Journal of Sri Lanka Library Review, Volume 36, Issue I1, June 2022, 69-83
DOI: http://doi.org/10.4038/sllr.v36i2.53

Use of Technology Acceptance Model to investigate the acceptance of learning management system amongst academics using selected universities in Sri Lanka

Wickramasinghe, D.[1], Suraweera, N[2].

Abstract

This study aimed to investigate the technology acceptance of Moodle learning management system (LMS) amongst academics in public and private universities in Sri Lanka. The study was carried out in 2019 before the Covid-19 pandemic plaguing Sri Lanka. As a result of e-learning adoption, LMS is a very popular tool that is used in an e-learning environment in public and private universities around the globe. The study population of this research was the academics who teach in Social Sciences & Humanities, Commerce & Management Studies and Computing & Technology at the University of Kelaniya (UOK) and Business, Humanities & Sciences and Computing in the Sri Lanka Institute of Information Technology (SLIIT). The sample selected using the Morgan table and sample size was 174 and 64 academics from UOK and SLIIT. This study selected stratified random sampling to get an accurate population. A total of 121 academics responded to this survey and those were 60 from a public university and 61 from a private university. The online and printed questionnaires were distributed to academics from selected faculties such as Social Sciences, Humanities, Commerce and Management Studies, and Computing & Technology in public and private universities. The objective of this paper was to develop a theoretical framework by testing five variables Perceived Ease of Use (PEOU), Perceived Usefulness (PU), Attitude toward use (ATU), Behavior Intention to Use (BIU) and Actual Use (AU) and tested

[1] Librarian, Law & Society Trust, No 3, Kynsey Terrace, Colombo 08, Sri Lanka
Email: dilani.wickramasinghe84@gmail.com https://orcid.org/ 0000-0002-5865-9321
[2] Senior Lecturer, Department of Lib. & Info. Science, University of Kelaniya, Sri Lanka
Email: namali@kln.ac.lk https://orcid.org/0000-0002-9191-8989

Received: 15 February 2022, Accepted revised version : 30 May 2022
This work is licensed under a Creative Commons Attribution-Share Alike 4.0 International License.

model was Technology Acceptance Model (TAM). Both types of universities have been using common LMS which is based on Moodle, the public university called it 'Computer Assisted Learning/CAL' while the private university called it 'COURSE WEB'. The research findings indicate that there is the strongest path coefficient between BIU and AU in both universities and the private university indicated the highest coefficient. Further, there is no significant relationship shown between perceived usefulness (PU) and behavioural intention to use (BIU) of Moodle LMS in both universities and no significant relationship between perceived ease of use (PEOU) and attitude towards use (ATU) of Moodle LMS in academics in the private university.

Keywords: Learning Management System (LMS), Academics, Technology acceptance model (TAM), Public and private universities, Moodle

Journal of Sri Lanka Library Review, Volume 36, Issue I1, June 2022, 69-83
DOI: http://doi.org/10.4038/sllr.v36i2.53

Introduction

Due to the fast development of information communication technology (ICT) in society, similar to other sectors, the education sector is also facing challenges day by day. As an example, e-learning becomes a more active method of today's education but there are challenges in getting everyone's active involvement. Alharbi and Drew (2014), stated that e-learning is a new paradigm for education with the increase in ICT access. According to Archana et al. (2013), e-learning teaches students to use fully enriched learning materials in multimedia content. According to Alharbi and Drew (2014), a learning management system (LMS) is one of the ICT tools which is incorporated into education and it is a rapidly-emerging technology in higher education. LMSs have become mainstream in higher education over the last decades and many universities have widely used them as a supportive or supplementary tool in the teaching and learning process (Cited in Walker et al. (2016). Most universities adopted LMS to support on-campus and off-campus activities as it provides a complete learning environment for students.

As LMS becomes a necessary tool in education, most universities prefer acquiring open-source LMS over commercial ones. Moodle is an open-source LMS and it has two types of features i.e. resources and activities. Activity modules include assignment, chat, choice, database, external tool, feedback, forum, glossary, lesson, mootyper, questionnaire, quiz, scorm package, survey, wiki and workshop. The resource module has URL, page, file, book, label, IMS content package and folder. Though the Moodle LMS has many interactive features, using them for education is still limited.

Although the universities have implemented LMSs in their education system, it is essential to investigate who uses such systems for teaching and learning. Alharbi and Drew (2014), developed a theoretical framework based on the technology acceptance model (TAM) to measure academics' behavioural intention for using an LMS. Almarashdeh et al. (2011), examined the factors which influence users' acceptance and use of LMS and tested the applicability of the technology acceptance model.

