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Realizing the SDGs Through Education: The Influence of Poverty and GRDP on the Average Years of Schooling in Sleman Regency

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ABSTRACT
Objective: *The 2022 PISA scores, which placed Indonesia 69th out of 80 countries and sixth among ASEAN nations, demonstrate that the quality of education in Indonesia still needs to be improved and that equal distribution to several remote areas must be carried out. Improving the quality of education aligns with global goals in SDG 1 (No Poverty) and SDG 8 (Decent Work and Economic Growth) because educational enhancement can reduce poverty rates and increase labor productivity. This research aims to analyze the influence of the poverty rate variable (X1) and GRDP (X2) on the average years of schooling in Sleman Regency for the 2015-2024 period. This research type uses a quantitative descriptive approach with secondary data obtained from bps.go.id for Sleman Regency.* ***Method:*** *The data analysis in this study employed a multiple linear regression method (Ordinary Least Squares or OLS) using EViews 12 software.* ***Results:*** *The results indicate that, both simultaneously and partially, the poverty rate does not exert a signify can't yet positive influence. This can be attributed to the existence of educational assistance and policies from the Sleman Regency government that support underprivileged communities. In contrast, the GRDP variable has a significant and positive effect, both simultaneously and partially. This is because the rate of economic growth encourages individuals to pursue higher levels of education. Therefore, policies focused on poverty reduction and enhancing economic growth are necessary to enable underprivileged communities to access higher education.* ***Novelty:*** *To date, no previous studies have examined the effect of poverty levels and GRDP on average length of schooling. Most other studies have focused on the provincial level, and none have simultaneously examined the variables of poverty levels and GRDP on average length of schooling in Sleman Regency for the period 2015-2024.*

INTRODUCTION

Education is an important factor in measuring a country's welfare. Improvements in education in a country increase the quality of the workforce and the number of productive workers, thereby improving overall economic welfare (Mellior, 2025). This is because equitable education will open up access to better job opportunities and higher wages for the community (Sun et al., 2025). The equal distribution of welfare can also be seen in education, because with increased education, the welfare gap between rural and urban areas becomes smaller (Sun et al., 2025). Thus, the benefits of education are not only felt by individuals, but can also be a strategy in reducing inequality and realizing sustainable economic development.

As a global effort, equitable education is also reflected in the Sustainable Development Goals (SDGs). Education is directly related to SDG 1 (no poverty) and SDG 8 (Decent Work and Economic Growth) because improving education can reduce poverty and increase labor productivity. Therefore, equitable education is one of the factors that supports sustainable development and improves the welfare of society as a whole (Alejandro Fuentes Penna et al., 2025; Castillo et al., 2020; Jain & Kumar, 2025).

Although education is important, many low-income countries have a high proportion of 10-year-old children who cannot read and understand short texts appropriate for their age (Crawford et al., 2025; Hadfield et al., 2024). In 2022, the global learning poverty rate increased by 70% from the initial rate of 57%. This challenge is similar to the situation in Indonesia, as seen from the 2022 PISA scores, which show that Indonesia ranks 69th out of 80 countries and 6th among ASEAN countries with a score of 1,108 (Prasastisiwi, 2024). This ranking data proves that the quality of education in Indonesia still needs to be improved and that equity needs to be achieved in several remote areas. The low PISA score is due to limited facilities in schools, disparities in teacher quality in several regions, and low literacy and numeracy among students in remote areas. This condition shows that education reform policies have not improved the quality and equity of learning for students (Muench & Wieczorek, 2022).

One important indicator for assessing the quality of education is the average length of schooling. The concept of average length of schooling as explained by BPS is the number of years of study for people aged 25 years and above who have completed formal education (not including repeat years) (Central Statistics Agency, 2021). BPS data for the Special Region of Yogyakarta in 2024 shows that the average length of schooling in Sleman Regency is 11.23 years, which indicates that the average resident has completed high school education. This is in line with Sleman Regency, which is known for its large number of universities and diverse economic activities, encouraging the community to pursue higher education. However, there are still many educational problems. Based on the report (Nurbaya, 2021), there are disparities in education levels between subdistricts, disparities in educational facilities, and low quality of educators.

