



CONTRIBUTION OF CREATIVITY TO MATHEMATICAL PROBLEM SOLVING SKILLS OF 5th GRADE STUDENTS ELEMENTARY SCHOOL OF IV NAGARI DISTRICT SIJUNJUNG REGENCY

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Abstrak

Penelitian ini bertujuan untuk mendeskripsikan kreativitas dan keterampilan pemecahan masalah matematika serta kontribusi kreativitas terhadap keterampilan pemecahan masalah matematika siswa kelas V SD Negeri Kecamatan IV Nagari Kabupaten Sijunjung. Jenis penelitian ini adalah penelitian korelasional. Populasi dalam penelitian ini adalah siswa kelas V se Kecamatan IV Nagari, Kabupaten Sijunjung. Teknik sampling yang digunakan adalah random sampling. Instrumen untuk mengumpulkan data adalah tes kreativitas dan keterampilan pemecahan masalah matematika. Teknik analisis yang digunakan adalah deskriptif dan korelasional. Hasil penelitian menunjukkan: 1) siswa kelas V SD Negeri Kecamatan IV Nagari memiliki kreativitas tinggi sebanyak 18 siswa atau 19,78%, kreativitas cukup tinggi sebanyak 31 siswa atau 34,07%, kreativitas kurang tinggi sebanyak 35 siswa atau 38,46% dan kreativitas rendah sebanyak 7 siswa atau 7,69%. 2) keterampilan pemecahan masalah matematika tinggi sebanyak 46 siswa atau 50,55%, keterampilan pemecahan masalah matematika cukup tinggi sebanyak 13 siswa atau 14,23%, keterampilan pemecahan masalah matematika kurang tinggi sebanyak 21 siswa atau 23,07% dan keterampilan pemecahan masalah matematika rendah sebanyak 11 siswa atau 12,08%. 3) terdapat kontribusi yang positif dan signifikan antara kreativitas terhadap keterampilan pemecahan masalah matematika dengan koefisien korelasi 0,426.

Kata Kunci: keterampilan pemecahan masalah; kreativitas.

Abstract

This study aims to describes the creativity and mathematical problem solving skills also the contribution of creativity to mathematical problem solving skills of 5th grade students public elementary school of IV Nagari District, Sijunjung Regency. Type of this study is correlational research. The population is 5th grade students all of IV Nagari District, Sijunjung Regency. The sampling technique uses is random sampling. The instrument for collects a data is a test of creativity and mathematical problem solving skills. The analysis technique uses is descriptive and correlational. The result shows: 1) 5th grade students public elementary school of IV Nagari District have high creativity as much as 18 students or 19.78%, high enough creativity as much as 31 students or 34.07%, high less creativity as much as 35 students or 38.46% and low creativity as much as 7 students or 7.69%. 2). High mathematical problem solving skills as much as 46 students or 50.55%, high enough mathematical problem solving skills as much as 13 students or 14.23%, high less mathematical problem solving skills as much as 21 students or 23.07% and low

mathematical problem solving skills as much as 11 students or 12.08%. 3)
There is a positive and significant contribution between creativity and mathematical problem solving skills with a correlation coefficient 0.426.

Keywords: creativity; problem solving skills.

Citation: Hendriani, M., Rijal, A. 2020. Contribution of Creativity to Mathematical Problem Solving Skills of 5th Grade Students Elementary School of IV Nagari District Sijunjung Regency. *Matematika dan Pembelajaran*, 8(1), 61-73. DOI: <http://dx.doi.org/10.33477/mp.v8i1.1283>

INTRODUCTION

One of skills needs in digital technology now and the future is problem solving skills. Ulvah (2016) suggests that problem solving abilities helps students think analytically in making decisions for daily life and increase critical thinking skills in dealing a new situations. With this skills someone is able to sees the problem from various perspective, expands alternative solutions, and chooses the best solution. This makes problem solving skills is investment in the future world challenges.

One of purposes of mathematic education is to supply students with problem solving abilities. In fact, 5th grade public elementary school of IV Nagari District Sijunjung Regency consist of 7 school, students skills in solving mathematical problem are low, this is based on the result of odd semester mathematic exam containt 40 question. 10 items are problem solving question, from 10 questions only 43% students can solves it. The result of the interview with the 5th grade teachers public elementary school of IV Nagari District Sijunjung Regency, when solves mathematic problem solving students there are still many asks about what is the mean by question, what was known by question, and what steps must do to solve the question. The teachers also says, students in solve mathematical problem are able to do like axemplified before, the students hard to solve it if the problem is a few different from example earlier.

