

# ***The Perception of Using Learning Management System In Higher Education: An Empirical Investigation Using TAM***

**Diyenti Rusdin<sup>1</sup>, Marzuki<sup>2</sup>, Ismail Yunus H<sup>3</sup>, Nila Irmayani<sup>4</sup>, Agung Rinaldy Maliik<sup>5</sup>**

Universitas Madako

Email: agungrinaldy11@gmail.com

**Abstrak.** The goal of this study is to identify the lecturers perceptions of using a learning management system (LMS) in the teaching of E-Learning procedures in English Department of Madako University. It was a qualitative study that involved three Lecturers and four students as participants. These persons served as English Department lecturers during the academic years 2020/2021. The TAM theoretical framework is applied to explain the uptake of LMS in terms of its perceived ease of use and utility. It was revealed that as long as the professor use LMS are (a) in perceiving ease of use, it is seen that the score of lecturers is 4,7 percent strongly agreed and agreed 52,3 percent while the score of uncertain lecturers is 42,80 percent (b) The sense of usefulness is strongly agreed upon by 17 percent of respondents, and agreed upon by 56 percent of respondents, despite the fact that 27 percent are suspicious. As for the usage of LMs, 22 percent strongly agree, 44 percent agree, and 33 percent doubt (c) this is the attitude toward which they should be utilized. (d) behavioral intention to use, where the mean score of the lecturer is agreed upon at 67 percent and doubted at 66,65 percent; and (e) job relevance, where the mean score of the lecturer is agreed upon at 67 percent and doubted at 49,95 percent. The researcher comes to the conclusion that the perception of English instructors regarding the employment of LMS is a neat idea.

**Keywords:** *LMS, Lecturer Perception, E-Learning*

**INTERFERENCE**  
Journal of Language,  
Literature, and  
Linguistics

**E-ISSN: 2721-1835**

**P-ISSN: 2721-1827**

**Submitted : 8<sup>th</sup> July 2022**

**Accepted : 30<sup>th</sup> August 2022**

## INTRODUCTION

Online technologies have been widely employed in higher education to promote some sort of co-learning between students and lecturers since the digital revolution. Online, a vast amount of information is available in a variety of formats. All learning resources can be evaluated at any time and from any location by students and professors. When digital technologies are integrated into educational settings, lecturers have a critical role to play in ensuring that students use online tools appropriately.

Nowadays, higher education (HE) institutions utilize learning management systems (LMS) to ensure that course materials are accessible 24 hours a day, seven days a week. This technology enables instructors to monitor and manage their students' access to course materials and learning activities. It serves as a vehicle for knowledge exchange and as a means of communication. As a result, the LMS has enabled lecturers and students to utilize digital technology in educational settings. Numerous higher education institutions have used LMS to improve the quality of teaching and learning, equip users with technology skills, and encourage users to be more participatory. The LMS is used to distribute course materials to students, enable instructors to communicate with them, and to evaluate students' performance. Lecturers must entice students with relevant and engaging e-learning content. As a result, they must leverage LMS to the fullest extent possible while providing students with learning resources.

When online technology are used in conjunction with creative teaching approaches, there is a shift in teaching practices. By providing new avenues for connection and interaction between students and lecturers, online technologies have the ability to expand the bounds of traditional classrooms. Instructors must establish a virtual environment conducive to interaction between students and lecturers. However, transitioning a university from a traditional to an online-based approach requires careful consideration, since instructors and students may require time to adjust to the new environment.

