



DEVELOPMENT OF DISTANCE LEARNING TECHNOLOGY WITH SMART CAMPUS IN IMO CONVENTION SUBJECT IN THE COVID-19 PANDEMIC AT MALAHAYATI MERCHANT MARINE POLYTECHNIC

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ABSTRACT

Pandemic Covid-19 in 2022 will continue and of course bring changes to the habits of human life in the world, especially in Indonesia, these changes bring new habits to human activities that make them study, work and worship from home, this certainly brings changes to the learning system that implemented in every educational institution that brings changes to the learning system, namely the Distance System. In 2021 the Malahayati Merchant Marine Polytechnic will develop a new distance learning technology called the Smart Campus. The development can provide convenience for various parties, namely students, educators, and education staff responsible for the implementation of the distance learning system at the Malahayati Merchant Marine Polytechnic. The purpose of this study was to examine in terms of the effectiveness of using a smart campus as a technology in the implementation of distance learning, it certainly wanted to observe the relation to the learning achievement of students and the activeness of lecturers in implementing distance learning using a smart campus. This research method uses This study uses a descriptive qualitative approach. The data collection methods that will be used in the study are interviews, questionnaires, observation, and documentation. To test the hypothesis, a multiple regression measuring instrument (multiple regression) will be used where the amount of Y (learning achievement) quantitatively will be known from each variable X. The results of this study show that based on the results of the study, the calculated $> F_{table} > 2,311$ at the significance level $50,725 = 5\%$, it states that simultaneously (together) the smart campus application variable affects the learning achievement of participants studied at the Malahayati Merchant Marine Polytechnic.

Keywords: Smart Campus, Distance Learning, Covid-19, Malahayati Merchant Marine Polytechnic.

INTRODUCTION

Pandemic Covid-19 in 2022 will continue and of course bring changes to human life habits in the world, especially in Indonesia, these changes bring new habits to human activities that make them learn, work and worship from home, and this certainly brings changes to the learning system implemented in every educational institution that brings changes to the learning system, namely the Distance System. Data on the distribution of Covid-19 is based on data obtained from the website www.covid19.go.id as of January 26, 2022, the number of people exposed to Covid-19 in Indonesia reached 4,301,193 positive COVID-19 people with 4,127,662

recoveries and 144,254 people who died. pandemic situation Covid-19 especially the recent emergence of a new variant, namely *Omicron*, course making the government more vigilant in providing policies to regulate community activities so that Indonesia does not experience an increase in the spread of Covid. -19 which occurred at the beginning of the 2020 pandemic.

One of these policies was the policy in terms of the learning system which required learning to still use the distance system. Universities that used to implement a face-to-face learning system fully and other academic activities now need to change it to a Distance Learning method. In foreign terms, it is called *distance learning*. In



various other studies, it is also known as *online learning*, e-learning, and online.

For universities that are located in geographical areas with weak internet connections, this is a challenge for students besides those who live in areas that are still experiencing problems with an internet connection, this is certainly a challenge for universities in implementing the learning system. while still paying attention to the learning outcomes expected to be maximally accepted by students.

Malahayati Merchant Marine Polytechnic is a Vocational College under the Ministry of Transportation, the Human Resources Development Agency under the guidance of the Sea Transportation Human Resources Development Center which has the task of organizing Vocational Education, Research, and Community Service in the shipping sector through the Regulation of the Minister of Transportation Number PM. 27 of 2019 concerning the Organization and Work Procedures of the Malahayati Merchant Marine Polytechnic has organized Diploma III Education for students at the Malahayati Merchant Marine Polytechnic often called Cadets, of course, must be able to answer the challenges during the covid-19 pandemic so that the learning outcomes that have been set in the operational curriculum of the Malahayati Merchant Marine Polytechnic Diploma III program can be achieved so that it can graduate shipping graduates who are Prima, Professional and Ethical.

In dealing with these conditions, the Malahayati Merchant Marine Polytechnic has implemented distance learning and has been carried out by the Malahayati Merchant Marine Polytechnic starting in 2020, of course, the distance learning system that has been implemented is evaluated in the hope

of improvement and development to improve the quality of diploma education at the Malahayati Merchant Marine Polytechnic even during the pandemic. all of which are limited. With this, in 2021 the Malahayati Merchant Marine Polytechnic will develop a new distance learning technology called the *Smart Campus*, where the development can provide convenience for various parties, namely students, educators, and education staff in being responsible for the implementation of the learning system. the distance at Malahayati Merchant Marine Polytechnic. In addition, of course, a *smart campus* is expected to be able to maximize the learning system implemented and be able to apply the *blended learning system*, where when the cadets are at home, the lecturer can maximize the theoretical understanding of the courses being studied, and later the Malahayati Merchant Marine Polytechnic will schedule time for cadets on campus to be able to practice the results of understanding that have been obtained from distance learning outcomes.

