RELATIONSHIP OF METACOGNITIVE AWARENESS AND SELF EFFICACY TO MATHEMATICS LEARNING OUTCOMES

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Abstract

This research aimed to examine the correlation between metacognitive awareness and self efficacy to the Mathematics learning outcomes of 4th grade students in elementary school Cluster Cakra Semarang. This research used a quantitative study with the type of correlation research. The population of this study amounted to 288 students. Sampling with cluster sampling obtained 167 students. The data collection technique used questionnaire. The data analysis techniques used descriptive statistics and correlation analysis. The results showed positive and significant relationship between metacognitive awareness and self efficacy towards Mathematics learning outcomes. The percentage of correlation was 73.96%. The r coefesient value showed 0.860 and the significance value showed 0.05. In conclusion, there was a positive and significant correlation between metacognitive awareness and self efficacy to the learning outcomes Mathematics learning outcomes of 4th grade students in elementary school Cluster Cakra Semarang.

Keywords: Jr.MAI; self efficacy; Mathematics

1. PRELIMINARY

The decline in mathematics learning outcomes in Indonesia can be seen from the results of the TIMSS (Trends in Mathematic and Science Study). In 2015, Indonesia was ranked 45th out of 50 countries (Depdiknas, 2015). Sourced from the results of the PISA (Program for International Student Assessment) in 2018. Indonesia in mathematics is ranked 73 out of 79 countries(Schleicher, 2019, p. 7).

The problems that occur in SDN Gugus Cakra Semarang City show that the cognitive learning outcomes of students have not reached the KKM as much as 51.4%. The results of teacher and student interviews in the student learning process lacked use of metacognitive awareness and lack of student self-confidence with the abilities that students had (self-efficacy) in completing assignments which could be seen from the difficulty of students working on math problems and students were not active in the classroom . This problem can be overcome by exploring and looking at aspects that can have an influence on student learning outcomes.

There are three aspects that affect the acquisition of student learning outcomes, namely internal aspects, external aspects and fatigue aspects. Internal aspects consist of physical aspects and psychological aspects. The external aspect relates to the aspects contained in the student environment, namely family, school, and community. The fatigue aspect also consists of physical and spiritual fatigue (Slameto, 2013, p. 54). Derived from the various types of internal aspects that have been described, there is an important aspect, namely metacognitive awareness. Metacognitive awareness has the main capacity in learning activities and learning outcomes. Metacognitive awareness is defined as cognition which knows the whole psychological process such as knowledge and awareness processes that lead to the process of cognition or knowledge thinking and how it works.(Schraw & Dennison, 1994, p. 460).

*Self efficacy*is an internal aspect that is able to contribute to student learning outcomes. According to Bandura, self efficacy is the acquisition of cognitive thinking results, namely decisions, thinking patterns, and beliefs and abilities that exist within oneself, so as to be able to process existing learning problems with strategies and actions that are ultimately measured to see student learning achievement.(Bandura, 1997, p. 80). This means that one of the internal aspects of learning outcomes is metacognitive awareness and self-efficacy, which can have an influence on learning mathematics. However, in reality there are many students who are not satisfactory in their learning achievement. This is because teachers are constrained in applying mathematics in their daily lives, causing students' final learning mathematics to be unstable and even decrease.

Research that supports solving this problem, one of which is research conducted by Eni Yunanti (2016, p. 86). Resulting in a positive effect of students' metacognitive awareness on student learning outcomes. Further research conducted by Suprat Dwi Cahyono and Mega Teguh Cahyono in (2016, p. 562). Resulting in a positive relationship of self-efficacy on mathematics learning outcomes.

Then research conducted by Lamita Sihaloho and et al. (2018, p. 128). The results of this study are metacognitive awareness has a strong influence on learning outcomes and self-efficacy.

The various results of previous studies illustrate that it is so important to study metacognitive awareness and self-efficacy. So that this research aims to test metacognitive awareness and self-efficacy together on the learning outcomes of fourth grade mathematics.

2. RESEARCH METHODS

This research method is a quantitative study with a correlation research design. The population in this study were fourth grade students of SDN Gugus Cakra Kota Semarang, consisting of 7 public elementary schools. Then five elementary schools were selected randomly, namely SD Negeri Tambakaji 03, SD Negeri Tambakaji 02, SD Negeri Tambakaji 01, SD Negeri Wonosari 02, and SD Negeri Wonosari 03 with 288 students in the 2019/2020 school year. Sampling in this study using techniques*probability sampling* namely cluster random sampling. The variables of this study consisted of: (1) independent variables, namely metacognitive awareness and self-efficacy; (2) the dependent variable is mathematics learning outcomes.

