Analysis the effect of learning habits and gender the mathematics learning achievement using the multiple linear regression approach

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Abstract - The purpose of this study is to analyze the factors of learning habits and gender on the mathematics learning achievement of students using multiple linear regression approaches. This type of research is quantitative with an approach ex post facto. The population used in SMP Negeri 1 Merauke students, class X and XI with a population of 625 students consisting of 322 male students and 303 students. The sample used by the propositional stratified Random Sampling technique was obtained ie 150 samples. The analysis used uses a significance level of 5%. The results obtained are: (1) there is a significant effect of learning habits and student mathematics learning achievements; (2) there is no significant effect of gender on student mathematics learning achievement; (3) there is no simultaneous influence of learning habits and gender on students' mathematics learning achievement. The results of the analysis using multiple regression approaches indicate learning habits provide a positive and significant influence on learning achievement. Students who have good and regular study habits will see that the lessons received are not so difficult to understand, because of the good readiness beforehand. Whereas for gender there is no significant effect. This is because there has been gender equality applied in school. Equality of conditions for men and women to obtain opportunities and their rights as human beings, to be able to play a role and participate in activities at school. Thus it can be concluded that the factors that influence the mathematics achievement of junior high school students for Merauke City are learning habits. The better and regular student learning habits, the students' mathematical achievements will increase.

1. Introduction
Education carried out must have good quality so that the people produced from education are good too. Education is a conscious and planned effort carried out by educators to change human behavior, both individually and in groups to mature these people through the process of teaching and training [1]. In the implementation of education, there are educational components, namely educators, students, curriculum, learning process, as well as facilities and infrastructure. The most important educational component is the learning process, because it affects student learning achievement. The current learning process requires students to be active so that the teacher is no longer the center of learning, but students as learning centers. The interaction between the learning environment is needed both with teachers and school friends, if there is good interaction and is supported by adequate learning facilities,
learning will be more effective and obtain optimal learning outcomes. One of them is learning mathematics.

Mathematics is the source of all scientific disciplines, this seems so important to mathematics, then mathematics is given from the elementary school level. But mathematics among students is an elusive lesson that causes student achievement to decline. The mathematics achievement of students in Indonesia is still very low compared to other countries. This is evidenced by the results of a survey conducted by the PISA (Program of International for Student Assessment) and the Organization of Economic Cooperation and Development (OECD) by 65 Indonesian countries ranked 64th. Factors that influence students are divided into two internal factors and external factors [2]. Factors that provide the greatest contribution are psychological factors, where psychological factors are part of internal factors that affect student learning achievement [2] [3]. Psychological factors are divided into one of them, namely learning habits. Students who have good and regular study habits will see that the lessons received are not so difficult to understand, so that the achievements obtained are better. This is in line with the opinions of Rana and Kausar [4] that the main key to successful learning is good learning habits, resulting in high student achievement. Good study habits will have a positive influence on students, namely in discipline, readiness, and independence in learning. The studies that have been conducted prove that learning habits have a significant influence on learning achievement [5][6][7][8].

Other factors that influence learning achievement are gender factors. Gender according to Puspitawati is anything that is associated with a person's sex, including roles, behavior, preferences, and other attributes that explain certain cultural or male males [9]. Gender and gender are two different things but cannot be separated as revealed by Sugihartono et al. [10] Gender and gender are two different things, but interrelated. In general, gender is defined as individual differences, namely biological factors that are born at birth, that is the difference between male and female sex while gender is the psychosocial aspect of men and women. According to Suryadi et al. [11], there is no gender equality in terms of employment, community roles, and expressing opinions.

Research that proved the influence of gender, namely the research of Ralf Benölken [12] was obtained boys who are have not gifted show functional mathematical self-concepts more often than non-talented girls. Wulandari et al. [13] found that there were differences in male and female students in terms of learning mathematics, male and female students preferred learning by application, but female students were freer in their learning style than male students, so achievement female mathematics learning is superior compared to male students' mathematics learning achievement, because female students in their learning use varied learning styles so as not to be boring.

2. Method

Type of research is ex post facto with research design is multiple regression to analyze attitudinal and gender factors towards mathematics learning achievement. The population used in this study were students of SMP Negeri 1 Merauke, class X, and XI with a population of 625 students consisting of 322 male students and 303 students. The sample used by the propositional stratified Random Sampling technique was obtained ie 150 samples. The variables in the study are independent variables namely attitudinal and gender factors and the dependent variable is mathematics learning achievement. Data collection techniques used in this study were non-test techniques using questionnaires to obtain information on factors that influence learning achievement and test techniques using multiple-choice questions to determine students' mathematics learning achievements. The research steps used a multiple regression approach, namely: (a) prerequisite test (normality, linearity test, correlation test); (b) parameter estimation; (c) test the significance of parameters.

