Application of the Unified Theory of Acceptance and Use of Technology (UTAUT) to the Use of Learning Management System (LMS)

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ABSTRACT

This research was conducted to determine the effect of performance expectancy, effort expectancy, social influence, and facilitating conditions on the use of a learning management system (LMS). The population in this study is students using the LMS. The research data were tested for validity, reliability tests, descriptive statistics, and structural equation model tests. Hypothesis testing was carried out with a variable model from the unified theory of acceptance and use of technology (UTAUT). The hypothesis test results show that performance expectancy, effort expectancy, social influence and facilitating conditions have a positive effect on the use of LMS. The conclusion of this study is that by understanding the factors that influence the acceptance and use of LMS based on UTAUT theory, educational institutions can design more effective strategies for introducing and adopting LMS, as well as providing the necessary support to LMS users so they can use it optimally.

Keywords: UTAUT, performance expectancy, effort expectancy, social influence, facilitating conditions, LMS

INTRODUCTION

In the current era of advances in information technology, learning via LMS (Learning Management System) has become very important in supporting the teaching and learning process. Along with technological developments, traditional learning methods that rely solely on textbooks and face-to-face teaching are no longer sufficient to meet the increasingly diverse learning needs of students. LMS is an online platform designed to support the teaching and learning process effectively and efficiently. In LMS, students and lecturers can access and interact with learning materials independently, and can communicate and collaborate online. Apart from that, LMS also allows users to manage and track their learning progress. Learning via LMS has many advantages, including facilitating access to learning materials, providing flexibility in time and place, enabling personalized learning according to student needs, increasing collaboration and communication between students and lecturers, and increasing student motivation and learning outcomes. In the current era of advances in information technology, learning via LMS has become a necessity to support an effective and efficient teaching and learning process. Therefore, the use of LMS must be properly integrated into the education system and become an alternative in a sustainable and highly competitive learning process in the era of globalization (Al-Nuaimi & Al-Emran, 2021; Raza et al., 2021).

A learning management system is a software application or web-based technology that is used to plan, implement and assess certain learning processes. According to Nguyen (2021) LMS or learning management system is a software or software for administrative purposes, documentation, activity reports, teaching and learning activities, and online activities connected to the internet), e-learning, and training materials, which is all done online. Kaewsaiha and Chanchalor (2021) explain that a learning management system is software used to create web-based online lecture materials and manage learning activities and their results. A learning management system is an e-learning practice which in its most general form consists

of two elements, namely a server that performs the basic functionality and a user interface operated by instructors, students and administrators.

The LMS function is a learning management system that provides a way for instructors to create and deliver content, monitor student participation, and assess student performance. Learning management systems also serve to provide students with the ability to use interactive features such as threaded discussions, video conferencing, and discussion forums. LMS can help improve traditional educational methods, saving time and money. Especially during a pandemic like now which may hinder face-to-face learning opportunities. An effective system will help instructors and administrators to more efficiently manage administrative functions such as user registration, content, calendar, user access, communications, certification, and notifications. In addition, LMS also has features to track and monitor student learning progress, including grades, activities, and class participation. LMS can be used for various types of learning, including distance education, blended learning, and independent learning. LMS is also often used in the context of employee training and development in companies (Chan et al., 2021; Wang, 2017).

Even though the Covid-19 pandemic will end someday, the use of LMS is still very much needed in the world of education and training. Here are some reasons why LMS is still needed after the COVID-19 pandemic: First, LMSs have proven effective in dealing with the challenges of enhanced distance learning during the pandemic. While most students and students have returned to class, it is possible that some may still choose to study remotely. In addition, emergency situations can occur at any time, and the LMS can assist education and training institutions to ensure the continuity of the teaching-learning process in the future. Second, an LMS can facilitate hybrid teaching, where students can take turns learning in class and remotely. This can allow more flexibility for students and help increase the efficiency and effectiveness of the learning process. Third, LMS can be used as a tool to assist education and training institutions in managing educational information and resources. In situations where important information can change rapidly, such as during the Covid-19 pandemic, an LMS can help organize and communicate information more easily and quickly. Finally, the use of LMS can help save time and costs in managing the learning process. LMS can allow easier and faster access to learning materials and resources, allowing lecturers and trainers to focus on direct interaction with students and trainees. Thus, even though the Covid-19 pandemic will end one day, LMS will still be a very useful tool in the world of education and training (AL-Nuaimi et al., 2022; Lwoga & Komba, 2015; Sk et al., 2021).