Theoretically, education is directly related to the economic level of a region. Countries with high levels of education will also experience higher economic growth (Ma et al., 2025; Tian & Kenayathulla, 2025; Yu & Liu, 2025). One indicator used to measure economic success is per capita GRDP. The higher the GRDP in a region, the higher the quality of its population (Kramin & Ustyuzhanina, 2024). Conversely, poverty has a negative impact on average length of schooling, as people cannot afford education or the high opportunity costs for poor families (Chen & Zhang, 2020; Han et al., 2021; Spiller, 2019). The higher the poverty rate in a region, the lower the average length of schooling (Bandyopadhyay et al., 2023; Oum, 2020). Thus, the relationship between poverty, GRDP, and average length of schooling has a strong theoretical basis, with an increase in GRDP increasing educational opportunities, while an increase in poverty decreasing educational opportunities.

Several previous studies have shown a relationship between poverty levels, GRDP, and average length of schooling. Research by Baydu et al., (2013) focused more on poverty levels affecting student graduation rates, but only in terms of school management. Research by Putria et al., (2023) examined poverty levels, GRDP, and minimum wages in relation to average length of schooling, but this research was conducted at the provincial level in Gorontalo. Research by Sururi & Septiyani, (2020) only examined the variable of GRDP in relation to average length of schooling without including the variable of poverty level and was still conducted at the provincial level in West Java.

Previous studies have focused on the provincial level, so there is no specific description at the district level. In addition, there has been no previous study that

simultaneously combines the variables of poverty level and GRDP on the average length of schooling in Sleman District for the period 2015-2024. Based on these gaps, this study is novel as it is the first to analyze the effect of poverty level and GRDP on average length of schooling in Sleman Regency for the period 2015-2024. This more detailed and localized approach is expected to provide an overview of the economic dynamics that affect educational achievement in Sleman Regency.

This study aims to analyze whether poverty levels and GRDP have a significant effect on the average length of schooling in Sleman Regency from 2015 to 2024. Therefore, this study is important to determine the extent to which economic conditions, as seen from poverty levels and GRDP, affect educational attainment in the region. The results of this study are expected to provide an overview for the Sleman Regency government as a benchmark for identifying educational disparities in the region and as material for evaluating policies that improve access to and quality of education.

Dependent Variable (Y) Average length of schooling

According to the Central Statistics Agency, the average length of schooling is the number of years of study for people aged 25 and above who have completed formal education (not including repeat years). Average length of schooling is the number of years that residents have undergone formal education (Diskominfotik, 2025). Thus, it can be concluded that average length of schooling is an indicator that describes the level of education in a region for people aged 25 years and above who have completed formal education. The government plays an important role in increasing the average length of schooling by providing targeted policies to improve the quality of education, such as improving the quality of teachers (Kaya et al., 2025), supporting educational facilities (Jana, 2020), and strengthening the curriculum in accordance with student needs (Agboola & Thompson, 2024).

Independent Variable (X1) Poverty Level

Makiw et al., (2012) state that the poverty rate is the percentage of families whose income is below the poverty line determined by the government and adjusted annually. Buni et al., (2025) state that poverty is a condition in which an individual or community is unable to meet their basic needs for a decent life, such as food, clothing, education, and health services. According to the Central Statistics Agency, poverty is a condition in which a person or individual is unable to meet their basic needs for a decent life. Thus, from the above explanation, it can be concluded that the poverty rate is the percentage of the population that cannot meet their basic needs and whose income is below the poverty line.

Independent Variable (X2) Gross Regional Domestic Product (GRDP)

Amin et al., (2025) state that GRDP is defined using three approaches, namely the production approach, the income approach, and the expenditure approach. According to the production approach, it is the total value added produced by production units in a region within a certain period. According to the income approach, it is the total remuneration received from production factors in that region within a certain period. According to the expenditure approach, it is calculated from final demand, namely

household consumption expenditure, government expenditure, domestic fixed capital formation, changes in stocks, and net exports. Makiw et al., (2012) state that GRDP is the market value of all goods and services produced in a region in a certain period of time. According to the Central Statistics Agency, GRDP is one of the indicators used to determine the economic condition of a region in a certain period of time. Thus, from the above definitions, it can be concluded that GRDP is the value generated by all economic activities using the production, income, and expenditure approaches. This study analyzes GRDP per capita at constant prices or real GRDP per capita. Total GRDP can indeed be used, but the use of GRDP per capita is more appropriate when linking it to the prosperity of the population.

