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THE INFLUENCE OF SELF-CONFIDENCE ON THE MATHEMATICAL REASONING ABILITY OF JUNIOR HIGH SCHOOL STUDENTS

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Abstract

Self-confidence is an aspect of personality that plays a role in shaping the potential of students, if they master the confidence with slick, it is also expected to pursue their mathematics to produce optimal results, so that this aspect also has an influence as an important role in the ability of mathematical reasoning students. This study has the intention to see the effect of student confidence on the mathematical reasoning ability of Grade IX students of SMPN 11 Bekasi semester 1 of the 2022-2023 academic year. The proposed research method is quantitative research techniques with survey research design. The sampling technique used is Simple Random Sampling. The population of Class IX was 237 students. Samples were taken as many as 149 students using the Slovin formula. The research Data was obtained through testing instruments about mathematical reasoning ability as much as 5 points and instrument questionnaire confidence as much as 20 statements. The results obtained can be concluded in the form of self-confidence affect the reasoning ability of students. Self-confidence had a positive effect of 3.4% on students ' reasoning ability. however, students ' self-confidence is still at a moderate level. So, the reasoning ability of students cannot be said to be optimal. Based on the results found, it is necessary to conduct extended research on this theme by using various other influencing factors.

Keywords: self-confidence, mathemathics reasoning, junior high school, geometry

Abstrak

Kepercayaan diri ialah suatu segi kepribadian yang berperan dalam membentuk potensi yang dimiliki siswa, apabila mereka menguasai kepercayaan diri dengan apik maka diharapkan juga dalam menekuni matematika mereka membuahkan hasil yang optimal, sehingga segi ini juga mempunyai pengaruh sebagai peranan penting dalam kemampuan penalaran matematis siswa. Penelitian ini memiliki maksud untuk melihat pengaruh kepercayaan diri siswa kepada kemampuan penalaran matematis siswa kelas IX SMPN 11 Bekasi semester 1 tahun pelajaran 2022-2023. Metode penelitian yang diajukan adalah teknik penelitian kuantitatif dengan desain penelitian survey. Teknik pengambilan sampel yang digunakan adalah Simple Random Sampling. Populasi kelas IX adalah 237 siswa. Sampel yang diambil sebanyak 149 siswa dengan menggunakan rumus Slovin. Data penelitian diperoleh melalui pengujian instrumen soal kemampuan penalaran matematis sebanyak 5 poin dan instrumen angket kepercayaan diri sebanyak 20 pernyataan. Hasil yang didapatkan adalah dapat disimpulkan berupa kepercayaan diri berpengaruh terhadap kemampuan penalaran siswa. Kepercayaan diri berpengaruh positif sebesar 3,4 % pada kemampuan penalaran siswa. meskipun demikian, kepercayaan diri siswa masih berkedudukan pada level sedang. Jadi, kemampuan penalaran siswa belum bisa dikatakan optimal. Berdasarkan hasil yang ditemukan, perlu dilakukan penelitian berkepanjangan mengenai tema ini dengan menggunakan berbagai faktor lain yang mempengaruhi.

Kata kunci: kepercayaan diri, kemampuan penalaran matematis, siswa SMP, geometri

INTRODUCTION

Education in developing the quality of mathematics learning to be better, students are expected to have several main abilities, namely mathematical, systematic, logical, creative, and reasoning (Salmina et al., 2018). The ability of mathematical reasoning has an important role that is in line with the mathematical vision for the fulfillment of future activities (Eni et

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al., 2018). Russefendi said this is because mathematics is a result formed from human thinking ability related to reasoning, ideas and processes (Mikrayanti, Baeti, & Wirahmat, 2019). But until now students' mathematical reasoning ability has not reached the expected stage, this has caused students' inability to solve mathematical problems One of the causes of students' lack of reasoning power is in the course of learning mathematics, students are only introduced by the teacher regarding formulas and concepts that are carried out orally without any understanding of where the formulas and concepts come from. (Kristina & Permatasari, 2021). In addition, mathematics learning also mostly only emphasizes cognitive aspects without paying attention to how the student's personality is (Hendriana, 2014).

One of the important factors for solvingmath learning problems is to recognize students' self-confidence (Sutrisno, 2017). Through self-confidence, students are able to get motivated to successfully learn mathematics (Andayani & Amir, 2019), they will be able to understand, find, and strategize mathematical problems and come up with a solution to the problem(Faudziah & Kadarisma, 2019). Case studies in one school show no correlation between students' confidence and mathematical reasoning ability (Desianty Nur Adilla & Rintan Nurhabibah, 2020). But on the other hand, some of the results of research that has been carried out (Eni et al., 2018, Faudziah & Kadarisma, 2019, Diniyah, Akbar, Nurjaman, & Bernard, 2018, (Desianty Nur Adilla & Rintan Nurhabibah, 2020) states there is a significant relationship between self-confidence and reasoning ability.

