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# The Effect of Google Classroom on Learning Independence and Mathematics Learning Outcomes: A Case of SMKN 3 Kupang, Indonesia

Magdalena Wangge

Department of Mathematic Education, Nusa Cendana University, Indonesia

**Abstract:** During the time of online learning is wrong One of the applications used in Google Classroom. The purpose of this study is to find out the effect of the use of Google Classroom on the independence of learning, use of Google Classroom for results learn mathematics, use Google Classroom independence of learning and learning outcomes of mathematics, as well as the influence between independence of learning on effects of study mathematics in students of State Vocational High School 3 Kupang. This research uses a type of quantitative research with survey methods. This study concludes that there is an influence on the use of Google Classroom on independence of learning, there is a significant influence on the use of Google Classroom, there is an influence on the use of Google Classroom on independence of learning and learning outcomes of mathematics, and there is an influence between the independence of learning on learning outcomes mathematics in students of State Vocational High School 3 Kupang.

**Keywords:** google classroom, independence of learning, learning outcomes.

***Abstrak:*** *Selama masa pembelajaran daring salah satu aplikasi yang digunakan adalah Google Classroom. Tujuan dari penelitian ini adalah untuk mengetahui pengaruh penggunaan Google Classroom terhadap kemandirian belajar, penggunaan Google Classroom terhadap hasil belajar matematika, penggunaan Google Classroom terhadap kemandirian belajar dan hasil belajar matematika, serta pengaruh antara kemandirian belajar dan hasil belajar matematika pada siswa SMK Negeri 3 Kupang. Penelitian ini menggunakan jenis penelitian kuantitatif dengan metode survei. Studi ini menyimpulkan bahwa ada pengaruh pada penggunaan Google Classroom pada kemandirian belajar, ada pengaruh yang signifikan terhadap penggunaan Google Classroom, ada pengaruh terhadap penggunaan Google Classroom pada kemandirian hasil belajar dan belajar matematika, dan ada pengaruh antara kemandirian belajar pada hasil belajar matematika pada siswa SMA Negeri 3 Kupang.*

***Kata kunci:*** *google classroom, hasil belajar matematika, kemandirian belajar.*

Magdalena Wangge.
Email:
magdalena.wangge@staf.undana.ac.id

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## ▪ INTRODUCTION

The rapid and massive spread of covid-19 around the world Including Indonesia has dramatically influenced various areas of life, including education. Starting from the elementary level to college is not regardless of the effects caused by the covid-19 pandemic. Because in addition, the learning process continues during this pandemic. The Ministry of Education and Culture issued Circular letter No. 4 of 2020 on implementing education policy in the emergency period of the spread of coronavirus disease (Covid-19). One The regulations in it regulate the process of learning from home as a strategy to meet the educational needs of children during pandemic times. Learning from home is carried out online or online (in-network).

Online learning is a learning system that does not face to face but uses a platform that Can help the teaching and learning process remotely. One of the applications used in running the online learning process is Google Classroom. Herman (in Hammi, 2017) says Google Classroom is an application that allows the creation of classrooms in the virtual world. In addition, Google Classroom can distribute tasks, submit tasks, and assess the functions collected. Thus, this application can help teachers and students learn from home during pandemics. It's because teachers can distribute learning materials, create discussion forums, distribute tasks, collect tasks, and assess student assignments from home; on the other hand, students can also access the material learning, providing feedback and organizing tasks from home or anywhere without being bound by time limits or lesson hours.

The application of online learning activities is certainly very especially for students. Learning that is usually done in the classroom as face-to-face is now replaced with learning that can be accessed independently from each other's homes. It demands students to be active and critical in learning the topics studied in learning activities. Without a face-to-face process with the teacher who teaches a subject, students must be more active independently to seek and acquire a variety of relevant sources of knowledge. One of the things that have an essential role in learning from home So that students can optimally develop their abilities are aspects of student learning independence.

Independence of learning refers to the will and ability of each individual learn by their initiative, with or without assistance from other parties regarding learning objectives, methods, and evaluating learning outcomes. Knowles (as cited by Sari, 2013) states that self-reliance is defined as a process by which an individual can take initiatives to diagnose their learning needs, formulate learning goals, identify learning resources, select and implement Suitable learning strategies evaluating their learning outcomes. Thus, the independence of learning is an activity derived from self-will, self-study based on his motivation, not relying on others, and being responsible for achieving the desired learning goals. In online learning, students are required to be independent in learning all subjects, including mathematics.