The effect of poverty levels on average length of schooling

Kuznets, (1955) in his theory of inequality and poverty states that in the early stages of economic growth, poverty and inequality actually increase because the results of economic growth are not yet evenly distributed. This theory shows that if it is not balanced with equitable development, it will cause some areas to lag behind, such as in access to education. Economic inequality makes it difficult for low-income communities to meet the costs of education. As a result, regions with high poverty rates tend to have low average lengths of schooling. Thus, the relationship between the variables of poverty rate and average length of schooling is negative; every increase in the poverty rate will decrease the average length of schooling in a region.

The effect of GRDP on average length of schooling

Smith, (1776)in his theory of economic growth stated that economic growth is the process of increasing the capacity of an economy to produce goods and services in the long term in a region. If the GRDP increases, it will increase output and community income. This is because employment opportunities increase, per capita income rises, and the purchasing power of the community increases. Theoretically, this condition will reduce poverty levels, as the community will be able to meet their needs, including education. Thus, the relationship between GRDP and average length of schooling is positive; every increase in GRDP will increase the average length of schooling in a region.

RESEARCH METHOD

This study uses a quantitative descriptive approach with secondary data obtained from bps.go.id Sleman Regency. The type of data used is time series with a period of 2015-2024. The data used in this study includes three variables: Variable Y (dependent): Average length of schooling in years, Variable X1 (independent): poverty rate in percent, and Variable X2 (independent): Gross Regional Domestic Product (GRDP) per capita in rupiah based on constant prices. All data was sourced from https://yogykarta.bps.go.id/id and collected in Excel to facilitate data processing. Furthermore, the collected data was processed using the Eviews 12 program. The use of this secondary data aims to determine the empirical description of the effect of poverty level and GRDP on the average length of schooling in Sleman Regency in 2014-2025.

This study uses multiple linear regression with the Ordinary Least Square (OLS) method. The number of time periods in the study is limited to 10 years, so other time series models such as ARDL, VAR, or ECM are not possible because they require longer time series (Shrestha & Bhatta, 2018). Therefore, the use of OLS is the right choice because it can be used for short-term time series as long as the classical assumptions are met and

the variables show a relatively stable pattern. The main objective of this study is to analyze the linear relationship between the poverty rate and GRDP variables on average length of schooling, so that the use of OLS is the most appropriate and efficient to answer the research questions in this study (Allkanjari et al., 2024; Kulaylat et al., 2023).

This study basically uses several statistical tests, including the F-test to see the simultaneous effect of poverty and GRDP variables, the T-test to see the partial effect, and the R2 test to measure how much the independent variable affects the dependent variable. This study also uses classical assumption tests, which are divided into autocorrelation, multicollinearity, heteroscedasticity, and normality tests to validate the suitability of the regression model. The multiple linear regression equation pattern in this study is as follows:

$$MYS = \beta o + \beta 1 (Poverty) + \beta 2 (GRDP\ per\ capita) + e$$

Explanation:

MYS	: Average length of schooling (years)
Poverty	: Poverty rate (%)
GRDP per capita	: Gross Regional Domestic Product per capita (constant prices)
βo	: constant
$\beta 1 \beta 2$	: regression coefficient
e	: error term (disturbance variable)

RESULTS AND DISCUSSION

Results

The F-test in Table 1 shows a probability value (F-statistic) of 0.00, which is less than the 0.05 significance level. This indicates that the variables of poverty rate and GRDP simultaneously have a significant joint effect on the mean years of schooling in Sleman Regency. This finding confirms that the regression model used is fit and that the two independent variables, together, are able to explain the variation in the mean years of schooling in Sleman Regency from 2015 to 2024.