According to Mursidik et al (2015) says, for solve the problem, someone needs creativity for produce new and useful ideas that combine from substance which has been there before. Sari (2016) also says, if we are more creative then we

are in a better position for solve various problem. Based on opinion can conclude, the factor may influence problem solving skills is creativity.

Siswono (Eftafiyana dkk, 2018) states that "the ability to think to find many possible answers to a problem, where the emphasis on the quantity, accuracy and diversity of answers is called creativity (creative thinking or divergent)". According to Munandar (Hendriana dkk, 2017), four criteria of creative thinking that is; fluency, flexibility, originality, and elaboration. Fluency covers: produce many ideas/answers that are relevant, flexibility covers; produce diverse idea, able to change the way or approach, different directions of thinking, originality includes: give an unusual answer, other than others, which is rarely given by many people, elaboration covers; expanding, adding to, enrich an idea, detailing details, and expand an idea.

Based on problem and description above, the researcher is interest to do the study to find out the creativity and mathematical problem solving skills also contribution of creativity to mathematical problem solving skills of 5th grade students public elementary school of IV Nagari District Sijunjung Regency.

METHOD

This study is quantitative research with correlational research type. The population were 5th grade students public elementary school of IV Nagari District Sijunjung Regency with 146 students which is spread 7 schools. The sample amount 91 students which is spread over 6 schools, was taken used simple random sampling technique.

The data collects use instrument of test mathematical problem solving skills and verbal creativity test. Mathematical problem solving skills test indicators can be seen in table 1.

Table 1 . Indicators of Mathematical Problem Solving tests

No	Indicator
1	Identifying the substance that are known, asked, and the adequacy of the substance needed
2	Choose the right strategy for solve problem
3	Solve the question / problem that appear

The assessment in this instrument is done by scoring use rubric. Rubric of assasment mathematical problem solving skills test can be seen in table 2.

Table 2 . Rubric of Assasment Mathematical Problem Solving Skills Test

Score	Identify the substance that are known, asked and adequacy of substance nedded	Choose the right strategy for solve the problems	Solve the question that appear
0	No answer	No answer	No answer
1	There are few answers, but it is not right to identify the substance that are known, asked, and adequacy of the substance needed	There are few answers, but it is not right to choose right strategy for solve the problem	There are few answers, but there is not right to solve the question that appear
2	There is an answer, but there is a few error in identifying substance that are known, asked, and adequacy of the substance needed	There are answers, but there is a few error to choose the right strategy for solve the problem	There is an answer, but there is a few error to solve the question that appear.
3	The correct and right answer in identifying the substance that are known, asked, and adequacy of the substance needed.	The correct and right answer to choose the strategy for solve problem	The correct and right answer to solve question that appear
	Max Score 3	Max Score 3	Max Score 3

Source: Adapted from Fauzan (2012)

For measures the creativity of students use a Verbal Creativity Test (TKV). TKV construction based on Guilford's intellectual structure. Verbal Creativity Test consist of indicators: fluency, flexibility, originality, and elaboration. Indicators of creativity tests can be seen in Table 3.

Table 3. Verbal Creativity Test Indicators

No	Indicator	Sub Indicator
1	Flexibility	Ability to finds an ideas
2	Fluency	1. Ability to produces ideas to solves problem from a different perspective. 2. Ability to changes mind to be more advance.
3	Originality	1. The ability to finds new and unique ideas. 2. The ability to create new ideas and combination of ideas and thoughts.
4	Elaboration	1. The ability to expands an ideas. 2. The ability to details of an idea.

Data were analyzed used the Pearson Product Moment Correlation formula with the SPSS 16.0 program for windows.

RESULTS AND DISCUSSION

Creativity

Based on result, data was obtained about creativity of 5th grade students public elementary school of IV Nagari District Sijunjung Regency with a maximum score 73 and minimum score 15, average 38.78, deviation standard 12.25 and median 37. Presentation of frequency distribution use the Sturges rule. Data from 91 respondents shows intervals class to be 8 (eight); and the width of the interval class 8. The presentation of the frequency distribution and the distribution of variable tendencies can be seen in Table 4 and Table 5.