Based on an interview with one of the teachers of State Vocational High School 3, Kupang obtained information that students lack independence in learning which affects student learning outcomes. Students lack independence in learning because teachers are still the center of the learning process and dominate teaching activities, causing students to feel dependent and lack active learning. According to Atikah et al. (2021), the learning process can be carried out properly using Google classroom. It is because Google classroom in learning activities can be easily accessed well by teachers and students. In addition, the utilization of learning using google classroom has a positive impact on students' learning outcomes are increasing every day through assignments and quizzes.

Relevant research by Najihah (2020) shows an influence on learning motivation and learning independence during pandemic times Covid-19 to the learning outcomes of class XII students on function derivative materials trigonometry in Madrasah Aliyah State 2 Banjar by 90,9%. In addition to the research Ernawati (2018) obtained that the use of Google Classrooms positively affects student learning outcomes in class XI economics subjects in Madrasah Aliyah State.

## ▪ METHOD

This research uses this type of quantitative research. According to Sugiyono (2017), quantitative research can be interpreted as a method Research based on the philosophy of positivism, used to examine specific populations or samples, data collection using research instruments, data analysis is quantitative/statistical, aiming to describe and test established hypotheses. The research method used in this study is surveying. According to Sugiyono (2017), survey research methods are research methods quantitative used to obtain data that occurs in the future, past or present, about beliefs, opinions, characteristics, behaviors, variable relationships and to test several hypotheses about sociological and psychological variables of samples taken from a particular population, data collection techniques by observation (interviews or questionnaires) are not in-depth, and the study results tend to be generalized.

### Participants

The population in this study are all students of class XI Computer and Network Technology expertise program, Kupang State Vocational High School, Year the 2021/2022 school numbered 152 students. Researchers use a simple random sampling technique where sampling of a population is done randomly regardless of the strata in that population (Sugiyono, 2017). In this study, the calculation sampling using Yamane formula (Sugiyono, 2017) as follows:

$$n = \frac{N}{1 + N(e)^2}$$

with $n$ = Number of samples; $N$ = Population = $152$; $e$ = Error tolerance limit = $10\%$.

### Research Design and Procedures

Place and time research was the odd semester of the 2021/2022 school year at State Vocational High School 3, Kupang conducted this research. The independent variable or free variable in this study is the use of Google Classroom. Dependent variables or variables tied to this study are the independence of learning and mathematical learning outcomes of State Vocational High School 3 Kupang students in the odd semester of the 2021/2022 school year.

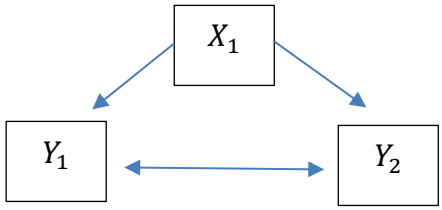


**Figure 1.** Model of variable relationship with two dependent variables (Sugiyono, 2017) Information: $X_1$ = Use of Google Classroom; $Y_1$ = Learning Independence; $Y_2$ = Learning Outcomes.

**Instruments**

The instrument used in this study is a non-test instrument in a questionnaire. The learning independence questionnaire used in this study aims to determine the learning independence of State Vocational High School students 3, Kupang. This questionnaire consists of 18 statements, namely eleven positive and seven negative statements adopted from the learning independence questionnaire compiled by Handayani & Ariyanti (2020). Measurement of Google Classroom usage questionnaires using Likert scale.

**Data Analysis Techniques**

The data analysis techniques in this study used inferential statistics. Inferential statistics is a statistical technique used to analyze sample data, and the results are applied to the population. Data analysis techniques contain instrument test data analysis and data analysis for hypothesis testing. In this study, researchers used questionnaires and documentation to collect data. Questionnaire to collect data on learning independence, while documentation by asking for data on previous student learning outcomes to the teachers of mathematics subjects of State Vocational High School 3 Kupang.