Table 1. F-Test and T-Test

Variable	T-statistic	*Prob.*
C	8.818297	0.000
Poverty	0.444609	0.670
GRDP	6.661794	0.000

The poverty variable has a probability value (significance) of 0.67, which is greater than 0.05. Therefore, it can be concluded that the poverty rate does not have a significant partial effect on the mean years of schooling. The coefficient of 0.044 suggests a theoretical positive relationship, meaning an increase in poverty is associated with an increase in schooling. However, since the effect is statistically insignificant, this relationship cannot be used as a benchmark to claim that changes in the poverty rate influence the mean years of schooling.

The GRDP variable has a probability value of 0.0003, which is less than 0.05. This leads to the conclusion that GRDP has a significant partial effect on the mean years of schooling. The positive coefficient of 0.068 indicates that for every one-unit increase in GRDP, the mean years of schooling is expected to increase by 0.068 years, holding other factors constant.

Table 2. adjusted R-Square

Variable	coefficient
R-square	0.880654

Table 2 shows an Adjusted R-squared value of 0.880654. This indicates that approximately 88% of the variation in the mean years of schooling can be explained by the simultaneous influence of the poverty rate and GRDP variables included in the model. The remaining 12% is attributed to other factors not examined in this study.

Classical assumption tests are a prerequisite in analytical procedures that must be met for multiple linear regression analysis based on the Ordinary Least Squares (OLS) method (Matondang & Nasution, 2022). This study conducted several diagnostic tests to ensure the validity of the regression model, namely the Multicollinearity Test, Normality Test, Heteroscedasticity Test, Autocorrelation Test, and Linearity Test.

The Multicollinearity Test is performed to evaluate the relationship between the independent variables in the regression model. In this study, we compare the value of the Coefficient of Determination ($R^{2)}$ from the auxiliary regression model with the R^2 value of the overall model. If the R^2 of the auxiliary regression is greater than the R^2 of the overall model, the data exhibits multicollinearity. Conversely, if the R^2 of the auxiliary regression is lower than the R^2 of the overall model, the relationship between the independent variables is non-significant, and the data is considered free from multicollinearity. The Multicollinearity Test also utilizes the Variance Inflation Factor (VIF) value to ensure calculation accuracy, thereby minimizing significant errors and avoiding the symptom of correlation between the independent variables (Nugraha, 2022).

Table 3. Multicollinearity Test

Variable	Centred VIF
Poverty	1.229280
GRDP	1.229280

Table 3 shows that the Variance Inflation Factor (VIF) value for the poverty variable is 1.229280 and for the GRDP variable is 1.229280. Since the VIF values for both independent variables in this study are less than 10.00 (VIF < 10.00), it can be concluded that the data passes the multicollinearity test, indicating the absence of severe multicollinearity among the independent variables in the regression model.

The normality test is conducted to determine whether the regression residuals are normally distributed, a key assumption for ensuring the validity of the regression model (Duli, 2020). In this study, the normality of the residuals was assessed using a histogram plot. The data is considered to be normally distributed if the probability value (p-value) is greater than the 0.05 significance level.

Table 4. Normality Test

Normality test	Probability
Jarque-Bera	0.680925

The normality test in this study was conducted using the Jarque-Bera method with a significance level of 0.05. As shown in Table 4, the probability value of the Jarque-Bera statistic is 0.680925, which exceeds the 0.05 significance level. This indicates that the residual data are normally distributed.

The third test conducted was the heteroscedasticity test. Heteroscedasticity occurs when the variance of the regression residuals is not constant across observations (Nugroho & Haritanto, 2022). An accurate regression model must be free from heteroscedasticity. The criterion for confirming the absence of heteroscedasticity is a probability value of the Chi-Square statistic greater than the alpha level of 0.05.

Table 5. Heteroscedasticity Test

Heteroskedasticity test	Probability
Obs *R-square	0.1059

As shown in Table 5, the probability value of the Chi-Square statistic is 0.1059, which is greater than the 0.05 significance level. This indicates that the regression model is free from heteroscedasticity.