Table 4 . Frequency Distribution of Creativity Variable Score

No	Interval	Frequency	
		Absolute	Relative%
1	14.5 - 22.5	6	6.59
2	22.5-30.5	19	20.88
3	30.5-38.5	23	20.27
4	38.5-46.5	22	24.18
5	46.5-54.5	9	9.89
6	54.5 to 62.5	10	10.99
7	62.5-70.5	1	1.10
8	70.5-78.5	1	1.10
Total		91	100

Table 5 . Trend Distribution of Creativity Variable

No	Score	Frequency		Category
		Absolute	Relative%	
1	$X \geq 48.7$	18	19.78	High
2	$48.7 > X \geq 36.5$	31	34.07	Enough
3	$36.5 > X \geq 24.3$	35	38.46	Less
4	$X < 24.3$	7	7.69	Low
Total		91	100	

From Table 5 it can be concluded that the 5th grade students public elementary school of IV Nagari District Sijunjung Regency have high creativity as much as 18 students or 19.78%, high enough creativity as much as 31 students or 34.07%, high less creativity as much as 35 students or 38.46 % and low creativity as much as 7 students or 7.69%. Thus it can be concluded that the 5th grade students public elementary school of IV Nagari District Sijunjung Regency have high less creativity.

Mathematical Problem Solving Skills (MPSS)

Based on result, data was obtained about mathematical problem solving skills of 5th grade students public elementary school of IV Nagari District Sijunjung Regency with maximum score 63 and minimum score 8. Average 39.70, deviation standard 15.225 and median 42. Exposure of frequency distribution use Sturges rules. Data from 91 respondents shows that interval class to be 7 (seven); and the width of the interval class 7. The presentation of the frequency distribution and the distribution of variable tendencies can be seen in Table 6 and Table 7 .

Table 6 . Frequency Distribution of MPSS Variable Score

No	Interval	Frequency	
		Absolute	Relative %
1	7.5-14.5	5	5.5
2	14.5-21.5	7	7.7
3	21.5-28.5	14	14.0
4	28.5-35.5	11	12.1
5	35.5-42.5	10	11.0
6	42.5-56.5	28	30.8
7	56.5 to 63.5	16	17.6
Total		91	100

Table 7 . Trend Distribution of MPSS Variable

No	Score	Frequency		Category
		Absolute	Relative%	
1	$X \geq 42$	46	50.55	High
2	$42 > X \geq 31.5$	13	14.23	Enough
3	$31.5 > X \geq 21$	21	23.07	Less
4	$X < 21$	11	12.08	Low
Total		91	100	

From table 7 can be concluded that the 5th grade students public elementary school of IV Nagari District Sijunjung Regency have high mathematical problem solving skills as much as 46 students or 50.55%, high enough mathematical problem solving skills as much as 13 students or 14.23%, high less mathematical problem solving skills as much as 21 students or 23.07% and low mathematical problem solving skills as much as 11 students or 12.08%. It can be concluded that the 5th grade students public elementary school of IV Nagari District Sijunjung Regency have high mathematical problem solving skills.

Contribution between creativity (X) and MPSS (Y)

The hypothesis is: there is a positive contribution between creativity (X) with mathematical problem solving skills (Y).

a) Regression equation

Table 8. Regression equation calculation (X) to (Y)

Model	Unstandardized coefficients		Standardize coefficients	t	Sig.	Collinearity statistics	
	B	Std. Error	Beta			Tolerance	VIF
1 (constant) CREATIVITY	19.078	4.840		3.942	.000		
	.532	.119	.428	4.467	.000	1.000	1.000

Based on Table 8 regression equation is $Y = 19.078 + 0,532X$ or mathematical problem solving skills = $19.078 + 0.532$ creativity.

b) Linearity test

Hypothesis:

H_0 = simple regression equation ($\hat{Y} = 19.078 + 0.532X$) linear

H_1 = simple regression equation ($\hat{Y} = 19.078 + 0.532X$) not linear

If the sig > 0.05 then H_0 is rejected and if the sig ≤ 0.05 then H_0 accepted.

Based on Table 9 earned value of sig 0,000 < 0.05. Then it can be concluded that H_0 is accepted or a simple regression equation ($\hat{Y} = 19.078 + 0.532X$) is linear.

Table 9 . Calculation of Linearity Test (X) to (Y)

			Sum of Squares	df	Mean Square	F	Sig
MPSS	Between	(combined)	10955.722	36	304.326	1.659	.045
Creatvity	Group	Linearity	3820.372	1	3820.372	20.823	.000
		Deviation from linearity	7135.350	35	203.867	1.111	.358
	Within	Group	9907.267	54	183.468		
	Total		20862.989	90			

c) Simple regression significance test

Hypothesis:

H_0 : simple regression equation ($\hat{Y} = 19.078 + 0.532X$) significant

H_1 : simple regression equation ($\hat{Y} = 19.078 + 0.532X$) not significant

If $F_{value} < F_{table}$ then H_0 rejected and if $F_{value} \geq F_{table}$ then H_0 accepted. Based on Table 10 earned $F_{value(19.951)} \geq F_{table(3.96)}$, it can be concluded H_0 is accepted or simple regression equation ($y = 19.078 + 0,532X$) is significant. The F_{table} data was obtained from df (1.89).