From the description above, the authors are interested in carrying out research related to the development of distance learning technology that was newly developed by the Malahayati Merchant Marine Polytechnic, researchers are interested in research from the side of the effectiveness of using *smart campuses* as technology in the implementation of distance learning, this, of course, wants to observe the relationship with learning achievement of students and activeness of lecturers in implementing distance learning using the *smart campus*.

Regarding this research, previously there was a discussion regarding the development of distance learning-based educational



technology, namely Napitulus in 2020 with the research title "Development of Distance Learning Technology with *Smart Campus* Course *IMO Convention* in the Covid-19 Pandemic Period at the Malahayati Merchant Marine Polytechnic".

LITERATURE REVIEW

The Distance Learning System is a system that is a solution to the limitations where students cannot attend campus and lecturers can still provide learning materials that must be mastered by students. The remote learning system is implemented where lecturers use media in delivering teaching materials that must be delivered to training participants such as via video conference, e-learning, soft files, etc. According to Law Number 20 of 2003 Article 1 Paragraph 15, distance education is education in which students are separated from educators and learning uses various learning resources through information and communication technology and other media. At least in the Distance Learning System, three important elements support its success when applied by universities: students, lecturers, and technology (Tîrziu & Vrabie, 2015).

With this situation making challenges for lecturers, students who like it or not must be ready to face *online learning* (Tîrziu & Vrabie, 2015) by innovating in providing learning materials so that they can produce innovations in education that were previously undiscovered. With the differences between face-to-face learning with distance learning, it will have a different influence on the quality of student learning (Karwati, 2014), for that lecturers must always be able to innovate and issue new ideas in finding unusual methods. This

is done in face-to-face learning but still pays attention to the learning outcomes that have been set by educational institutions so that students can feel satisfied even though they cannot learn face-to-face. Many factors affect satisfaction including technology, educational content, motivation and attitudes (Navimipour & Zareie, 2015), student readiness level (Yilmaz, 2017), suitability of information with needs (Isaac et al., 2019), learning design (Rienties & Toetenel, 2016), information quality (Pereira, Ramos, Gouvêa, & da Costa, 2015), experience (Deshwal, Trivedi, & Himenshi, 2017). If students obtain online learning satisfaction, it will affect motivation and learning outcomes (Wang, Hsu, Bonem, Moss, Yu, Nelson, & Levesque-Bristol, 2019; Kurucay & Inan, 2017), perceived value and intensity of sustainability (Nugroho, Setyorini, & Novitasari, 2019).

RESEARCH METHODS

This study uses a descriptive qualitative approach where the informants in this study are cadets/I Diploma III program of Nautical Studies Study Program, Ship Permeation Study Program, and Ship Electrical System Study Program at Malahayati Merchant Marine Polytechnic, teaching staff are lecturers in the Diploma III program and educational staff in this is the secretary of the study program.

The data collection methods that will be used in the research are

1. Interviews and Questionnaires.

In structured interviews, researchers use them for teaching staff, lecturers, and education staff at the Malahayati Merchant Marine Polytechnic and researchers will prepare research



instruments in the form of written questions for which alternative answers have also been prepared. With this structured interview, each respondent is given questions and the researcher can use several interviewers as data collectors. For cadets in their respective homes, the researchers used an electronic questionnaire distributed through class groups of cadets in the Nautical Study Program, Ship Engineering Study Program, and Ship Electrical System Study Program.

2. Observation.

Observation is used by observing directly the smart campus application that is used, in this case, what can be done is to observe directly from the side of lecturers and education staff in using the smart campus application of the Malahayati Merchant Marine Polytechnic.

3. Documentation

Documents are records of events that have passed. Documents can be in the form of writing, pictures, or monumental works of someone. Document studies in qualitative research are complementary to the use of observation and interview methods. In this case, the researcher documents all matters relating to the results of the research, musings of interviews, questions, ires, and observations.

Data Analysis Tools

To test the hypothesis, a multiple regression measuring instrument (multiple regression) is used in which the amount of Y (learning achievement) quantitatively will be known from each variable X with the following formula.

