Analysis of The Use of Student Learning Management System in The Department of Food and Clothing Engineering Education-Universitas Negeri Yogyakarta After The COVID 19 Pandemic

Kokom Komariah[1], Mohammad Adam Jerusalem[2], Asri Andarini Nurlita[3,] Muhammad Yafie Nuha[4]
[1]Universitas Negeri Yogyakarta, Jl. Colombo No. 1 Yogyakarta, Indonesia
[2]Universitas Negeri Yogyakarta, Jl. Colombo No. 1 Yogyakarta, Indonesia
[3]Universitas Negeri Yogyakarta, Jl. Colombo No. 1 Yogyakarta, Indonesia
[4]Universitas Negeri Yogyakarta, Jl. Colombo No. 1 Yogyakarta, Indonesia

kokom@uny.ac.id

Abstract
The COVID-19 pandemic has had a significant impact on the education sector, forcing educational institutions to adapt to profound changes in teaching methods. This research aims to analyze the use of the Learning Management System (LMS) after the COVID-19 pandemic in the Food and Clothing Engineering Education-Universitas Negeri Yogyakarta. The method used is the PLS-SEM analysis method which is considered the right tool to help achieve research objectives. In this study, there are four research variables, namely student engagement (STE), perceived ease of use (PEOU), perceived usefulness (PU), and Continuance Intention (CI). The results of this research are model still has a predictive level that is not very good. The poor predictive level of the research model shows that the overall research structural relationship model is not too strong. Although the majority of the research structural paths are significantly accepted, the existence of one path that has not been accepted significantly causes the poor predictive power of the research model. This research recommends that efforts be made to increase the use of LMS as a learning method to improve the quality of learning in line with the demands of the 21st century through more optimal use of LMS.
Keywords: COVID-19 pandemic, Learning Management System (LMS), Food and Clothing Engineering Education

1. INTRODUCTION

The COVID-19 pandemic that hit the world has entered Indonesia since March 2020. The entry of the COVID-19 pandemic into Indonesia forced the government to make policies to deal with the COVID- 19 pandemic. Various policies have been made by the government to stem the spread of COVID-19 [1]. The main policy taken by the government to stem the spread of COVID-19 is in the form of limiting social distancing. The policy of limiting social activities has had a huge impact on various sectors of life

I. Widiyanah et al. (eds.), *Proceedings of the 8th International Conference on Education Innovation (ICEI 2024)*,
Advances in Social Science, Education and Humanities Research 888,
https://doi.org/10.2991/978-2-38476-360-3_120

distancing. The policy of limiting social activities has had a huge impact on various sectors of life [2]. This huge impact will certainly be experienced by Indonesia as a country with the fourth largest population in the world [3]. One sector that has not been spared the impact of the COVID-19 pandemic is the education sector. The COVID-19 pandemic has forced many institutions to undertake significant transformations in the use of technology [4], these changes are accelerating the application of technology in education in changing the way teaching and learning takes place, as well as driving innovation in teaching and evaluation methods. Educational institutions are required to adapt quickly to ensure the learning process continues during the COVID-19 pandemic [5] [6].

The increased penetration of internet technology that occurred in Indonesia before the COVID-19 pandemic took place has become a provision for the government in making policies during the COVID- 19 pandemic [7]. The COVID-19 pandemic can be considered as a trigger and catalyst to accelerate technology adoption in life, especially in the field of education [8] [9] [10] [11]. In the field of education, technology is used as a tool to support the administration and implementation of learning [12].

Post-COVID the education system will enter into new development directions to achieve more flexible curriculum stability [13]. This is necessary for the development of a new curriculum that has the resilience to carry out learning during an emergency. Two government policy focuses for 2021 in the form of infrastructure and technology development; as well as strengthening curricula, pedagogy, and assessments can be considered as an effort to transform the world of education so that it is more flexible to apply in emergencies [14]. These two policies explain that educational transformation leads to the continuity of the use of technology as a means of learning in the future. The government has a challenge to continue to improve the distance learning process so that it can run more optimally, both as a learning tool during the pandemic and as a means to support learning after the pandemic is over [15].

Learning in a distance learning format is an alternative for educational institutions to implement as a form of adaptation to maintain the continuity of learning activities during the COVID-19 pandemic. Distance learning is carried out by relying on information and communication technology as the main means of learning. Distance learning applications generally have a complete system to control the implementation of learning. Distance learning applications are the main media that enable the implementation of distance learning, without this application distance learning will be difficult to implement effectively. The two essential and frequently complementary elements of online distance education are online teaching and online learning [16]. Distance learning is defined as using a variety of internet-connected devices (such as computers, cell phones, and other devices) to engage in learning experiences in synchronous or asynchronous contexts [17]. Synchronous learning environments are those in which students participate in live lectures and have video conferences with other students and teachers to communicate in real-time. Meanwhile, an Asynchronous learning environment denotes learning activities that don't happen in real-time where there is no teacher response or feedback, like when

students learn course material from the teacher on the forum. The choice of learning format in the form of distance learning is carried out with the consideration of the high level of ICT penetration in people's lives. Three areas apply to ICT use in the education sector: learning systems; information sources and information searching; and instructional media (tools), which serve as an additional means of elucidating the descriptions being delivered [18]. One alternative learning that utilizes Internet technology is the Learning Management System.

