of Extended Technology Acceptance Model (ETAM) (Rachel, 2017). The study investigates the usage of LMS in the teaching and learning of Computer Science undergraduate students of a higher educational institute with a stress on the attitudes and experiences of learners in relation to implementation of the LMS as a teaching and learning tool in the classroom.

One of the investigator working as Assistant Professor in the department of Computer Science in a University in Coimbatore implemented LMS Moodle for the final year undergraduate students of BCA (Rachel, 2016). The students accessed the LMS for learning materials, submitted assignment (Rachel, 2016), attended quiz (Rachel, 2017), discussed in forum, chat. Extended Technology Acceptance Model (ETAM) (Rachel, 2017) tool is used to find the acceptance of LMS. The construction and standardization of the ETAM tool which has constructs like perceived ease of use, perceived usefulness, attitude toward usage, behavioural intention to use, self-efficacy and access control is discussed in (Rachel, 2017).

Methodology

The investigators used normative survey method to administer the data collection. A total sample of 48 students of final year undergraduate BCA students of a women's University in Coimbatore who used LMS for the subject Data Analytics and Business Intelligence was taken up for the present study. The tool was distributed to the students and was given assurance that the data will be used only for research purpose. Proper instructions were given so the students were able to provide meaningful responses for the questions. The reliability measures of the ETAM constructs were above the minimum recommended level of 0.70 and hence, the questionnaire is a reliable measurement instrument. The data were collected and used for further analysis. Refer Appendix I.

Table 1 Descriptive Statistics

Constructs	Mean	Standard Deviation
Perceived Ease of Use	3.4526	0.133
Perceived Usefulness	3.4689	0.109
Attitude Towards Usage	3.5281	0.122
Behavioural Intention to Use	2.6529	0.076
Self Efficacy	2.5740	0.072
Access Control	2.6100	0.093

The ETAM constructs perceived ease of use had 32 items, perceived usefulness with 19 items, Attitude towards usage with 16 items, Behavioural Intention to Use with 7 items, Self Efficacy with 5 items and Access control with 6 items.

Out of the questions presented to identify each of the factors that students perceived to be important attitude towards usage received the highest mean value of 3.52 while self efficacy received the lowest mean value of 2.57. Refer Table 1.

Statistical Analysis and Hypothesis Testing

Correlation analysis was conducted to examine the relationship between the variables used within this study, and to decide whether or not to accept or reject the null hypotheses. Hypothesis was tested based on the whole sample. Hypotheses on the relationship between TAM original variables are presented.

Hypotheses for TAM Variables

H1-Perceived ease of use has positive relationship with perceived usefulness

From the correlation analysis result in Table 2, it can be observed that perceived ease of use has a significant positive relationship with perceived usefulness of a LMS. Therefore, H1 is supported.

Table 2 PEU and PU Correlations

Correlations		
Factors		**PU**
PEU	r-value	0.987**
	p-value	0.000
	N	48
PEU- Perceived Ease of Use PU-Perceived Usefulness		

H2-Perceived ease of use has positive relationship with attitude towards usage

From the correlation analysis result in Table 3, it can be observed that perceived ease of use has a significant positive relationship with attitude towards usage of a LMS. Therefore, H2 is supported.

Table3 PEU and ATU Correlations

Correlations		
Factors		**ATU**
PEU	r-value	0.969**
	p-value	0.000
	N	48
PEU- Perceived Ease of Use ATU-Attitude towards usage		

H3-Perceived ease of use has positive relationship with behavioural intention to use

From the correlation analysis result in Table 4, it can be observed that perceived ease of use has a significant positive relationship with behavioural intention to use of a LMS. Therefore, H3 is supported.

Table 4 PEU and BIU Correlations

Correlations		
Factors		**BIU**
PEU	r-value	0.829**
	p-value	0.000
	N	48
PEU- Perceived Ease of Use BIU-Behavioural Intension to use		

H4-Perceived ease of use has positive relationship with self-efficacy

From the correlation analysis result in Table 5, it can be observed that perceived ease of use has a significant positive relationship with self efficacy of a LMS. Therefore, H4 is supported.