The data analysis for hypothesis testing consisted of a normality, linearity and multicollinearity, homogeneity and MANOVA test. A normality test is a test that is used to see normal distribution data or not. In this study, the normality test conducted is a multivariate normality test as a multivariate prerequisite test that must meet. In this study, the multivariate normality test used the Mahalanobis distance test with the criteria of accepting $H_0$ if ${d_i}^2 \leq \chi^2_{(p;0,5)}$. It means the data is normally distributed if about $50\%$ of Mahalanobis distance is less or equal to $\chi^2_{(p;0,5)}$ or if scatterplots tend to form a straight line, then the data is a normal distribution. In addition, it can be seen from the correlation value if the significance value is $< 0.05$, then there is a significant correlation which means that the data is normally distributed multivariate. This Mahalanobis test in its calculations uses the help of the SPSS 25.0 application. Test linearity and multicollinearity between dependent variables is about the relationship between the dependent variables, the relationship between covariates (if there is a covariate), and the relationship of the dependent variable where the covariate is linear. It's better to calculate the correlation first between dependent variables. If the bivariate correlation (measured by Pearson's Correlation). The presence or absence of multicollinearity can be seen from each independent variable's coefficients. If the correlation coefficient between each independent variable is more than 0.8, then multicollinearity occurs and vice versa; if the correlation coefficient between each independent variable is less than 0.8, then there is no multicollinearity (Sari et al., 2021). One way to test the relationship's linearity is to use a scatter plot. Curved data points will show a nonlinear relationship (Gudono, 2017). The SPSS 25.0 application assists the calculation.

The homogeneity test of the variance/covariance matrix is a prerequisite test before performing the MANOVA test. This test is used to test the MANOVA assumption, which requires that the variance/covariance matrix of the dependent variable is the same. In this study, the homogeneity test of the variance/covariance matrix using the Box's M test. Accept $H_0$ if $\chi^2_{hitung} \leq \chi^2_{\frac{1}{2}(k-1)p(p+1)}$ , it means the variance matrix covariance is homogeneous (Azies, 2016). In the calculation test homogeneity of the covariance variance matrix using application assistance SPSS 25.0. MANOVA test stands for multivariate analysis of variance, a multivariate form of analysis of variance (ANOVA). MANOVA is a statistical test used to measure independent variables' effect on a

categorical scale on several dependent variables at once with a quantitative data scale. The multivariate analysis of variance can use several test statistics to make decisions, including Wilk's Lambda, Pillai's Trace, Hotelling's Trace, and Roy's Largest Root. In MANOVA test calculations using the help of the SPSS application 25.0.

Test the hypothesis to answer the formulation of the 4th problem in this study using a simple linear regression test. This linear regression analysis tests the extent to which the causal relationship between the causative factor ($X$) variables to the consequent variable. The test criteria: by comparing the value of $t_{hitung}$ with the value of $t_{tabel}$ with degrees of freedom $(dk)$ at a significance level $(a)$ of 5%. If $t_{hitung} \geq t_{tabel}$, there is no significant effect between the independent variables and dependent variables. Based on this information, it can be concluded that is the null hypothesis ($H_0$) or alternative hypothesis ($H_1$) rejected or accepted.

## ▪ RESULT AND DISCUSSION

This research was conducted at the State Vocational High School 3 Kupang from November to December 2021. Research implementation, by sharing Learning independence questionnaire for students majoring in TKJ 1 – 4 Vocational High School State 3 Kupang, class XI, majoring in Computer and Network Engineering.

### a. Prerequisite Test.

**A normality test**.

Multivariate normality test results presented as follows:

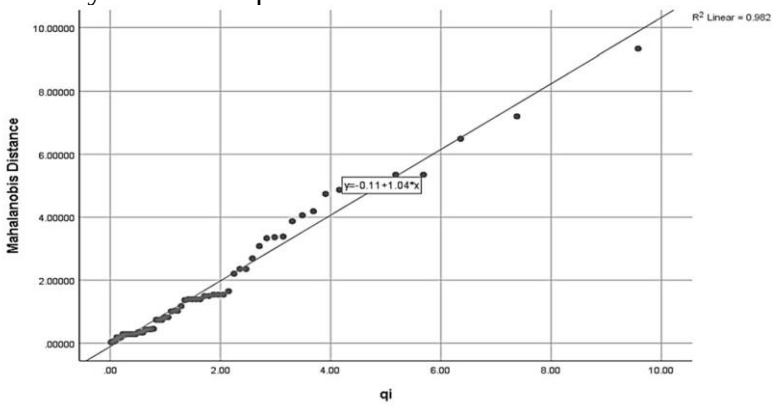


**Figure 2.** Mahalanobis Distance, $d_i{}^2$

Based on the pictures above, the scatter plot forms a straight line, so the data is normally distributed. It can be concluded that the data has a multivariate normal distribution can see.