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + e$$

Where:

Y = Learning Outcomes

X₁ = Smart Campus Contents

X₂ = Interface

X₃ = Feedback

X₄ = Personalization

X₅ = Interactivity

a = Constant

b₁ = Regression Coefficient of Smart Campus Content Factor

b₂ = Interface Factor Regression Coefficient

b₃ = Feedback Factor Regression Coefficient

b₄ = Personalization Factor Regression Coefficient

b₅ = Interactivity Factor Regression Coefficient

e = Std. error

The regression calculation will show the strength of the functional relationship between the dependent variable (Y) and the independent variable (X₁, X₂, X₃, X₄, X₅). To measure the closeness of the relationship between the dependent variable and the independent variable, overall correlation analysis is used to find the correlation coefficient (R), while to see how much influence the independent variable has on the dependent variable on the learning achievement of students at the Malahayati Merchant Marine Polytechnic as a whole used the coefficient of determination (R²).

RESULTS AND DISCUSSION

Characteristics of Students

The characteristics of students in this study only looked at the age level of students who filled out the smart campus application questionnaire, as described in table 4.1 below:



Table 4.1
Characteristics of Students

No.	Description	Frequency	Percentage
1.	Age		
	▪ 18 years	9	8.4
	▪ 19 years	33	30.8
	▪ 20 years	42	39.3
	▪ 21 years	18	16.8
	▪ 22 years	5	4.7
Total		100	100.0

Source: Primary data processed, (2022)

Based on age students can be explained that as many as 9 people or 8.4% of students aged 18 years, then students with the age level of 19 years as many as 33 people or 30.8%, students with the age level of 20 years as many as 42 people or 39.0%, then students with the age of 21 years as many as 18 people or 16.8% and students with the age level of 22 years as many as 5 people or 4.7% of the total students.

Instrument Test Results

1. Validity

Test The data validity test in this study used the *Pearson product-moment coefficient of correlation* with the help of SPSS version 23.0. The results show that all statements have a correlation value above the critical value of 5%, which is above 0.195 (See Table of *Product-Moment* for $n = 107$). This means that the data obtained is valid and can be used for research, as described in the following table.

Table 4.2
Validity Test Results

No.Statement		Variable	Correlation Coefficient	Critical Value 5% (N=100)	Note
1.	A1	Contents of Smart Campus	0.893	0.195	Valid
2.	A2		0.912		
3.	A3		0.923		
4.	A4		0.910		
5.	B1	Interface	0.817	0.195	Valid
6.	B2		0.810		
7.	B3		0.814		
8.	B4		0.794		
9.	B5		0.730		
10.	C1	Feedback	0.824	0.195	



No.Statement		Variable	Correlation Coefficient	Critical Value 5% (N=100)	Note
11.	C2		0.883		Valid
12.	C3		0.861		
13.	C4		0.921		
14.	C5		0.900		
15.	C6		0.868		
16.	C7		0.898		
17.	D1	Personalization	0.917	0.195	Valid
18.	D2		0.911		
19.	D3		0.922		
20.	D4		0.948		
21.	D5		0.921		
22.	E1	Interactivity	0.908	0.195	Valid
23.	E2		0.938		
24.	E3		0.941		
25.	E4		0.905		

Source: Primary Data (2022), (processed)

Based on table 4.2. above it can be explained that all the variables used in this study were declared valid so that all the questions contained in this research questionnaire were declared valid for further in-depth research.

2. Reliability Testing Reliability

Testing is intended to determine the

extent to which the measurement results remain consistent. Also statistically, it is done by calculating the amount of Cronbach *Alpha* with the help of the SPSS version 15.0 program. The results are shown in the table below which shows that the instrument in this study is reliable (reliable) because the alpha value is greater than 0.60 (Malhotra, 2016).

Table 4.3
Research Variable Reliability (Alpha)

No.	Variable	Average	Number Variables	Alpha Value	Smart Campus
1.	Smart Campus content (x1)	3,390	4	0.931	Reliable
2.	Interface (x2)	3.393	5	<u>0.929</u>	Reliable
3.	Feedback (x3)	3,348	7	<u>0.950</u>	Reliable



4.	Empathy (x4)	3.344	5	<u>0.958</u>	Reliable
5.	Interactivity (x5)	3.357	4	<u>0.940</u>	Reliable

Source: Primary Data (2022) (processed).