The importance of using information technology has begun to be realized by various organizations or companies, especially in the current era of globalization where companies are required to be able to compete and be increasingly competitive. However, it should be noted that building an information system requires a lot of time and money. The use of information systems besides providing many benefits, there are also organizations that fail to implement it. Failure to implement information technology systems in organizations can be caused by several factors, both internal and external (Abdou & Jasimuddin, 2020; Dwita, 2020). The decision to adopt an information technology system is in the hands of the manager, but the successful use of the technology depends on the acceptance and use of each individual user. To find out how much influence the use of the system has for users, technology acceptance can be used. Technology acceptance is the level of user acceptance of a technology. There are many models of technology acceptance that can be used. However, the technology acceptance model that will be used was regarding UTAUT (Unified Theory of Acceptance and Use of Technology) (Alshehri et al., 2019b; Tussardi et al., 2021).

UTAUT is a model developed by Venkatesh et al. (2012) in as a comprehensive mix of previous technology acceptance research. UTAUT has four key constructs (performance expectations, effort expectations, social influence, and facilitating conditions) influencing

behavioral intentions to use technology or use technology. Performance expectations are as a degree to use technology that benefits consumers in activities, social influence, namely the extent to which users perceive that other people are important (family and relatives) who believe that they must use certain technologies, and facilitate conditions that refer to consumer perceptions with resources and behavioral support to do. According to UTAUT, performance expectations, effort expectations, and social influence are theorized to influence behavioral intentions to use technology, while behavioral intentions and facility conditions determine technology use (Gayatrie et al., 2017; Sedana & Wijaya, 2010).

Performance expectancy, namely that each individual will use a system that can assist in achieving benefits for activities. Business expectation (effort expectancy) is the level of ease in using technology. Social influence is someone who can be trusted when using technology. Facilitating conditions, namely available infrastructure that can support the use of technology (AL-Nuaimi et al., 2022; Fidani & Idrizi, 2012). The UTAUT research model is a combination of theories of technology acceptance that are combined into one theory, namely performance expectancy, effort expectancy, social influence, facilitating conditions on the behavioral intention to use LSM. Based on what will be analyzed, the researcher wishes to conduct research on the factors of interest in using LSM by applying the UTAUT theory (Alshehri et al., 2019b; Azizi et al., 2020). The research questions are as follows:

1. Does performance expectancy affect the use of LSM?
2. Does effort expectancy affect the use of LSM?
3. Does social influence affect the use of LSM?
4. Do the facilitating conditions affect the use of LSM?

LITERATURE REVIEW

The function of the LMS as a whole is to help, in this case lecturers or lecturers, when making some assignments. Such as making a syllabus, managing learning materials, student or student activities, managing grades, recapitulating attendance, displaying grade transcripts to forums for discussion and conducting quizzes. The form of the LMS is an application as well as a web platform, this is considered to make it easier for teaching staff to plan the learning process online or online. Apart from functioning to help lecturers or teaching staff, LMS also functions to make it easier for students or students when they are going to access content or lecture material. The difference between traditional learning and the e-learning model is that in the traditional class, the lecturer is considered an all-knowing person and is tasked with imparting knowledge to his students, whereas in the e-Learning model the main focus is on students. Students are independent at certain times and are responsible for their learning. The learning atmosphere with the blended learning model will force students to play a more active role in their learning. Students make designs and find materials with their own efforts and initiatives (Alshehri et al., 2019b; Elfeky & Elbyaly, 2021; Sedana & Wijaya, 2010).