### Test linearity and multicollinearity

From the output graphic image SPSS, it is explained that there is a relationship between significant relationship between learning independence and learning outcomes, with value $R^2 = 0{,}971$ in XI TKJ 1 Class. Then there is a relationship between significant relationship between learning independence and learning outcomes, with value $R^2 = 0{,}90$ in XI TKJ 2, there is a relationship between significant relationship between learning independence and learning outcomes, with value $R^2 = 0{,}876$ in XI TKJ 3, and there is a relationship between significant relationship between learning independence and learning outcomes, with value $R^2 = 0{,}971$ in XI TKJ 4. Based on the scatter plot graph output,

the plot points the data tends to form a straight line pattern. This matter shows a linear relationship between the dependent variable. The result of the multicollinearity analysis of variables dependent with Pearson correlation test shows that Learning Independence has a Pearson Correlation towards learning independence one and learning outcomes 0.946 while learning outcomes are the opposite. Output shows that the learning independence variable and student learning outcomes have a strong relationship significant with a significant value < 0.05, so it can be concluded that there is multicollinearity between the dependent variable.

**The homogeneity test of the covariance matrix**

Results analysis of the homogeneity test of the variance of the covariance matrix using the test Box's M Test the significance value is $0{,}000 < \alpha$, then $H_0$ is rejected can see. Therefore, it can be concluded that the covariance variance matrix dependent variable is not the same, or there is a difference matrix covariance of the dependent variable for all groups.

**b. Hypothesis testing**

**Univariate Test**

The result test of between-subject effect or the univariate results show that the use of Google Classroom in class significantly affects the independence of learning with a significance value of $0.002 < 0{,}05$; so reject $H_0$ can see. While the use of Google Classroom in other classes does not significantly affect the learning outcomes of mathematics students with a significance value of $0{,}61 > 0{,}05$; so accept $H_0$.

**Multivariate Test**

The table of Multivariate tests shows that the independent variable categorized into classes, the significance value tested on Pillai's Trace procedure offers a significance value $< 0{,}05$ where reject $H_0$. The variable using Google Classroom simultaneously affects learning independence and mathematics learning outcomes.

**c. Simple linear regression test**

This linear regression analysis tests the extent to which the causal relationship between independent learning variables ($X_1$) on the variable of mathematics learning outcomes ($Y$). R-value is a symbol of the correlation coefficient. In the table below, the value of correlation is $0{,}946$. This value can be interpreted as both research variables are in the less category. The table of coefficient learning independence and learning outcomes mathematics also obtained the value of R square or coefficient determination (KD), which shows how well the regression model is formed by the interaction of the independent variable and dependent variables. The KD-value obtained is $0{,}8\%$, so the independent variable ($X_1$) has a contribution effect of $89{,}4\%$ on the variable ($Y$), and another factor influences the remaining $10{,}6\%$ can interpretation.

The significant value test table is used to determine the level of significance of the regression. Based on the test significance value, provided that the significance value is $> > 0{,}05$ the variable is not significant/does not meet the requirements or otherwise can determine criteria. The table above obtained a significance value of $0{,}000$ mean significance of $< 0{,}05$. Thus the regression equation model based on research data is significant or meets the criteria.

The results of the simple regression coefficient calculation show that the coefficient of the constant is $52{,}171$; and the coefficient of variable $X$ is $0{,}395$. So that the regression equation is formed as follows:

$$Y = 52{,}171 + 0{,}395X$$

Furthermore, the positive value in the regression coefficient learning independence variable illustrates that the direction of the relationship between the learning independence variable and the variable mathematics learning outcomes is unidirectional. Each increase in one variable of learning independence will cause an increase in mathematics learning outcomes.

Based on table 7, it is known that the value of $t_{tabel}$ for significant level 5%, $t_{tabel} = t\left(\frac{a}{2}; n-k-1\right) = t(0{,}025; 58) = 2{,}00172$. While the value of $t_{hitung}$ is obtained using SPSS version 25.0, equal to $22{,}138$. If result $t_{hitung} > t_{tabel}$ then $H_1$ is accepted, and $H_0$ is rejected. From the calculation results $t_{hitung} = 22{,}138 > t_{tabel} = 2{,}00172$; so $H_1$ is accepted, and $H_0$ is rejected. So that the variable $Y_1$ on the $Y_2$ variable has a significant effect can conclude. From the result testing, the hypothesis is proven to have an effect between learning independence and mathematics learning outcomes in State Vocational High School 3 Kupang students during the pandemic.