Table 5 PEU and SE

Correlations		
Factors		**SE**
PEU	r-value	0.913**
	p-value	0.000
	N	48
PEU- Perceived Ease of Use SE-Self Efficacy		

H5-Perceived ease of use has positive relationship with access control

From the correlation analysis result in Table 6, it can be observed that perceived ease of use has a significant positive relationship with access control of an LMS. Therefore, H5 is supported.

Table 6 PEU and AC

Correlations		
Factors		**AC**
PEU	r-value	0.828**
	p-value	0.000
	N	48
PEU- Perceived Ease of Use AC-Access Control		

H6-Perceived usefulness has positive relationship with attitude towards usage

From the correlation analysis result in Table 7, it can be observed that perceived usefulness has a significant positive relationship with attitude towards usage of an LMS. Therefore, H6 is supported.

Table 7 PU and ATU

Correlations		
Factors		**ATU**
PU	r-value	0.969**
	p-value	0.000
	N	48
PU- Perceived Usefulness ATU-Attitude towards usage		

H7-Perceived usefulness has positive relationship with behavioural intention to use

From the correlation analysis result in Table 8, it can be observed that perceived usefulness has a significant positive relationship with behavioural intention to use of an LMS Therefore, H7 is supported.

Table 8 PU and BIU

Correlations		
Factors		**BIU**
PU	r-value	0.808**
	p-value	0.000
	N	48
PU- Perceived Usefulness BIU- Behavioural Intension to use		

H8-Perceived usefulness has positive relationship with self-efficacy

From the correlation analysis result in Table 9, it can be observed that perceived usefulness has a significant positive relationship with self-efficacy of an LMS Therefore, H8 is supported.

Table 9 PU and SE

Correlations		
Factors		SE
PU	r-value	0.902**
	p-value	0.000
	N	48
PU- Perceived Usefulness SE- Self Efficacy		

H9-Perceived usefulness has positive relationship with access control

From the correlation analysis result in Table 10, it can be observed that perceived usefulness has a significant positive relationship with access control of an LMS Therefore, H9 is supported.

Table 10: PU and AC

Correlations		
Factors		**AC**
PU	r-value	0.820**
	p-value	0.000
	N	48
PU- Perceived Usefulness AC- Access Control		

H10-Attitude towards usage has positive relationship with behavioural intention to use

From the correlation analysis result in Table 11, it can be observed that attitude towards usage has a significant positive relationship with behavioural intention to use of an LMS Therefore, H10 is supported.

Table 11 ATU and BIU

Correlations		
Factors		**BIU**
ATU	r-value	0.797**
	p-value	0.000
	N	48
ATU-Attitude towards usage BIU-Behavioural Intension to use		

H11-Attitude towards usage has positive relationship with self-efficacy

From the correlation analysis result in Table 12, it can be observed that attitude towards usage has a significant positive relationship with self-efficacy of an LMS Therefore, H11 is supported.

Table 12 ATU and SE

Correlations		
Factors		**SE**
ATU	r-value	0.874**
	p-value	0.000
	N	48
ATU-Attitude towards usage SE- Self Efficacy		

H12-Attitude towards usage has positive relationship with access control

From the correlation analysis result in Table 13, it can be observed that attitude towards usage has a significant positive relationship with access control of an LMS Therefore, H12 is supported.

Table 13 ATU and AC

Correlations		
Factors		**AC**
ATU	r-value	0.783**
	p-value	0.000
	N	48
ATU-Attitude towards usage AC- Access Control		

H13-Behavioural intention to use has positive relationship with self-efficacy

From the correlation analysis result in Table 14, it can be observed that behavioural intention to use has a significant positive relationship with self-efficacy of an LMS Therefore, H13 is supported.

Table 14 BIU and SE

Correlations		
Factors		**SE**
BIU	r-value	0.952**
	p-value	0.000
	N	48
BIU- Behavioral Intension to use SE- Self Efficacy		

H14-Behavioural intention to use has positive relationship with access control

From the correlation analysis result in Table 15, it can be observed that behavioural intention to use has a significant positive relationship with access control of an LMS Therefore, H14 is supported.