LMS is important to support the E-learning process because it provides many benefits for users, both for students and for lecturers, including:

1. Ease of Access to Learning Materials: With LMS, learning materials can be accessed anytime and from anywhere, as long as internet access is available. Students can study independently and flexibly without being limited by time and place.
2. Interactive and Engaging: LMS provides various multimedia formats such as video, audio, and animation, which make learning more interactive and interesting for students.
3. Personalized Learning: LMS allows students to learn at their own pace and learning style, so students can study more effectively.
4. Collaboration and Communication: LMS allows students and lecturers to interact and communicate online, both individually and in groups, thereby increasing collaboration in the learning process.

5. Improving Teaching Effectiveness: LMS provides facilities to create and manage assignments and exams online, so lecturers can monitor and evaluate student progress more easily and quickly.
6. Increase Efficiency: LMS can save time and money in the teaching and learning process, because students and lecturers no longer need to physically gather in one place.
7. Facilitate Monitoring and Evaluation: LMS provides accurate and complete data regarding student progress, making it easier for lecturers to monitor and evaluate student learning progress.
8. Increase Learning Motivation: With LMS, students can learn more independently and flexibly, thereby increasing learning motivation and better learning outcomes.

In conclusion, LMS E-Learning is important to support the learning process because it facilitates access to learning materials, is interactive and interesting, personalizes learning, collaboration and communication, increases teaching effectiveness, increases efficiency, facilitates monitoring and evaluation, and increases learning motivation (Mohammadi et al., 2021; Nguyen, 2021; Samaila et al., 2022).

UTAUT is a model to explain user behavior towards information technology. UTAUT is formulated with 4 core determinants of intention and usage, namely performance expectancy, effort expectancy, social influence, & facilitating conditions. Then each determinant influences behavioral intention and use behavior. UTAUT is expected to be a useful tool for managers who need to assess the likelihood of success for the introduction of new technologies and help them understand the drivers of acceptance to proactively formulate interventions (including training, marketing, etc.) targeted at populations. Users who may be less inclined to adopt and use the new system. Meanwhile, UTAUT2 is an expansion of UTAUT to study the acceptance and use of technology in the consumer context by adding 3 constructs, namely hedonic motivation, price value, and habit (Abdou & Jasimuddin, 2020; Garone et al., 2019).

Performance Expectancy is defined as the level of benefit or advantage obtained by consumers in using technology to carry out their daily activities. In Performance Expectancy, there are 3 sub-variables. The first is usefulness, which means the usefulness obtained in using technology in everyday life. The second is quickness, which is the degree to which a technology can speed up the work being done. Lastly is productivity, which is defined as an increase in related productivity in terms of user work when using a technology (Alshehri et al., 2019b; Elfeky & Elbyaly, 2021; Sedana & Wijaya, 2010).

Effort expectancy is defined as the level of effort or effort associated with using a system or technology by a user. There are 2 dimensions in effort expectancy, namely complexity and ease of use. Complexity is how complicated a technology is difficult to learn. Meanwhile, ease of use is the ease that is felt when using technology. Social influence is defined as the degree to which an individual feels that it is important for others (e.g., family and friends) to believe that they should use a particular system or technology. There are 2 dimensions in social influence, namely social factors and subjective norms. Social factors are related to the level of influence of people who are near users in using technology. Meanwhile, subjective norms are the influence of important people related to users on the use of technology (Abdou & Jasimuddin, 2020; Garone et al., 2019). Facilitating conditions are defined as the extent to which a person believes that resources and organizational support and technical infrastructure are available to support the use of the system. There are 3 dimensions of facilitating conditions, namely resources, knowledge, and compatibility. Resource is the presence of external sources that affect the use of technology. Knowledge is the existence of sources of knowledge from outside to use technology, and the third is compatibility, which is the level of compatibility of the system with the technology currently used (Alshehri et al., 2019b; Elfeky & Elbyaly, 2021; Sedana & Wijaya, 2010).

