

# Analysis of the Factors that Influence the Use of the Learning Management System: An Empirical Study in Indonesia During Pandemic COVID-19 Period

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**Abstract**— This study aims to analyze and influence perceived usefulness, perceived ease of use, intention to use as an intervening variable on user satisfaction with the Learning Management System (LMS) application. This study uses respondents, namely students who use LMS in universities. The sampling technique is purposive sampling. The questionnaire was distributed via google form. The number of respondents in this study were 233 students. The results showed that the perceived usefulness and perceived ease of use variables had a positive effect on intention to use, perceived benefits and ease of use had a positive effect on user satisfaction, and usage intention had a positive effect on user satisfaction. The conclusion of this study is the existence of LMS technology can be used to improve the quality of education, with LMS can add and improve educational teaching strategies. In the world of education, the use of LMS technology is very influential because LMS can provide convenience and also make the learning system more directed, effective and efficient.

**Keywords**— perceived usefulness, perceived ease of use, intention to use, and user satisfaction.

## INTRODUCTION

The COVID-19 pandemic has forced the world community to define the meaning of life, the purpose of learning, and the nature of humanity. If all this time, humans are forced to live in a fast-paced situation, work without stopping, and pursuit of economic growth targets in a competitive system. However, the spread of the Corona virus (Covid-19) which has become a major crisis for modern humans, forces us to breathe for a moment, stop from the vortex of the system, and look back at life, family, and the social environment in its truest sense. The massive spread of the Corona virus in various countries forces us to see the fact that the world is changing. We can see how the changes in the fields of technology, economy, politics and education in the midst of the crisis due to Covid-19. These changes require us to be prepared, respond with attitudes and actions while always learning new things. Indonesia is not alone in finding solutions for students to continue to learn and fulfill their educational rights. Until April 1, 2020, UNESCO recorded at least 1.5 billion school-age children affected by Covid 19 in 188 countries including 60 million of them in our country, Indonesia (<https://www.kompas.com>). The implementation of the physical distancing policy which later became the basis for implementing learning from home, with the sudden use of information technology, often surprises educators and students, including parents and even everyone in the house. Information technology learning has indeed been implemented in the last few years in the education system in Indonesia.

However, the online learning that took place as a surprise from the Covid-19 pandemic, shocked almost all lines, from districts/cities, provinces, centers, and even the international community. All affected countries have tried to make their best policies in maintaining the continuity of education services. During this Covid-19 pandemic, the education system must be ready to make a leap to transform online learning for all students and by all teachers and lecturers. All universities are entering a new era to build creativity, hone student skills, and improve self-quality by changing systems, perspectives, and patterns of interaction with technology commonly known as the learning management system (LMS) (A. Khan & Qudrat-Ullah, 2021; Alturki & Aldraiweesh, 2021).

In general, the notion of a learning management system (LMS) is software designed to create, distribute, and manage the delivery of learning content. This system can help lecturers to plan and create a syllabus, manage learning materials, manage student learning activities, manage grades, recapitulate student attendance, display grade transcripts, and manage e-learning displays (Balkaya & Akkucuk, 2021; Habibi et al., 2021). Because it is based on digital applications, in addition to making it easier for lecturers to plan the online learning process, LMS also makes it easier for students to access learning content from anywhere and anytime. Through LMS, it is easier for lecturers to create online learning content, from planning, reporting, to documentation. Through this LMS, lecturers can take advantage of content in digital forms, such as interesting articles, e-

books, animations, sounds, and videos (Alturki & Aldraiweesh, 2021; Asabere et al., 2021).

Technology Acceptance Model (TAM) is a model that is specifically designed to determine the factors that can have an impact on the acceptance of the use of computer technology (Davis, 1989). TAM is conceptualized as an attitude towards the use of the system in the form of acceptance or rejection as a result when someone uses technology in their work (Asabere et al., 2021; Picciano et al., 2010). Habibi et al., (2021) defines that attitude explains a person's acceptance of information technology. The concept of this research is the technology acceptance model (TAM). This model states that system users tend to use the system if the system is easy to use and useful for the user. The TAM concept is based on the theory of reasoned action developed by Davis (1989). In TAM, user acceptance of information systems is determined by two key factors, namely perceived usefulness, perceived ease of use and perceived intention to use.