Table 15 BIU and AC

Correlations		
Factors		**AC**
BIU	r-value	0.969**
	p-value	0.000
	N	48
BIU- Behavioural Intention to use AC-Access Control		

H15-Self-efficacy has positive relationship with access control

From the correlation analysis result in Table 16, it can be observed that self efficacy has a significant positive relationship with access control of an LMS Therefore, H15 is supported.

Table 16 SE and AC

Correlations		
Factors		**AC**
SE	r-value	0.974**
	p-value	0.000
	N	48
SE- Self Efficacy AC- Access Control		

The table below summarises the hypothesis after the testing was done

Hypothesis	Statement	Result
H1	Perceived ease of use has positive relationship with perceived usefulness	Supported
H2	Perceived ease of use has positive relationship with attitude towards usage	Supported
H3	Perceived ease of use has positive relationship with behavioural intention to use	Supported
H4	Perceived ease of use has positive relationship with self-efficacy	Supported
H5	Perceived ease of use has positive relationship with access control	Supported
H6	Perceived usefulness has positive relationship with attitude towards usage	Supported
H7	Perceived usefulness has positive relationship with behavioural intention to use	Supported
H8	Perceived usefulness has positive relationship with self-efficacy	Supported
H9	Perceived usefulness has positive relationship with access control	Supported
H10	Attitude towards usage has positive relationship with behavioural intention to use	Supported
H11	Attitude towards usage has positive relationship with self-efficacy	Supported
H12	Attitude towards usage has positive relationship with access control	Supported
H13	Behavioural intention to use has positive relationship with self-efficacy	Supported
H14	Behavioural intention to use has positive relationship with access control	Supported
H15	Self-efficacy has positive relationship with access control	Supported

Conclusion

This study discussed the acceptance of LMS among undergraduate Computer Science students' using Extended Technology Acceptance Model (ETAM). It validates the relationship between the constructs of ETAM perceived ease of use, perceived usefulness, attitude toward usage, behavioural intention to use, self-efficacy and access control. From the study we found each construct has a strong relationship between each other and it proves that students' has accepted the technology based learning. Most significantly, this study could benefit other undergraduate students to adopt e-learning technologies.

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APPENDIX-1

Questionnaire Form

Dear Respondent,

This is a research survey carried out on the usage of Learning Management System (LMS). Please provide the data by completing the questionnaire. Thank you for your ultimate support.

V.Rachel
Ph.D Research Scholar
Dept.of Educational Technology
Bharathiar University
Coimbatore

----------Read the items carefully and decide how you feel about it. To do this, you have to put a tick mark [√] in the relevant columns. Please do not omit any statement. The information you furnish will be confidential and will be used for research purpose only.[Note:SA-Strongly Agree,A-Agree,D-Disagree,SD-Strongly Disagree]

S.No	Questions	SA	A	D	SD
	Perceived Ease of Use (PEU)				
1	I find LMS is easy and friendly to use				
2	LMS is flexible and interactive to learn subjects				
3	The interface is pleasant				
4	It is easy to become skilful in using LMS				
5	I find LMS not easy to use because of my lack of experience				
6	Interacting with LMS requires much mental effort				
7	The language used in LMS is easy to understand				
8	Accessing the activities (Assignment, Quiz, learning materials, forum) are easy				
9	Activities such as assignment, learning material, quiz and forums in LMS are clear and understandable				
10	LMS is a package where learning materials, assignment, quiz, forums are all at one web portal				
11	It is convenient to download learning materials in .ppt, .doc. and .pdf format				
12	It is easier to listen to the audio based learning materials				
13	It is easier to view the video based learning materials				
14	Allows to access learning materials as many times as needed				
15	It is convenient to upload assignment as a file in any format (.doc, .pdf and .ppt)				
16	It is convenient to submit assignment by typing text in text editor				
17	LMS helps to add images easily in assignment preparation				
18	Hyperlinks in activities (Assignment, Quiz, learning materials, forum) are properly connected				