Initially, the Learning Management System (LMS) was an innovation developed to facilitate less-than-optimal learning. However, since the COVID-19 pandemic, the application of LMS has increased throughout the world, making LMS a digital platform for learning activities. The Learning Management System provides information content and educational resources that contain material packaged in multimedia (text, animation, video, sound) that requires virtual-based innovation through online learning and web learning. LMS has a role in facilitating several activities, starting from scheduling classes to assignment collection [19]. The use of Learning Management Systems (LMS) in post-COVID-19 learning has become an integral element in the modern education system. The study aims to reveal the results of an analysis of the use of the Learning Management System for students at the Department of Food and Clothing Engineering Education - Yogyakarta State University after the COVID 19 Pandemic.

2. METHODS

The research data analysis was carried out through 4 stages. Each stage consists of several analysis processes carried out. The detailed stages and processes of research data analysis are as follows:

a. Preliminary analysis
1) Missing value detection
2) Detection of outliers

b. Descriptive analysis
1) Description of respondent profile
2) Categorization of research data

c. Evaluation of the measurement model (outer model)
1) Indicator reliability test
2) Internal reliability test
3) Convergent validity test
4) Discriminant validity test

d. Evaluation of the structural model (inner model)
1) Collinearity detection
2) Structural path analysis of the research model
3) Analysis of the explanatory power of the model
4) Analysis of the predictive power of the model (predictive power)

All analyses were carried out with the help of R-programming, which was run on RStudio software version 2023. The research model was analyzed using the Partial Least Square-Structural Equation Modeling (PLS-SEM) method. The third and fourth stages of analysis are specifically the stages of the PLS-SEM method analysis. The PLS-SEM method in R-programming is run with the help of a package (additional program) called "seminr" version 2.3.2.

Research aims to increase understanding of existing theories by combining them with other rarely connected variables. In other words, research seeks to explore theory development. The PLS-SEM analysis method is considered the right tool to help achieve research objectives.

In this study, there are four research variables, namely student engagement (STE), perceived ease of use (PEOU), perceived usefulness (PU), and Continuance Intention (CI). The student engagement variable is the only exogenous variable in the study, while the other three variables (perceived ease of use, perceived usefulness, and continuance intention) are endogenous. A group of measuring items represents each variable. Especially for the student engagement variable, the relationship between variables and items is through the intermediary of sub-variables (known as two stages). The following is the code name of the measuring items for each research variable:

a. Student engagement variable (STE) is measured through 3 sub-variables, namely
1) Cognitive engagement (CogE) is measured using 3 items, namely STE1 - STE3;
2) Behavioral engagement (BehE) is measured using 3 items, namely STE4 - STE6;
3) Emotional engagement (EmoE) is measured using 4 items, namely STE7 - STE10;
4) Social engagement (SocE) is measured using 4 items, namely STE11 - STE14;
b. The variable perceived ease of use (PEOU) is measured using 6 items, namely PEOU1 - PEOU6;
c. The variable perceived usefulness (PU) is measured using 7 items, namely PU1 - PU7; and
d. The continuance intention (CI) variable is measured using 6 items, namely Cl1 - Cl6;.

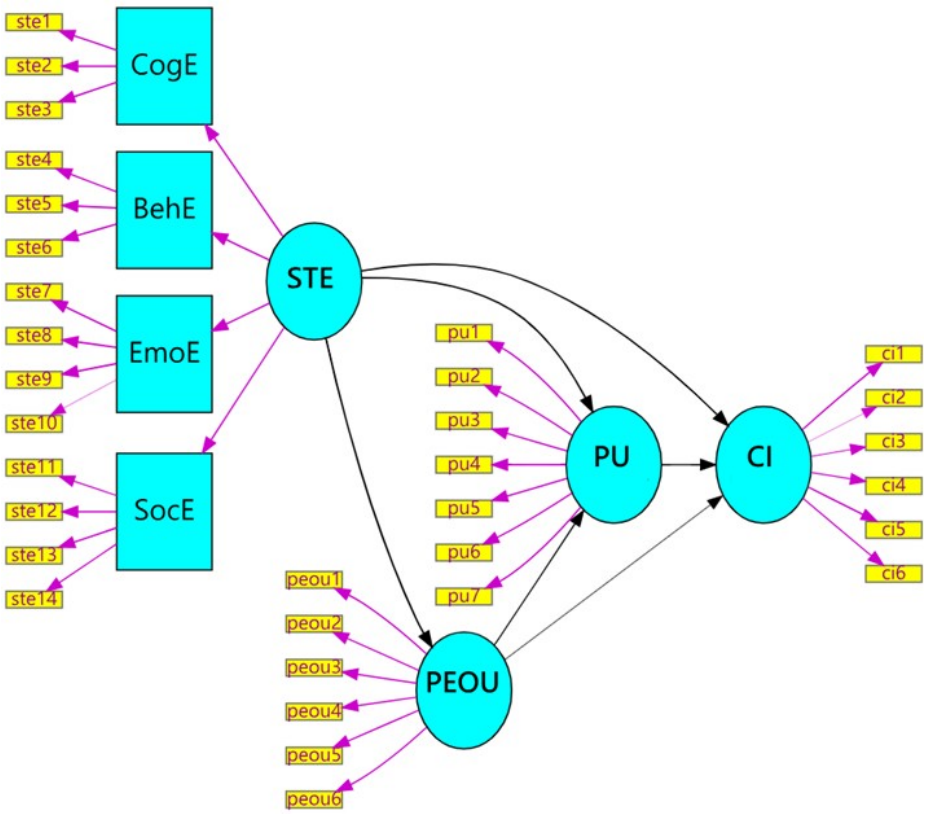

Figure 1. Diagram of the Research Model of Continuance Intention to Use the Learning Management System After the COVID-19 Pandemic

Figure 1 illustrates the research model that describes the relationship between research variables and between variables and their measuring items. Research variables are depicted in a cyan-coloured oval (cyan or salted egg green), while research sub-variables are shown in a cyan-coloured square. The items measuring the research variables are depicted with a yellow square.

