Technology Adoption in Higher Education Case Study: University Student in Labuhanbatu

Rika Syahmewah Munthe[1*], Amron Zarkasih[2], Erni Wahyuni[3], Irhamna Mandili[4]

[1,2,3,4] Universitas Islam Labuhanbatu
[*] Corresponding author:
Email: rsyahmewah@gmail.com

Abstract.
The online learning system has become an indispensable solution for educational institutions during the COVID-19 period. Therefore, if we take a closer look at the findings of this study, it is evident that the students are working hard to overcome the challenges of the online learning system. Learning and teaching activities must continue to be carried out even though COVID-19 still exists, educational institutions must immediately adapt so that they can continue to run as they should. The use of online learning media using relevant software is certainly a new demand in the world of education. Every change certainly takes time to adapt to the new thing. The online learning system also takes time to be accepted by students. In this study, researchers wanted to examine the effect of perceived ease of use, perceived usefulness and perceived quality of the system on the intention to use online learning tools. This study was conducted in Labuhanbatu with the sample being students in Labuhanbatu district who had undergone online learning during the COVID-19 pandemic. This study uses a quantitative approach and the analytical method used is Partial Least Square with the help of SMART PLS 3 software. It is hoped that this research can provide input to universities in order to improve the quality of learning with online learning methods.

Keywords: *Perceive ease of use; Perceive usefulness; Perceive system quality; Intention to use*

I. INTRODUCTION

With the development of information and communication technology in the current era, it has a significant impact on the education sector. This progress is felt from the aspect of ease of finding information, to the ease of internet-based learning activities. Compared to learning in face-to-face classes that are usually done, online learning is more flexible and expands the area of education without limitations of time and space [1]. However, online learning is not without its limitations. One of the weaknesses in this learning system is that students may feel a lack of social interaction when learning online so that their learning motivation may be affected [2]. Nevertheless, online learning systems are still considered as a potential alternative to conventional classroom-based learning [3].The online learning system, especially since the Covid-19 pandemic in Indonesia, has become a very important new aspect in the education sector. For this reason, almost all levels of formal and informal education are required to accept and adapt to this system. One of the most influential frameworks for exploring issues of acceptance and rejection of technology is the Technology Acceptance Model [4] [5].

TAM is a model introduced by Fred D. Davis in 1989 to predict the acceptance of a technology system. The essence of the TAM variable is to explain technology acceptance as: 1) Perceived Usefulness (PU), namely the extent to which a person believes that the use of technology will improve their work performance; 2) Perceived Ease Of Use (PEU), namely the belief that the use of technology is easy; 3) Attitude Towards Technology (ATT), namely the overall evaluation of a technology indicated by positive or negative feelings towards the use of the technology.In particular, when a system is designed with a model that is easy to use, it will provide more comfort and ease of use during use, so they want to interact with the system more. For this reason, if the quality of a technology system is considered good enough, this will affect the intention to use it.Intentions and also efforts to carry out a particular activity cannot be separated,which is why the possibility to use a system will increase if there is a strong intention from the user to use the system [6].

Behavioral intention can show motivational factors that influence human behavior. These factors are “an indication of how hard people plan to try and how much effort they plan to exert them to perform a behavior” [6]. Therefore, understanding the factors that influence behavioral intentions to use a web-based learning system can also improve understanding of the actual use of the system.Although the TAM model is currently being widely used to test users' willingness to use a technology, only a few empirical studies have been conducted regarding student acceptance of technology [7]; [8]; [9]; [10]. In particular, only a small part is known about the factors that encourage students to use technology for learning purposes [11]. For this reason, the purpose of this study is to determine the factors that can increase the intention to accept the use of online learning technology.

II. METHODS

This study uses Structural Equation Modeling (SEM), which is a statistical analysis technique that is cross-sectional and is commonly used for theoretical model analysis. Hypothesis testing is done by using a questionnaire to measure each variable in the theoretical model distributed online. The questionnaire is divided into two parts. The first part consists of several questions related to the respondent's profile, such as gender, age, education, name of institution. The second part consists of several questions related to the variables in the theoretical model.

