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THE EFFECT OF SELF EFFICACY ON SCIENTIFIC LITERACY: A CORRELATION STUDY IN ELEMENTARY SCHOOL STUDENTS

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Abstract

Future generations need scientific literacy to face challenges. One of the factors that influence students' scientific literacy is self-efficacy. The purpose of this study was to analyze how much influence self-efficacy and scientific literacy had. This research is a quantitative correlational study. The population of this research is the population of all fifth-grade students of SDN Kepuh Sedan Sidoarjo. A sample of VA class students was determined through the proportional cluster random sampling technique. The research instrument was a scientific literacy test and a self-efficacy questionnaire developed in a standardized manner. Analysis with simple linear regression test. The study results indicate that: (1) there is a positive influence between self-efficacy on the scientific literacy of elementary school students; (2) The effect of self-efficacy on elementary school students' scientific literacy is 26.2%. This means that 26.2% of the contribution in elementary school students' scientific literacy is influenced by self-efficacy.

Keywords: scientific literacy, self-efficacy.

INTRODUCTION

Scientific literacy is the ability to understand, communicate, and apply scientific skills to solve problems. Based on the results of the three surveys, the scores of Indonesian students on scientific literacy skills are still far below the international standard scores set by the OECD institution. The low science learning outcomes are suspected to be related to the science learning process that has not provided opportunities for students to develop critical reasoning skills (Mubarokah, 2019).

The results of research on scientific literacy have been widely carried out. The profile of the scientific literacy ability of high school students using the SLA instrument from the cognitive domain on average is shallow (Diana et al., 2015). Case studies conducted Safrizal, et al. (2020) State that the scientific literacy ability of elementary school students in Padang in terms of content is included in the reasonably low category. Preliminary research conducted by researchers on 30 PGSD students at Unipa Surabaya showed that students' scientific literacy was in a low category. Only 25% of students were able to answer the questions correctly. The most obvious difficulty is analyzing and making inferences regarding the given context. This phenomenon attracts attention for further research.

The factors that influence the low level of scientific literacy can be divided into two groups: factors that come from within the student and those that come from outside the student. Factors that come from outside include learning models and support from parents, while those that come from within students include learning discipline, self-confidence, self-efficacy, and self-regulated learning. The aspect of scientific literacy from the affective domain that is the lowest controlled by students is self-efficacy. In contrast, the aspect of scientific

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literacy that is the highest controlled by students is the value of science (Diana et al., 2015). If we look closely, factors that come from ourselves significantly influence students' scientific literacy. One factor that comes from oneself is self-efficacy (Muwonge, Ssenyonga, Kibedi, & Schiefele, 2017). One of the factors that influence scientific literacy is self-efficacy.

Setiawan said that self-efficacy is an individual's belief that he can successfully do something in a particular situation. The individual's belief comes naturally as the environment supports him to believe in himself. Bandura (2006) states that self-efficacy refers to an individual's belief in determining, organizing, and carrying out several appropriate behaviors to face obstacles to achieve the expected success and achieve specific achievement results. This self-efficacy researcher can say that emphasizes the individual's belief in the abilities that exist in him.

According to Klassen (2018), self-efficacy is an individual's assessment of his ability and competence to perform a task, achieve a goal, and produce something. Self-efficacy researchers can say it is an assessment of the individual's competence. Furthermore, according to Marsh et al. (2019), self-efficacy is a matter of the individual's perceived ability to cope with particular situations in connection with an assessment of the ability to perform an action related to a specific task or situation. Self-efficacy is an individual's assessment of self-confidence in carrying out tasks to obtain results as expected. Self-efficacy is the individual's perceived ability to cope with a particular situation and assess the ability to perform an action related to a particular task or situation. The situation can be, for example, with a learning situation to obtain high learning achievement. Based on the background explanation above, the researcher wants to know how much influence self-efficacy has on the scientific literacy of elementary school students.