HYPOTHESIS DEVELOPMENT

In this study, the researcher wanted to provide an overview of the research model in the form of variables in UTAUT. The independent variables are performance expectancy, effort expectancy, social influence, facilitating conditions. The following is the development of the hypothesis that will be described:

Effect of Performance Expectancy on the Use of LSM

Performance expectancy is a factor that significantly influences the acceptance of information systems. Performance expectancy is one of the factors that measure acceptance of new technology. New technology users have the intention to accept the technology because they consider the new technology to have certain performance (Alfalah, 2023; Fidani & Idrizi, 2012). Usually prospective users have the view that the new technology has good performance. Performance expectancy has a significant positive effect on the use of LSM and the researchers formulate the following hypothesis:

H_1: *Performance expectancy has a positive effect on the use of LSM.*

Effect of Effort Expectancy on the Use of LSM

Effort expectancy is the level of ease associated with using the system. There are three constructions of the model that capture the concept of effort expectancy, the first being ease of use, complexity and ease of use. In research, effort expectancy can increase the use of LSM so that effort expectancy has a positive effect on the use of LSM. Someone will have the intention to use a new technology when they have a high effort expectancy. When potential users feel that the new technology is easy to adopt and does not require a big effort to adopt, they will intend to use the new technology (Abdou & Jasimuddin, 2020; Garone et al., 2019). We also adopt this in accepting LSMs and formulate the hypothesis as follows:

H_2: *Effort expectancy has a positive effect on the use of LSM.*

Effect of Social Influence on the Use of LMS

Social influence is the influence exerted by other people on individuals to use the new system. Relationships between close relatives can have a strong impact on an individual's use of LSMs. Social influence influences the use of LSMs. Someone will use new technology because they get input or input from outsiders. They gain knowledge or influence so that they have the urge to use new technology (AL-Nuaimi et al., 2022; Fidani & Idrizi, 2012). Likewise in using LSMs, external parties such as campus institutions, lecturers, friends and others can make someone want to use LSMs and the hypothesis is formulated as follows:

H_3: *Social influence has a positive effect on the use of LSM.*

Effect of Facilitating Conditions on the Use of LMS

Facilitating conditions are individuals who believe that the organizational and technical infrastructure of a technology supports the existing use system. This is considered as a person's belief in the use of technology because of adequate facilities. Very similar to social influence, conditions which facilitate a direct effect on intention and use of IS. Facilitating conditions affect the use of LSMs. The better the condition of the facilities offered by a new technology, the higher a person's intention to use the new technology (AL-Nuaimi et al., 2022; Fidani & Idrizi, 2012). A condition of the facilities offered can make someone willing to accept a new technology and the hypothesis is formulated as follows:

H_4: *Facilitating conditions have a positive effect on the use of LSM.*

RESEARCH FRAMEWORK

This study will systematically examine the effect of the independent variables are performance expectancy, effort expectancy, social influence, facilitating conditions in the using the LMS application. The research model developed can be seen in the following framework:
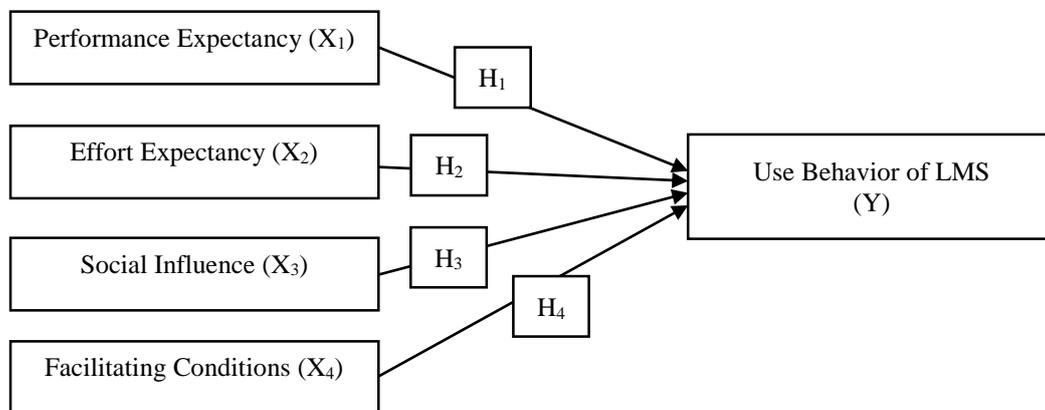
Figure 1. Research Framework