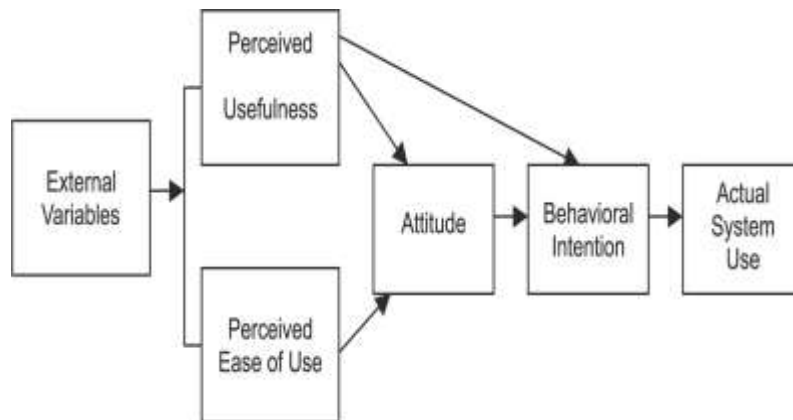
Therefore, acceptance of LMS by lecturers is critical to the efficient application of LMS in higher education. The willingness of lecturers to accept and use LMS would result in an increase in usage and would encourage students to use LMS in class as well. When a new e-learning environment is introduced, it must be accepted by the people who will be using it. Various elements, such as the implementation, end users' concerns, system acceptance, technological dependability, and security all have an impact on how consumers perceive their systems and services. For lecturers, it is vital to take into account the various aspects that influence their decision to use a learning management system (LMS). In order to accomplish this, academics are attempting to understand the relationship between perceptions of technology (such as PU and PEOU) and the conduct of lecturers when using technology as a teaching tool.

Several studies have examined students' impressions of LMS. However, there is a dearth of research on how instructors feel about using LMS in the classroom. Therefore, we offer an interplay posable study to discover the actual

utilization of LMS by lecturers at a private higher education school that just adopted an LMS (Moodle).

### Technology Acceptance Model (TAM)

On the basis of Fishbein and Ajzen (1975) theory of rational behavior, Fred Davis (1989) established the Technology Acceptance Model (TAM) in 1989. (TRA). In place of many of TRA's attitude measures, TAM uses the two technological acceptance measures of simplicity of use, and utility. Davis's TAM includes perceived ease of use, perceived utility, attitude toward using, behavioral intention to use, and actual system use



Picture1. Illustrates the TAM by Davis

The degree to which a person believes that the use of a system would improve his/her performance (Davis, 1989) is referred to as perceived usefulness (PU). Purposeful Use (PU) is the extent to which a student believes that using the technology would improve their performance. Intention to utilize the technology can be strongly determined by the presence or absence of a PU (Jonas, 2011).

This is because the effectiveness of a system in the classroom is intimately related to how effectively lecturers can employ technology to engage students. The utility of a learning management system (LMS) is the most important component to consider when conceptualizing the quality of learning and teaching in a university context. If a new system can assist them in attaining their goals, both lecturers and students will be willing to adapt to it. The perceived simplicity of use has an impact on the perceived usefulness as well.

According to the definition, perceived ease of use (PEOU) refers to "the degree to which a person perceives that the usage of a system would be easy" (Davis, 1989). PEOU is described as "the extent to which a student perceives that using technology would be relatively straightforward perceived ease of use of technology (Jonas, 2011). It is specifically defined as the assessment of the extent to which using the technology is devoid of effort. If a technology is too complex or difficult to use, people will seek out an alternate technique rather than relying on the new technology to accomplish their goals.

TAM is a technique that is often used to investigate individuals' attitudes and behavioral intentions regarding the acceptance of technology. It gathers feedback from real-life participants and gives advice on how to use Internet-based teaching

platforms, among other things. Liu, Liao, and Peng (2005) investigate the acceptance behavior of users who participate in web-based streaming e-learning. The findings demonstrate that the media-rich interface created higher levels of perceived utility than the text-audio and audio-video-based presentations, which were compared. Pardamean, Suparyanto, and Kurniawan (2013) establish that the TAM is a valid tool for assessing user acceptance of the application of graph theory in a learning management system (LMS). According to the concept, when consumers are faced with a new technology, perceived ease of use and perceived utility are the elements that impact their decision about how and when they will utilize the new technology.

Recent studies that have looked at technology acceptance have found that TAM is capable of predicting and explaining why consumers prefer to use information systems in a variety of contexts and environments. Because of its understandability and simplicity, TAM is widely used in information systems research (Šumak, 2011; Gefen, 2000). TAM has also been used in an e-commerce scenario to investigate whether or not PEOU has an impact on IT adoption. According to the findings of the study, TAM is completely applicable to business-to-business and business-to-consumer systems. TAM was also used to investigate the level of adoption of telemedicine technology among physicians. In their study, Hu et al. (1999) demonstrated that the TAM is a good intention-based model for explaining and predicting consumer adoption of computer technology.