METHOD

This research is quantitative. The type of research used is ex post facto. The author does not directly control the independent variable because the event has occurred (Creswell, 2012). The research design used in this study is as follows.

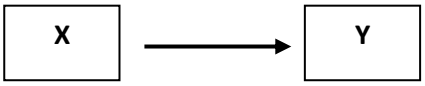

Figure 1. Research design

The variables in this study consisted of one independent variable, namely self-efficacy (X), and one dependent variable, namely scientific literacy (Y). The population is all fifth-grade students at SDN Kepuh Sedan Sidoarjo. The proportional cluster random sampling technique determined a sample of 35 students in class VA in the elementary school.

In inferential analysis, several stages of analysis are prerequisites, namely the analysis of the normality test of the data and the analysis of the linearity test of the data. The normality test was conducted using the SPSS 22 program with the Kolmogorov Smirnov method. In contrast, the linearity test in this study was carried out using SPSS 22 with the Test For Linearity method less than 0.05. Next, a hypothesis test was conducted to determine the effect of self-efficacy on scientific literacy using simple linear regression analysis. At the initial stage, testing was conducted to determine the relationship or correlation between self-efficacy and scientific literacy. The interpretation of the correlation coefficient can be seen in Table 1. Furthermore, hypothesis testing in simple linear regression used a statistical t-test. To find out how much influence self-efficacy has on the scientific literacy of elementary school students, the coefficient of determination is used using the SPSS 23.0 tool.

Table 1. Interpretation of Correlation Coefficient Value

The value of r	Interpretation
0.800 < rxy 1.00≤	Very high
0.600 < rxy .800≤ 0	Tall
0.400 < rxy .600≤ 0	Enough
0.200 < rxy .400≤ 0	Low
0.00 < rxy ,200≤ 0	Very low

RESULTS AND DISCUSSION

The descriptive analysis describes the characteristics of respondents from each research variable, namely self-efficacy (X) and scientific literacy (Y). The results of descriptive analysis using SPSS 23.0 have shown the minimum score, highest score, mean, standard deviation, and variance. Numerical descriptive analysis can be seen in Table 2 below.

Table 2. Descriptive Analysis of Scientific Literacy

	N	Minimum	Maximum	mean	Std. Deviation
Literacy_Science	35	56.00	82.00	77.5429	5.36515
Valid N (listwise)	35				

Based on Table 2 above, the minimum score for the respondent's test is 56, and the maximum value is 82. The average is 77.54, and the standard deviation is 5.36.

Self-efficacy includes first dimension of the level with indicators of the difficulty of the task and the behavior or attitude shown in dealing with the task. The second dimension is strength with solid indicators of weak belief and individual expectations of abilities. The third dimension of generalization with indicators considers experience, not an obstacle, and makes the experience a basis for increasing confidence. An overview of the self-efficacy of elementary school students can be seen in Table 3 below.

Table 3**.** Distribution of Self Efficacy of Elementary School Students

Interval	Criteria	Frequency	Percentage
X < 25.27	Tall	11	33.3%
25.27 X < 34.88	Currently	10	27.7%
34.88 X	Low	14	38.8%

Based on table 3 above, it can be seen from 35 respondents obtained information about the level of self-efficacy of respondents, namely 11 respondents (33.3%) belonging to high criteria. Ten respondents (27.7%) belong to the moderate criteria. Fourteen respondents (38.8%) belong to the low criteria.

The analysis of the effect of self-efficacy on scientific literacy was carried out using a simple linear regression test. To find out how significant the effect is by looking at the magnitude of the coefficient of determination. Before determining the hypothesis test, the researcher conducted a normality test and a linearity test to show that the data in this study were normally distributed and had a linear relationship.

The analysis results for checking the normality of numeric data were carried out using the Kolmogorov-Smirnov test with the help of SPSS 23.0. The results of the calculation of the normality test are presented in Table 4.