Data collection techniques using questionnaires, documentation, and interviews. Before the instrument was used, the study tested the validity and reliability of the instrument at SDN Sampangan 02 with 38 student respondents. After testing the instrument results with the formula*Pearson Product Moment*, rhitung> rtabel = 0.32 at the 5% significance level obtained 18 valid metacognitive awareness statements and 26 self-efficacy statements. The reliability test in this researcher used the Cronbach Alpha formula which resulted in r11 metacognitive awareness 0.813 and r11 self-efficacy 0.841, while r table = 0.325. So it can be concluded that r11> r table means that the two instruments of the research agket statement are reliable.

The research data obtained were transformed with MSI before conducting prerequisite tests such as tests for normality, linearity, multicollinearity, heterocesdasticity, and autocorrelation. After fulfilling the prerequisite test, the data were analyzed using descriptive statistics, and analyzed hypotheses such as simple correlation, multiple correlation, F test, simple linear regression, and multiple regression.

3. RESULTS AND DISCUSSION

The results of the research on the relationship between metacognitive awareness and self-efficacy on the mathematics learning outcomes of fourth grade students of SD Negeri Gugus Cakra Semarang City include the following:

Descriptive Analysis Results

Descriptive Analysis of Metacognitive Awareness (X1)

Descriptive data analysis *metacognitive awareness*obtained from student respondents on a questionnaire with 18 statements and. The results of the descriptive analysis of students' metacognitive awareness are as follows.

Table 1 Metacognitive Awareness Data

No.	Score Interval	Category	Frequency	Percentage	Average
1	66 - 81	Very good	14	8%	57.18
2	50 - 65	Good	140	84%	
3	34 - 49	Moderate	13	8%	
4	18 - 33	Less	0	0%	
total			167	100%	Good

Sourced from table 1 shows the metacognitive awareness of grade IV students from 167 students, obtaining very good categories of 14 students, good categories of 140 students, moderate categories of 13 students and there are no students with poor categories. The average value of the metacognitive awareness questionnaire was 57.18, meaning that metacognitive awareness was in the good category.

Descriptive Analysis of Self Efficacy (X2)

Self-efficacy descriptive analysis data obtained from student respondents on the questionnaire, with 26 statements and four Likert scale answer choices. Produce a descriptive analysis of the student self-efficacy questionnaire as follows.

Table 2 Self Efficacy Data

No.	Score Interval	Category	Frequency	Percentage	Average
1	95 - 117	Very good	28	17%	83.51
2	72 - 94	Good	121	72%	
3	49 - 71	Moderate	18	11%	
4	26 - 48	Less	0	0%	
total			167	100%	Good

Sourced from table 2 shows that the self-efficacy of grade IV students out of 167 students, obtained a very good category of 28 students, a good category of 121 students, a moderate category of 18 students and there were no students with a poor category. The average value of the self-efficacy questionnaire is 83.51, which means that the questionnaire data

for the self-efficacy variable has a good category level.

Descriptive Analysis of Mathematics Learning Outcomes

Student learning outcomes in the cognitive domain of Mathematics. Data obtained from the PAS value documentation. The result values are grouped according to Permendikbud Number 53 of 2015. Referring to the results of the data analysis, the following results are obtained.

Table 3 Mathematics Learning Outcomes

Category	Score	Frequency	Percentage (%)	Average
Very good	86 - 100	48	29%	
Good	71 - 85	111	66%	81
Enough	56 - 70	8	5%	
Less	≤ 55	0	0%	
Total		167	100%	Good

Based on table 3, it shows that the average score of mathematics learning outcomes of fourth grade students of SD Negeri Gugus Cakra Semarang City obtained very good categories of 48 students, good categories of 111 students, sufficient categories of 8 students and no students with poor categories. The average score of Mathematics learning outcomes is 81, meaning that the students' Mathematics learning outcomes are categorized as good.