TAM has emerged as a critical theoretical instrument for ICT in education research domains, particularly in higher education. Despite the fact that TAM is extensively used to predict technology acceptance in higher education settings, Venter, Rensburg, and Davis (1989) shown that TAM is a theoretical framework that has been employed in ten previous studies. Nair (2011) also feels that the TAM is a robust model that is extremely good at assessing technology acceptance and predicting actual use of information and communication technologies in teaching and learning.

TAM is also appropriate for use in other types of educational settings. For example, Chong, C., (2010); Wong, K. T. (2013) validated TAM in the context of integrating technology into their teaching and learning, and Dibrell, C., Craig, J., & Hansen, E. (2011) investigate the impact of usability of mobile learning in higher education institutions. Based on the results, it was determined that the system's usability assists students in their academic endeavors. A significant relationship exists between students' awareness of and motivation toward technology, as well as their readiness for the pedagogical application of mobile learning in the classroom.

Several previous studies have used TAM to investigate the adoption of Moodle, including (Šumak, 2011; Chen, 2012). Despite the fact that there have been studies conducted using TAM to analyze Moodle, the contexts in which they have been conducted are different. Using TAM in the Slovenian context, Šumak et al. (2011) investigate the factors that influence students' perceptions of Moodle acceptance in the acceptance of Moodle using TAM. Hsu and Chang (2013) investigate whether or not students are willing to use Moodle for their educational

needs. In the study's findings, it was discovered that perceived ease of use is the most significant determinant that has a direct impact on students' attitudes toward using Moodle. Because TAM has been adapted to higher education, it has been used as a conceptual framework in this study to understand the adoption of LMS by lecturers in terms of perceived usefulness and perceived ease of use, as well as perceived accessibility.

### **Learning Management System**

A learning management system (LMS) gives 24/7 access to course materials. It controls student access to course materials and tracks their learning activities. A LMS is a tool for delivering course materials, sharing expertise, and communicating with students (Mabed, 2012). Learning management systems (LMS) are designed to enhance traditional classroom instruction by allowing students to review and revise at their convenience. LMS allows lecturers to assess students and track their progress through online quizzes, wikis, blogs and discussion forums.

Using a learning management system (LMS) is encouraged by higher education institutions all around the world. For example, LMS are widely used in universities in the Middle East (Halawi, 2007), the United Kingdom (Muhsen, 2012), Taiwan (Hsu, 2013; Chen, 2007). Learning management systems (LMS) have the ability to boost utilization while also improving overall student experiences.

Using online discussion and chat rooms, lecturers can not only exchange lecture notes and learning resources with their students, but they can also encourage collaboration and involvement among students in a collaborative learning environment. Student discussion, sharing of points of view, discussion of problems, and commenting on ideas submitted by their peers are all encouraged and welcomed. Online discussion encourages student participation, allows for rich interactions, and facilitates the development of a sense of community (Elmendorf, & J. Ottenhoff, 2009).

Course facilitators are cultivating a more open environment in which students are expected to stay connected and to actively participate in class discussions. Students are given the opportunity to share what they have learned with their peers through the use of wikis, blogs, and discussion boards. According to the literature, the primary function of a learning management system (LMS) is to communicate the intended learning activities to students and to serve as a content repository for the creation and maintenance of materials. It promotes students' learning experiences through the use of self-assessment quizzes, and it also serves as a form of online communication medium between lecturers and their students.

### **Moodle**

Martin Dougiamas created Moodle in 2002. Moodle is an open source LMS (LMS). Moodle's implementation architecture is good. Many universities worldwide have embraced it (Halawi and R. Mccarthy, 2008). Moodle is a type of LMS for educational purposes (Psycharis, 2013). Students receive lecture notes via Moodle, and their performance is assessed by assignments and quizzes. Forums, wikis, and blogs are available for collaborative learning (Šumak, 2011). Moodle encourages self-directed learning, encourages student interaction, and fosters a sense of

community. The authors of [Zakaria & Daud \(2012\)](#) say Moodle may be utilized to provide information and create dynamic collaborative learning communities. Moodle is free open source software (OSS). Moodle is copy righted, but users can copy, use, and alter the features as long as they share them with others.

There are over ten thousand Moodle sites. Because Moodle is open source, it is difficult to estimate the number of Moodle sites currently in use. Moodle is adaptable, low-cost, and easy to configure ([Hölbl and T. Welzer, 2010](#)). It's well-established and extensible. According to past studies, students and lecturers like Moodle's performance and stability ([Walker, 2011](#); [Hölbl and T. Welzer, 2010](#); [Saleem, N. E., 2016](#)).