The diagram shown in Figure 1 is an overall research model that combines the outer and inner models. The outer or measurement model is a model of the relationship between research variables and their measuring items. The outer model in Figure 1 is shown with purple arrows. The inner or structural model is a model of the relationship between research variables. The inner model in Figure 1 is shown with black arrows. The inner model in the study will test 6 structural relationships, namely:

a. The effect of student engagement (STE) on perceived ease of use (PEOU);
b. The effect of student engagement (STE) on perceived usefulness (PU);
c. The effect of student engagement (STE) on continuance intention (CI);
d. The effect of perceived ease of use (PEOU) on perceived usefulness (PU);
e. The effect of perceived ease of use (PEOU) on continuance intention (CI); and

f. The effect of perceived usefulness (PU) on continuance intention (CI);

Research using the SEM-PLS method involves various relationship tests on the research model. Different relationships in the research model are tested using the correlation coefficient, t, and p values. The SEM-PLS method has two types of correlation coefficients: outer loading and path coefficient. Outer loading, indicator loading, is the correlation coefficient value that connects variables with their measuring items. Another correlation coefficient value used explicitly for the relationship between variables in research is called the path coefficient. The outer loading value is used when evaluating the measurement model, while the path coefficient value is used when assessing the structural model.

3. RESULTS AND DISCUSSION

The majority of research respondents are students who take the S1 Boga Education study program (S1 PT Boga) with a percentage of 46%. The study program that contributed respondents was the S1 Fashion Engineering Education study program (S1 PT Busana) with a percentage of 29.02%. The rest of the research respondents came from the S1 Industrial Engineering Education (S1 T Industry) study program with a percentage of 17.65 and S2 PKK with a percentage of 7.45% respondents. The age range of respondents is between 18-22 years.

As many as 65.1% of students who became respondents in the research on the continuity of LMS use claimed to use the LMS frequently. Respondents who claimed to rarely use LMS and always use LMS had a frequency of 21.18% and 12.55%. A total of 1.18% of research respondents claimed to use the LMS very rarely.

In this study, respondents admitted that they used the LMS on the recommendation of the lecturer. The percentage of lecturers as recommenders of LMS use was 91.76%. Other parties involved as recommenders of LMS use are teachers and friends. The percentage of teachers and friends as recommenders of LMS use is 3.14% and 5.1% respectively. This means that the majority of respondents only used the LMS after entering college.

Frequency distribution of LMS names commonly used by respondents in attending lectures. The first column shows the main LMS most often used or accessed by respondents and the second column shows the alternative LMS used by respondents. A total of 78.82% of respondents chose to use BeSmart as their main LMS and Google Classroom as their alternative LMS. Only a small percentage of respondents only use BeSmart (15.69%) or Google Classroom (4.71%) as the main LMS without using an alternative LMS. All text, figures, tables, etc. should fit exactly in the type area of 15 × 24 cm (5.91" × 9.52"). All text should be typed in Times New Roman. All text is 11 pt on 12 pt line spacing except for the paper title (16 pt on 18 pt), author(s) (12 pt on 13 pt), affiliation(s) (10 pt on 11 pt) and the small text in tables, captions and references (10 pt on 11 pt). All line spacing is exact. Never add a line space between lines or paragraphs.

1.

2.
3.

3.1. *Research Variables*

The description of the research variable scores aims to determine the tendency of each respondent's variable score. Description of variable scores in general is done by calculating the mean value and standard deviation of each variable score. The mean value is needed to determine the middle value of the variable score and the standard deviation is needed to determine the distribution of the variable score.

The student engagement variable score of all respondents has a mean value of 51.05 and a standard deviation of 7.23. A total of 52.5% of respondents have student engagement scores in the high category. Respondents who have moderate and very high student engagement score categories have a percentage of 26.3% and 18.8% respectively. The remaining 2.4% of respondents had low student engagement scores.

The perceived ease of use variable score has a mean value of 23.21 and a standard deviation of 3.64. Most respondents fall into the high score category with a total of 43.1%. The second highest perceived of use score category is very high with a percentage of 35.3% of respondents. The medium perceived of use score category has a percentage of 18.8%.

The mean and standard deviation of the perceived usefulness variable score have a value of 26.24 and 4.24, respectively. The pie chart in Figure 8 shows the distribution of score categories for the perceived usefulness variable. More than 50% of respondents fall into the high perceived usefulness score category. The medium and very high perceived usefulness score categories have a percentage of 21.57% and 21.96%. The remaining respondents fall into the low and very low perceived usefulness score categories.

The continuance intention variable for using the LMS has a mean score of 21.38 and a standard deviation score of 2.93. The majority of respondents with a percentage of 45.9% are in the high continuance intention score category. The category that has the second largest continuance intention percentage score is the medium category (38.8%) and followed by the very high category in the fifth place with a percentage value of 13.3%. The low continuance intention score category has a percentage score of 1.96% and none of the respondents are in the very low continuance intention score category.

1.
2.
3.

3.1.