**Interpretation of the use of Google Classroom on learning independent student**

The results of previous research from Yuhandi (2021) show that there is an influence of Google Classroom's online learning media on students' independent learning in cross-interest X MIPA 2 High School Pasundan 2 Bandung. In line with the results of previous studies based on test results, univariate shows that the use of Google Classroom in class significantly affects learning independence with the value of significance of $0{,}002 < 0{,}05$; so reject $H_0$. Research results obtained an influence between the use of Google Classroom on learning independence. It is because, through the learning process remotely or online using the Google Classroom app, students are indirectly demanded. They must be accustomed to learning independently through the materials and tasks given by the teacher through uploading these materials and assignments on Google Classroom, but it doesn't stop there. Still, students must also independently seek relevant learning resources when the distance learning process takes place. Some things are lacking understood to increase the student's knowledge and understanding. Thus, the use of Google Classroom can impact student learning independence; in this case, it can grow the character of students' learning independence during the distance learning pandemic.

**Interpretation of the use of Google Classroom on learning outcomes mathematics**

The results of research conducted by Lestari (2021), in her research, show that there is an effect of using Google Classroom learning media on future learning outcomes Covid-19 pandemic students of Muhammadiyah 6 Medan Vocational High School. Based on the results of SPSS calculations, it can be concluded that the use of Google Classroom in different classes does not significantly affect students' mathematics learning outcomes with the value of sig. $0{,}61 > 0{,}05$, so accept $H_0$. It is because, during the learning period, Google Classroom is an online learning medium that assists teachers in distributing good subject matter uploading material from teachers such as learning videos from youtube, pdf worksheets, pictures, etc., in its implementation, there is also assistance other face-to-face platforms such as zoom meet or GMeet Platforms. It helps students gain a deeper understanding of the material uploaded by the teacher in Google Classroom because not

all students can directly understand the material uploaded by the teacher without any explanation from the teacher.

**Interpretation of research results on the effect of using Google Classroom on learning independence and student learning outcomes of State Vocational High School 3 Kupang during a pandemic**

Research results from Ma'arif & Murdiono (2021) show a significant influence from the use of the Google Classroom application on the character of independence and learning outcomes of class VIII junior high school students. Based on the results of the MANOVA test with decision making using Pillai's Trace statistic, sig value is known. of $0{,}000 < 0{,}05$. Thus $H_0$ is rejected, so it can be concluded that these results show an influence on the use of Google Classroom on independent learning and student learning outcomes in the future pandemic. The study results found that there was an influence the use of Google Classroom on independent learning and result in Simultaneous learning means the use of Google Classroom makes a positive contribution during distance learning or learning from home, which is the impact of the Covid-19 pandemic. The use of Google Classroom as a media platform online helps to expedite the distance learning process or network so that students can achieve their learning goals.

**Interpretation of the effect of independent learning on learning outcomes mathematics**

The results of the statistical test of simple linear regression know the value $t_{tabel} = 2.00172$ while the value of $t_{hitung} = 22.138$. Thus $t_{hitung} > t_{tabel}$ so $H_0$ is rejected. The result shows a significant influence of independent learning on learning outcomes mathematics. The results of this study are in line with the results of research that has been done by Bey & Narfin (2013), which shows that the independence of learning mathematics has an effect on significant to the mathematics learning outcomes of students in class XI science high school Country 6 Kendari. Based on the results of SPSS calculations in this study, it was obtained that there is a significant positive effect between independent learning and learning outcomes of mathematics. It can be interpreted student learning independence can improve mathematics learning outcomes for students. Shah (in Bey & Anwar, 2013) argues that students have good learning independence. They will get good opportunities relatively large enough to obtain satisfactory learning outcomes compared to students who have higher learning independence not good, so it will also affect the results of learning mathematics the student. Thus, if students have independence and good study, the student will have good learning outcomes. On the other hand, if students have high learning independence, not good, the student will have poor learning outcomes.

## ▪ CONCLUSION

Based on the results of the analysis and discussion of the data, the authors obtained conclusions that can be drawn from research on the effect of the use of Google Classroom on independent learning and student learning outcomes of Vocational High Schools Negeri 3 Kupang during the pandemic, namely the effect of using Google Classroom on independence learning, there is no significant effect on the use of Google Classroom on learning outcomes, there is an effect of using Google Classroom on independent learning and learning outcomes of mathematics, and there is an influence between learning independence on learning outcomes Mathematics at the State Vocational High School 3

Kupang. The limitatiton of this study is that it does not further examine the influencing factors of google classroom use either from teaching methods or others. Further researchers expect to compare online learning media applications, pay attention to other factors that may affect mathematical learning outcomes, and add research variables to the application of MANOVA two-way techniques in future research.

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