Data Analysis Prerequisite Test

Normality test

The research variable normality test used the chi squared test at the 0.05 significance level. The metacognitive awareness normality test results show valueχ^2_{count} = 5.08, for self efficacy χ^2_{count} = 10.88, and Mathematics learning outcomes χ^2_{count} = 10.97 whereas χ^2_{table} = 14,067 so that χ^2count < χ^2_{table}which means Ho is accepted. Then it can be concluded that metacognitive variables awareness, self efficacy, and learning outcomes are normally distributed.

Data Linearity Test

Linearity test at a significance level of 0.05, the metacognitive awareness variable of learning outcomes shows the value of Fcount = 1.069 and the value of Ftable = 1.59 so that Fcount <Ftable which means that Ho is accepted. So it can be interpreted that there is a linear relationship between metacognitive awareness of learning outcomes. Meanwhile, the self-efficacy variable for learning outcomes shows the value of Fcount = 1.276 and the value of Ftable = 1.49 so that Fcount <Ftable which means that Ho is accepted. So it can be interpreted that there is a linear relationship between self efficacy and learning outcomes.

Multicollinearity Test

Multicollinearity test uses the product moment test by calculating the correlation between variables at the 0.05 significance level. These results indicate the value of rcount = 0.538, which means 0.538 <0.600 so that Ho is rejected. So it can be concluded that the research data did not occur multicollinearity.

Autocorrelation Test

The autocorrelation test used the Durbin Watson (DW) test with a significance level of 0.05. These results indicate the value of DW = 1.949 and the value of dU = 1.774 so that 4 - Du = 2.226. So that the result Du <DW <4-dU means that Ho is accepted. So it can be concluded that the data does not have autocorrelation problems.

Heteroscedasticity Test

The heteroscedasticity test used the Spearman's rho test with a significance level of 0.05. This result shows the value of r11 = 0.522. Because n> 30, you have to calculate the value of Zhitung = 6.726 and the value of Ztabel = 1.96, which means that Zhitung> Ztabel so that Ho is rejected. So it can be concluded that the data does not have a heteroscedasticity problem.

Hypothesis testing

Simple Correlation Test

Simple correlation test uses Product moment correlation analysis with a significance level of 5%,. The results of this test analyze between the independent and dependent variables as follows.

Table. 4 Simple Correlation Results

Variable	rhitung	r table	Correlation	Power Category
X1 and Y	0.600	0.159	Positive	Strong
X2 and Y	0.617	0.159	Positive	Strong

Sourced from table 4, the variables X1 and Y show the value of r count 0.600 and the value of r table = 0.159 so that r count> r table, meaning that Ho is rejected. So it can be concluded that there is a relationship between metacognitive awareness and mathematics learning outcomes. While the variables X2 and Y show the value of rcount = 0.617 and the value of rtable = 0.159 means that Ho is rejected. So it can be concluded that there is a relationship between self-efficacy and mathematics learning outcomes.

Result Research that is relevant to metacognitive awareness variables and learning outcomes is research conducted by Riska Lidia, et al, (2018, p. 110). The results of the study show that there is a strong relationship between metacognitive awareness and learning outcomes. Then research conducted by Siti Aisyah and Syaiful Ridho (2015, p. 26). This study shows a strong positive relationship between metacognitive awareness and student cognitive learning outcomes.

Meanwhile, the research results that support the variables of self-efficacy and learning outcomes are research conducted by Dewi Sri Wahyuni, (2016, p. 28). Shows that*self efficacy*positive effect on student mathematics learning outcomes. Then research conducted by Aprilian Wahyuni, et al (2018, p. 101). Stating that self-efficacy has a positive effect on Accounting subjects so that it can improve student learning outcomes.

Multiple Correlation Test

Tests conducted to see the relationship between two independent variables simultaneously to one dependent variable. The results of the calculation of multiple correlation analysis can be seen in table 5 as follows.

Table. 5 Multiple Correlation Results

Variable	Rhitung	Rtabel	Correlation	Power Category
X1, X2 and Y	0.860	0.159	Positive	Very strong

Sourced from table 5, with a significance level of 5%, it shows the value of Rhitung = 0.860 and the value of Rtabel = 0.159. So that Rhitung> Rtabel means that Ho is rejected. So it can be concluded that there is a relationship between metacognitive awareness and self-efficacy together on mathematics learning outcomes.

Supporting research is research conducted by Dewi Sri Wahyuni (2016, p. 28). Resulting in that self-efficacy has a positive effect on student mathematics learning outcomes.

Agree with previous research, the results of research conducted by Aprilian Wahyuni and Sukirman (2018, p. 101). Stating that self-efficacy has a positive effect on Accounting subjects so that it can increase learning outcomes in students.