Table 4. Normality Test Results

	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistics	df	Sig.	Statistics	df	Sig.
Literacy_Science	.317	35	.012	.628	35	.012

a. Lilliefors Significance Correction

Based on Table 4, it is found that the data is usually distributed because the significance value is more than 0.05, so that Ho is accepted. That is, the data is usually distributed.

Numerical test data were analyzed and calculated using the SPSS 23.0 application based on the linearity test. The results of the linearity test calculations are presented in Table 5 below.

Table 5. Linearity Test Results

			Sum of Squares	df	Mean Square	F	Sig.
Self_Efficacy * Literacy_Science	Between Groups	(Combined)	96,457	8	12.057	4.220	.002
		linearity	44,791	1	44,791	15,677	.001
		Deviation from Linearity	51,666	7	7.381	2,583	.037
	Within Groups		74.286	26	2.857		
	Total		170.743	34			

Based on Table 5, it can be seen that the value of F for deviation from linearity is 2.583 with a significance of 0.037, so it can be concluded that the significant value of □(0.037≥ 0.05) then from the given hypothesis, H0 is accepted. This means that the data variables X and Y have a linear relationship.

Based on the normality test and linearity test, it can be said that it is regular and linear so that simple linear regression analysis can be used in this study. Simple linear regression testing uses SPSS 23.0 statistical application calculations. The results of the simple linear regression statistical test calculation can be seen in Table 6 below.

Table 6. Simple Linear Regression Test Output Results

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.512a	.262	.240	4.67730

a. Predictors: (Constant), Self_Efficacy

Table 6 above describes the summary of the model; among others, R shows a simple correlation between the independent and dependent variables. Decision-making is based on if the results of the correlation value are closer to one, the relationship between variables is very close. R square shows the value of the coefficient of determination, the value is then converted into the percent to show the percentage of the effect of the independent variable on the dependent variable, adjusted R square is also used to show the effect of the independent variable on the dependent variable, especially if the independent variable is more than two

Table 7. Regression Coefficient

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	40,651	10,798		3,765	.001
	Self_Efficacy	1.226	.358	.512	3.426	.002

a. Dependent Variable: Literacy_Science

Based on the regression test results in Table 7, a constant value of 40,651 and a self-efficacy coefficient value of 1,036 was obtained. It can be estimated that the regression function is Y = 40,651 + 1,226X. This means that if the self-efficacy variable increases by 1 unit, then the scientific literacy value will increase by 1,226 units with a constant value of 40,651. In addition, the value of Asymp is obtained. Sig. (2-tailed) is 0.000 with = 0.05. Because 0.000 <0.05, H0 is rejected, which means that self-efficacy significantly affects elementary school students' scientific literacy.

The correlation analysis test in this study uses the product moment, which is used to determine the relationship between two variables. The results of the calculation of the correlation analysis can be seen in the results of the simple regression analysis in Table 7. The Output Results of the Simple Linear Regression Test. The results in Table 7 show that R is 0.512, so the correlation is high. To find out how much influence self-efficacy has on the numeration of prospective elementary school teachers, the coefficient of determination is used using the SPSS 23.0 tool. The results of the coefficient of determination are presented in Table 8 below.

Table 8. Result of Termination Coefficient

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.512a	.262	.240	4.67730

a. Predictors: (Constant), Self_Efficacy

From Table 8, it is found that the magnitude of the influence of self-efficacy and scientific literacy of elementary school teachers can be known through the magnitude of the coefficient of determination (r2), which is 0.262. Thus, the magnitude of the effect of self-efficacy on numeracy is 26.2%.

CONCLUSION

There is a positive influence between self-efficacy on science literacy of scientific literacy is 26.2%. This means that 26.2% of elementary school students; The effect of self-efficacy on elementary school students' the contribution in elementary school students' scientific literacy is influenced by self-efficacy.

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