Based on table 4.3. above shows that the alpha value for each variable, namely the smart campus content variable (x1) obtained an alpha value of 93.1 percent, the interface variable (x2) obtained an alpha value of 92.9 percent, the feedback variable (x3) obtained an alpha value of alpha of 95.0 percent and the personalization variable (x4) obtained an alpha value of 95.8 percent, the interactivity variable (x5) obtained an alpha value of 94.0 percent, thus the reliable measurement of the research variable shows that the reliability measurement meets the required requirements. by Malhotra.

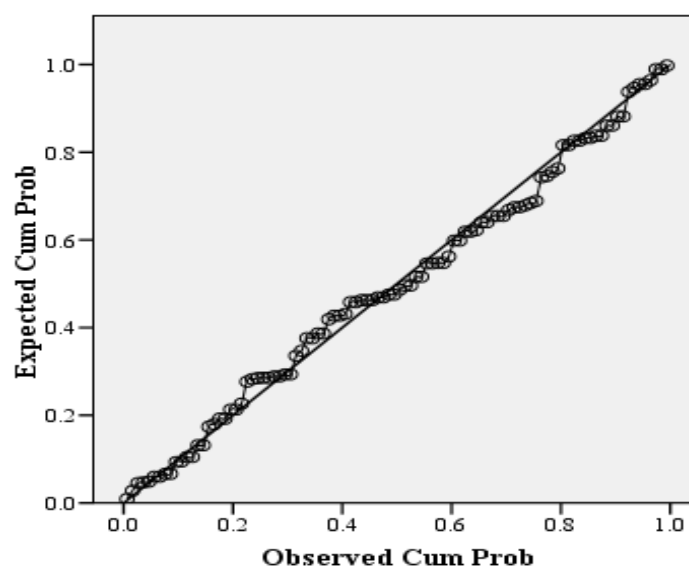
Classical Assumption Testing

By using the multiple linear regression model in the discussion of data analysis, the classical assumption test is carried out first, where in this case there are 3 types of assumptions used, namely:

a. Normality

The first classic assumption tested is normality. Based on the normal P-P plot on the appendix page, the distribution of *standardized residuals* is in the range of the diagonal line. As described in the following figure:

Figure 4.1.
Normality of Student Learning Outcomes
Normal P-P Plot of Regression Standardized Residual
Dependent Variable: Capaian Pembelajaran



Based on Figure 4.1. above it can be explained that the dependent data in this

study are normally distributed, meaning that in this study it is feasible to do further



research. The normal distribution in this study is characterized by the distribution of data (in the form of dots) around the horizontal line, this indicates that the data is normally distributed.

b. Testing

Multicollinearity was tested by looking at each independent variable's VIF (Variance Inflating Factor) on the dependent variable. If $VIF < 5$, there is no multicollinearity or non-multicollinearity. The test results are shown in the following table:

Table 4.4
Value of VIF Independent

Variable	Tolerance	VIEW	Description
Smart Campus Content (x1)	0.805 1.242	Non	Multicollinearity
Interface (x2)	0.357	2.804	Non Multicollinearity
Feedback (x3)	2.724	0.367	Non Multicollinearity
Personalization (x4)	0,867	1,153	Non Multicollinearity
Interactivity (x5)	0,816	1,225	Non Multicollinearity

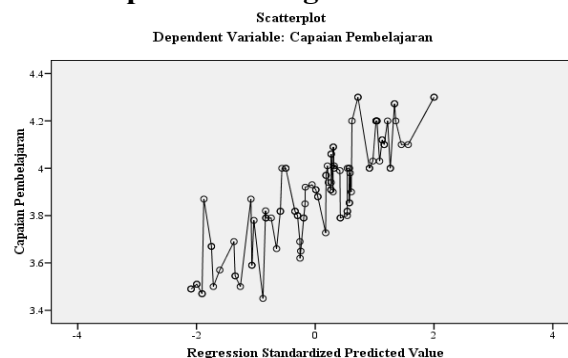
Source: Primary Data Processed, (2022)

Based on table 4.4, above it can be explained that all independent variables in this study obtained a value of VIF (*Variance Inflating Factor*) less than 5 and have a value tolerance is less than one, so the independent variable in the study shows non-multicollinearity.

c. Testing

Heteroscedasticity is an indication that the variance between residuals is not homogeneous which results in the estimated value obtained being no longer efficient. One way that can be used to detect the presence or absence of heteroscedasticity can be done with the Glejser test as shown in Figure 4.2. This:

Figure 4.2
Scatterplot of Managerial Performance



Based on Figure 4.2 above it can be

explained that the points spread above and



below the number 0 on the Y axis so there is no heteroscedasticity meaning that the data in this study can be used as an indicator of variable measurement, (Ghozali, 2017).