Data was collected using purposive (judgmental) sampling method, which is suitable for collecting data from respondents with certain characteristics. The fit statistic is to assess the extent to which the characteristic values of the model, which are determined using the estimated parameters and structure of the model correspond to the characteristic values estimated from the sample data. Principal component factor analysis was used to test the validity (discriminant and convergent) of each indicator of all variables in the theoretical model. Meanwhile, to test the reliability of the indicator measurements of each variable, the researcher used Cronbach's alpha coefficient [12].

Research Hypothesis

H1: Perceive ease of use has a positive and significant effect on purchase intention.

H2: Perceive usefulness has a positive and significant effect on purchase intention.

H3: Perceive system quality has a positive and significant effect on purchase intention.

III. RESULT AND DISCUSSION

1. Outer Model Testing

The analytical method used in this research was to analyze the data using the PLS SEM method by SMART PLS 3 software. In testing the outer model there are several things that are tested, namely the validity and reliability of research measuring instruments.

2. Validity test

The validity test can ensure that the set of items used are qualified and representative and see how well the dimensions and elements of the concept have been described in the questionnaire [13]. The validity tests used in this study are content validity, and construct validity, namely convergent validity and discriminant validity.

Table 1. Convergent Validity Test Results

VARIABLES	INTENTION TO USE	PERCEIVE EASE OF USE	PERCEIVE SYSTEM QUALITY	PERCEIVE USEFULNES S
ITU1	**0.889**	0.589	0.616	0.643
ITU2	**0.915**	0.627	0.634	0.620
ITU3	**0.885**	0.578	0.696	0.534
PEOU1	0.628	**0.945**	0.623	0.785
PEOU2	0.655	**0.960**	0.667	0.784
PEOU3	0.631	**0.950**	0.653	0.789
PEOU4	0.616	**0.936**	0.684	0.787
PSQ1	0.650	0.663	**0.939**	0.649
PSQ2	0.682	0.652	**0.932**	0.604
PSQ3	0.689	0.623	**0.926**	0.631
PU1	0.673	0.787	0.652	**0.964**
PU2	0.657	0.805	0.627	**0.966**
PU3	0.578	0.785	0.651	**0.932**

Source: Data Processed by Researchers, 2022

Based on Table 1 above, it can be seen that all the items have met the existing prerequisites, meaning that these items are able to explain the research variables well. If the loading value has a correlation with other constructs, the correlated items can be deleted, because these items cannot explain the research variables properly. Research items can be said to be valid when the loading value ranges from 0.4 to 0.7 [12].

Table 2. Fornell-Larcker Criterion. Discriminant Validity Test

VARIABLES	INTENTION TO USE	PERCEIVE EASE OF USE	PERCEIVE SYSTEM QUALITY	PERCEIVE USEFULNES
INTENTION TO USE	0.896			
PERCEIVE EASE OF USE	0.667	0.948		
PERCEIVE SYSTEM QUALITY	0.723	0.693	0.933	
PERCEIVE USEFULNES	0.669	0.530	0.673	0.954

Source: Data Processed by Researchers, 2022

Discriminant validity is the extent to which a construct is completely different from another construct by empirical standards. One way to find out whether a construct is discriminantly valid is to use the Fornell-Larcker Criterion. The Fornell-Larcker criterion is an approach that compares the square root of the AVE value with the correlation of the latent variables [12]. Based on table 2 above, it can be seen that each variable can be declared valid discriminantly.

3. Reliability Test

Reliability test is used to measure the reliability or level of consistency of a questionnaire if it is used as a measuring instrument at different times.

Table 3. Reliability Parameter Values

VARIABLES	Cronbach's Alpha	Composite Reliability	(AVE)	Interpretation
INTENTION TO USE	0.878	0.925	0.803	Good
PERCEIVE EASE OF USE	0.962	0.972	0.898	Good
PERCEIVE SYSTEM QUALITY	0.925	0.952	0.870	Good
PERCEIVE USEFULNES	0.951	0.968	0.910	Excellent

Source: Data Processed by Researchers, 2022

Table 3 shows the value of Cronbach's Alpha and Composite Reliability. Based on the table, the value of Cronbach's Alpha and Composite Reliability shows a value greater than 0.70. So it can be said that all the constructs in this study are reliable and have consistency when used as a measurement from time to time.

