The Effect of IQ and Learning Duration on Students' Mathematics Scores at SMP Fathul Huda

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Abstract.
Many factors can affect a person's academic achievement. One of the internal factors that can affect a person's academic achievement is IQ. Therefore, this study aims to see whether there is a significant effect between IQ and learning duration on mathematics scores at SMP Fathul Huda. The research method used in this study is quantitative. The subjects of this study were 29 students of class VIII SMP Fathul Huda consisting of 12 girls and 17 boys. The data for this research uses secondary data in the form of IQ data and data on the results of the latest report cards on students' math scores in the odd and even semesters of the 2020/2021 academic year. The results showed that there was no effect between IQ and learning duration on students' math scores.
Keywords: IQ, mathematics learning outcomes, study duration.

1. Introduction

IQ is the ability to act purposefully, think rationally, and face challenges effectively [1]. IQ as also defined as a person's abstract thinking ability [2]. There are so many definitions of intelligence put forward by experts. The definition of intelligence seems to have undergone various changes over time, but since then it has never reduced the emphasis on the cognitive aspect of the value of IQ.

One way that is often used to express high or low levels of intelligence is to translate the results of intelligence tests into numbers which can be an indication of the position of a person's level of intelligence when compared relative to a norm. Traditionally, normative figures from intelligence test results are expressed in the form of ratios (quotients) and are called IQ (Intelligence Quotient). The standard of success is the Intellectual Quotient (IQ), which is associated with brain brilliance, which does not guarantee that a person's life will reach the peak of success [3]. Sometimes there is an assumption that places intelligence in a role that exceeds its actual proportions. Some people even think that high intelligence test results are a guarantee of success in learning so if there is a case of learning failure in a child who has a high IQ, it will cause an overreaction in the form of losing trust in the institution that failed the child or losing trust in the party who gave the IQ diagnosis. In line with that, no less dangerous is the assumption that a low IQ test result is the final verdict that the individual concerned is unlikely to be able to achieve good achievements.

Another factor that influences student academic achievement is the duration of study. Duration is how long something lasts or a time. Learning is any relatively permanent behavior change that occurs as a result of training or experience [4]. Study duration is the length of time

a person spends in learning activities which include reading, writing, listening, and practicing which results in changes in behavior.

experienced by individuals. The longer a student's study time, the better their academic performance. Every child or student has different study habits, some study for a long duration, and some study for a short duration. To achieve good academic achievement, students must increase the duration of their study, so they can understand the material more deeply. For example, from previously studying 30 minutes to 60 minutes every day.

2. Method

The type of research used in this research is a quantitative research method. Quantitative research is a process of finding knowledge that uses data in the form of numbers as a tool to analyze information about what we want to know. Quantitative research methods use research data with the help of statistical tools which are used to measure data and generalize results from samples that are relatively large and representative of the population.

Population is a generalized area consisting of objects/subjects that have certain quantities and characteristics determined by researchers to be studied and then conclusions drawn [5]. The population in this study was 300 SMP Fathul Huda students. The sample is part of the number and characteristics possessed by the population, by taking a sample of 29 students. The sampling technique in this research uses a probability sampling method, namely random sampling using a simple random sampling technique.

One important factor in the success of research is data collection techniques. The data collected will be used for problem-solving in research through distributing questionnaires distributed to students at SMP Fathul Huda.

Data analysis in this study used a descriptive quantitative approach which was used to see the influence of IQ and duration of study on mathematics scores at SMP Fathul Huda. This research aims to see the influence of the relationship between the independent variables on the dependent variable. The dependent variable is the influence of IQ and duration of study on mathematics scores at SMP Fathul Huda.

To test the truth of the proposed hypothesis, the model used is a multiple linear regression model [6]. The model used can be expressed by

$$Y = a + b_1 X_1 - b_2 X_2 \tag{1}$$

Where:
Y= Mathematics value
X_1= IQ
X_2= Study duration
 a = Constant
 b_1 and b_2= Regression Coefficient

We use SPSS to help us do data processing [7].

3. Result and Discussion

First, we did a normality test to see whether the data being analyzed is normal or not. To see whether the data is normally distributed or not, use the Normal QQ Plot [8]. The dots around the line are the state of the data being tested. If most of the points are very close to the line or even attached to the line, then the data is normally distributed.

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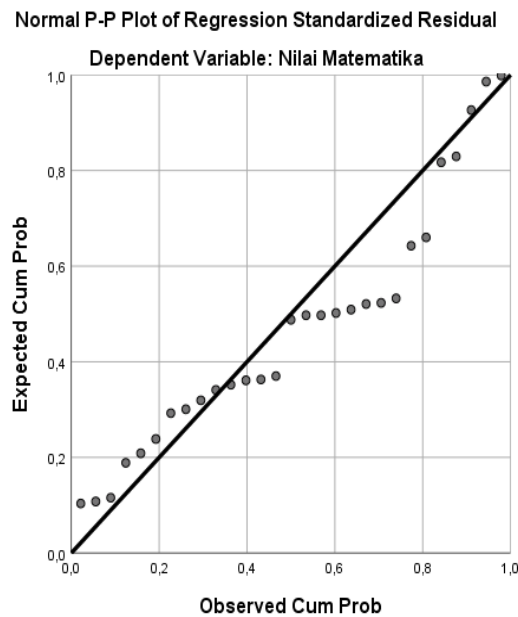*FPMIPATI-Universitas PGRI Semarang*
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Figure 1. Normality test using SPSS

Based on Figure 1, it can be concluded that the data distribution on the research variables is normally distributed. Because the data spreads around the diagonal and follows the direction of the diagonal line. That's aligned with the following Table 1.