RESEARCH METHODS

Students at university already know the LMS application and use the LMS application. Therefore, the authors choose university students in Indonesia who have used the LMS application. For this research the population is a generalization area consisting of objects or subjects that have certain qualities and characteristics that are determined by researchers to be studied and then conclusions can be drawn. The sample is part of the number and characteristics possessed by the population. There are two commonly used sampling techniques, namely probability sampling and non-probability sampling (Ali & Bhaskar, 2016). This research uses quantitative methods. The purpose of using this method is to be able to determine the effect or relationship of one variable with other variables (Al-Nuaimi & Al-Emran, 2021; Raza et al., 2021). The sample selection used purposive sampling based on a specific goal, namely to analyze the effect of performance expectancy, effort expectancy, social influence, and facilitating conditions in the using the LMS application in Indonesia. This study uses data collection techniques with online google form questionnaires. The research questionnaire is divided into two categories. The first category contains 4 questions related to demographics (age, gender, etc.). In measuring answers from respondents, filling out this questionnaire can be measured using the Likert scale contained. Likert scale is a scale to measure a person's opinions, attitudes, and perceptions (Fink, 2011; Thomson, 2010).

DEFINITIONS OF OPERATIONAL VARIABLES

The variables in this study use the dependent variable and the independent variable. In the statistical regression model, the independent variable and the dependent variable are used to model the relationship between the independent variable and the dependent variable. Statistical regression models are often used to predict or estimate the value of the dependent variable based on the value of the independent variable. Independent variables are variables that are considered as factors or causes that affect the dependent variable. In the regression model, the independent variable is used to predict or estimate the value of the dependent variable. The independent variable is also known as the predictor variable or explanatory variable, in this study the independent variable is user behavior of LMS (Al-Nuaimi & Al-Emran, 2021; Raza et al., 2021).

The dependent variable is a variable whose value is predicted or estimated based on the value of the independent variable. In the regression model, the dependent variable is used as the output variable or the variable that must be predicted. The dependent variable is also known as the response variable. There are four independent variables in this research, namely: performance expectancy, effort expectancy, social influence, facilitating conditions. This study uses regression because the purpose of this research analysis is to find the relationship between the independent variables and the dependent variable. This can be done using regression analysis techniques to measure how strong the relationship between the independent variable and the dependent variable is. This relationship can be used to predict or estimate the value of the dependent variable based on the value of the independent variable (Abdou & Jasimuddin, 2020; Garone et al., 2019).

RESEARCH FINDING AND DISCUSSIONS

The object of this research are Indonesia students, the distribution of questionnaires is carried out only through Google form so that the questionnaire can be distributed without having to go directly to the respondents. The process of distributing questionnaires began from 15 November 2022 up to 30 January 2023. The total number of questionnaires distributed was 150 but the number of respondents that could be tested and processed was only 143. The researcher conducted a reliability test to ascertain whether the indicators used could be answered by respondents (either the same or different) consistently over time when used repeatedly. The following below shows that all instruments from each variable used are reliable, seen from Cronbach's Alpha greater than 0.6. The Cronbach's Alpha value of each variable marked in the red box above is greater than 0.6 (Fink, 2011; Thomson, 2010). This shows that all the instruments used in this study are reliable.

Table 1. Reliability Test Results

Variable	The Cronbach's Alpha	Composite Reliability	Average Variance Extracted
Performance Expectancy	0,795	0,866	0,618
Effort Expectancy	0,646	0,673	0,602
Social Influence	0,755	0,845	0,777
Facilitating Conditions	0,762	0,837	0,629
User Behavior of LMS	0,779	0,819	0,646

Researchers tested linear correlation between independent variables. This study does not contain Collinearity Statistics problems because the Variance Inflation Factor (VIF) value in the table below is smaller than 5. All inner VIF numbers less than 5 indicate that there is no multicollinearity between the independent variables.