4. Inner Model Testing

The SEM analysis of the theoretical model in Figure 1 is presented first and is followed by the final model. The theoretical model that has been analyzed and Table 4 shows the results of the direct effect SEM analysis, the test of the inner model aims to test the path relationship and the research hypothesis. In this study, testing was conducted to test the three hypotheses in this study by looking at the path coefficient value (β) and the significance of p-value. If the path coefficient value is positive, it

indicates that the exogenous construct is positively related to the endogenous construct, whereas if the path coefficient value is negative, the exogenous construct is negatively related to the endogenous construct and the significance value of p value which shows a value of less than 0.05 (significant at 5% level) indicates that the hypothesis is supported [12].

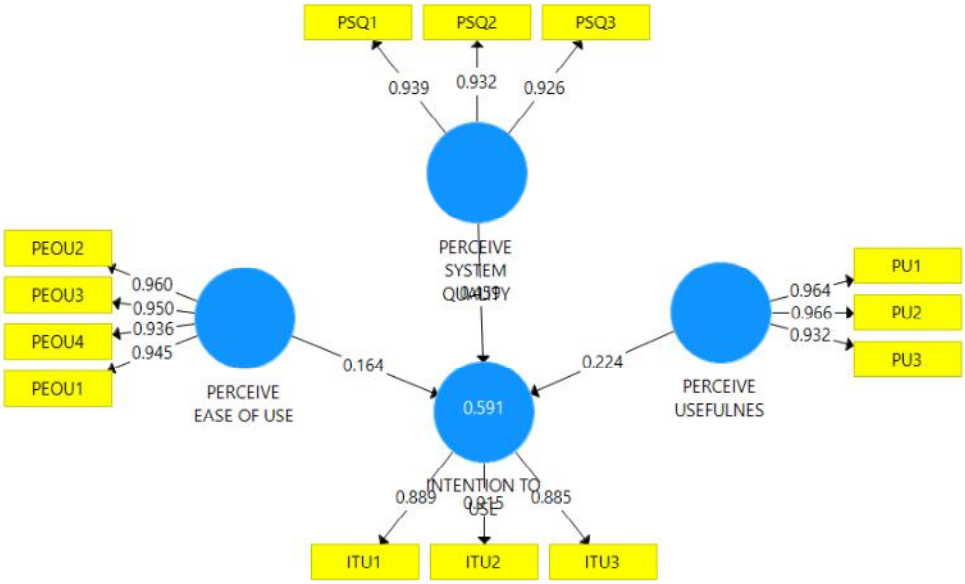

Fig 1. Hypothesis Test Results with Structural Model

Based on the model above, it is known that all the items used in this study have reached the lower limit of the loading value, so it can be said that the items can be used as a measuring tool and can be tested further.

Table 4. Path Coefficient and P-value

VARIABLES	Path Coefficients	P Values
PERCEIVE USEFULNESS -> INTENTION TO USE	0.224	0.011
PERCEIVE EASE OF USE -> INTENTION TO USE	0.164	0.006
PERCEIVE SYSTEM QUALITY -> INTENTION TO USE	0.461	0.000

Source: Data Processed by Researchers, 2022

The path coefficient table above shows all the relationships between the variables studied in this study. it can be seen that all path relationships have p-values less than 0.05 so it can be said that all relationships between variables have a significant relationship and the hypothesis in the study is supported.

IV. CONCLUSION

Many studies have been published on the effectiveness and barriers of online learning systems for students. Online learning systems are defined in the literature as "access to experiential learning through the use of multiple technologies" [14].

Furthermore, [15] state that E-learning is a situated activity that occurs in a variety of settings and, if applied appropriately, can provide an ideal environment for facilitating social interaction while also providing academic, social, and psychological benefits.The results of the current study imply several relationships that determine student intention to use the Online Education Platform.