Journal of Sri Lanka Library Review, Volume 36, Issue I1, June 2022, 69-83
DOI: http://doi.org/10.4038/sllr.v36i2.53

Theoretical Development

As LMS is an essential tool for university academics and students, it is very important to investigate user acceptance using the technology acceptance model. To explain the relationship between determinants, many theories have been proposed in past studies. Factors such as user attitudes, perceptions, beliefs and system usage (Alharbi & Drew, 2014) are some determinants of tested models.

To investigate the acceptance of computer technology, there are various models used in past research. According to Paluri and Mehra, (2015), the technology acceptance model (TAM) (Davis, 1989) is an adaptation of the theory of reasoned action (TRA) (Ajzen and Fishbein, 1980). Davis (1986), introduced TAM and it is a well-known theory and it tested in the field of information systems (IS) (Alharbi & Drew, 2014).

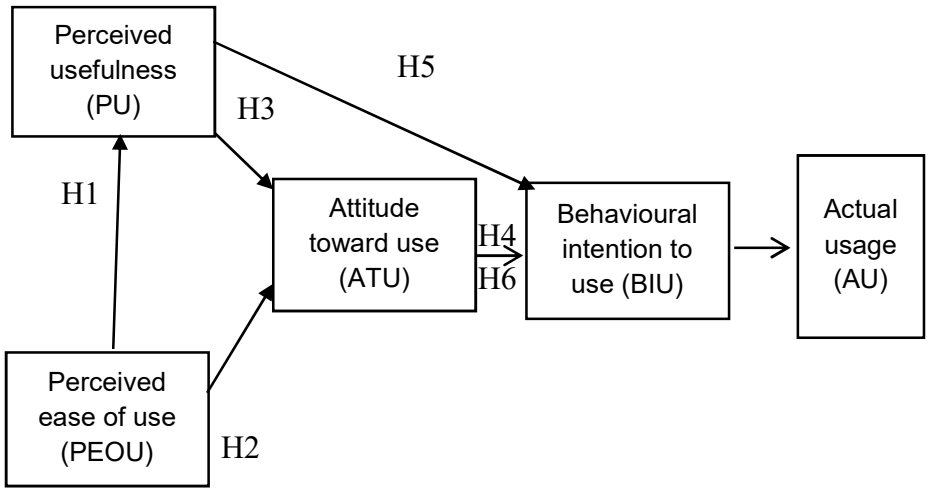

Figure 1: Initial Technology Acceptance Model
Source: Davis (1989)

Figure 1 shows the technology acceptance model (TAM) and it measured TAM constructs namely Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Attitude Toward Use (ATU), Behavior Intention to Use (BIU) and Actual Use (AU). In numerous studies, TAM has been used to test user acceptance and Durodolu (2016) mentioned that TAM is a prominent theory

that examines the influence of technology adoption. Paluri and Mehra (2015), stated that perceived ease of use (PEOU) and perceived usefulness (PU) are different factors influencing the attitude of use (ATU) of technology. Further, according to Taylor and Tod (1995), TAM has successfully predicted behavioural intention to adopt a new technology among inexperienced and experienced users.

To forecast technology acceptance, many studies have used TAM-based models. Therefore, this study focuses the initial TAM framework on identifying the LMS acceptance by academics in the private and public universities in Sri Lanka.

Initial TAM components which lead to six hypotheses in this study are as follows;

H1: Perceived ease of use (PEOU) positively affects perceived usefulness (PU) to use LMS
H2: Perceived ease of use (PEOU) positively affects attitude toward use (ATU) LMS
H3: Perceived usefulness (PU) positively affects attitude toward use (ATU) LMS
H4: Attitude toward use (ATU) positively affects behavioral intention to use (BIU) LMS
H5: Perceived usefulness (PU) positively affects behavioral intention to use (BIU) LMS
H6: Behavioral intention to use (BIU) positively affects actual use (AU) LMS

Method

Participants

This is a comparative study between public and private universities in Sri Lanka, selected universities were only two. To better understand and identify the acceptance of Moodle LMS there is a need to focus on all the universities under the university grants commission (UGC) in Sri Lanka. But this study remained only one public and one private university which are from Western

province due to the limitation of time and financial resources. But there are 15 public and 21 private institutions which offer degree programs in Sri Lanka under the university grant commission.

