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Educator Satisfaction Using LMS with ICT Infrastructure as a Mediation Variable

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Abstract

The use of technology during the COVID-19 pandemic is very helpful in providing teaching materials to students. Two-way and collaborative interactions can be created with a dynamic learning platform such as an LMS. This study aims to analyze user satisfaction, especially with educators in using LMS with the support of ICT Infrastructure. Satisfaction is seen in terms of usefulness (usability), Ease of Use (Ease of use), and Accessibility (Access Range). Respondents in this study were 55 respondents. The data was collected using an online google form questionnaire which was then tested for validity, reliability, and model fit using the War PLS 7.0 analysis tool. The test results show that usefulness has a significant impact on user satisfaction mediated by ICT Infrastructure (with a path coefficient value of 0.524, p-value <0.001). Ease of Use has no significant impact on user satisfaction mediated by ICT Infrastructure (with a path coefficient value of 0.150 with a p-value of 0.122). Accessibility has a significant impact on user satisfaction in mediation with ICT Infrastructure (with a coefficient value of 0.309 with p-value <0.001). The fit model is tested with a VIF value of 1.670 and a GoF value of 0.586. The limitations of this study are that the sample needs to be increased, and exogenous variables need to be added to expand knowledge.

Keywords: *Learning Management System, ICT Infrastructure, Usefulness, Ease of Use, Accessibility*

INTRODUCTION

Covid 19 pandemic cases as of August 24, 2021, in Indonesia were confirmed positive as many as 4,008,166 people (Gugus Tugas Percepatan Penanganan Covid-19, 2021). This pandemic has a significant impact on various sectors of human life so that people are expected to continue to comply with health protocols. Today's community activities have shifted from physical, social interaction to using technology. To minimize the spread of the COVID-19 virus, the public is encouraged to reduce physical interactions and switch to technology.

Technological developments play a very vital role in facilitating work. The education sector is one of the sectors that is influenced by technology with the development of a digital-based learning platform or commonly referred to as a Learning Management System (LMS). Some educational institutions are moving towards online education, which can affect student learning (Shehzadi et al., 2021). Open and distance education is currently one of the institutional strategies in carrying out learning innovations (Altınay et al., 2019).

Universities use LMS-based learning platforms because this web-based software can distribute, track, and manage internet-based courses (Islam & Azad, 2015). LMS is a platform that has proven to be

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impactful in helping facilitate learning and can provide opportunities for students to collaborate, interact, and participate (Kampa, 2017).

With the convenience that technology provides for users, it turns out that some shortcomings are found when using it. Lack of understanding of the impact of technology on learning impactiveness as well as proper e-learning design to achieve successful learning has become an issue that has occurred in recent years (Cheng et al., 2017). Educators can quickly find out the results of the work done by students with the internet. The use of technology in the learning process helps educators correct students' work, but concerns arise about the implementation of ICT by campus management due to limitations and lack of human resource expertise (Asad et al., 2020).

Mid-2020, UPN "Veteran" Yogyakarta developed an IT-based learning platform as a form of improving services to students in the learning process. LMS is starting to be used by lecturers and students so that interaction occurs in learning, while face-to-face activities are carried out directly online. The application of the LMS has encountered many complex obstacles, both from the lecturer's and students' perspectives in using the LMS features. The LMS audit conducted in the even semester of the 2020/2021 academic year on classes taught by FEB Lecturers was found in the form of many features contained in the LMS that has not been used, and there are still many empty dashboard pages. This means that there are still many educators who have not used and or understood the features in the LMS.

The success of the LMS depends on its impactive use by educators and students as stakeholders. Stakeholder perceptions may differ from one another to the satisfaction of using an LMS.