Analysis of Smart Campus Applications on Learning Outcomes of Students of Malahayati Merchant Marine Polytechnic.

The learning achievement of students is a success of a learning process carried out by educational institutions with various learning methods. In other words, the

learning achievement of students is an evaluative assessment of the learning process carried out.

To determine the effect of the independent variables, namely the content of the smart campus (x1), interface (x2), feedback (x3), personalization (x4), and interactivity (x5) on the learning achievement of students at the Malahayati Merchant Marine Polytechnic (Y). The effect of each independent variable on the dependent variable in detail can be seen in the following table:

Table 4.5
Effect of Independent Variables on Student Learning Achievements

Name	Variable	Standard Error	arith metic	table	Sig.
Constant	2,070	15,908	—	1,984	0.000
campus	2.271	0.023	—	1.984	0.025
Interface	0.116	0.037	3.112	1.984	0.002
Feedback	0.103	0.028	3.721	1.984	0.000
Personalization	0.102	0.023	4,429	1.984	0,000
Interactivity	5,980	—	—	,	0,000
R	=				
0.130 _{0.051}	0,95				
Smart contents	= 0.715	F _{calculate}	50.725		
Std. The error in the estimate	= 0.118	F _{able}	2.311		
		Sig.	0.000 ^a		

Source: Primary data processed, (2022)

Based on the results of the computer output through the SPSS program as shown in the table above, the following multiple regression equation was obtained.

$$Y = 2.070 + 0.051x_1 + 0.116x_2 + 0.103x_3 + 0.102x_4 + 0.115x_5$$

From the regression equation above, it can be seen that the results of the study are as follows:

Regression Coefficient (\square):

- In the study, the constant value was 2.070, meaning if the smart campus content factors (x1), interface (x2), feedback (x3), personalization (x4), and interactivity (x5), are considered constant, then the learning achievement of students at the Malahayati Merchant Marine Polytechnic is 2,070 on a Likert scale unit. or the learning achievement of students is still low.



- The smart campus content regression coefficient (x_1) is 0.051, meaning that every 100% change in the smart campus content variable will increase the learning achievement of students at the Malahayati Merchant Marine Polytechnic by 5.1% assuming interface variables (x_2), feedback (x_3), personalization (x_4) and interactivity (x_5) are held constant. This means that the better the contents of the smart campus will influence the learning achievement of the Malahayati Merchant Marine Polytechnic students.
- The interface regression coefficient (x_2) is 0.116, meaning that every 100% change (improvement) in the interface variable will relatively increase the learning achievement of students at the Malahayati Merchant Marine Polytechnic by 11.6% assuming the smart campus content variable (x_1), feedback return (x_3), personalization (x_4) and interactivity (x_5) are held constant. This means that the more interface learning is carried out, it will indirectly affect the learning achievement of students in using the smart campus application at the Malahayati Merchant Marine Polytechnic.
- The feedback regression coefficient (x_3) is 0.103, meaning that every 100% change (improvement) in the feedback variable will relatively increase the learning achievement of students at the Malahayati Merchant Marine Polytechnic by 10.3% assuming the contents of the smart campus (x_1), interface (x_2), personalization (x_4) and interactivity (x_5) are considered constant. This means that the better the feedback from the students, the indirectly will affect students' learning achievement in using the smart

campus application at the Malahayati Merchant Marine Polytechnic.

- The personalization regression coefficient (x_4) is 0.102, meaning that every 100% change (improvement) in the personalization variable will relatively increase the learning achievement of students at the Malahayati Merchant Marine Polytechnic by 10.2%, assuming the smart campus content variable (x_1), interface (x_2), feedback (x_3) and interactivity (x_5) are considered constant. This means that the better the level of personalization carried out by lecturers to students, it will indirectly affect students' learning achievement in using the smart campus application at the Malahayati Merchant Marine Polytechnic.
- Interactivity regression coefficient (x_5) is 0.115. This means that every 100% change (improvement) in the interactivity variable will relatively increase the learning achievement of students at the Malahayati Merchant Marine Polytechnic by 11.5%, assuming the smart campus content variable (x_1), interface (x_2), feedback (x_3) and personalization (x_4) is held constant. This means that the better the interactivity, the more indirectly will affect students' learning achievement in using the smart campus application at the Malahayati Merchant Marine Polytechnic.