A method of quantitative approach was used to collect data from selected universities and the study administered a survey with open-ended and closed-ended questions. The research strategy was the survey method and the survey strategy used in the study was a questionnaire. The questionnaires were distributed to obtain data from academics who were from a public university and a private university. Selected academic groups which included tutor to senior professor level including any age group. The sample was selected using the Morgan table by Krejcie and Morgan (1970), according to that; questionnaires were distributed online and manually. This study followed the stratified random sampling method and the sample selected was in proportion to the size of each stratum in the population and chosen starters were the faculties.

This study followed the stratified random sampling method and questionnaires distributed to 174 public university academics and 64 private university academics. The research design includes a descriptive case study of the use of LMS among academics in both universities in selected faculties.

Research instruments

A survey instrument was the questionnaire and it consists of academic demographic data such as faculty, gender, age and academic status. The second part focused on the constructs which are from the conceptual research model. Demographic data coded were given numbers in ascending order starting from 1 (gender coded 1=male, 2=female). Each construct includes several questions and altogether there were 57 questions. TAM constructs used a five-point Likert scale and each point is given numbers 1,2,3,4, and 5 (Strongly Disagree- 1 to Strongly Agree- 5). 15 minutes took to complete the online or printed questionnaire which was distributed to academics who agreed to take part of this study. The pilot study was carried out with two academics in each faculty and the total was eight academics who can assume the roles of the specific and general audience.

According to them, check the reliability and validity of the questionnaire and changes were made accordingly. To assemble the meaningful data, qualitative and quantitative analysis processes were used and data was coded and labelled under themes. Statistical Package for Social Sciences (SPSS) 25 package and Microsoft excel were used to analyze the collected data and techniques which were used descriptive and regression for this study.

Results

Reliability and Validity

Cronbach's α is the most commonly used test to determine the internal consistency of an instrument and a result is a number between 0 and 1. According to Crutis and Drennan (2013), an acceptable reliability score is 0.7 and when it is greater than 0.8 indicates a good internal consistency. On the other hand, validity is defined as the extent to which a concept is accurately measured in a quantitative study. KMO measure the sample adequacy and the values are between 0 to 1 and when it is greater than 0.6 confirms a high validity of the sample.

Table 1: Reliability and Validity test

Constructs	Cronbach's Alpha	KMO Value	No of items
Perceived Ease of Use (PEOU)	0.913	0.898	15
Perceived Usefulness (PU)	0.949	0.918	13
Attitude toward Usage (ATU)	0.922	0.901	14
Behavioral Intention to Use (BIU)	0.936	0.881	6
Actual Use (AU)	0.901	0.848	8

According to table 1, the reliability test i.e. Cronbach’s alpha > 0.7, is considered reliable. KMO value for each construct was above 0.6. So, Bartlett’s test of sphericity value was sufficient to proceed with the analysis.

Journal of Sri Lanka Library Review, Volume 36, Issue I1, June 2022, 69-83
DOI: http://doi.org/10.4038/sllr.v36i2.53

Path analysis and testing hypotheses in research model

To investigate the acceptance, regression analysis has been used in this study and TAM constructs have been taken as independent and dependent variables according to the model. Based on table 2, shows the path coefficient for each construct.

According to Cramer (2003), path analysis helps to set up a model showing how other variables are thought to be related to others. It shows how variables are interconnected with lines, and each path evolves two variables. Path analysis helps to examine the relationship between a dependent variable and two or more independent variables.

Table 2: Summary of structural model path coefficient academics in public university

Hypotheses	Path	Path Coefficient	Standard Error	T Statistics	P Values	Result
H1	PEOU->PU	0.801	0.090	8.854	0.000	Accepted
H2	PEOU->ATU	0.148	0.097	1.519	0.134	Rejected
H3	PU->ATU	0.676	0.092	7.341	0.000	Accepted
H4	ATU->BIU	0.791	0.134	5.909	0.000	Accepted
H5	PU->BIU	0.044	0.122	0.363	0.718	Rejected
H6	BIU->AU	0.937	0.124	7.545	0.000	Accepted

P<0.025

Based on path analysis, the hypotheses of some of the p values of the path were significant because of p<0.025 under 95% confidence interval level. Therefore, four hypotheses can be accepted while two were rejected.