LITERATURE REVIEW

ICT Infrastructure

Educators generally use ICT for different purposes, e.g., teaching for various types of software and administrative purposes such as LMS learning and also to communicate with other educators or learners. Some of the challenges in the teaching and learning process by relying on ICT are a) The role of ICT in the 21st century concerning formal and informal learning, b) Preparation of educators in technology implementation, c) The role of educational institutions in making technology integration, and d) Developing conditions that needed at the policy level for ICT implementation (Craig & Orland-Barak, 2015). During online learning, educators reveal that there are various obstacles, including the lack of technical infrastructure and also lack of knowledge of technology. A survey found that the technology infrastructure used by educators was not good. Educators do not have adequate infrastructures such as configured laptops, stable internet, bandwidth problems, and others (Joshi et al., 2020).

Learning Management System (LMS)

The provision of information is one of the most important aspects of electronic services because the exchange of information between two certain parties has a very important meaning (Shehzadi et al., 2021). LMS provides a virtual platform for e-learning by enabling management, student monitoring, delivery, learning tracking, testing, communication, registration, and scheduling processes (Cavus, 2015). LMS is a platform that offers a variety of integrated tools in delivering and managing instructions online (Fearnley & Amora, 2020).

Satisfaction, Usefulness, Ease of Use, and Accessibility

Perceived usefulness (PU) affects the satisfaction of using LMS (Mouakket & Bettayeb, 2015). Based on the theory of Davis (1986) explains that the Technology Acceptance Model (TAM) is a model to predict

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and explain how technology users accept and use technology related to the user's work. Usefulness and Ease of Use are factors that influence user perceptions in the context of using information technology (Irawati et al., 2020).

Reynolds (2012) explains that user satisfaction can improve their performance. Islamic research (2015) suggests that Usefulness, Compatibility as factors that provide student satisfaction in the use of LMS. For educators that Ease of Use and Accessibility provides satisfaction in the use of LMS. Accessibility is one of the controllers of extensive e-learning (Panigrahi et al., 2020). Positive perception in terms of usefulness, bulletin boards, and discussion forums, and tools on LMS (Loredana Di Pietro and Francesca Di Virgilio, 2012). Lwoga (2015) shows that there are several challenges in the use of LMS, namely related to barriers to information and communication technology (ICT) infrastructure. Asad (2020) said that students could learn more impactive, and educators use technology well to provide teaching materials. This study modifies the variables of Usefulness, Ease of Use, and Accessibility on the educator's side of their satisfaction using LMS supported by reliable IT Infrastructure (as mediation) such as a stable network, supporting device conditions. The hypothesis in this study is as follows.

H1 = Usefulness has a significant impact on user satisfaction in mediation with ICT Infrastructure
H2 = Ease of Use has a significant impact on user satisfaction in mediation with ICT Infrastructure
H3 = Accessibility has a significant impact on user satisfaction mediated by ICT Infrastructure

The Framework for Thinking is shown in Figure 1 below.

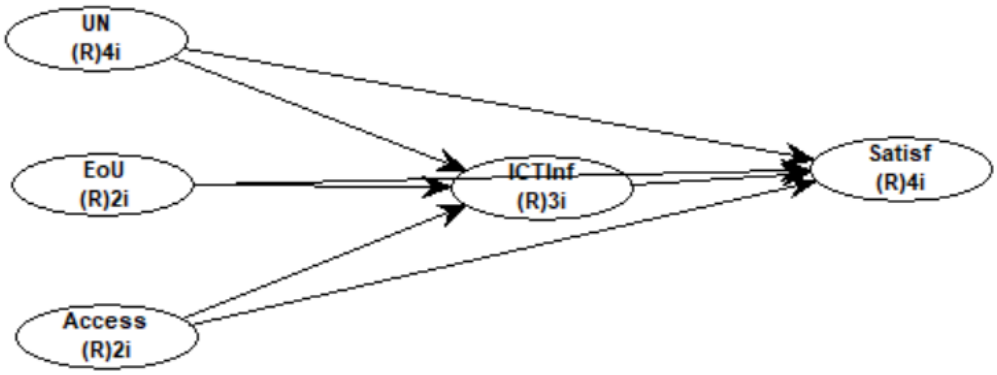

Figure 1 The Framework for Thinking

RESEARCH METHOD

Research methodology This study uses a quantitative method by using a questionnaire as a data collection tool through a google form. According to Sugiyono (2018), It is called a quantitative method because the research data is in the form of numbers, and the analysis uses statistics. Apuke (2017) explained that quantitative research has the purpose of testing hypotheses and seeing the cause and impact of the predictions of the hypotheses that have been built. The relationship between the variables built was analyzed using Path Analysis, both to test the relationship directly or indirectly and also the level of significance.