Perceived usefulness is a measure of the use of technology to improve a person's performance or it can also be said that technology can be useful for its users. Perception of usefulness is one of the processes in decision making. It can be concluded that if the individual believes that the information system can be useful, it will be used otherwise, if the individual is not sure that the information system can be useful, it will not be used (Elfeky & Elbyaly, 2021). The results of the study by Togar Alam Napitupulu (2021) with framework developed research by Davis (1989) showing perceived usefulness and perceived ease of use are valid or reliable for different information systems.

Perceived ease of use is a technology which is defined as a benchmark for someone who believes that computers can be understood and used easily. Several indicators that can be used to measure perceived ease of use include being flexible, easy to learn, easy to use, and being able to control work Shurygin et al. (2021). The individual's desire to do something that is considered right is called the intention to use (Davis, 1989).

Intention to use is also projected by many factors, such as cultural, social, personal, and psychological. According to Alturki & Aldraiweesh (2021) and Lester et al. (2017) the intention to use is the personality of someone who tends to want to use technology. Several factors can influence in attracting consumers to use such as attitudes, opinions, and beliefs. Research by Asabere et al. (2021) that perceived usefulness has a positive and significant influence on the intention to use actual social networking services based on location.

User satisfaction is the user's reaction after using the information system. Several factors affect user satisfaction, such as the quality of information, systems, and quality services. These factors contained in a system are used as a benchmark in measuring the level of user satisfaction. A pleasure or disappointment felt by individuals for their impression of the performance or product results is called satisfaction. User satisfaction is often used as a measure of the effectiveness of information systems. If the system has a definition of adding a value to a company, then the system is said to be effective and has a positive influence on user behavior, such as increasing productivity, decision making, and other things (Agustina & Nandiyanto, 2021; Einggi Gusti Pratama & Andhyka Kusuma, 2021).

Based on the description above the authors are interested in conducting research on " Analysis of the factors that influence the use of the Learning Management System: An Empirical Study in Indonesia during Pandemic Covid-19Period"

**LITERATURE REVIEW**

TAM (Technology Acceptance Model) is a model that is specifically designed to determine the factors that can have an impact on the acceptance of the use of computer technology. This model is an adoption of TRA (Theory of Reasoned Action). The TAM model was developed by (Davis, 1989) based on TRA (Theory of Reasoned Action) (Trafimow, 2009). TRA itself is a psychological theory that explains human behavior. There is a scheme of TAM that proposed by Davis (1989):

