



ANALYSIS OF FACTORS THAT AFFECT DIFFICULTIES IN LEARNING MATHEMATICS DURING THE PANDEMIC

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Abstract

Covid-19 is a virus that originated in Wuhan China in 2019. The spread of this virus has spread to 234 countries including Indonesia. The government took the decision to implement health protocols, PPKM and vaccination. Due to the Covid-19 virus, there are impacts in various sectors, one of which is the education sector. In the field of online learning education, due to the decision taken by the government, namely PPKM, over time with a decrease in cases, the government began to reactivate limited school activities and January 2022 entered the new normal phase. In these three phases, there are obstacles in the education sector. This study aims to determine whether or not ordinal regression is feasible to use and determine whether school environmental factors, learning motivation and study habits affect mathematics learning difficulties during a pandemic and how much the independent variable can affect the dependent variable. Research with the distribution of questionnaires at SMK Bina Bangsa. The independent variables are school environment, learning motivation and study habits and dependent variables of difficulty learning mathematics during the pandemic. Ordinal logistic regression model with $\text{logit}(Y_1)$ equation = $\theta_1 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_p X_p$. Goodness of fit test to find out whether the regression model is feasible, simultaneous parameter test comparing models without predictor variables, wald test knowing the influential variable and Nagelkerke test results for the magnitude of influence. The results showed ordinal regression on the independent variable to the dependent variable by 45%.

Keywords: Covid-19, Mathematic, Regresi Logistic Ordinal

INTRODUCTION

The *covid-19 pandemic* began in Wuhan China in December 2019, this virus spread to almost all countries including Indonesia. The pandemic entered Indonesia on March 2, 2020. As a result of the spread of this virus is quite fast so that the government has taken several policies to suppress the spread of Covid-19, the decisions taken are to enforce PPKM, comply with the 5M health protocol and carry out vaccinations, this makes some of the impacts of changes that occur in various fields including in the field of education because teaching and learning activities in schools are stopped and moved to their respective homes.

The online learning chosen for students can still study at home, but in online learning there are obstacles faced such as there are students who do not have electronic devices that support online learning according to (Anugrahana, 2020:286) students do not have electronic devices due to family economic conditions and according to (Rigianti, 2020:299) other difficulties faced by students are internet connections that are constrained so that when the learning process becomes hampered

and other difficulties faced during the online learning process. Limited face-to-face learning began to be implemented on February 3, 2022 followed by a decrease in covid-19 cases and also with the condition that they can take part in this limited face-to-face learning in good health, have been vaccinated and also continue to comply with the 5M health protocol, but the learning obstacles still cannot be said to be over, students must adapt to the circumstances of the covid-19 pandemic by complying with the 5M health protocol and also adapt to the 5M health protocol. school environment because for almost 2 years the students have been learning from home. Difficulties in the learning process when wearing masks are also an obstacle itself because of the difficulty of breathing properly and the difficulty of hearing learning clearly, according to (Agustino, 2020) the students have an awareness of the importance of using masks but the students also do not wear masks because of the difficulty of breathing and feeling hot when indoors and other difficulties are according to (Nasution et al, 2022) Another obstacle faced is the limited time during learning. Then on May 17, 2022, there are still obstacles, namely in the use of masks, students find it difficult to hear clearly when delivering learning materials and also difficulty breathing normally because in its application when breathing and communicating requires air circulation.

Mathematics learning during the pandemic with a 100% face-to-face learning system has some difficulties and this is also felt by students because when the teacher explains the material using a mask, it is difficult to hear clearly so that the students understand the learning material a little. Even though mathematics is an important science according to (Siagian, 2016:60) mathematics is a branch of science that plays an important role in terms of tools for solving problems in daily life and also tools as a tool for the development of science and technology. In mathematics subject matter, students still consider it difficult to learn because students are not comfortable with the method or way the teacher teaches mathematics so that students do not understand the learning material and there are other obstacles that make it difficult for students to understand mathematics lessons.

Related to the above problems, this study is related to the difficulty of learning mathematics during the pandemic. The objects studied in this study are school environment factors, learning motivation and learning habits. It is hoped that the results of this research can contribute so that students and teachers can be input when facing difficulties in learning mathematics during the pandemic.

METHODS

This research method uses a descriptive quantitative method. According to (Yusuf, 2014:62) descriptive quantitative research is research that is shown to systematically delineate factual and accurate on the nature of a particular population or try to describe phenomena in detail. This research was conducted at SMK Bina Bangsa majoring in Automation and Office Governance. Sampling technique with simple *random sampling*. This simple random sample by selecting directly on the population and on everyone in the population has a high chance of becoming a sample. The instrument used in data collection is using a questionnaire in a *google form*. The analysis used in this study is ordinal logistic regression analysis which is one of the statistical methods that is useful for analyzing response variables on the ordinal scale

that can use three or more predictor categories (continuous or continuous category variables).