Table 2. Collinearity Test Results

Variable	(M)	(y)
Performance Expectancy	1,650	1,662
Effort Expectancy	1,444	1,514
Social Influence	1,332	1,442
Facilitating Conditions	1,484	1,717
User Behavior of LMS	1,643	1,568

R Square shows the ability of in this research model to explain variations in user behavior of LMS with is 0,864 and user satisfaction, which is 0.682 greater than 0.50 is classified as all independent variables have ability to explain variations in the dependent variable.

Table 3. Coefficient of Determination Test Results (R^2)

Variable	R Square	R Square Adjusted
User Behavior of LMS	0,864	0,752

The following are the diagram of the PLS Algorithm processing in the research model used are as follows:
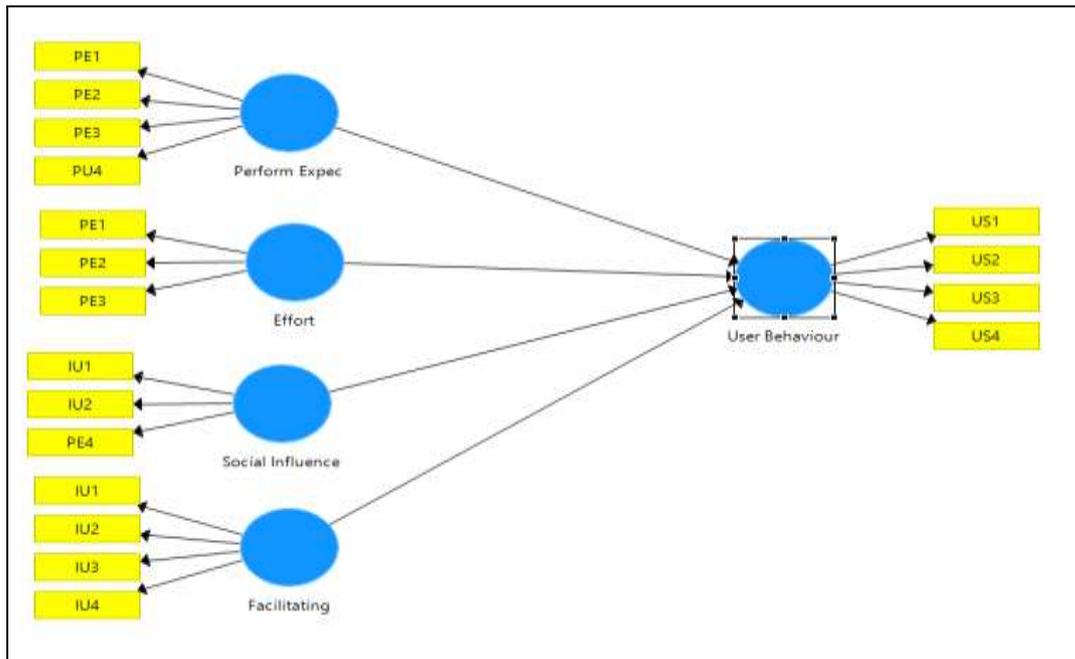
Figure 2. PLS Algorithm Processing Model

Path Coefficients in the table below contain the path coefficient values (the numbers are located in the original sample column). All path coefficients in this study are positive as based on the Path Coefficients result, the researcher can test for each path with the results listed in the table below. A positive sign and p-value less than 0.05 indicates that the independent variable has a positive effect on the dependent variable.