3.2. *Evaluation of the Measurement Model (Outer Model)*

There are four tests carried out on the measurement model evaluation, namely the indicator reliability test, internal consistency reliability test, convergent validity test, and discriminant validity test.

1.
2.
3.

3.1.

3.2.

3.2.1. *Uji Reliabilitas Indikator.*

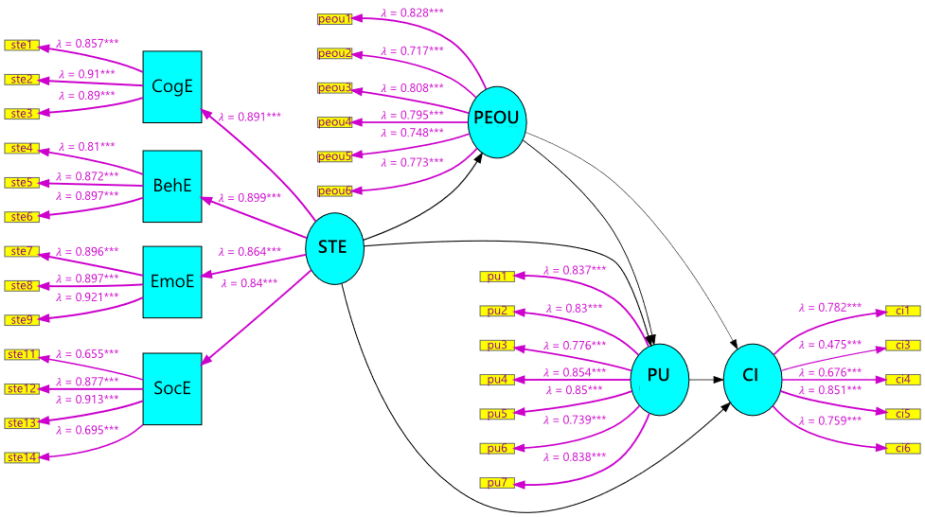

Figure 2. Diagram of the Modification of the Research Model with Outer Loading Values on Each Item

The items that have the largest and smallest outer loading values are ste9 (0.921) and ci3 (0.475), respectively. The outer loading value on ste9 can be interpreted that every increase in ste9 by 1 unit will increase student engagement by 0.921 units. The square value of outer loading is the amount of variance in the measured variable that can be explained by the measuring item. The square value of the outer loading of ste9 is 0.845 (the result of 0.9212). This means that the variance of the student engagement variable that can be explained through the ste9 item is 84.5%.

In accordance with the description of the outer model value analysis, it can be concluded that all items have very good indicator reliability in explaining the concept of the variable they measure. Student engagement variables can be represented by items ste1 - ste9 and items ste11 - ste14 very well. The same also applies to the perceived ease of use variable which can be represented by items peou1 - peou6 very well. Items pu1 - pu7 can also explain the concept of perceived usefulness variables very well. The continuance intention variable of LMS usage can also be measured very well by its five measuring items (ci1, ci3, ci4, ci5, and ci6).

1.
2.
3.

3.1.

3.2.

3.2.1.

3.2.2. *Internal Reliability Test*

The rhoA, alpha Cronbach, and rhoC coefficient values for all research variables are above 0.6. The smallest rhoA coefficient value belongs to the continuance intention variable (0.802) and the largest belongs to the perceived usefulness variable (0.919). The Cronbrach alpha value for the four research variables ranges from 0.762 to 0.917 with the smallest value for the continuance intention variable and the largest value for the perceived usefulness variable. Finally, the largest rhoC value belongs to the perceived usefulness variable (0.934) and the smallest (0.839) belongs to the continuance intention variable. All the highest rhoA, alpha Crobach, and rhoC values are owned by the perceived usefulness variable and the lowest is owned by the continuance intention variable.

According to the description of the rhoA, alpha Crobach, and rhoC values owned by the research variables, it can be concluded that all research variables can be measured by a group of measuring items consistently. The highest consistency is owned by a group of items measuring the perceived usefulness variable, while the lowest consistency is owned by a group of items measuring the continuance intention variable.

Table 1. Nilai Koefisien Rho_A, alpha Cronbach, Rho_C, dan AVE

Variabel	Rho_A	Alpha Cronbach	Rho_C	AVE
STE	0.899	0.897	0.928	0.764
PEOU	0.871	0.87	0.902	0.607
PU	0.919	0.917	0.934	0.67
CI	0.802	0.762	0.839	0.519

1.

2.

3.

3.1.

3.2.

3.2.1.

3.2.2.

3.2.3. *Convergent Validity Test*

The highest AVE value is owned by the student engagement variable (0.764) and the lowest value is the AVE value of the continuance intention variable (0.519). The AVE values for the perceived ease of use and perceived usefulness variables are 0.607 and 0.67, respectively.

According to the results of the calculation of the AVE value, it can be concluded that each research variable can be measured by a group of measuring items together well. In accordance with the AVE value of each variable, it can be interpreted that the

percentage of accuracy of a group of items in measuring the measured variable is as large as the AVE value. For example, the AVE value of 0.764 on the student engagement variable can be interpreted that the student engagement variable can be measured by eleven measuring items together with 76.4% accuracy.

3.2.4 Discriminant Validity Test

Based on the results of the cross loading analysis, each item measuring a variable has the highest correlation value to the variable it measures compared to the correlation value with other variables it does not measure. This means that all items have been able to measure the research variables accurately.

1.
2.
3.

3.1.
3.2.