First, two hypotheses related to the original TAM variable are supported. In particular, perceived ease of use positively impacts perceived usefulness and perceived usefulness significantly affects users' intention to use the Platform. This finding was confirmed by a previous study conducted by [16], indicating that when learners find the Platform is easy to use, they feel it is more useful. At the same time, when learners believe the usage of the Platform is conducive to their learning, they are more willing to use it in practice.The results of this study support the existing literature [17] by identifying a positive relationship between perceived system quality and perceived usefulness. The findings show that the user interface design and functionality of the Platform, as well as their reliability and stability in terms of operability, significantly impact learner ease of use. [2], the impact of system quality may be important during the initial adoption of a learning system but diminishes over time, especially as users become accustomed to implementing it.

Based on the results of the research analysis, it can be concluded as follows:

1. Perceive ease of use have been proven to have a positive and significant effect on the intention to use online learning system.
2. Perceive usefulness have been proven to have a positive and significant effect on the intention to use online learning system.
3. Perceive system quality have been proven to have a positive and significant effect on the intention to use online learning system.

V. ACKNOWLEDGMENTS

Technology adoption during the covid-19 pandemic and post-covid-19 pandemic is without a doubt an adaptation that must be done, because an educational institution will be left behind if it does not adapt to the use of technology as soon as possible. This research provides input to educational institutions on how to adopt new technology. The researcher would like to thank all parties who contributed to the completion of this research, and hope to continue to develop and contribute together in the future.

REFERENCES

[1] Cheng, Y. (2012). Effects of quality antecedents on e-learning acceptance. Internet Research, 22(3), 361–390.

[2] Tang, Y., & Hew, K. F. (2019). Examining the utility and usability of mobile instant messaging in a graduate-level course: A usefulness theoretical perspective. ***Australasian Journal of Educational Technology***, 35(4), 128–143.

[3] Liu, I., Chen, M., Sun, Y., Wible, D., & Kuo, C. (2010). Extending the TAM model to explore the factors that affect Intention to use an online learning community. Computers & Education, 54(2), 600–610.

[4] Davis, F. D. (1986). A technology acceptance model for empirically testing new end-user information systems: *Theory and results* [PhD dissertation]. MIT Sloan School of Management.

[5] Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, *13*, 319–340.

[7] Hao, S., Dennen, V. P., & Mei, L. (2017). Influential factors for mobile learning acceptance among Chinese users. Educational Technology Research and Development, *65*(1), 101–123.

[8] Huang, F., Teo, T., & Zhou, M. (2019). Chinese students' intentions to use the Internet-based technology for learning. Educational Technology Research and Development, 68(1), 575–591.

[9] Teo, T., Zhou, M., Fan, A. C. W., & Huang, F. (2019). Factors that influence university students' intention to use Moodle: A study in Macau. Educational Technology Research and Development, 67(3), 749–766.

[10] Yang, M., Shao, Z., Liu, Q., & Liu, C. (2017). Understanding the quality factors that influence the continuance intention of students toward participation in MOOCs. Educational Technology Research and Development, 65(5), 1195–1214.

[11] Zhou, M. (2016). Chinese university students' acceptance of MOOCs: A self-determination perspective. Computers & Education, 92, 194–203.

[12] Hair, Joseph F, Back, C William Babin, B. J., & Anderson, R. E. 2014. on Multivariate Data Analysis Joseph F. Hair Jr. William C. Black Seventh Edition. Essex: Pearson Education Limited.

[13] Sekaran, U & Bougie, R. 2016. Research Methods For Business (Seventh). Willy.

[14] Moore, J. L., Dickson-Deane, C., & Galyen, K. (2011). e-Learning, on-line learning, and distance learning environments: Are they the same? The Internet and Higher Education, 14(2), 129–135

[15] Turnbull, D., Chugh, R., Luck, J. (2021). Issues in learning management systems implementation: A comparison of research perspectives between Australia and China Education and Information Technologies 1–22

[16] Chang, C., Yan, C., & Tseng, J. (2012). Perceived convenience in an extended technology acceptance model: Mobile technology and English learning for college students. ***Australasian Journal of Educational Technology***, 28(5), 809–826.

[17] Yang, M., Shao, Z., Liu, Q., & Liu, C. (2017). Understanding the quality factors that influence the continuance intention of students toward participation in MOOCs. Educational Technology Research and Development, 65(5), 1195–1214. Yeou, M. (2016). An investigation of students' acceptance of moodle in a blended learning setting using technology acceptance model. ***Journal of Educational Technology Systems***, 44(3), 300–318.