Table 4. Path Coefficient

H.	Influence between Pathways	Beta (Original Sample)	Sign	Sample Mean	T-Statistic	P-value	Meaning
H_1	Performance expectancy ➜ user behavior of LMS	0,017	+	0,393	2,036	0,033	Performance expectancy has a positive effect on user behavior of LMS
H_2	Effort expectancy ➜ user behavior of LMS	0,347	+	0,344	4,683	0,009	Effort expectancy ➜ user behavior of LMS

H₃	Social influence ➔user behavior of LMS	0,519	+	0,233	3,298	0,027	Social influence ➔user behavior of LMS
H₄	Facilitating conditions ➔ user behavior of LMS	0,207	+	0,410	2,397	0,005	Facilitating conditions ➔ user behavior of LMS

Note: Significant P-value (Sig.) At α = 5%

For hypothesis number one (H₁) performance expectancy has effect to user satisfaction, the p value of 0,033 is less than 0.05 which means it has significant effect. Based on the research findings in this research, the performance expectancy variable has a positive effect on the intention to use the learning management system application. This means that performance expectancy plays a role in the interest in using LMS application users because students believe the LMS information system is useful for their studies. This shows that performance expectancy plays a role in user satisfaction, because the use of LMS applications can provide benefits for users in adding information to learning materials (Alfalah, 2023; Fidani & Idrizi, 2012).

For hypothesis number two (H₂) the p-value is less than 0.05 which means that effort expectancy has a significant effect on user satisfaction. Based on the findings of the researchers in this study, the performance expectancy variable has a positive effect on user satisfaction in using the LMS. This shows that the use of LMS applications can provide satisfaction for users in adding information. Researchers refer to the results of research conducted by Abdou & Jasimuddin, (2020) and Garone et al. (2019)that there is a significant and positive effect of performance expectancy on user satisfaction. With this perception of usability, users can use LMS applications more often because usability can add information and add insight and there are positive benefits.

Table 4 above shows the result of the test for hypotheses H₃ and H₄ based on the P-value that is smaller than 0.05 it can be concluded that social influence and facilitating conditions have significant effect on user behavior of LMS. The social influence and condition of the facilities can be said to have influenced the community to use online learning at this time, such as cellphones, tablets, laptop and internet. Judging from the respondents' responses, one must have a laptop and a good internet connection. However, only having a sophisticated laptop and internet is not enough, users must have knowledge of how to use the LMS. The good condition of the facility, which makes it easy for the user, which benefits the user, makes the user want to continue using the LMS. This is evidenced by the results of respondents' answers that support the availability of resources in the use of LMS. As in other studies, which say that these facilitating conditions and social influence have a positive influence on the intention to use LMS (Alfalah, 2023; Fidani & Idrizi, 2012).

CONCLUSION

Researchers concluded that technology and humans will go hand in hand with time. Many changes will occur in the future. The UTAUT model, has provided an explanatory theoretical model regarding the factors that influence individuals in the technology described by Alshehri et al. (2019a) and Jain & Jain (2022). That LMS is able to provide benefits for its users students in performance expectancy which help improve its education performance. The UTAUT theory can be used to understand the use of LMS by looking at the factors that influence the adoption and acceptance of the system. By leveraging UTAUT theory, lecturers can identify areas within the LMS that may need further improvement or development. For example, if perceptions of the usability of lecturer LMS are low, lecturer can improve the user interface or add more useful

features. By understanding the acceptability factors, lecturer can improve the design and development of lecturer LMS to better suit user needs.

SUGGESTIONS

Based on the reviews or opinions as well as the research process obtained, the discussion, conclusions and results that the researchers have conveyed, namely:

1. Make sure the interaction and Collaboration: Strive to create opportunities for interaction and collaboration between students and lecturers. Use features such as group discussions, group projects, or assignments that involve joint discussion and problem solving. This helps build rapport between students, encourages active participation, and improves understanding of the material.
2. Engaging Content: Create learning materials that are engaging and relevant to students. Use different types of content such as videos, images, infographics, and interactive simulations to explain concepts in a visual and engaging way. Provide variety in teaching methods to maintain student interest.
3. Constructive Feedback: Students need to get constructive feedback about their progress in online learning. Lecturers should provide specific comments and help students understand their strengths and weaknesses and provide clear directions for improvement.

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