The fourth test is the autocorrelation test. Autocorrelation refers to the correlation of error terms (residuals) across different observations in a regression model (Supriadi, 2020). This test is conducted to detect the presence or absence of the classical assumption violation of autocorrelation. Performing this test is crucial, as autocorrelation in the residuals can lead to inefficient parameter estimates and biased statistical inferences. In this study, the criterion for the absence of autocorrelation is a probability value of the Chi-Square statistic greater than 0.05.

Table 6. Autocorrelation test

Autocorrelation test	Probability
Prob. Chi-square	0.1059

The results of the autocorrelation test, presented in Table 6, show a Chi-Square probability value of 0.4301, which is greater than the 0.05 significance level. This indicates that the regression model is free from autocorrelation.

The fifth diagnostic check is the linearity test. Linearity, in the context of regression, refers to whether the relationship between an independent variable and the dependent variable can be adequately represented by a straight line (Marwan et al., 2023). This implies that a unit change in the independent variable is associated with a constant change in the dependent variable.

Table 7. Linearity test

Linearity test	Probability
F-statistic	0.8151

Table 7 shows an F-statistic probability value of 0.8151, which is greater than the 0.05 significance level. This leads to the conclusion that the relationship between the variables is linear.

Based on the comprehensive diagnostic testing, all classical assumption tests were satisfied. This confirms that the model fulfills the requirements for the Best Linear Unbiased Estimator (BLUE). Consequently, the regression model is linear, produces unbiased estimates, has minimum variance, and yields reliable coefficient estimations. With these assumptions met, regression analysis can be reliably used for further inference and prediction.

Regression analysis was employed to determine the influence of the poverty rate and GRDP on the mean years of schooling. The general form of the multiple linear regression model is as follows:

$$Y = a + \beta_1 X_1 + \beta_2 X_2 + e$$

This multiple regression analysis aims to specifically examine the effect of two independent variables: the poverty rate (X_1) and the Gross Regional Domestic Product (GRDP) (X_2) on the dependent variable, the mean years of schooling (Y). Based on the analysis, the following estimated regression equation was derived:

MYS = 8.428640 + 0.044(Poverty Rate) + 0.068(GRDP) + e

Table 8. Regression Analysis

Variable	Coefficient
C	8.428640
Proverty	0.044051
GRDP	0.068569

Based on the model estimation results, the constant of 8.428640 represents the predicted Mean Years of Schooling (MYS) for Sleman Regency if the values of both the poverty rate and GRDP were zero. A positive constant suggests a baseline educational attainment level; however, interpreting this scenario is theoretically abstract, as a region cannot have zero economic activity. The finding that an increase in the poverty rate is associated with a rise in MYS by 0.044 years is counterintuitive. This positive relationship may be attributed to effective government interventions, such as educational assistance programs and pro-poor policies, which mitigate the financial barriers to education for underprivileged communities in Sleman Regency.

Conversely, the coefficient for GRDP is 0.068, indicating that for every one-billion rupiah increase in GRDP, the Mean Years of Schooling increases by 0.068 years, holding other factors constant. This result aligns with economic theory, demonstrating that regional economic growth directly and positively contributes to higher educational attainment by potentially increasing household incomes and public investment in education.

Discussion

Based on the results of the partial test or t-test, a probability of 0.67 > 0.05 was obtained, indicating that the poverty rate does not have a significant effect on the average length of schooling in Sleman Regency. The regression coefficient value of 0.044 shows a positive direction, meaning that when the poverty rate increases by one unit, the average length of schooling will increase by 0.044 years. However, the effect is not significant, so this relationship cannot be used as a basis for concluding that poverty levels affect the average length of schooling. In other words, poverty is not a major factor determining educational attainment in Sleman Regency for the period 2014-2025.

The insignificant effect of poverty can be explained by the condition of Sleman Regency, which has equitable education. This phenomenon can occur because there are educational scholarships and educational assistance that enable some underprivileged communities to obtain free educational facilities. Various government scholarship programs in Sleman Regency include Sleman Pintar Plus Plus (Fadya, 2025), Sleman Pintar scholarships (Sleman, 2023), and the Silabadikdas scholarship application (Sleman, 2023). Thus, an increase in poverty does not automatically reduce school participation, as access to education has been facilitated by the government through strong policy interventions. This is the main reason why the poverty variable does not show a negative direction as explained by classical theory.