The results of early observation at SMP Negeri 11 Bekasi through the provision of geometry material tests to grade IX students as well as interviews for teachers in the field of mathematics studies and students, found that many students were not able to solve the questions correctly and correctly and some even chose to leave the answers blank, and only some students were able to complete the questions correctly. This is because the average student does not have the confidence to ask questions and in solving math problems still depends on their friends. Meanwhile, students who have a high average score are mostly due to often practicing questions at home and have the activeness to ask the teacher. These early observations are in line with research (Eni et al., 2018) that there is a relationship between the two variables.

The results of these observations are in accordance with Andayani's research that every student who has high self-confidence is able to do some good things to develop his potential,

such as interacting well with his peers, daring to give opinions and respecting different opinions, having positive thoughts and behaviors in deciding a conclusion, while students who have low self-confidence they want to have difficulties in doing such things for having the thought that they are incapable of surpassing other students (Andayani & Amir, 2019). It aims to look at the influence of students' self-confidence on students' mathematical reasoning abilities. Is it that if students' self-confidence increases, then the reasoning ability they have will also increase?

METHODS

This research was carried out in the odd semester of the 2022/2023 school year. The selected research subjects were grade IX students of SMP Negeri 11 Bekasi. The research instrument chosen is a test, namely 5 description questions with geometry and non-test material, namely a confidence questionnaire with 20 statements. Description questions are used to understand the level of students' mathematical reasoning ability, other things such as questionnaires are used to understand the level of student confidence.

The method implemented in the study is quantitative with a research design, namely survey research. The samples taken were 149 students of classes IX-A, B and C. The sample is carried out by a simple random retrieval method with the *Slovin* formula. The free variable in this research is self-confidence while the bound variable is the student's reasoning ability. Data processing was performed using simple linear regression test calculations. Before performing the repression calculation, the conditions that must be done are validity test, normality test, homogeneity test, and linearity test.

RESULTS AND DISCUSSION

Before testing the regression test between the confidence questionnaire and the student's mathematical reasoning ability test, a normality test and linearity test are first carried out. Here are the results of the normality test:

Table 1. Confidence Questionnaire Normality Test

One-Sample Kolmogorov-Smirnov Test		
		Unstandardized Residual
N		149
Normal Parameters[a,b]	Mean	.0000000
	Std. Deviation	13.01672145

Most Differences	Extreme	Absolute	.061
		Positive	.048
		Negative	-.061
Test Statistic			.061
Asymp. Sig. (2-tailed)			.200

It can be seen from Table 1 above that the data is normally distributed because the sig.α > value is 0.05, which is 0.200 > 0.05.

Then is to conduct a linearity test between the confidence questionnaire and the mathematical reasoning ability test. Below are the results of the linearity test:

Table 2. Confidence Questionnaire Linearity Test and Reasoning Ability Test

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
tes * Angket	Between Groups	(Combined)	7410.614	36	205.850	1.243	.194
		Linearity	878.608	1	878.608	5.306	.023
		Deviation from Linearity	6532.006	35	186.629	1.127	.313
	Within Groups		18544.379	112	165.575		
	Total		25954.993	148			

It can be stated from Table 2 that it is found between confidence and mathematical reasoning ability to be linear. This is because the degree of syignivisibility of the deviation from linearity is > 0.05 which is 0.313 > 0.05.

Next is regression testing. Regression tests are carried out to determine whether there is an influence of self-confidence on the child's mathematical reasoning ability. Regression itself has several aspect results, namely *the Model Summary*, ANOVA Table, and *coefficients table.* Here are the results of regression testing:

Table 3. Model Summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.184[a]	.034	.027	13.061

It can be seen from Table 3 that the correlation value between the two variables above is 0.184. Furthermore, the coefficient of determination is 0.34. It can be concluded that the influence of self-confidence on mathematical reasoning ability is as much as 3.4%. Then,

students' reasoning ability is also categorized as very weak with 3.4% influenced by self-confidence and 96% influenced by other factors.