3.3. *Structural Model Evaluation (Inner Model)*

There are four analyses in evaluating the structural model, namely collinearity detection analysis, structural path analysis, coefficient of determination analysis, and predictive relevance coefficient analysis. In the structural path analysis, there is hypothesis testing between research variables which is the main topic of discussion in the study.

3.3.1. *Collinearity Detection*

All VIF values of the research structural model are shown in Table 6. Endogenous variables that have VIF values are variables that are influenced by two or more variables, such as the perceived usefulness variable which is influenced by the perceived ease of use variable and the student engagement variable (see the second row). The perceived ease of use variable which is only influenced by one variable does not have a VIF value (see the third row). All VIF values presented in table 2 have values less than 5. This means that there is no collinearity in the structural relationship path between research variables.

Table 2. VIF value of the research structural model

	PU	PEOU	STE
CI	4.674	2.566	3.528
PU		1.917	1.917
PEOU			

1.
2.
3.

3.1.
3.2.

3.3.

3.3.1.

3.3.2. *Structural Path Analysis*

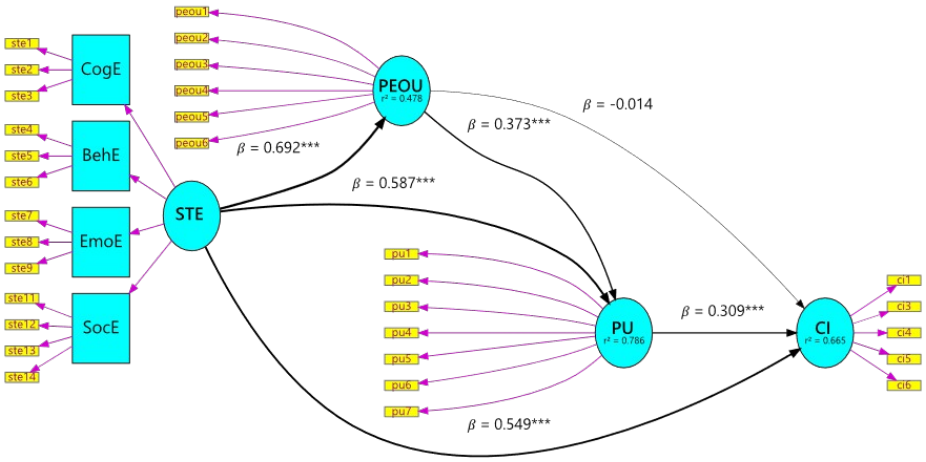

Figure 3. Research Model Diagram with path coefficient values.

The research model diagram accompanied by the path coefficient value on each structural relationship path between research variables is shown in Figure 3. The arrows describing the structural relationship between research variables are black. The size of the path coefficient value is indicated by the thickness of the arrow connecting the two research variables. The thicker arrows indicate a higher path coefficient value.

The path coefficient value of the structural model is indicated by a black number with the letter β prefix. The letter β (beta) is a symbol of the structural model path coefficient. The path coefficient value, t value, p value, and the complete structural model path analysis results are presented in Table 3.

The first structural path of the study tested the hypothesis of the effect of student engagement on perceived ease of use. The initial research hypothesis in the first structural path reads that there is no positive direct effect of student engagement on perceived ease of use. The first structural path has a t value of 19.587 and a p value of less than 0.001 (marked with three stars). Based on the t value which is greater than 1.96 and the p value which is less than 0.05, the initial hypothesis of the first structural path is rejected. This means that the alternative hypothesis which reads that there is a direct positive effect of student engagement on perceived ease of use is significantly accepted.

Table 3. Path coefficient values, t values, p values, and research hypothesis testing

No	Relation	Path Coefficient	(Path Coefficient)^2	T Value	P Value (sig)	Description

1	STE -> PEOU	0.692	0.479	19.587	0 (***)	Significant
2	STE -> PU	0.587	0.345	13.312	0 (***)	Significant
3	STE -> CI	0.549	0.301	6.71	0 (***)	Significant
4	PEOU -> PU	0.373	0.139	7.526	0 (***)	Significant
5	PEOU -> CI	-0.014	0	-0.217	0.585 (-)	Not significant
6	PU -> CI	0.309	0.095	3.159	0.002 (**)	Significant

The path coefficient on the first structural path has a value of 0.692. This value can be interpreted that every time there is an increase in the value of student engagement by one unit, the value of perceived ease of use is predicted to increase by 0.692. The amount of perceived ease of use variance that can be explained directly by student engagement is 47.9% (according to the square path coefficient value). This means that in the research model, the student engagement variable has an influence of 47.9% on perceived ease of use.

The hypothesis of the effect of student engagement on perceived usefulness is tested through the second structural path analysis. The initial research hypothesis on the second structural path reads that there is no positive direct effect of student engagement on perceived usefulness. The t value on the second structural path is 13.312 and the p value on the second structural path is less than 0.001. The t value which is greater than the criterion of 1.96 and the p value which is less than the criterion of 0.05 causes the initial hypothesis of the second structural path to be rejected. Thus, the alternative hypothesis that there is a direct positive effect of student engagement on perceived usefulness is significantly accepted.

The path coefficient value in the second hypothesis (0.587) can be interpreted that every time there is an increase in the value of student engagement by one unit, it is predicted that the value of perceived usefulness will also increase by 0.587 units. The variant of perceived ease of use that can be explained directly by student engagement is 34.5%. This means that the student engagement variable has an individual influence of 34.5% on the perceived usefulness variable.