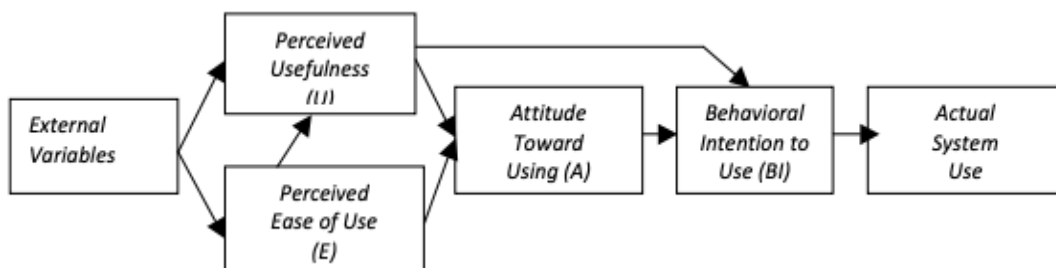


Figure 1: Technology Acceptance Model (TAM) Method Scheme

The TAM method is often used by researchers to measure the applications they create. There are 5 main components in the Technology Acceptance Model (TAM), including: perceived usefulness, perceived ease of use, attitude toward, behavioral intention to use, and actual system usage. According to Davis (1989) there are two reasons why individuals want to use or reject information technology applications because some of them believe that information technology can contribute to better activities, this is called perceived usefulness. The belief that this system is useful but at the same time the user can believe that this system is very difficult to use, this is called perceived ease of use. The results of research conducted by Al-Nuaimi & Al-Emran, (2021) and Drennan et al. (2005) stated that perceived usefulness and perceived ease of use have a significant influence on explaining attitudes in using TAM already has two individual beliefs such as perceived usefulness and perceived ease of use which are the main influences in technology acceptance. The TAM model is a model of developing psychological theories, namely beliefs, attitudes, intensity, and user behavior relationships. According to Davis (1989) TAM is designed to predict, not describe, which is used to predict user acceptance of technology systems. One of the most frequently used research models is TAM, because the research model is simpler and easier to apply.

Perceived usefulness is where individuals believe that the use of information systems can improve their performance. Beliefs about the decision-making process are called perceived usefulness. If the individual believes that the information system can be useful, then the individual will definitely use it, but on the contrary if the individual believes the information system is not useful, then the individual feels reluctant to use information technology. There are five indicators of perceived usefulness, namely increased productivity, work more quickly, effectiveness, job performance, usefulness, and makes job easier Davis (1989). Previous research stated that perceived usefulness is a significant construct and influences attitudes, interests, and behavior in using technology. Some researchers suggest that perceived usefulness has a positive and significant effect on intention to use. The benefits of using technology can be seen from the belief that users decide whether to accept information technology. Several previous studies stated that the construct of perceived usefulness has a significant and positive influence on the use of technology (Al-Nuaimi & Al-Emran, 2021; Habibi et al., 2021)

Intention to use is a user's desire to utilize or intend to reuse a certain object. Interest is one of several aspects

of the human psyche that tend to give more attention or feelings of pleasure to certain objects that can motivate them to achieve targets. Conscious behavior when doing something that has been targeted is called intention. There are basic factors that influence intentions, namely social factors and personal factors. Both factors have a positive influence on individual behavioral intentions. Behavior is a person's real reaction caused by several factors that influence it. According to Alturki and Aldraiweesh (2021) and Prior et al. (2016) several indicators of intention to use are:

1. Compatibility is a user who perceives innovation in the subject as proportional to existing values, past experiences, and potential needs.
2. Ease of use is a user who perceives the use of a particular subject as easy.

User satisfaction is one of the factors that reflects the dependence of the six measures of information system success in the model. The six factors are information quality, system quality, usage, user satisfaction, personal influence and organizational influence. This model does not independently measure the six dimensions of information system success but measures the overall impact of one dimension on another. So that it can be explained that system quality and information quality simultaneously affect the use and satisfaction of users. Users influence personal influence which in turn affects organizational influence. User satisfaction is the user's reaction after using an information system. When measuring user satisfaction, that is by looking at the output of system providers, websites, support service satisfaction (Al-Nuaimi & Al-Emran, 2021)

User satisfaction can be used as a substitute measure of effectiveness, there are five indicators to measure the level of user satisfaction proposed by DeLone and McLean (2003), among others:

1. Content is user satisfaction as seen from the contents such as roles and modules used by the user as well as the information generated according to the user's needs.
2. Accuracy is user satisfaction in terms of data accuracy when receiving input and then processing it into information.
3. Format is user satisfaction as seen from the output that has been produced.
4. Ease of use is user satisfaction which is seen from the user's pleasure when using the system, such as the process of entering data, processing data, and finding the information needed.
5. Timeliness is user satisfaction which is seen from the accuracy of time on the system in providing data and information needed by users.

### Hypotheses Development

According to Cavus et al. (2021) and Kant et al. (2021) perceived usefulness is the level of confidence an individual has when using a system that can provide convenience when doing work so that work can be done more quickly. According to Drennan et al. (2005) perceived usefulness is a significant and most important variable in influencing attitude, behavioral intention (behavior interest), and behavior (behavior) in using technology compared to other variables or constructs. Moreover, perceived usefulness is a significant and most important variable in influencing attitude, behavioral intention in using technology compared to other variables or constructs.