Table 3: Summary of structural model path coefficient academics in private university

Hypotheses	Path	Path Coefficient	Standard Error	T Statistics	P Values	Result
H1	PEOU->PU	0.470	0.104	4.541	0.000	Accepted
H2	PEOU->ATU	0.116	0.116	1.545	0.128	Rejected
H3	PU->ATU	0.613	0.082	7.521	0.000	Accepted
H4	ATU->BIU	0.710	0.118	5.998	0.000	Accepted
H5	PU->BIU	0.060	0.103	0.588	0.559	Rejected
H6	BIU->AU	0.941	0.127	7.386	0.000	Accepted

P<0.025

Journal of Sri Lanka Library Review, Volume 36, Issue 11, June 2022, 69-83
DOI: http://doi.org/10.4038/sllr.v36i2.53

Based on path analysis, the hypotheses of some of the p values of the path were significant because of p<0.025 under the 95% confidence interval level. Therefore, four hypotheses can be accepted and two were rejected by the private university.

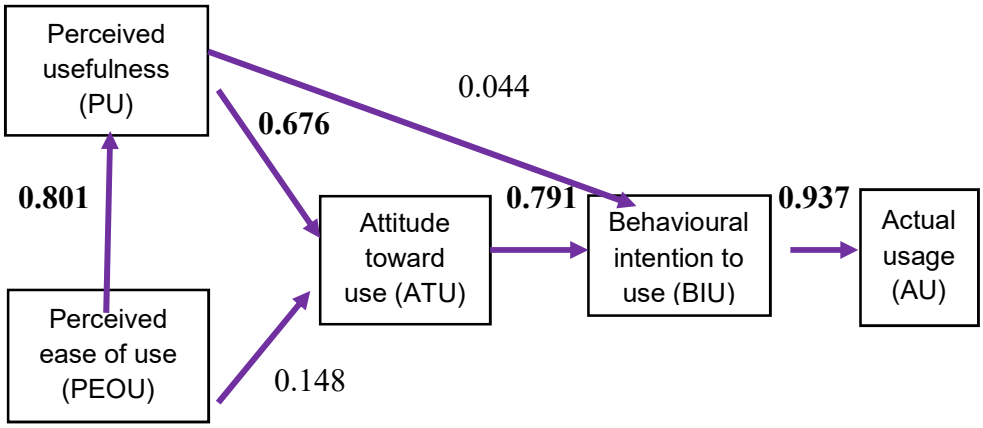

Figure 2: Model testing results for academics in public university

In figure 2, the testing model for the public university shows only a few relationships maintain a high level of significance, and the strongest path coefficient is presented in the relationship between BIU and AU (0.937). Secondly, there is a high coefficient between PEOU and PU (0.801, higher than the private university). There is no significant relationship between perceived ease of use (PEOU) and attitude towards to use (ATU) of LMS. There is no significant relationship between perceived usefulness (PU) and behavioural intention to use (BIU) of LMS.

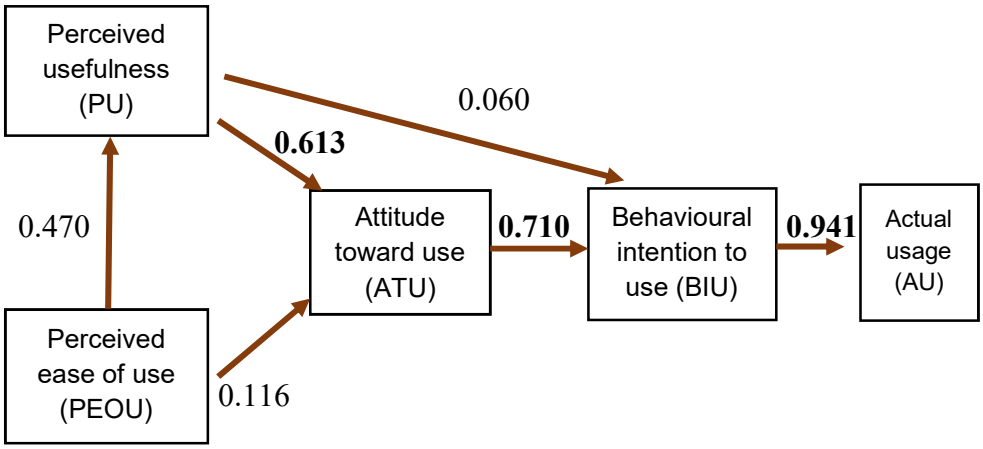

Figure 3: Model testing results for academics in the private university

In figure 3, private university shows few relationships that maintain a high level of significance, and the strongest path coefficient is presented in the relationship between BIU and AU (0.941, higher than public university). Secondly, there is a high coefficient between PU and ATU (0.613, less than the public university). There is no significant relationship between; PEOU and ATU of LMS and PU and BIU of LMS.