3. Result and Discussion

3.1. Research Results

This study aimed to analyze the influence of learning habits and gender on mathematics learning achievement. Data collection techniques used were using test techniques, namely to obtain data on students’ mathematics learning achievement with test sheets and non-test techniques, namely using instruments in the form of questionnaires to obtain data on student learning habits and gender.
Questions to test student learning achievement are in the form of multiple choices consisting of 20 questions by adjusting the material that has been obtained by students. While the instruments used are adopted from Fitrianti research [2]. The instrument is used for public junior high school students in Merauke city. The instrument used has been tested so that in this study there was no instructional trial. The instrument for measuring student learning habits consists of 28 statements with measured indicators, namely learning discipline, learning readiness, and learning independence. The full explanation of the results of the study is written as follows:

3.1.1. Descriptive results
Study This study was conducted on the best public schools in Merauke City based on students' mathematics learning achievements obtained from the results of Fitrianti's research [2]. The results of students' mathematics learning achievement and factors that influence mathematics learning achievement can be seen in the following Table:

| variable      | Mean | median | maximum | minimum | Standard deviation |
|---------------|------|--------|---------|---------|--------------------|
| Achievement   | 43   | 38     | 88      | 25      | 15.4               |
| Study habits  | 98   | 99     | 128     | 64      | 12.1               |

Results Table 1 shows the mathematics learning achievement of students tends to be negative, meaning that more students get low mathematics learning achievement. The average student learning achievement at 43 with the distribution of data at 25 to 88 and the distribution of data varies. This can be seen from the standard deviation value obtained. A large range and variation of values identify a gap in student learning achievement. One of the results of student learning is caused by learning habits. This can be seen from the average student learning habits tend to be irregular. Most students study when given homework by the teacher or have an exam. To further analyze the learning habits and student achievement using multiple linear regression analysis.

3.1.2. Prerequisite
Before analyzing the influence of study habits and gender using multiple linear regression, a prerequisite test will be conducted first. The prerequisite tests the linearity test, normality test, multicollinearity test, and heteroscedasticity test.

3.1.2.1. Linearity test
Data test is used to find out whether there is a linear relationship between the independent variable and the dependent variable. The linearity decision will be taken if the deviation from linearity value is sig. > 0.05. With the help of SPSS 20 software obtained the results of the linearity test sig. that is 0.3 this shows sig. obtained is greater than 0.05, so it can be concluded that there is a linear relationship between the independent variable and the dependent variable. The free variable in question is variable student learning habits.

3.1.2.2. Normality test
Test Data normality test is done to find out the regression model has residuals that follow the normal distribution. The normality test of the data in this study was conducted using the Kolmogrov-Smirnov test. By taking decision making if the value is Sig. > 0.05 then it is normally distributed, vice versa if the value is Sig. <0.05 so it is not normally distributed. The test results show the residual has an sig value. Sig. (p) equal to 0.07 Thus it can be concluded that the residual is normally distributed, because of the value of Asymp. Sig. greater than 0.05.

3.1.2.3. Multicollinearity Test
Mutikolinearitas Test used to test whether the regression model found a correlation between independent variables. A good regression model should not occur multicollinearity between independent variables. Decision making based on the value of the variance inflation factor (VIF) of each independent variable must be less than 10 and the value tolerance formed above 10%. The results of the calculation of multicollinearity test can be seen in Table 2.

| Variables  | Tolerance | VIF Value | Description          |
|------------|-----------|-----------|----------------------|
| Learning habits | 0.98      | 1.021     | There is no multicollinearity |
| Gender     | 0.98      | 1.021     | There is no multicollinearity |

Based on the results of multicollinearity testing in Table 2, shows that the two variables free have a value tolerance greater than 0.1 and VIF which is smaller than 10, meaning there is no multicollinearity problem between the two independent variables. So the assumption of the absence of multicollinearity between independent variables is fulfilled in the model.