User satisfaction is the user's reaction after using an information system. When measuring user satisfaction, it is by looking at the output of system providers, websites, and support facilities provided by a system. Based on the conclusions above, it is suspected that perceived usefulness can affect user satisfaction of users of the LMS application. Based on the literature obtained, the researcher concludes that perceived usefulness is the most significant variable influencing attitudes, interests, and behavior in using a technology (Davis, 1989). Based on explanation above it concluded there is a positive and significant effect of perceived usefulness on the intention to use, therefore the researcher proposes the following hypothesis:

**H<sub>1</sub>:** There a positive effect of perceived usefulness on user satisfaction in using the LMS application

Davis (1989) states that ease means freedom from difficulty or great effort. Furthermore, ease to use perceived is defined as the degree to which a person believes that using a particular system or service would enhance be free of effort. From this statement, it is known that users will like and use a technology system when it is easy to use.

Perceptions of the ease of use of technological systems will affect behavior and attitudes, the higher a person's perception of the ease of use of the system, the higher the level of use of the technology system. It can be concluded that if someone believes that the information system is easy to use then he will use it.

The user's perception of the ease of using the system is supported by the user's attitude about the usability of the system. This can be influenced by the period of service of students using information technology and the period of implementation (Asabere et al., 2021; Kant et al.,

2021). Therefore, when students use an information technology system for approximately 1 or 2 years, students will assume that the LMS they have used is easy to use because they already know the usefulness of the LMS. Based on the description above, the hypothesis can be derived:

**H<sub>2</sub>:** There a positive effect of perceived ease of use on user satisfaction in using the LMS application

In fact, a variable can have an indirect effect on other variables. The influence of these variables on other variables through a variable called the mediating variable. The mediating variable, better known as the intervening variable, is the one that appears between the time the independent variable begins to operate to influence the dependent variable and the time its impact is in it. Thus, there is a temporal quality or time dimension for the mediating variable. In other words, the mediating variable appears as a function of the independent variable operating in any given situation and helps to conceptualize and explain the effect of the independent variable on the dependent variable. The attitude towards the desire to use technology is called the intention to use. Behavioral intention to use is chosen as mediating variable.

Attitudes, opinions, and beliefs are indicators that can have an impact on students to attract interest and use LMS. Intention to use is the user's desire to utilize or intend to reuse a certain object.

Several indicators that affect the intention to use, such as ease of use, information quality, system quality, and service quality (Al-Nuaimi & Al-Emran, 2021; Ismail et al., 2021). Based on the explanation above, it can be concluded that the intention to use is thought can mediate user satisfaction of users of the LMS application, so the researcher proposes the following hypothesis:

**H<sub>3</sub>:** Intention to use can mediate the relationship between perceived usefulness on user satisfaction in using the LMS application

**H<sub>4</sub>:** Intention to use can mediate the relationship between perceived ease of use on user satisfaction in using the LMS application

### Research Framework

This study will systematically examine the effect of perceived usefulness and perceived ease of use on user satisfaction with intention to use as mediating variable in using the LMS application. The research model developed can be seen in the following framework.