Table 4. ANOVA Result

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	878.608	1	878.608	5.150	.025
	Residual	25076.386	147	170.588		
	Total	25954.993	148			

It can be seen from Table 4 that the calculated F value is 5.150 with a significance level of 0.025 < 0.05. Then it can be known that there is a positive influence of self-confidence on students' mathematical reasoning abilities.

Table 5. Coefficients Result

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	19.553	7.329		2.668	.008
	Angket Kepercayaan Diri	.269	.119	.184	2.269	.025

It can be seen from Table 5 that the constant value (a) is 19.553 and the confidence value (b) is 0.269. Thus, the regression equation is as follows:

$$Y = 19{,}553 + 0{,}269x$$

This shows that the constant value of students' mathematical reasoning is 19.553 and the regression coefficient is 0.269 which means 1% per accumulated confidence value, so the student's mathematical reasoning value also increases by 0.269. Furthermore, it can be concluded that self-confidence has a positively valuable influence on students' mathematical reasoning abilities. So it is true that the higher the level of self-confidence that students have, the higher the mathematical reasoning ability they have.

Next is the results of students' answers in the student reasoning ability test from examples of reasoning questions as in Figure 1 are associated with the confidence of the survey results with high, medium, and low categories.

2. Pak Jefri mengecat sebuah kamar di rumahnya yang memiliki ukuran panjang $5m^2$, lebar $4m^2$ dan tinggi $4m^2$. Untuk mengecat dinding, permeternya dikenakan biaya Rp 20.000 Jika untuk 1 kaleng cat hanya dapat mengecat $2m^2$, maka tentukan:
   a. Bagaimanakah cara menghitung luas permukaan dinding tanpa tutup yang akan dicat tersebut?
   b. Berapakah total biaya yang diperlukan untuk mengecat dinding tersebut?
   c. Jika pak Jefri memiliki persediaan 40 kaleng cat, apakah cukup untuk mengecat keseluruhan dinding tersebut? Jika tidak, berapa kaleng lagi yang harus pak Jefri sediakan? Buktikan dengan perhitungan yang logis.

Figure 1. ***Examples of Mathematical Reasoning Ability Test Questions***

Figure 2 is an answer from students with high self-confidence where the ability to understand problems and write down answer descriptions is quite complete and good. The student is able to compile an appropriate answer pattern by writing down what he knows in the question as well as the conclusions of the answers he is working on. However, the description of the answer related to the narrative of the answering process has not been maximized according to the question of section (a) which asks how the process is calculated. In fact, a person's reasoning ability can be seen from the way he performs mathematical manipulations, presenting answers both orally and in writing precisely (Firdausy & Indriati, 2021).

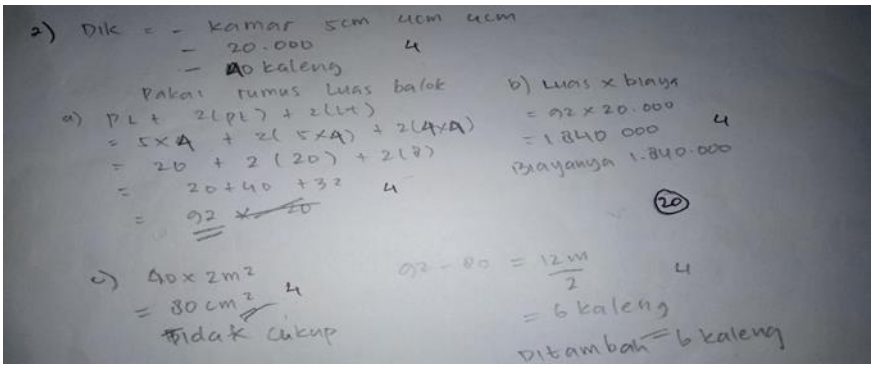

Figure 2. High Self-Confidence Student Answers

In general, students' answers in Figure 2 can still be said to meet the criteria for mathematical reasoning ability by looking at what aspects of understanding are asked in the problem. This study has not analyzed whether gender factors affect self-confidence and mathematical ability (Solomon, 2012).