Sleman Regency is also an area with the highest number of universities in the Special Region of Yogyakarta, such as UGM, UII, UPN, UNY, and UIN (Dukcapil, 2023). The existence of these universities creates a social environment that supports education. There are tutoring services, literacy centers, and a strong academic culture. Adequate public facilities are also a factor in increasing the average length of schooling. The community has easier access to educational facilities such as transportation, the internet, and a variety of public and private schools. This encourages the community to pursue higher levels of education.

This finding differs from Kuznets' theory of inequality and poverty (Kuznets, 1955), which states that in the early stages of development, inequality and poverty hinder education. However, Sleman is a relatively developed area with a high level of urbanization and the largest concentration of educational institutions in the Special Region of Yogyakarta. This mitigates the negative impact of poverty on average length of schooling. Along with equal access to education and educational assistance or scholarships, this can help underprivileged communities obtain an education. This condition is a positive sign that the Sleman Regency government is reducing the impact

of poverty on education. Thus, it shows good development progress, where inequality is decreasing and access to education is increasing.

This condition can be concluded even though poverty levels are a social factor, but the influence of central and regional government education policies is a dominant factor in improving access to education. The policies implemented must be monitored and transparent to the public so that the policies run well in helping the underprivileged. This will reduce the abuse of power that benefits certain parties.

Based on the results of the partial test or t-test, a probability of 0.0003 < 0.05 was obtained, indicating that the level of GRDP has a significant effect on the average length of schooling. The regression coefficient value of 0.068 shows a positive direction, meaning that when GRDP increases by one unit, the average length of schooling will increase by 0.068 years. This shows that increased economic growth in a region can increase the value of community participation in obtaining education.

This finding is in line with Smith, (1776) theory of economic growth, which states that an increase in output and income will increase purchasing power and encourage investment in human capital. When per capita income in a family increases, it will provide income to provide educational facilities for children. The drive to pursue education and the ability to finance education will increase the average length of schooling. This finding is also in line with the concept of human capital accumulation by Becker, (1993); Lucas, (1988), which states that education is a long-term investment to increase productivity. Stable GRDP growth encourages people to pursue higher education, as the job market tends to demand higher skills.

In addition, an increase in GRDP also gives rise to new business sectors that can increase employment opportunities. This condition indirectly creates educational qualifications in the world of work, so that people are encouraged to continue their education to get better jobs. Therefore, GRDP is the most dominant and consistent factor in increasing the average length of schooling in Sleman Regency.

CONCLUSION

Fundamental Finding: Based on the results of secondary data analysis from 2015 to 2024 using Eviews 12, this study found that simultaneously, the poverty rate variable had a positive and insignificant effect on the average length of schooling. This means that an increase in poverty in the Sleman Regency does not directly reduce the average length of schooling. This is due to the availability of scholarships or educational assistance, equitable access to education that encourages underprivileged communities to continue their education, high urbanization rates, and the concentration of the largest educational institutions in the Special Region of Yogyakarta. Conversely, the GRDP variable has a positive and significant effect on the average length of schooling. This means that increased economic growth in Sleman Regency will increase the average length of schooling. This shows that improved community welfare will encourage the expansion of opportunities for the community to pursue education. **Implication:** Based on the findings of this study, there are several practical implications that can be applied. For local governments, the results of the study emphasize the importance of expanding and

maintaining educational assistance as a form of prevention against the impact of poverty on education. In addition, the government needs to increase economic growth in human capital investment by increasing the fiscal-based education budget and regional GRDP contributions. For educational institutions, it is necessary to strengthen the quality of education, because access to education alone is not enough without quality education. For researchers and academics, the study shows that educational equity is not only influenced by social conditions, but also by regional economic stability and growth. **Limitation:** this research is still limited to two variables and 10-year time series data (2015-2024), so it does not yet cover other factors such as the human development index, education budget, and education expenditure. **Future Research:** subsequent research is expected to expand the scope of the region, add other variables, expand the research area, or use more complex analysis methods to produce a more comprehensive picture.

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