Exogenous variables in this study are Usefulness, Ease of Use, and Accessibility. The mediating variable is ICT Infrastructure, while the Endogenous Variable is Satisfaction. Sholihin (2020) states that the mediating variable intervenes or bridges the relationship of other variables, which means that a change in the exogenous variable can cause a change in the mediating variable, which in turn changes the

endogenous variable. The impact of the mediating variable is not mediating, partially mediating, and fully mediating.

This study uses a Likert scale of 1-5. This study uses the criteria for convergent validity for the reflective construct; namely, the loading must be above 0.70 with a significant value <0,05) (Hair et al., 2017; Kock, 2020). The questionnaire compiled for the Usefulness variable has 11 questions, four valid questions. The Ease of Use variable has nine questions, and two questions are valid. Accessibility variable there are four questions, two valid questions. The ICT Infrastructure variable has six questions, and three questions are valid. Satisfaction variable there are five valid questions four questions.

FINDINGS AND DISCUSSION

The respondents in this questionnaire were 55 respondents who met the purposive sampling criteria, namely the lecturers of FEB UPN "Veteran" Yogyakarta who taught using LMS. The distribution of respondents is 16 Lecturers of Accounting, 10 Lecturers of Economics, and 29 Lecturers of Management. Based on the age range of the respondents, namely two lecturers aged <30 years, four lecturers aged 30-40 years, 31 lecturers aged 46-55 years, and 18 lecturers aged >55 years. Respondents consisted of 25 men and 30 women, with a distribution of 42 Lecturers with the last education of S2 and 13 Lecturers of S3.

The validity test uses the loading factor test of each indicator to measure the validity of the variables used. The loading factor used must be greater than 0.70. The results of testing the validity of the exogenous Usefulness variable, seven questions, cannot be used as an indicator of the assessment variable. The results of testing the validity of the exogenous Ease of Use variable seven questions cannot be used as an indicator of the assessment variable. The results of testing the validity of the exogenous Accessibility variable contained two questions that could not be used as an indicator of the assessment variable. The results of testing the validity of the mediation variable, namely ICT Infrastructure, contained three questions that could not be used as an indicator of the assessment variable. The results of testing the validity of the endogenous variable, namely satisfaction, contained 1 question item that could not be used as an indicator of the assessment variable.

Reliability testing uses Cronbach's Alpha criteria of more than 0.6, Composite Reliability of more than 0.7. The test uses the AVE value with criteria of more than 0.5. Following are the results of reliability testing.

Table 1. Cronbach's Alpha, Composite Reliability, and Average Variance Extracted (AVE) values

	Cronbach's Alpha	**Composite Reliability**	**Average Variance Extracted (AVE)**
Usefulnesss (X1)	0,824	0,885	0,658
Ease of Use (X2)	0,796	0,907	0,830
Accesability (X3)	0,634	0,845	0,732
ICT Infrastructure (M)	0,854	0,911	0,744
Satisfaction (Y)	0,877	0,916	0,732

Source: Processed data

Validity testing is done by testing discriminant validity with a standard value of more than 0.7. The following is the result of testing output correlations among latent variables.

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Table 2. Output Correlations Among Latent Variable

	X1	X2	X5	M	Y
Usefulnesss (X1)	**(0.811)**	0.582	0.636	0.043	0.814
Ease of Use (X2)	0.582	**(0.911)**	0.619	0.199	0.639
Accesability (X3)	0.636	0.619	**(0.856)**	0.234	0.716
ICT Infrastructure (M)	0.043	0.199	0.234	**(0.880)**	0.122
Satisfaction (Y)	0.814	0.639	0.716	0.122	**(0.856)**

Source: Processed data

The next test uses path analysis based on the structure of the research model that has been formed previously. The results of testing the model structure are presented in the following figure.