19	Accessing links to the external web resources is easy				
20	It is convenient to attend Multiple Choice online quiz				
21	It is convenient to attend Short answers in Quiz				
22	It is convenient to attend Descriptive answers in Quiz				
23	Easy to participate in the survey				
24	Easy to communicate with other students through 'chat' feature				
25	Easy to communicate with other students through 'message' feature				
26	Easy to communicate with teacher through 'chat' feature				
27	Easy to communicate with teacher through 'message' feature				
28	LMS can be accessed anytime through internet from inside the campus				
29	LMS can be accessed anytime through internet from outside the campus				
30	LMS can be accessed through smart phones				
31	LMS can be accessed through ipad/tablet devices				
32	Easy to handle technical difficulties if arises				
	Perceived Usefulness (PU)				
1	LMS improves my academic achievement(Internal/External marks)				
2	Has a positive effect on my learning				
3	LMS with the support of traditional teaching method helps me to learn better				
4	Learning materials uploaded are available throughout the semester and hence it gives flexibility to learn anytime				
5	LMS gives me learning materials and other information that I need at right time				
6	Helps in accessing unit wise 'learning materials' according to the syllabus				
7	The calendar in LMS helps to know the assignment submission date				
8	The calendar helps to know the quiz participation date				
9	Helps to improve questioning and answering performances in forum participation				
10	Submission of assignment, attending quiz, downloading learning materials can be done from anywhere				
11	LMS allows me to complete assignment on time than would otherwise be not possible if submission done manually				
12	Feedback on assignment given by the teacher is very useful to learn further				
13	LMS allows me to participate in quiz on time than would otherwise be not possible				
14	Attending Quiz helps to test the knowledge gained from learning materials distributed through LMS				
15	Attending Quiz helps to test the knowledge taught in traditional teaching				
16	Knowing the immediate answer(feedback) at the end of the quiz helps to correct the mistakes				
17	Helps to know the marks immediately after submission of quiz				
18	News forum in LMS is useful to know the events				
19	RSS Feed in LMS is useful to know the current News				

	Attitude Toward Usage (ATU)				
1	Learning through LMS is a good idea				
2	LMS makes me to realize anywhere and anytime learning				
3	I feel positive towards LMS				
4	LMS has all the functions and capabilities required for a learning environment				
5	LMS has to be an essential part of this graduation programme				
6	Wish all the subjects be taught by face-to-face/traditional learning method and supported through LMS				
7	Wish all the subjects be taught by face-to-face/traditional learning method only				
8	Wish all the subjects be taught through LMS only				
9	Interested in using LMS for all subjects				
10	LMS is useful only when teacher provides appropriate learning materials and relevant activities				
11	Believe I could become successful in using LMS				
12	Learning the subjects through LMS is more difficult than learning in a traditional classroom				
13	The organization of information on the screens of LMS is clear and understandable				
14	LMS requires proficiency in Information Technology (IT)				
15	Learning through LMS is acceptable				
16	LMS is becoming more popular in universities and colleges				
	Behavioural Intention to Use (BIU)				
1	I intend to be a user of LMS frequently in my learning activities				
2	I like to use new learning methods other than traditional way of learning				
3	I intend to learn more about the features of LMS				
4	I would recommend other students to use LMS				
5	I intend to continue using LMS every semester				
6	I intend to use LMS as part of my daily learning activities				
7	I will use LMS in the future if I get any opportunity				
	Self-Efficacy				
1	I could use the LMS if only I had the manual for reference				
2	I could use the LMS if I see someone else using it before trying it myself				
3	I could access learning materials on the LMS even if there is no one around to show me how to use it				
4	I feel confident using the LMS				
5	I have the necessary skills for using LMS				
	Access Control				
1	The submission of assignment material by me is accessible only by the teacher				
2	I cannot see other student's assignment material				
3	I cannot see other student's assignment marks				
4	The feedback for assignment given by the teacher is accessible only by me				
5	I cannot see other's student's feedback given by the teacher				
6	I cannot see other student's quiz marks				