Most research on Moodle focuses on students' perceptions ([Psycharis, 2013](#); [Zakaria, and Y. Daud, 2013](#); [Evans, 2008](#)). This study's LMS is Moodle. Moodle was implemented at the institution in early 2012 as part of a strategy effort to integrate ICT into the curriculum.

## RESEARCH METHOD

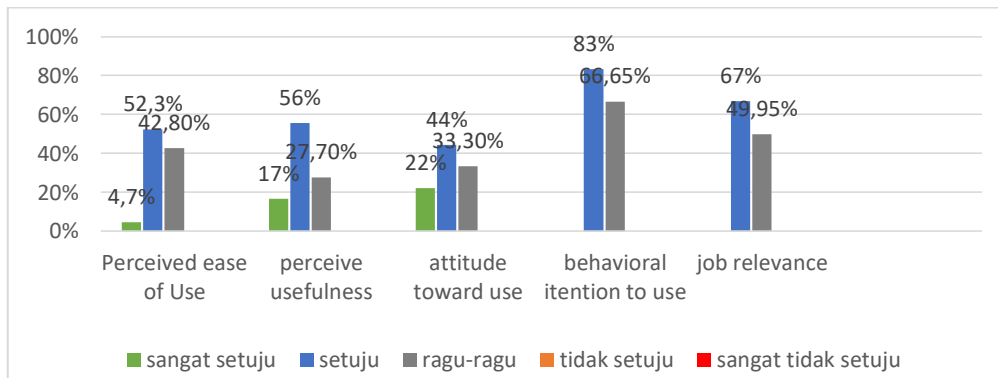
A questionnaire was built online to answer research questions. Four lecturers and students were involve in this research as sample. The online questionnaire provided quantitative and qualitative data. Google Doc was used to put the questionnaire online. Both lecturers and students received the questionnaire via word-of-mouth via Facebook and Twitter. Respondents were encouraged to engage by email. Email stated the study's purpose. A reminder email was issued in the second week to enhance response rate.

Questions were designed carefully by evaluating their contribution towards the achievement of the research questions, as they were specified in the research proposal. The questions include the respondents' demographic, experiences in using Moodle and perceptions in using Moodle in term of perceived usefulness and perceived ease of use. The online questionnaire comprises close-ended questions such as multiple-choice items and 5-likert scale items, and some openended questions. Close-ended questions have important advantages such as providing the respondents with an easy way of indicating their answers and permits the respondents to state the answer categories that were most suitable for their purposes. In this research, there were also open-ended questions asked to allow respondents to write their personal views in order to gain deeper understanding about the issues under study. The qualitative data resulted from the open-ended questions embedded in the questionnaire. All the questions were put in a meaningful order and format according to categories of PU and PEOU. The questionnaire takes 15 minutes to complete. After checking for clarity and appropriateness, all queries were emailed. The questionnaire link was confirmed for accuracy. Microsoft Word tables were used to categorize and classify open-ended question patterns.



## RESULT AND DISCUSSION

### The Result of Questionnaire



Based on the result of questionnaire, there were five aspects to know lecturers' perception. The first Based on the result above in aspects perceived ease of use conclude the lecturers were ease to operate learning management system. Based on the result about Perceived usefulness conclude those lecturers believe that using learning management system in teaching improve their job performance, Attitude toward Using conclude the lecturers' perception on using learning management system is a positive feeling performing of using LMS. Based on the result above on behavioral intention to use conclude the English lecturers will continue applying this application or LMS. And based on the result above in job relevance conclude the English lecturers are provide clarify about the use of learning management system. After the researcher did the research about lecturer' perception toward the using learning management system in Universitas Madako Tolitoli

### The lecturer perception of Learning Management System

MF "I already know about that how to run out, how to operate, how submit the file documents, how to make video comprehending, ...I think it easy but only the new feature makes me a little bit confuse".

The researcher concluded those lecturer feels easy when operate this platform (LMS) because when he was in student at graduate at state in university of Makassar he applied this application and he knows well how to operate but it is not easy at all because some of the features are not well known well known in my in his teaching learning process because it is very update.