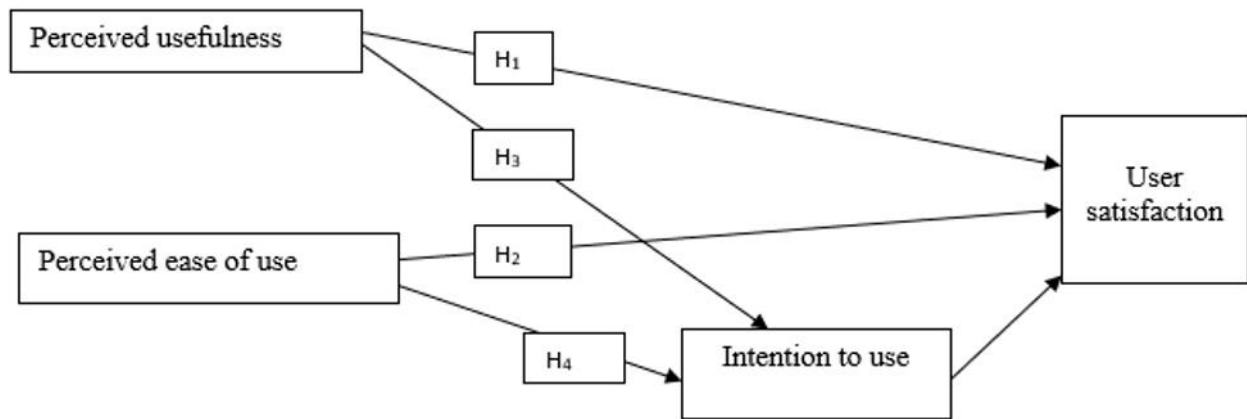


Figure 2: Research Framework

### RESEARCH METHODS

The research entitled Analysis of the factors that influence the use of the Learning Management System during Covid -19, for 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. The sample selection used purposive sampling based on a specific goal, namely to analyze the effect of perceived usefulness, intention to use, and user satisfaction on 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. The variables used in this study are two independent variables, one mediating variable and one dependent variable (Ali & Bhaskar, 2016):

1. Exogenous variables are variables whose variability is assumed to be determined by causes that are outside the model, the exogenous variable of this study are perceived usefulness and perceived ease of use. While endogenous variables are variables whose variations can be explained by exogenous and endogenous variables that are in the system, this study uses the endogenous variable is user satisfaction.
2. Mediating (intervening) variables that theoretically affect the relationship between the independent and dependent variables become an indirect relationship. It can also be interpreted that the intervening variable is a variable that can weaken and strengthen the relationship between variables. According to Jörg and Henseler (2016) there are 2 (two) types of mediation, namely partial mediation and perfect mediation. Partial mediation occurs when the direct effect (independent variable => dependent variable) is significant and the indirect effect (independent variable => mediation => dependent variable) is also significant. Meanwhile, perfect mediation occurs when the direct effect (independent variable => dependent variable) is not significant and the indirect effect (independent variable => mediation => dependent variable) is significant.

#### 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 given the Covid-19 pandemic that is happening all over the world, including Indonesia. The process of distributing questionnaires began from 1 October 2021 up to 20 December 2021. The total number of questionnaires distributed was 250 but the number of respondents that could be tested and processed was only 233. 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 0.7. The Cronbach's Alpha value of each variable marked in the red box above is greater than 0.7 (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
Perceived usefulness	0,795	0,866	0,618
Perceived ease of use	0,755	0,845	0,777
Intention to use	0,762	0,837	0,679
User satisfaction	0,779	0,889	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)
Perceived usefulness	1,650	1,662
Perceived ease of use	1,332	1,442
Intention to use	1,484	1,717
User satisfaction		1,568

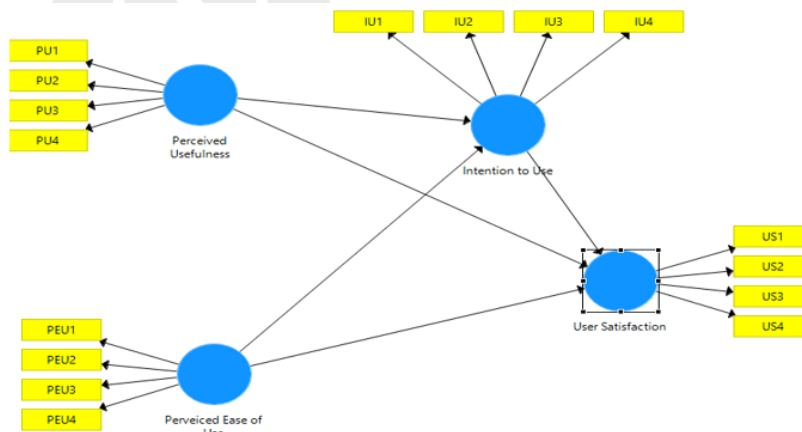
R Square shows the ability of in this research model to explain variations in perceived intention to use with is 0,864 and user satisfaction, which is 0.682. The value of

user satisfaction is R Square (R<sup>2</sup>) = 0.672 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<sup>2</sup>)**

Variable	R Square	R Square Adjusted
Intention to Use	0,864	0,845
User Satisfactions	0,682	0,672