Figure 2. Data Processing Model Structure

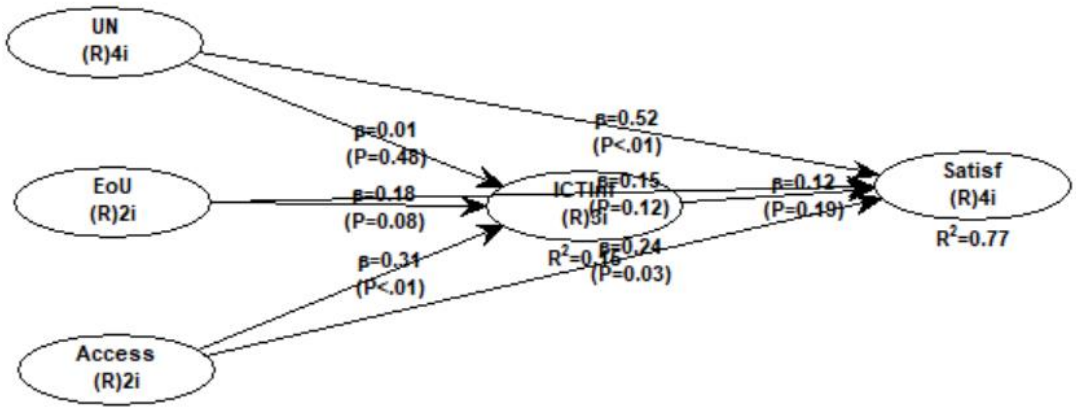

Figure 2 shows the fit model value with an APC value of 0.218 or 21.8% with a P value of 0.021, ARS of 0.461 or equivalent to 46.1% with a P-value of <0.001. This means that the p-value for APC and ARS is smaller than 0.05, which means it is significant. The value of the Average block VIF (AFIV) is 1,670. The GoF value is 0.586 or is included in the explanatory power category with large criteria because >= 0.36. Overall the path coefficient value is 0.116 with P-value = 0.187 and R square is 0.77.

The next step after data processing is the discussion of the results of the research hypothesis. Table 3 presents a summary of the hypotheses of this study.

Table 3. Direct dan Indirect Impact

	Direct Impact		Indirect Impact	
	Path Coefficient	**P-Value**	**Path Coefficient**	**P-Value**
X1-Y	0,524	P<0,001	0,001	P=0,497
X2-Y	0,150	P=0,122	0,021	P=0,411
X3-Y	0,236	P=0,031	0,036	P=0,353
X1-M	0,006	P=0,481		
X2- M	0,184	P=0,075		
X3- M	0,309	P<0,001		

M-Y	0,116	P=0,187		

Source: Processed data

In table 3, the H1 test shows that the p-value (<0.001) indicates full mediation, meaning that H1 is supported. The results of this test indicate that usefulness has a significant impact on user satisfaction mediated by ICT infrastructure.

The results of the H2 test show that the p-value (0.122) is greater than the set significance level, so H2 is not supported. The results of this test indicate that Ease of Use has no significant impact on user satisfaction mediated by ICT Infrastructure.

The results of the H3 test show that the p-value (0.031) is greater than the set significance level, but in the X3 test to mediation, the p-value (<0.001) means that full mediation occurs, H3 is supported. The results of this test indicate that Accessibility has a significant impact on user satisfaction in mediation with ICT Infrastructure.

CONCLUSION

This study concludes that the usefulness and accessibility factors are not the main factors that educators feel satisfied with using LMS. Other factors still need to be explored in further research. The Ease of Use factor is not supported, meaning that the features on the LMS are still considered difficult by some respondents because they are considered complicated. Suggestions for institutions to continue to improve the ability of educators in terms of using technology, especially providing training and evaluation related to the use of LMS.

The limitation of this research is that the sample used is not optimal, which is only 55 lecturers out of a total of 106 lecturers at FEB (51.8%). Further research is expected to add exogenous variables to enrich the knowledge.

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