IND "LMS is a process to facilitate learning in English especially at this time in the pandemic covid-19 we are now learning remotely so it is somewhat better that we use LMS in learning process". The researcher concluded lecturer feels easy to operate LMS, and the lecturer thinks LMS is a very good in learning process because LMS is a process to facilitate the lecturer in teaching in an online process in this pandemic of covid-19. MRMS "LMS is one device

that available to help teacher and lecturer in arranging teaching material and method in university, I never feel difficulties or got some troubles taught through LMS". The researcher concluded the lecturer feels clear and understandable to operate or use learning management system, and lecturer didn't feel difficulties on using this application but sometimes the lecturer annoyed because he has been prepared everything for teaching online but the network is not run well when he teaches students used LMS.

### Student perception

*"I feel very comfortable, this application is easy to access and use" (MN)". "I felt not comfortable because the material given is not entering in our brain, they just give the material in LMS (AAF)"*

The researcher concluded one student feels comfortable in using LMS because LMS is easy to access, and some students feel that using LMS is not comfortable, and they don't really understand online system because the lecturers only give the materials and assessment without explanation and student cant understand it. The lecturer perception on operate LMS in academic year

*MF "when I teach my students in face to face learning I I'm not also give the student by given the assignment darkly face to face but also I give them online meeting".*

The researcher conclude the lecturer uses LMS in online learning and also when he teaches students face to face learning too he gives students by given the assignment directly but the lecturer gives the assignment in an online meeting(LMS) so the student have to send their assignment to the learning management system so the lecturer means he can combine of using leaning management system in face to face or in an online meeting and its not only in the classroom but also out of classroom.

*IND "I will still use or operate LMS even When the pandemic is over, because it really helps me when I'm out of town".*

The researcher conclude the lecturer will still use LMS When the pandemic is over because her position is not only in one place and when she stayed in Tolitoli the lecturer teaches students by face to face but when she stayed in Palu she used LMS in the teaching process.

*MRMS "I will wait and see. LMS is controlled by the university so lecturers depends on university police whether it could be used or not in academic process".*

The researcher conclude the lecturer will wait and see will use LMS or not in academic process in the future because LMS is controlled by the University so the lecturer depends on University.



### **Student perception**

*“Affective, because this is ease to use and get information using LMS” (MN)*

*“I think is not truly effective to do, because according to me I am still lack of English if the lecturer just give the material just in LMS because nothing explanation from the lecturer”(AAF).*

The researcher conclude one student perception that using LMS is effective because in LMS student can get the information of materials from lecturer and also LMs is ease to operate, and some students perception that LMS is not affective in learning process

### **The lecturers’ feeling of use LMS**

*MF “when we operate learning management system the first is the clear how o ask the students, how to give instructions to students how to submit aa the files or documents video comprehending and make zoom meeting I think it so very easy for me”.*

The researcher conclude the lecturer feels easy and clear in operate learning management system in submit file, documents and video comprehending also make zoom meeting.

*IND “according to me for the use of this LMS there are positives as well as negatives, if I think so, I can say this LMS is positive”.*

The researcher conclude the lecturer says this LMS is positive because LMS is really needed during a pandemic and also if I am out of town the lecturer can monitor when the clock is still able to teach while she is still out of town especially in Palu.

*MRMS “Absolutely yes. Lecturer can manage, control and save their files during and after teaching process”.*

The researcher conclude the lecturer feels positive idea in using LMS, because LMS can manage and control the lecturer file since they use LMS to teach in an online process.

### **Students perception**

*“No, because in offline learning student can increase their English but in an online learning student can’t increase their English” (MA)*

*“Yes, it can improve my knowledge about how to apply the LMS because LMS is still new for me” (SN)*

The researcher conclude one student disagree that LMS can increase his knowledge in English learning and some of students’ perception LMS can improve their knowledge based on how to operate and apply this application because LMS is new in learning academic.

### The Lecturer Perception on difficulty of LMS

MF *“as I said before that I don’t have lack of experience of using LMS, so according to this situation when I know already about learning management system”*.

The researcher concluded that LMS is relevant in lecturers’ job and the lecturer doesn’t have lack of experience of using learning management system and the lecturer known well to operate LMS.

### Students perception

*“At the first time, I feel very comfortable this application is easy”*(MN)  
*“I don’t really understand an online system and how to apply the application of LMS”*(SN).