Table 10 . Calculation of Simple Regression Significance Test (X) to (Y)

Model	Sum of Squares	df	Mean Square	F	Sig
1 Regression	3820.372	1	3820.372	19.951	.000 ^a
Residual	17042.617	89	191.490		
Total	20862.989	90			

d) Determinant Coefficient

Based on Table 11, it was obtained that r^2 YI was 0.183. This value means that 18.3% of changes in the mathematical problem solving skills variable is influenced by creativity. While the rest is explained by other variables.

Table 11 . Calculation of Determinant Coefficient (X) to (Y)

Model	R	R Square	Adjusted R Square	Std. error of the Estimate
1	.428 ^a	.183	.174	13.838

e) Correlation Coefficient

Table 12 . Calculation of Correlation Coefficient and Correlation Significance Test (X) to (Y)

		Creativity	MPSS
Creativity	Pearson	1	.42
	Correlation		
	Sig. (2-tailed)		.0
	N	91	
MPSS	Pearson	.428	
	Correlation		
	Sig . (2-tailed)	.000	
	N	91	

Based on Table 12 find that the contribution of creativity to mathematical problem solving skills is 0.428, this means that contribution of creativity to mathematical problem solving skills is quite strong and unidirectional. Positive value (+) means when creativity is higher, then students mathematical problem solving skills will be higher.

f) Significance Test of Correlation Coefficient

Hypothesis:

H_0 : significant correlation coefficient

H_1 = correlation coefficient is not significant

If the significance value > 0.05 H_0 is rejected and if the significance value < 0.05 H_0 accepted. Based on Table 12, significant value was obtained of 0,000 < 0.05 , it can be concluded that H_0 accepted or significant correlation coefficient.

Based on the results in 5th grade students public elementary school of IV Nagari District Sijunjung Regency it was found that the correlation coefficient of creativity with mathematical problem solving skills was quite strong. Furthermore, creativity contributes significantly to mathematical problem solving skills. This shows that students mathematical problem solving skills are influenced by their creativity. Therefore, creativity must get more attention from students and teachers of 5th grade public elementary school of IV Nagari District Sijunjung Regency.

The contribution of creativity to mathematical problem solving skills have a simple regression equation $\hat{Y} = 19.078 + 0.532X$, this shows that when creativity has not an effect to mathematical problem solving skills, the value of mathematical problem solving skills was 19,078 when creativity gives one value, then the value of mathematical problem solving skills will change by $19,078 + 0.532 (1)$ therefore, higher the creativity students have, then higher their mathematical problem solving skills.

The results of this study are in line with De Porter and Hernacki (2015) says that problem solving is a combination of creative and logical thinking. This means to be able to solve a problem requires creativity. Beside that, according to Febriani and Novisita (2018), creative thinking is a process to solve problem. It is accordance with the results of Wafik Khoiri, Rochmad, and Adi Nur Cahyona (2012) study who found that there is positive correlation between creative thinking skill to problem solving abilities. Wijaya (2012) also says, problem solving refers to modeling that requires a productive thought about the problem situation so that it requires creative thinking and complex ways of solving. Furthermore, Shallcross (Munandar, 2009), also says at the conception stage (devising strategies), students apply divergent (creative) thinking that produce ideas for problem solving, because it can give variety of solution. Based on the expert opinion, it can be concluded that the creativity of students must be improved so that mathematical problem solving skills increase.

As a statement that have been describes in the background of study that creativity has a contribution to mathematical problem solving skills, then the statement has been proven by the results of study. The results shows that creativity contributes positively and significantly to mathematical problem solving skills. This is shows through the results of a simple regression analysis, the calculated F_{value} was obtained 19.955. F_{value} is far greater than $F_{\text{table}} F_{(0.05; 89)} = 3.96$. While the coefficient of determination of 0.183 shows 18.3% of mathematical problem solving skills can be explaine through creativity. Creativity is one of the many factors that contribute to the mathematical problem solving skills of 5th grade

students public elementary school of IV Nagari District Sijunjung Regency. Higher creativity of students, then higher their mathematical problem solving skills.

CONCLUSION

There is a positive and significant contribution between creativity and mathematical problem solving skills of 5th grade students public elementary school of IV Nagari District Sijunjung Regency. Based on the results suggest to teachers to train students creativity by hold regular academic and non-academic activities. Other researchers are expected to be encouraged to carry out further similar study by examining other variables and contribution to mathematical problem solving skills.

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