Accepted hypotheses were for public and private universities;

H1: Perceived ease of use (PEOU) positively affects perceived usefulness (PU) to use LMS
H3: Perceived usefulness (PU) positively affects attitude toward use (ATU) LMS
H4: Attitude toward use (ATU) positively affects behavioral intention to use (BIU) LMS
H6: Behavioral intention to use (BIU) positively affects actual use (AU) LMS

Discussion and Implication

This study indicated that the Technology Acceptance Model could play a dynamic role to understand the acceptance of the Learning Management System amongst academics in both universities. According to De Smet et al. (2012), specified in their research perceived ease of use is the strongest predictor of acceptance of LMS. Mokhtar, et al. (2018), in their study indicated three predictors such as PU, PEOU, and Task Technology Fit (TTF) to the behavioural intention to use LMS. This study was carried out before the Covid-19 situation in Sri Lanka and at this point, there were limited LMS activities were used in the Sri Lankan Universities.

Purple lines indicated public university, while brown lines indicated private university. Broken lines indicate a proposed model's relationships among factors that were not accepted from the output model.

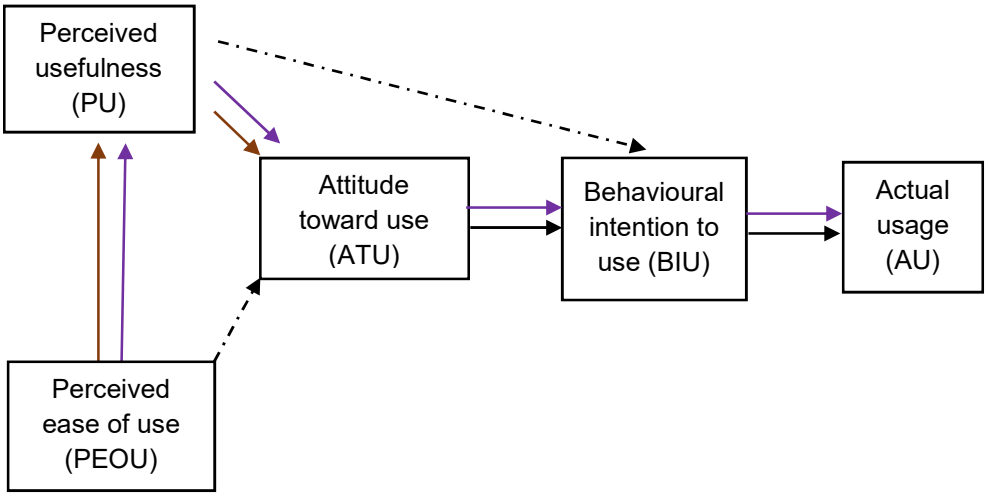

Figure 4: Output model for academics in the public and the private universities

According to their acceptance of Moodle LMS, the new output models are given for both types of universities. There are many new activities introduced to Moodle LMS during the Covid-19 period such as virtual programming lab, zoom meeting, blog, group choice, attendance, E-voting, games, and so on and it might be an impact on the findings related to LMS usage highly than ever.

Conclusion and limitation

Academics' acceptance of Moodle LMS

The proposed TAM model did not match the output model. Only four hypotheses were matched with academics in both universities. So, academics have no relationship between the perceived ease of using Moodle LMS and attitude toward using Moodle LMS.

This is because academics might know using technology would enhance their performance, but they don't have a positive attitude towards using technology such as learning management systems.

People use technology in a work-related setting, but they don't have a positive attitude toward using the technology Lee, et al. (2006).

Further, there is no relationship between the perceived usefulness of Moodle LMS and behavioral intention of the use of Moodle LMS. Sometimes use of an LMS without having more skills and training made a high effort to use and it might not effect to behavioral responses of users. According to Binyamin et al. (2017), specified that behavior intention to use represents behavioral responses of users.

From the regression analysis, academics' coefficient between behavioral intention to use Moodle LMS and Actual use of Moodle LMS in the public university is higher than the private university. According to TAM constructs, a few relationships maintain a high level of significance, and the strongest path coefficient between BIU and AU in both universities, and the private university's coefficient is higher than in the public university.

Academics in public university finds it easy to use the LMS when their perceived usefulness of LMS increases. That means they don't need much effort, and they are capable of enhancing the teaching performance. Further, academics in the public university who perceived the LMS as being useful will increase their attitude toward using LMS, those who have the attitude to use LMS will increase their behavioral intention to use LMS, and those who have a behavioral intention to use LMS will increase their actual use of LMS in teaching.