Table 1. Linearity Test

ANOVA Table							
			Sum of Squares	df	Mean Square	F	Sig.
Unstandardized Residual * Unstandardized Predicted Value	Between Groups	Combined	88,736	21	4,226	,586	,838
		Linearity	,000	1	,000	,000	1,000
		Deviation from Linearity	88,736	20	4,437	,615	,815
	Within Groups		50,500	7	7,214		
	Total		139,236	28			

Based on the results of the linearity test, it can be seen that the F-Calculated value < F-table (0.05.29) and is confirmed by the p-value (Sig.) > 0.05 so that all variables X_1, dan X_2 have a linear relationship with Y.

To answer the problems in this research, it is necessary to carry out a statistical analysis of the data that has been obtained. The statistical analysis used in this research is multiple linear regression analysis.

Table 2. Hypothesis Test

Model		Unstandardized Coefficients		SStandardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	69,457	5,446		12,753	,000
	IQ	,014	,066	,039	,206	,839
	Durasi Belajar	1,166	,750	,297	1,554	,132

Dependent Variable: Mathematics Value

Based on the estimation results in Table 2 above, the estimation equation results are as follows.

$$Y = 69{,}457 - 0{,}014\ X_1 - 1{,}166\ X_2.$$

If the IQ variable increases by one unit assuming the learning duration variable remains constant, then the mathematics score will decrease by 0.014. If the learning duration variable increases by one unit assuming the IQ variable remains constant, then the mathematics score will decrease by 1.166. If the IQ and study duration variables are equal to zero, then the mathematics score is 69.457.

Table 3. t-Test

Coefficientsᵃ							
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		Std. Error	Beta			Tolerance	VIF
	69,457	5,446		12,753	,000		
	,014	,066	,039	,206	,839	,951	1,051
	1,166	,750	,297	1,554	,132	,951	1,051
a. Dependent Variable: Nilai Matematika							

To determine the influence of each independent variable on the dependent variable, the t-statistical test is partially used, by looking at the calculated t-value compared to the t-table.
The degree of freedom of the test is n-k = 29-3 = 26, so the t-table value is 2.056. The test results can be seen as follows:

The IQ variable (X_1) has a calculated t-value of 0.839. This value is smaller than the t table of 2.056 and sg t (0.839) is greater than 0.05, so the research hypothesis testing for H_a is rejected and H_0 is accepted. This explains that, partially, IQ does not affect students' Mathematics Scores.

The learning duration variable (X_2) has a calculated t-value of 1.554. This value is smaller than the t table of 2.056 and the sig t (0.132) is greater than 0.05, so the research hypothesis testing for H_a is rejected and H_0 is accepted. This explains that the duration of study does not affect students' mathematics scores.

Table 5. F-Test

ANOVAᵃ					
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
	Regression	14,626	2	7,313	1,366	,273ᵇ
	Residual	139,236	26	5,355		
	Total	153,862	28			
a. Dependent Variable: Nilai Matematika						
b. Predictors: (Constant), Durasi Belajar, IQ						

The F test is used to determine whether the independent variables have a real effect or not together on the dependent variable by comparing the F-count and F-table values, F-table with the values df 1 = k 1= 3-1 = 2 and df 2 = n-k = 29-3 = 26 then the F-table is 3.37.

Criteria:

H_0 is accepted if Sig (F-statistics) $> \alpha$ (0.05)

H_a is accepted if Sig (F-statistics) $< \alpha$ (0.05)

Sig (F-statistic): 0.273

Based on the results of calculations using SPSS, it can be seen that the F-statistic is 1.366. The Sig F statistic value of 0.273 is greater than the significance level of 0.05. So the hypothesis testing H_a is rejected and H_0 is accepted. This explains that simultaneously IQ (X_1) and duration of study (X_2) do not have a significant effect on mathematics scores at Fathul Huda Middle School. This is align with the research of [9] and [10].

4. Conclusion

Based on the results of the discussion and analysis of research data regarding the influence of IQ and duration of study on mathematics scores at SMP Fathul Huda, the following conclusions can be drawn: 1). The IQ variable has no significant effect on mathematics scores at SMP Fathul Huda; 2). The study duration variable does not have a significant effect on mathematics scores at SMP Fathul Huda; and 3). The variables IQ and duration of study together do not have a significant effect on mathematics scores at SMP Fathul Huda. So, it can be said that IQ and duration of study are not one of the influences on mathematics scores at SMP Fathul Huda.

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