The researcher conclude the students perception the researcher found that students feel that using learning management system is comfortable and easy to operate it but some students feel they don’t really understand how to operate this application in an online learning.

### Discussion

This part presents the discussion of the research findings. The discussion focuses on the finding of the research question of this study. The discussion is about the lecturer perception on the application of learning management system in the teaching e-learning process in teachers’ English department. The researcher employed questionnaire and interviewing to the English lecturers in order to find lecturer perception on the application of learning management system in the teaching e-learning process at Universitas Madako Tolitoli.

In relation to the result of questionnaire given to the 3 English lectures and 4 English students in six semesters about their perception who uses LMS in teaching and learning process. Namely MR, II and MRMS. The results of this study indicate that as long as lecturers use learning management system based on Wijaya (2006) are in perceive ease of use it is found that mean score of lecturers are 4,7% strongly agreed and agreed 52,3% computation of the data is 57% and doubted is 42,80% the researcher conclude lecturers find easy to apply the learning management system in the online learning process. In perception of the usefulness of English lecturers it is found that mean score of lecturer is strongly agreed 17% and agreed 56% although doubted is 27,70% the researcher conclude that English lecturers can improve their performance in the teaching process. The perception of English lecturers in attitude toward the use of LMS, it is found that mean score of lecturer is strongly agreed 22%, agreed 44% and doubted is 33,30% so the researcher conclude the lecturers have a positive feeling of using the application of learning management system. Behavioral intention to use, it is found that mean score of lecturer is agreed 83% and doubted 66,65% so the researcher conclude based on the lecturers’ perception of the subject in using learning management system that they agree to apply learning management system, and for job relevance, it is found that mean score of lecturer is agreed 67%

and doubted 49,95% the researcher conclude that lecturers perception on using LMS provides harmony in the teaching e-learning process.

In accordance to findings above on interview the researcher can conclude that some the lecturer perception on using LMS is ease because the lecturers have already know about this platform or LMS in teaching and learning process but because LMS have been up date so the lecturer still understandable because the new feature of LMS and the lecturers still are not known well. The important of using learning management system is important because the lecturers can use LMS a lot in an online learning. The lecturers perception on operate LMS is the lecturer can give the assignment easily in an online meeting and LMS it help a lot lecturer in learning process in online. The lecturers' feeling of use LMS is the lecturers feel easy and clear in operate LMS in submit file, documents, and video comprehending and others. The lecturers' difficulties on using LMS the lecturers don't have lack of experience of using LMS and the lecturers known well in operate learning management system. The lecturers' way in evaluating the result of materials in using LMS is the lecturers have been evaluate students in using learning management system and the lecturers get the student is easy to operate LMS but because there is some of new students which they are new beginner they got some trouble in operate the LMS.

Based on students perception above of LMS the researcher conclude the students are easy to access LMS, and some students feel that using LMS is not comfortable, and they don't really understand online system because the lecturers only give the materials and assessment without explanation and student can't understand it. Students perception based on the important of using LMS are students feel easy to acces s, and some students feel that using LMS is not comfortable, and they don't really understand online system because the lecturers only give the materials and assessment without explanation and student cant understand it. And students perception on difficulties of using LMS students feel that using learning management system is students comfortable and easy to operate it but some students feel that they do not really understand how to operate this application in an online learning.

## **CONCLUSION**

Based on the findings of the lecturers who use LMS in the teaching process, the researcher can conclude that the English lecturers at Madako University are comfortable using LMS. The English teachers feel enhancing their teaching and learning performance will increase their usefulness. English lecturers believe students have pleasant experiences when utilizing an LMS. This is based on lecturers' perceived behavioral intention to utilize the system, which implies they will use the LMS in the future. LMS can clarify teaching for job relevance.