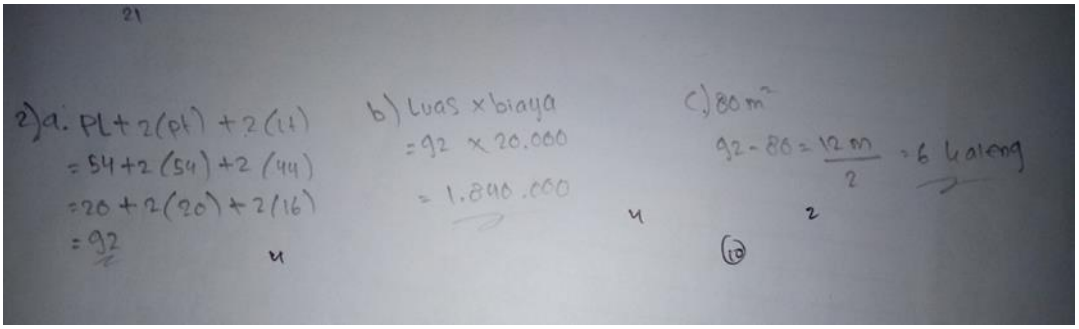

Figure 3. Answers of Students With Moderate Self-Confidence

The answer of a student with moderate confidence on Figure 3 indicates an incomplete answer in deciphering the answer. The student does not write down what he knows and does not write down the conclusions of what he answers. In addition, there are some symbols that are not written appropriately, such as $pl + 2(pt) + 2(lt) = 54 + 2(54) + (44)$. Unfortunately, we did not conduct observations and interviews of these students to confirm.

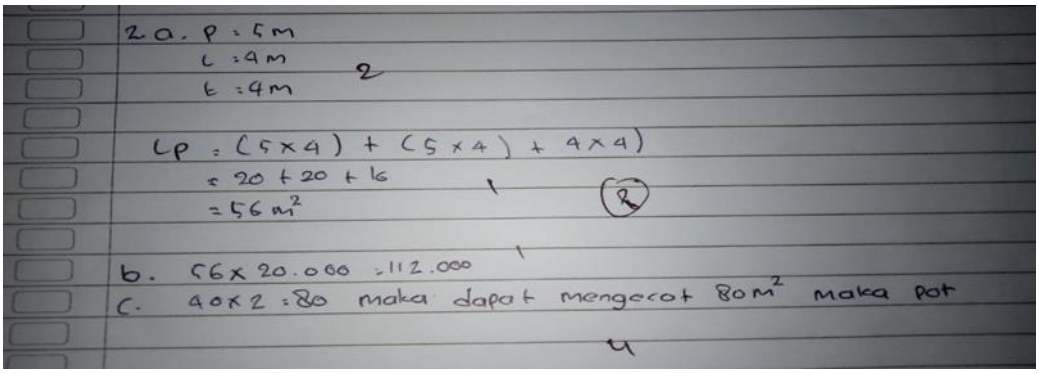

Figure 4. Low Confidence Student Answers

From figure 4, it can be seen that students who have low self-confidence have not been able to decipher and analyze the answers well. This happens because of low knowledge of mathematical concepts so that students are not right in answering questions. This is inversely proportional when viewed from the side of emotional intelligence which shows students with low emotional intelligence, then their reasoning ability is also low (Rohmah & Soebagyo, 2022). On the other hand, non-cognitive predictors of students' understanding of a topic have an influence on the answers given (Yang & Sianturi, 2021).

One of the indicators of reasoning ability is being able to check the truth of an argument where students are expected to be able to understand the question given and prove whether it is true or false. Students who have high self-confidence are likely to prove the answers they find whereas students with moderate and low self-confidence will directly answer their

grades without proving them first. The results of this study indicate that students with low self-confidence ability need to be further studied, why their reasoning ability is low (Pratiwi & Soebagyo, 2022). The results of previous research have answered several solutions to improve students' reasoning skills , including through *the educational game* Thinking Math (Diwimuri & Soebagyo, 2022), VBA in Excel (Bernard & Senjayawati, 2019), dan VBA in powerpoint (Bernard & Chotimah, 2018).

It can be inferred from all students' answers that the higher the student's self-confidence, the student's level of reasoning will also be in line with his self-confidence. In student success when studying mathematics, the confidence aspect is able to provide motivation because students will be encouraged to understand and find solutions to the problems they face (Setyaningrum et al., 2017).

CONCLUSION

Based on the research conducted, the conclusion was that self-confidence has a positive effect on students' mathematical reasoning ability. Self-confidence affects 3.4% and 96% is influenced by other factors. Although self-confidence affects reasoning ability quite a little, it does not mean that this aspect is simply ignored, this aspect is very meaningful in the process of learning mathematics because it makes students more confident in the solutions they have answered and found.

The advice given by researchers is that teachers like educators in the classroom are able to understand the level of students' ability to do math problems, such as the time to do and the type of questions given. Furthermore, other researchers are expected to examine more broadly this aspect of self-confidence. This aspect can affect the ability or other subjects, so it is advisable to continue taking this study.

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