The third structural path of the study aims to test the hypothesis of the effect of student engagement on continuance intention of using LMS. The initial research hypothesis in the third structural path reads that there is no positive direct effect of student engagement on continuance intention of LMS usage. The third path has a t value of 6.71 and a p value of less than 0.001. The t value which is greater than the 1.96 criterion and the p value which is smaller than the 5% significance testing criterion causes the initial hypothesis to be rejected. The rejection of the initial hypothesis in the third structural path causes the alternative hypothesis which reads

that there is a direct positive effect of student engagement on continuance intention to use the LMS to be accepted significantly.

The third structural path has a path coefficient value of 0.549. The path coefficient value means that every time there is an increase in student engagement by one unit, the continuance intention value will increase by 0.549 units. The percentage of continuance intention variance that can be explained directly by student engagement is 54.9%. The percentage of variance means that in the research model, student engagement has an influence of 54.0% on continuance intention.

The fourth structural path of the study aims to test the hypothesis of the effect of perceived ease of use on perceived usefulness. The initial research hypothesis in the third structural path reads that there is no positive direct effect of perceived ease of use on perceived usefulness. The fourth structural path has a t value of 7.527 and a p value of less than 0.001. Based on the provisions of hypothesis testing, the initial research hypothesis is rejected because it has a t value greater than 1.96 and a p value less than 0.05. The rejection of the initial hypothesis of the fourth structural path means that the alternative hypothesis which reads that there is a direct positive effect of perceived ease of use on perceived usefulness is significantly accepted.

The path coefficient on the fourth structural path is 0.373. This value can be interpreted that perceived usefulness will increase by 0.373 units when there is an increase in the perceived ease of use value by one unit. The percentage of perceived usefulness variance that can be explained directly by perceived ease of use is 13.9%. This means that the magnitude of the effect of perceived ease of use on perceived usefulness is 13.9%.

The fifth hypothesis was tested using the fifth structural path analysis of the study. The initial hypothesis of the fifth structural path research reads that there is no effect of perceived ease of use on continuance intention to use the LMS. The t value and p value for the fifth structural path are -0.014 and 0.585, respectively. The initial hypothesis in the fifth structural path is accepted because the t value is smaller than the criterion of 1.96 and the p value is greater than 0.05. The acceptance of the initial hypothesis means that the perceived ease of use variable does not have a significant direct influence on the continuance intention of using the LMS. With the insignificance of the fifth structural path, the path coefficient value cannot be interpreted.

The sixth structural path tests the hypothesis of the effect of perceived usefulness on continuance intention to use the LMS. The initial hypothesis of the sixth structural path reads that there is no positive direct effect of perceived usefulness on continuance intention to use the LMS. The sixth structural path has a t value of 0.309 and a p value of 0.002. Based on the t value which is greater than the 1.96 criterion and the p value which is smaller than the 0.01 criterion, the initial hypothesis of the sixth structural path is rejected. This means that the alternative hypothesis which reads that there is a direct positive effect of perceived usefulness on continuance intention to use the LMS is significantly accepted.

The path coefficient value in the sixth hypothesis is 0.309. The path coefficient value means that the continuity intention to use LMS is predicted to increase by 0.309 units when there is an increase in perceived usefulness by one unit. The percentage of variance in continuance intention to use LMS that can be explained directly by perceived usefulness is 9.5%. This means that the direct effect of perceived usefulness on continuance intention to use LMS is 9.5%.

1.

2.

3.

3.1.

3.2.

3.3.

3.3.1.

3.3.2.

3.3.3. *Analysis of the Explanatory Power of the Model*

The third step in structural model evaluation is analysis of the explanatory power of the model. The explanatory power of a model is the ability of a variable or group of variables to explain the other variables it influences. Analysis of the explanatory power of the model was carried out by calculating the coefficient of determination R2. The coefficient of determination R2 is in the weak category if it has a value of less than 0.5, in the medium category if it has a value between 0.5 - 0.74, and has a high value if it has a value of more than 0.74. The complete value of the coefficient of determination R2 is shown in Table 4

Table 4. Value of Determination Coefficient R2 Endogenous Variable Research

	CI	PU	PEOU
R^2	0.665	0.786	0.478
Adj R^2	0.661	0.784	0.476
PU	0.309		
PEOU	-0.014	0.373	
STE	0.549	0.587	0.692

The largest coefficient of determination R2 is in the perceived usefulness variable with a value of 0.786. The perceived usefulness variable in the structural model is influenced by the student engagement and perceived ease of use variables.

This means that the contribution of student engagement and perceived ease of use together in explaining the variance of perceived usefulness is 78.6%. The magnitude of the contribution of student engagement variables and perceived ease of use to perceived usefulness is in the high category. The remaining 21.4% variance in perceived usefulness is explained by measurement error.

The endogenous variable that has the smallest R2 coefficient of determination is perceived ease of use. The perceived ease of use variable in the research structural model is directly influenced by one variable, namely student engagement. The coefficient of determination R2 of the perceived ease of use variable is 0.478. This value means that the contribution of the student engagement variable in explaining the perceived ease of use variant is 47.8%. The percentage contribution of student engagement in explaining the perceived variance of use is in the weak category. However, because the percentage contribution is close to 50%, the contribution of the student engagement variable in explaining the perceived ease of use can be categorized in the moderate category.