The following are the diagram of the PLS Algorithm processing in the research model used are as follows:



**Figure 3: 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 <sub>1</sub>	Perceived usefulness → user satisfaction	0,017	+	0,093	2,036	0,043	Perceived usefulness has a positive effect on user satisfaction
H <sub>2</sub>	Perceived ease of use → user satisfaction	0,347	+	0,344	4,683	0,000	Perceived ease of use has a positive effect on user satisfaction

Significant P-value (Sig.) At  $\alpha = 5\%$

For hypothesis number one (H<sub>1</sub>) perceived usefulness has effect to user satisfaction, the p value of 0,043 is less than 0.05 which means it has significant effect. Based on the research findings in this research, the perceived usefulness variable has a positive effect on the intention to use the learning management system application. This means that perceived usefulness 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 perceived usefulness plays a role in user satisfaction, because the use of LMS applications can provide benefits for users in adding information to learning materials.

For hypothesis number two (H<sub>2</sub>) the p-value is less than 0.05 which means that perceived ease of use has a significant effect on user satisfaction. Based on the findings of the researchers in this study, the perceived usefulness 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 Goh & Yang, (2021) and Nguyen (2021) that there is a significant and positive effect of perceived usefulness 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 5: Specific Indirect Effect

H	Influence Between Pathways	Beta (Original Sample)	Sign	Sample Mean	T-Statistic	P-value	Meaning
H <sub>3</sub>	Perceived usefulness → → user satisfaction	0,422	+	0,024	0,830	0,046	Perceived usefulness has a positive effect on user satisfaction
H <sub>4</sub>	Perceived ease of use → user satisfaction	0,787	+	0,094	1,868	0,032	Perceived ease of use has a positive effect on user satisfaction

Intention to use can mediate the relationship between perceived usefulness on user satisfaction in using the LMS application.

The table above is the result of the test for hypotheses based on the P-value that is smaller than 0.05, Based on the P value which is smaller than 0.05 (already marked in the table), it can be concluded that intention to use partially mediates the effect of perceived usefulness on user satisfaction. In addition, intention to use also partially mediates the effect of perceived ease to use on user satisfaction. Intention to use can mediate the relationship between perceived usefulness and perceived ease to use to user satisfaction, because the desire and ease of using the LMS system is supported by the user's attitude about the usefulness of the LMS system. This can be influenced by the respondent's

length of time using the LMS and the implementation period. Therefore, when students use an information technology system for a period of more than 1 year, the students will assume that the LMS have used is easy to use because they already know the use of the LMS.

A good LMS must have an attractive and user-friendly user interface. An attractive interface design will be the aesthetics of the LMS, as well as clear instructions for use will make the software more satisfaction by users. Finally, the application of the LMS in online learning is supported by the creativity of lecturers in learning activities, for example to develop students' critical

thinking skills, lecturers can provide learning experiences by designing problem-based learning.

### CONCLUSION AND SUGGESTIONS

Based on research results and the discussion above that the impact of COVID-19 on the implementation of online learning at university, college can do well. It was concluded that the ease of use of the LMS and the usefulness of the LMS had a positive impact on the student's attitude towards the use of the LMS. After students have a positive attitude towards learning by using LMS, it will eventually affect student behavior in using LMS which in the end students can actualize LMS-based learning. That is, the easier the LMS is to use, the more the benefits of the LMS will increase and it will also have an impact on the desire to use the LMS. Because LMS can be easily understood, operated and easy to use to share the knowledge that students have and to find the knowledge that students need. So, the results of the study conclude that the perceived usefulness, perceived ease of use, intention to use significantly affect the user satisfaction of LMS effectively and efficiently is supporting.

Suggestion for future research online learning study, the challenge for lecturers and students is indeed related to the use of learning technology which must be continuously improved in quality. Moreover, online learning content still needs to be improved to be more interactive so that students can be more involved in the learning process. The carrying capacity of technology also needs to be continuously improved, such as internet speed facilities by the university. In this case lecturers must also be prepared with intense communication with students, various conversation channels can use to serve students during the current pandemic. With such a process expected to be able to develop the quality of learning.

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