Limitations

Most private universities do not provide Humanities and Sciences degrees in Sri Lanka. The selected private university has four faculties namely; Humanities and Sciences, Computing, Business, and Engineering.

Further, this study focused only on academics in both universities. However, to get a better idea of university acceptance of Moodle LMS, the students', and IT administrators' opinions are also very important.

Further research

This study investigated academics' perceptions of using Moodle LMS in both universities before the Covid-19 pandemic. But after the pandemic,

there were a lot of activities added to the LMS, and rise of the use of online education become increased during that period. As a result of it, LMS became very famous among academics and students.

As administrators have a role to manage the LMS environment, there should be a need to investigate administrators' perceptions as well as students' perceptions on managing and maintaining Moodle LMS.

Moreover, this study focused on only two universities in the Western province of Sri Lanka. To get a reasonable and reliable idea for the whole university system, future research should be done in the national-level study using a cluster sample and proposed model.

Acknowledgements

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. Further, this article presents findings related to one of the research objectives of the major research project which conduct a partial requirement of fulfilling the Master of Social Sciences Degree in Library and Information Science at the University of Kelaniya, Sri Lanka.

References

Alharbi, S., & Drew, S. (2014). Using the Technology Acceptance Model in Understanding Academics' Behavioural Intention to Use Learning Management Systems. *International Journal of Advanced Computer Science and Applications*, *5*(1). https://doi.org/10.14569/IJACSA.2014.050120

Almarashdeh, I. A., Sahari, N., Zin, N. A. M., & Alsmadi, M. (2011). Acceptance of learning management system: A comparison between distance learners and instructors. *Advanced in Information Sciences and Service Sciences*, *3*(5), 1–9. https://doi.org/10.4156/aiss.vol3.issue5.1

Archana, T., Abhishek, K., & Pallavi. (2013). E-learning: initiatives in India. *Open Journal of Education*, *1*(3), 61–69.

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behaviour.* Englewood Cliffs, NJ: Prentice-Hall

Binyamin, S., Rutter, M., & Smith, S. (2017). The Students' acceptance of learning management systems in Saudi Arabia: a case study of King Abdulaziz University. In *INTED 2017 Proceedings* (Vol. 1, pp. 9324–9333). IATED. https://doi.org/10.21125/inted.2017.2205

Cramer, D. (2003). *Advanced quantitative data analysis*. Open university press.

Curtis, E., & Drennan, J. (Eds.). (2013). *Quantitative health research methods: issues and methods* (1st ed.). Open university press.

Davis, F.D. 1989. Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 13, 319-340

De Smet, C., Bourgonjon, J., De Wever, B., Schellens, T., & Valcke, M. (2012). Researching instructional use and the technology acceptation of learning management systems by secondary school

Durodolu, O. (2016). Technology Acceptance Model as a predictor of using information system' to acquire information literacy skills.

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational And Psychological Measurement, 30*, 607-610. Retrieved from https:// home .kku.ac.th/sompong/guest_speaker/KrejcieandMorgan_article.pdf

Lee, H. H., Fiore, A. M., & Kim, J. (2006). The role of the technology acceptance model in explaining effects of image interactivity technology on consumer responses. *International Journal of Retail and Distribution Management, 34*(8), 621-644. doi:https://doi.org /10.1108/ 09590550610675949

Mokhtar, S. A, Katan, H., & Hidayat-ur-Rehman, I. (2018). Instructors' Behavioural Intention to Use Learning Management System: An Integrated TAM Perspective. *TEM Journal 7*, 513-525.

Olumide, O. D. (2016, November). Technology Acceptance Model as a predictor of using information system' to acquire information literacy skills. *Library Philosophy and Practice (e-Journal)*, 1-27. doi:https://doi.org/10.1016/j.ygyno.2014.12.020

Paluri, R., & Mehra, S. (2015). Exploring the acceptance for e-learning using technology acceptance model among university students in India. *International Journal of Process Management and Benchmarking*, *5*, 194–210. https://doi.org/10.1504/IJPMB.2015.068667

Taylor, S., & Todd, P. A. (1995). Understanding Information Technology Usage: A Test of Competing Models. *Information Systems Research*, *6*(2), 144–176.

Walker, D. S., Lindner, J. R., Murphrey, T. P., & Dooley, K. (2016). LEARNING MANAGEMENT SYSTEM USAGE: Perspectives from University Instructors. *Quarterly Review of Distance Education*, *17*(2).