RESULTS AND DISCUSSION

In this study, the dependent variables are Difficulties in Learning Mathematics during the Pandemic with the independent variables X_1 school environment factors, X_2 learning motivation factors X_3 learning habit factors. Based on the difficulty level, there are 24% with low difficulty, 76% with low difficulty, 51% with high difficulty level and 24% with very high difficulty.

The first stage is a multicollinearity test which aims to find out the extent of freedom of each free variable and find out if there is a significant relationship between the free variables. Based on the results of the multicollinearity test with tolerance values X_1 0.524, X_2 0.510 and X_3 0.526, multicollinearity does not occur because based on the decision test, if the tolerance value above 0.10 does not occur, multicollinearity and if and discussion contains analysis of research data, answers to research questions, and analysis of research findings.

Parameter Estimates

	Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Threshold [Y = 1.00]	7.587	1.216	38.899	1	.000	5.203	9.971
[Y = 2.00]	10.460	1.319	62.907	1	.000	7.875	13.045
[Y = 3.00]	12.757	1.446	77.843	1	.000	9.923	15.591
Location X1	.194	.055	12.687	1	.000	.087	.301
X2	.115	.041	7.989	1	.005	.035	.194
X3	.106	.038	7.748	1	.005	.031	.180

Link function: Logit.

Based on the results of the output above, there are 4 category intervals in learning difficulties in mathematics during the pandemic, namely:

1. Students in the very low difficulty category ($Y=1$) if $y^* \leq 7,587$
2. Students in the low-difficulty category ($Y=2$) if $y^* 7,587 < y^* \leq 10,460$
3. High difficulty category students ($Y=3$) if $y^* 10,460 < y^* \leq 12,757$
4. Students in the very high difficulty category ($Y=4$) if $y^* > 12,757$

The goodness of fit test aims to find out whether the ordinal logistic regression model is suitable for use

Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	502.464	486	.293
Deviance	329.145	486	1.000

Link function: Logit.

It is known that the Chi-Square value of the Deviance method is 329,145 with a free degree of 486. The test criterion is to reject if $H_0 D > = 538.393 X^2_{(0.05;486)}$ or reject if the significance value is less than 0.05 (. The Deviance test value in the table above is known to be a value at a significance of 1,000. The decision is accepted because the

significance value is greater than 0.05. The conclusion is that the logit model obtained is feasible to use. $H_0 \alpha = 0.05) H_0$

Simultaneous parameter testing of this test is carried out by comparing models without predictor variables. The following are the results of the simultaneous parameter test.

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	432.749			
Final	339.085	93.664	3	.000

Link function: Logit.

Based on this data, it is known that the statistical value of G is 93,664. The test criteria are carried out by taking the real level of $\alpha = 0.05$ from the distribution table of chi squared obtained $X^2_{(0.05,3)} = 7.81$, because the statistical value of G (93,664) $> = 7.81$, the decision is rejected and accepted. In conclusion, there is one of the $X^2_{(0.05,3)} H_0 H_1 \beta_P \neq 0$

Partial Parameter Testing

Variabel	Wald	Sig	$X^2_{(0.05;1)}$	Results
X ₁ : School Environment	38,899	0,000	3,841	Subtract H ₀
X ₂ : Learning Motivation	62,907	0,005		Subtract H ₀
X ₃ : Learning Habits	77,843	0,005		Subtract H ₀

The results of the Wald parameter test above show that the variables of the school environment, learning motivation and learning habits have a significant influence on the difficulty of learning mathematics during the pandemic in students of SMK Bina Bangsa majoring in automation and office management for the 2022/2023 school year because these variables have a significant value of $< \alpha (0.05)$ or in other words, minus H_0 if $= 3.84. Z^2 > X^2_{(\alpha,1)}$

Coefficient of determination

Pseudo R-Square

Cox and Snell	.414
Nagelkerke	.450
McFadden	.211

Link function: Logit.

The table above shows the value of the Mc Fadden determination coefficient of 0.211 while the Cox and Snell determination coefficient of 0.414 and the Nagelkerke coefficient of 0.450 or 45.0%. The Nagelkerke coefficient of 45.0% means that independent variables of the school environment, learning motivation and learning habits affect the assessment of mathematics learning difficulty by 45.0% while 55.0% is influenced by other factors that are not included in the model testing.

CONCLUSION

This study found that there were several informants who had difficulty learning mathematics during the *Covid-19 pandemic*. After learning during the pandemic, which was divided into 3 stages, namely learning was carried out online and the next stage was carried out face-to-face with limited until now 100% face-to-face learning has been implemented. This makes students have to start socializing with the school environment again and there is also a change in learning habits in the school environment during the pandemic, namely by wearing masks, this makes it difficult for students to hear clearly when talking between students or explaining the material explained by the teacher.

Mathematics is also still considered difficult for students, so it is necessary to explain the material with a clear voice and good concentration to understand the lesson. The motivation to learn during the pandemic in 100% face-to-face learning also needs to be a special concern to build the students' enthusiasm for learning again. Motivation is not only from the family but also the need for motivation to learn from the school environment from teachers and from school friends so that students build more enthusiasm in learning mathematics and achieve good learning results.

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