3.1.2.4. Heteroscedasticity test
The test aims to determine the difference in the variance of the residual regression model. The test used is the glejser test. Decision making is with the sig value. which is compared to the 5% significance level. If sig. > 0.05, then heteroscedasticity occurs. The results of calculation of heteroscedasticity test variable learning habits are 0.9 and gender variables, namely 0.06. Based on the results of the two variables, sig. > 0.05 so that it can be concluded based on the glejser test that heteroscedasticity does not occur.

3.1.2.5. Analysis of the influence of learning habits and gender on mathematics learning achievement
After testing the prerequisites, it will be carried out by analysis using multiple linear regression. The steps taken in multiple linear regression modeling are parameter estimation and parameter significance test. Significance decision making is if sig. < 0.05, the independent variable is not significant for the variable. The results of parameter estimation and test of significance can be seen in Table 3.

| Model            | Coefficients unstandardized (B) | Significance |
|------------------|---------------------------------|--------------|
| Constant         | 25.6                            | 0.03         |
| learning habits  | 0.22                            | 0.04         |
| Gender           | -2.368                          | 0.38         |

Table 3 obtained variable habit of learning sig value < 0.05 and variable gender value sig. > 0.05, so it can be concluded that there are effects of variable learning habits on student learning achievement while gender variables have no significant effect. Therefore the variable that influences student learning achievement that cannot be ignored is variable learning habits.

Furthermore, simultaneous independent variable testing is carried out on the dependent variable. The results of simultaneous testing of significance for independent variables on the dependent variable are obtained sig. that is 0.06, the results show sig. > 0.05 so that it can be concluded that the independent variable does not significantly affect the dependent variable.

Based on the results in table 4, the multiple linear regression equation is obtained, \( y = 25.6 + 0.22 \) (study habits). The contributions that the habits of students in student achievement are through the test of the coefficient of determination \( (R^2) \). The results obtained by \( R^2 \) are 0.034 which means the contribution of learning skills to students' mathematics learning achievement is 3.4%. The results of the analysis obtained only have the effect of learning habits on student learning achievement. The
equation of the regression model obtained shows that each learning habit is changed so that the learning achievement will increase.

3.2. Discussion

Learning achievement consists of cognitive, affective, and psychomotor achievements. Based on Hayati’s opinion [14] mathematics is more dominated by cognitive achievement than affective and psychomotor. This is because mathematics prioritizes thinking and reasoning about abstract concepts so that cognitive achievement is more dominant. Cognitive achievement is an achievement related to the mathematical knowledge students have through competence. According to Ahma[15], the learning achievement achieved is the result of the interaction of internal factors and external factors of students. Internal factors consist of physical and psychological factors. While external factors are teacher factors, social environment, school curriculum, and facilities and infrastructure. The factors that influence the learning achievement discussed in this study are the psychological factors that come from students, namely learning habits.

The results of this study indicate that most students get low achievement, this is due to irregular student learning habits. Students learn when given homework or there will be an exam, thus causing mathematics learning achievement to below. This is supported by the statement of Nasution et al. [16] students who only study before the exam tend to experience learning anxiety and result in low mathematics learning achievement. Based on Supardi’s opinion [17] learning restoration is the result obtained by students after experiencing a learning process where changes in abilities, understanding, skills, and attitudes can be observed and measured.

Other results obtained from the analysis using multiple linear regression mathematics learning achievement increase if student learning habits are getting better. This shows that student learning habits provide a positive and significant influence on students’ mathematics learning achievement. The learning ability measured in this study is student discipline, readiness, and learning independence. Students who have good and regular study habits will see that the lessons received are not so difficult to understand even though the lessons according to some students are difficult, because there has been a good readiness before. In other words, students who have good study habits will get good achievements too. This is in line with Magfirah’s research [7] Learning habits have a linear relationship with learning achievement.

In addition to the factors of learning, habits analyzed in this study, namely gender factors. The results obtained there were no significant gender influences on mathematics learning achievement. This is because there has been gender equality in the community so that gender has no significant effect. Equality of conditions for men and women to obtain opportunities and their rights as human beings, to be able to play a role and participate in political, economic, socio-cultural, national defense and security activities, and similarities in enjoying the results of such development. This has been proven by the research conducted by Hidayat [18] and Setiawati Gusti Ayu Dewi, et al. [19] that gender was not significantly affected by learning achievement.

4. Conclusion

Based on the results of the research and discussion, it can be concluded that:

1. There is a significant effect of learning habits on student mathematics learning achievement.
2. There is no significant effect of gender on mathematics learning outcomes.
3. Simultaneously there is no significant effect of learning habits and gender on mathematics learning achievement.

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