The endogenous variable continuance intention of using LMS has a coefficient of determination of 0.665. There are three variables that affect the continuance intention of using LMS directly, namely student engagement, perceived ease of use, and perceived usefulness. The contribution of the three variables in explaining the variant of continuance intention to use LMS simultaneously is 66.5%. The percentage contribution of the three variables in explaining the variant of continuance intention to use LMS is included in the high category. The remaining variant of continuance intention that is not explained by the variables that influence it is 33.5%.

The level of influence that each variable has on the other variables it measures is shown through the effect size value f2. The level of influence that a variable has in influencing other variables is in the small category if the effect size f2 value is between 0 - 0.14, the medium category if it is between 0.15 - 0.34, and the large category if the value is above 0.34. The effect size f2 coefficient table for the complete research structural model can be seen in Table 5. Interpretation of the effect size f2 coefficient value is done by looking at Table 5 and the structural relationship model diagram in Figure 3. The student engagement variable is not influenced by other variables, so the effect size f2 value of other variables on student engagement is zero.

Table 5. Effect size coefficient value f2

	STE	PU	PEOU	CI
PU	0	0	0	0.065
PEOU	0	0.337	0	0
STE	0	0.828	0.917	0.240
CI	0	0	0	0

The endogenous variable perceived usefulness is directly influenced by the variables student engagement and perceived ease of use. The effect size coefficient value f2 of student engagement and perceived ease of use on perceived usefulness is 0.337 and 0.828, respectively. Both effect size f2 coefficient values are in the large or strong category. This means that the influence that student engagement and perceived ease of use have on perceived usefulness individually is very strong. In accordance with the effect size coefficient value f2, perceived usefulness is more strongly influenced by student engagement than perceived ease of use.

Unlike perceived usefulness which has two structural paths, perceived ease of use only has one structural path. Therefore, there is only one effect size coefficient value f2 that leads to perceived ease of use. The effect size coefficient value f2 of student engagement on perceived ease of use is 0.917. This value is included in the very large category. This means that the level of influence given by student engagement on perceived ease of use is very large.

The endogenous variable continuity intention of using LMS has two effect size f2 coefficient values, namely: the effect size f2 coefficient of student engagement which is 0.240 and the effect size f2 coefficient of continuance intention which is 0.065. The effect size coefficient f2 of student engagement is in the medium category, while the effect size coefficient f2 of perceived usefulness is in the low category. This means that the influence given by student engagement on continuance intention to use LMS is stronger than the influence given by perceived usefulness on continuance intention to use LMS.

1.
2.
3.
    3.1.
    3.2.
    3.3.
        3.3.1.
        3.3.2.
        3.3.3.
    3.3.4. *Analysis of Model Predictive Power*

Analysis of the predictive power of the model aims to determine the accuracy of the model in making predictions. Analysis of the predictive power of the model is done by comparing the root-mean-square error (RMSE) value or the mean absolute error (MAE) value in the PLS model with the RMSE or MAE value in the benchmark linear regression model (LM) for each item measuring the research variable.

The RMSE value in the PLS and LM Benchmark models has a comparison coefficient of 0.50. This means that 50% of the PLS model RMSE value is lower than the LM benchmark model RMSE value and 50% of the LM benchmark model RMSE value is lower than the PLS model RMSE value. The same number of RMSE value comparisons shows that in terms of the RMSE value the research model can be said to have a medium or medium level of prediction.

The MAE comparison coefficient value of the PLS model with the benchmark LM model is 0.39. This means that 39% of the MAE value of the PLS model is lower than the MAE value of the benchmark LM model. Based on the MAE coefficient value, it can be concluded that the research model has a low predictive level.

Based on the analysis of the predictive power of the model, it can be concluded that the research model still has a predictive level that is not too good. The predictive level of the research model that is not too good shows that the overall research structural relationship model is not too strong. Although the majority of the research structural paths are significantly accepted, the existence of one path that has not been accepted significantly causes the poor predictive power of the research model.

4. CONCLUSION

Based on the results of the discussion, it can be concluded that, based on calculations using the Partial Least Square-Structural Equation Modeling (PLS-SEM) method in R-programming run with the help of a package called "seminr" version 2.3.2, the results are:

a. The student engagement variable research model has an influence of 47.9% on perceived ease of use.
b. The student engagement variable has an individual effect of 34.5% on the perceived usefulness variable.
c. Variable student engagement has an influence of 54.0% on continuance intention.
d. The effect of perceived ease of use on perceived usefulness is 13.9%.
e. The perceived ease of use variable does not have a significant direct influence on the continuance intention of using the LMS. With the insignificance of the fifth structural path, the path coefficient value cannot be interpreted. the direct effect of perceived usefulness on continuance intention to use LMS is 9.5%.

Based on the analysis of the predictive power of the model, it can be concluded that the research model still has a predictive level that is not too good. The predictive level of the research model that is not too good shows that the overall research structural relationship model is not too strong. Although the majority of the research structural paths are significantly accepted, the existence of one path that has not been accepted significantly causes the poor predictive power of the research model.

Recommendations for this research include (a) For lecturers and managers, efforts need to be made to increase the use of LMS as a learning method to improve the quality of learning in line with the demands of the 21st century through more optimal use of LMS; (b) There are still students with low engagement scores.

Therefore, lecturers must make breakthroughs in preparing materials and learning methods by providing up-to-date illustrations or asking stimulating questions; (c) The categories of perceived ease of use and continuance intention among respondents are in the high score category. However, this research is still on students in Generation Z, so it is necessary to research perceived ease of use and continuance intention among teaching staff and other academics; (d) The structural model test results state that the five measuring items can measure the variable very well. Therefore, the results of this model can be used to measure other relevant research; and (e) For students, efforts need to be made to increase responsibility and independence in learning to achieve optimal learning outcomes.