Correlation Coefficient and Determination Correlation

1) coefficient (R)

Based on the computer output above, the correlation coefficient in the study obtained a value of 0.854 where with this value there is a relationship between the independent variable and the dependent variable of 85.4%. This means that the



learning achievement of students at the Malahayati Merchant Marine Polytechnic is closely related to the factors of smart campus content (x1), interface (x2), feedback (x3), personalization (x4), and interactivity (x5).

2) Coefficient of Determination (R^2)

Meanwhile, the coefficient of determination obtained with a value of 0.730 means that 73.0% of changes in the dependent variable (student learning achievement at the Malahayati Merchant Marine Polytechnic) can be explained by changes in smart content factors. campus (x1), interface (x2), feedback (x3), personalization (x4) and interactivity (x5). While the remaining 27.0% is explained by other factors outside the five variables as described above.

3) Simultaneous Testing

Based on the test results from the ANOVA test or F-test (simultaneously) the calculated 50.725, while the Fable at the significance level = 5% is 2.311 This shows that $F_{\text{count}} > F_{\text{table}}$, with a significance level of 0.000. The results of this calculation can be concluded that the smart campus content variables (x1), interface (x2), feedback (x3), personalization (x4), and interactivity (x5) together have a significant effect on student learning outcomes. at the Malahayati Merchant Marine Polytechnic.

4) T-Test Results

To see the effect of each variable on student learning outcomes at the Malahayati Merchant Marine Polytechnic, it can be seen from the t-test results. results shown in table 4.5 can be seen as the magnitude of the t-value calculation for each variable with a level

of confidence or degree of significance of=5%.

Smart Campus Content Variable (x1)

The results of research on the smart campus content variable (x1) obtained a t_{count} of 2.271 while the table was 1.984, the results of this calculation indicate that count > table with a significance level of 0.025. Thus, the results of statistical calculations show that the smart campus's content has a significant effect on students' learning achievement at the Malahayati Merchant Marine Polytechnic.

Interface Variable (x2)

The findings of the research on the interface variable obtained a t_{count} of 3.112, while the table of 1.984, the results of this calculation indicate that count > table with a significance level of 0.002. Thus, the results of statistical calculations show that partially the interface variable has a significant effect on the learning achievement of students at the Malahayati Merchant Marine Polytechnic.

Feedback Variable (x3)

The results of the research on the feedback variable obtained a count of 3.721, while the t_{table} of 1.984, the results of this calculation indicate that count > table, with a significance level of 0.000 or a probability less than = 5%. Based on the results of statistical calculations show that partially the feedback variable has a significant effect on the learning achievement of students at the Malahayati Merchant Marine Polytechnic.

Personalization Variable (x4)

Based on the findings of the research on the personalization variable, the count is



4.429 while the t_{table} is 1.984, the findings of this study indicate that $\text{count} > \text{table}$, with a significance level of 0.000. Based on the results of statistical calculations show that partial personalization variables have a significant effect on the learning achievement of students at the Malahayati Merchant Marine Polytechnic.

Interactivity Variable (x5)

Based on the results of research on the interactivity variable, the t_{count} is 5.059 while the table is 1.984, the results of this calculation show that $\text{count} > \text{table}$, with a significance level of 0.000. This finding shows and at the same time proves that partially the interactivity variable has a significant effect on the learning achievement of students at the Malahayati Merchant Marine Polytechnic.

Conclusion

1. Based on the results of this study, it was explained that there was a strong relationship between the independent variables of smart campus content (x1), interface (x2), feedback (x3), personalization (x4), and interactivity (x5) with the dependent variable learning achievement of students at the Malahayati Merchant Marine Polytechnic with a correlation coefficient of 85.4%.
2. Then based on the results of the coefficient of determination, an explanation was obtained that there was a strong influence between the variables of smart campus content (x1), interface (x2), feedback (x3), personalization (x4), and interactivity (x5) on increasing student learning outcomes at the Polytechnic. Malahayati cruise, with the coefficient of determination obtained by 73.0%.

3. Based on the results of the study, it was obtained that the calculated $> F_{\text{table}} > 2,311]$ at the significance level $50,725 = 5\%$, it states that simultaneously (together) the smart campus application variable affects the learning achievement of students at the Malahayati Merchant Marine Polytechnic.
4. While partially the variables that have a dominant influence are the interface variable and the interactivity variable because the regression coefficient value is greater than the regression coefficient value of the other variables.

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