## REFERENCES

- Chen, H. H., Lee, M. C., Wu, Y. L., Qiu, J. Y., Lin, C. H., Tang, H. Y., & Chen, C. H. (2012, August). An analysis of moodle in engineering education: The TAM perspective. In *Proceedings of IEEE International Conference on Teaching, Assessment, and Learning for Engineering (TALE) 2012* (pp. H1C-1). IEEE.
- Chong, C., Lee, C., Go, Y., & Lam, C. (2010). Factors affecting the usage of WBLE (Web-Based Learning Environment): A Malaysian private university experience. In *Proceedings of the 5th International Conference on ELearning: ICEL* (p. 64). Academic Conferences Limited.
- Dibrell, C., Craig, J., & Hansen, E. (2011). Natural environment, market orientation, and firm innovativeness: An organizational life cycle perspective. *Journal of Small Business Management*, 49(3), 467-489.
- Davis, F. D. September 1989, "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology" *MIS Quarterly*, 13(3), 318-340.
- Elmendorf, H., & Ottenhoff, J. (2009). The importance of conversation in learning and the value of web-based discussion tools. Retrieved July, 10, 2012.
- Evans, C. (2008). The effectiveness of m-learning in the form of podcast revision lectures in higher education. *Computers & education*, 50(2), 491-498.
- Gefen, D., & Straub, D. W. (2000). The relative importance of perceived ease of use in IS adoption: A study of e-commerce adoption. *Journal of the association for Information Systems*, 1(1), 8.
- Halawi, L., & McCarthy, R. (2007). Measuring faculty perceptions of blackboard using the technology acceptance model. *Issues in information systems*, 8(2), 160.
- Hölbl, M., & Welzer, T. (2010). Students' feedback and communication habits using Moodle. *Elektronika ir Elektrotechnika*, 102(6), 63-66.
- Hu, P. J., Chau, P. Y., Sheng, O. R. L., & Tam, K. Y. (1999). Examining the technology acceptance model using physician acceptance of telemedicine technology. *Journal of management information systems*, 16(2), 91-112.
- Hsu, H. H., & Chang, Y. Y. (2013). Extended TAM model: Impacts of convenience on acceptance and use of Moodle. *Online Submission*, 3(4), 211-218.
- Jonas, G. A., & Norman, C. S. (2011). Textbook websites: User technology acceptance behaviour. *Behaviour & Information Technology*, 30(2), 147-159.
- Liu, S. H., Liao, H. L., & Peng, C. J. (2005). Applying the technology acceptance model and flow theory to online e-learning users' acceptance behavior. *E-learning*, 4(H6), H8.
- Muhsen, Z. F., Maaita, A., Odeh, A., Eljinini, M. A., Nsour, A., Azzam, M. A., & Ahed, M. (2012, June). Moodle caroline and blackbord systems. In *European, Mediterranean & Middle Eastern Conference on Information Systems*.
- Mabed, M., & Köhler, T. (2012). The impact of learning management system usage on cognitive and affective performance. In *Workshop Gemeinschaften in Neuen Medien (GeNeMe) 2012*.
- Nair, Indu, and V. Mukunda Das. "Analysis of recent studies undertaken for assessing acceptance of technology among teachers using TAM." *International Journal of Computer Applications* 32.8 (2011): 38-46.

- Pardamean, B. E. N. S., Suparyanto, T. E. D. D. Y., & Kurniawan, R. I. F. K. Y. (2013). Assessment of graph theory e-learning utilizing learning management system. *Journal of Theoretical and Applied Information Technology*, 55(3), 353-358.
- Psycharis, S., Chalatzoglidis, G., & Kalogiannakis, M. (2013). Moodle as a learning environment in promoting conceptual understanding for secondary school students. *Eurasia Journal of Mathematics, Science and Technology Education*, 9(1), 11-21.
- Šumak, B., Heričko, M., Pušnik, M., & Polančič, G. (2011). Factors affecting acceptance and use of Moodle: An empirical study based on TAM. *Informatica*, 35(1).
- Saleem, N. E., Al-Saqri, M. N., & Ahmad, S. E. (2016). Acceptance of Moodle as a teaching/learning tool by the faculty of the department of information studies at Sultan Qaboos University, Oman based on UTAUT. *International Journal of Knowledge Content Development & Technology*, 6(2), 5-27.
- Wong, K. T. (2013). Understanding Student Teachers' Behavioural Intention to Use Technology: Technology Acceptance Model (TAM) Validation and Testing. *Online Submission*, 6(1), 89-104.
- Walker, D., Livadas, L., & Miles, G. (2011). Key Influencing Factors behind Moodle Adoption in Irish Small to Medium Sized Higher Education Colleges. *European Journal of Open, Distance and E-learning*.
- Zakaria, E., & Daud, M. Y. (2013). The role of technology: Moodle as a teaching tool in a graduate mathematics education course. *Asian Journal of Management Science & Education*, 2(4), 46-52.