REFERENCES

[1] Wang, Y. (2021). Government policies, national culture and social distancing during the first wave of the COVID-19 pandemic: International evidence. *Safety Science*, *135*. https://doi.org/10.1016/j.ssci.2020.105138.

[2] Escorcia Hernández, J. R., Torabi Moghadam, S., Sharifi, A., & Lombardi, P. (2023). Cities in the times of COVID-19: Trends, impacts, and challenges for urban sustainability and resilience. In *Journal of Cleaner Production* (Vol. 432). Elsevier Ltd. https://doi.org/10.1016/j.jclepro.2023.139735

[3] Djalante, R., Lassa, J., Setiamarga, D., Sudjatma, A., Indrawan, M., Haryanto, B., Mahfud, C., Sinapoy, M. S., Djalante, S., Rafliana, I., Gunawan, L. A., Surtiari, G. A. K., & Warsilah, H. (2020). Review and analysis of current responses to COVID-19 in Indonesia: Period of January to March 2020. *Progress in Disaster Science*, *6*. https://doi.org/10.1016/j.pdisas.2020.100091

[4] Dwivedi, Y. K., Hughes, D. L., Coombs, C., Constantiou, I., Duan, Y., Edwards, J. S., Gupta, B., Lal, B., Misra, S., Prashant, P., Raman, R., Rana, N. P., Sharma, S. K., & Upadhyay, N. (2020). Impact of COVID-19 pandemic on information management research and practice: Transforming education, work and life. *International Journal of Information Management*, *55*. https://doi.org/10.1016/j.ijinfomgt.2020.102211

[5] Iyengar, R. (2021). Rethinking community participation in education post COVID-19. *Prospects*, *51*(1–3), 437–447. https://doi.org/10.1007/s11125-020-09538-2

[6] Teräs, M., Suoranta, J., Teräs, H., & Curcher, M. (2020). Post-COVID-19 Education and Education Technology 'Solutionism': a Seller's Market. *Postdigital Science and Education*, *2*(3), 863–878. https://doi.org/10.1007/s42438-020-00164-x

[7] Almomani, L. M., Halalsheh, N., Al-Dreabi, H., Al-Hyari, L., & Al-Quraan, R. (2023). Self-directed learning skills and motivation during distance learning in the COVID-19 pandemic (case study: The university of Jordan). *Heliyon*, *9*(9). https://doi.org/10.1016/j.heliyon.2023.e20018

[8] Dey, B. L., Al-Karaghouli, W., & Muhammad, S. S. (2020). Adoption, Adaptation, Use and Impact of Information Systems during Pandemic Time and Beyond:

Research and Managerial Implications. *Information Systems Management*, *37*(4), 298–302.

[9] Sangeeta, & Tandon, U. (2020). Factors influencing adoption of online teaching by school teachers: A study during COVID-19 pandemic. *Journal of Public Affairs*.

[10] Schwab, K., & Malleret, T. (2020). *COVID-19: The Great Reset*. World Economics Forum.

[11] Siahaan, M. (2020). Dampak Pandemi COVID-19 Terhadap Dunia Pendidikan. In *Edisi Khusus* (Issue 1). http://ejurnal.ubharajaya.ac.id/index.php/JKI

[12] Dalvi-Esfahani, M., Wai Leong, L., Ibrahim, O., & Nilashi, M. (2020). Explaining Students' Continuance Intention to Use Mobile Web 2.0 Learning and Their Perceived Learning: An Integrated Approach. *Journal of Educational Computing Research*, *57*(8), 1956–2005. https://doi.org/10.1177/0735633118805211

[13] Charland, P., Deslandes Martineau, M., Gadais, T., Arvisais, O., Turgeon, N., Vinuesa, V., & Cyr, S. (2021). Curriculum response to the crisis. *Prospects*, *51*(1–3), 313–330. https://doi.org/10.1007/s11125-020-09526-6

[14] Kemdikbud. (n.d.). *Kemendikbud Sampaikan Capaian Tahun 2020 dan Sasaran Tahun 2021*.

[15] Daniel, S. J. (2020). Education and the COVID-19 pandemic. *Prospects*, *49*(1–2), 91–96. https://doi.org/10.1007/s11125-020-09464-3

[16] Outoukarte, I., Fares, S. Ben, Itouni, H., Rassou, K. K., & Tahiri, A. (2023). Distance Learning in The Wake of COVID-19 in Morocco. *Heliyon*, *9*.

[17] Dhawan, S. (2020). Online Learning: A Panacea in the Time of COVID-19 Crisis. *Journal of Educational Technology Systems*, *49*(1), 5–22. https://doi.org/10.1177/0047239520934018

[18] Anggadwita, G., Indarti, N., & Ratten, V. (2024). Changes in Indonesian private universities educational practices in the post COVID-19 environment. *International Journal of Management Education*, *22*(1). https://doi.org/10.1016/j.ijme.2023.100905

[19] Lim, C., Martin, Adnyana, M. A., Achmad, S., & Sutoyo, R. (2023). Online Learning Platform Analysis During COVID- 19 Pandemic in Indonesia. *Procedia Computer Science*, *227*, 606–613. https://doi.org/10.1016/j.procs.2023.10.564