Significance Test or F Test

The test is used to determine the significant effect between variables *independent* and the dependent variable. The results of the calculation of the significance test can be seen in table 6 as follows.

Table. 6 Results of the Calculation of Significance Test

Variable	Fcount	Ftable
X1 and Y	92,739	3.06
X2 and Y	101,723	3.06
X1, X2 and Y	232.9	3.91

Sourced from table 6, the variables X1 and Y show the value of Fcount = 92.739 and the value of Ftable = 3.06. So that Fcount> Ftable means that Ho is rejected. So it can be concluded that there is a significant relationship between metacogniive awareness of mathematics learning outcomes. While the variables X2 and Y show the value of Fcount = 101.739 and the value of Ftable = 3.06. So that Fcount> Ftable means that Ho is rejected. So it can be concluded that there is a significant relationship between self-efficacy on mathematics learning outcomes. While the variables X1, X2 and Y show the value of Fcount = 232.739 and the value of Ftable = 3.91. So that Fcount> Ftable means that Ho is rejected. So it can be concluded that there is a significant relationship between metacogniive awareness and self-efficacy together on mathematics learning outcomes.

Simple Linear Regression Test

Measurement of influence involving one of the variables *independent* and the dependent variable. The results of the calculation of simple linear regression analysis can be seen in table 8 as follows.

Table. 7 Results of the Calculation of Simple Linear Regression Test

Variable	r	R	a	b
X1 and Y	0.600	0.36	44,0055	0.65507
X2 and Y	0.617	0.381	51,562	0.35801

Sourced from table 7 on variables X1 and Y shows the coefficient of determination of 0.36. This means that metacognitive awareness has a positive impact of 36%on the learning outcomes of Mathematics.While the simple linear regression equation metacognitive awareness of mathematics learning outcomes has the equation Y '= 44.005 + 0.655 X1. Meanwhile, variables X2 and Y show the coefficient of determination of 0.381. This means that self-efficacy has a positive impact of 38.1%. This means that self-efficacy contributes 38.1% to mathematics learning outcomes. Meanwhile, the simple linear regression equation metacognitive awareness of mathematics learning outcomes has the equation Y '= 51.562 + 0.358X2.

Metacognitive awareness has the main capacity in learning activities and learning

outcomes. Especially learning mathematics, because there is a relationship between the use of student learning strategies with students 'thinking patterns and habits or students' abilities in the learning process(Anantyarta & Sari, 2017, p. 5).

Confidence in students, every individual has from an early age. A person's belief about their abilities or skills which is then applied when doing academic assignments or solving problems is*self efficacy* (Somawati, 2018, p. 40).

Multiple Regression Test

Multiple regression analysis is used by researchers to predict the rise and fall of the value of the dependent variable, if two independent variables are manipulated by increasing and decreasing the value. Furthermore, in table 8, the results of the calculation of multiple linear regression analysis are described as follows.

Table. 8 Multiple Regression Test Results

Variable	r	R	a	b1	b2
X1, X2 and Y	0.860	0.739	36,438	0.483	0.208

Referring to table 8, the value of R = 0.739 or 73.9%. Interpreting 73.9% metacognitive awareness and self-efficacy simultaneously contribute to mathematics learning outcomes. Meanwhile, the multiple regression equation metacognitive awareness and self-efficacy on Mathematics learning outcomes has the same Y '= 36.438 + 0.483X1 + 0.208X2. The relevant research is the research conducted by Juhrani (2017, p. 256). Show that metacogntive awareness can contribute positively to student learning outcomes. Metacognitive awareness in the learning process of mathematics must also be supported by a sense of belief in students, namely self-efficacy.

4. CONCLUSION

Sourced from data processing and discussion of the research carried out, the following conclusions can be drawn; (1) There is a positive and significant relationship between*metacognitive awareness* and student mathematics learning outcomes with a correlation coefficient of 0.600> 0.159; (2) There is a positive and significant relationship between self-efficacy and student mathematics learning outcomes with a correlation coefficient of 0.618> 0.159; (3) There is a positive and significant relationship between metacognitive awareness and self-efficacy together on student mathematics learning outcomes with a correlation coefficient of 0.860> 0.159. There is a joint contribution of 73.9% metacognitive awareness and self-efficacy to student mathematics learning outcomes.

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