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Profile of Critical Thinking Skills Associated with Science Learning Outcomes of Junior High School Students in Mataram City

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Abstract
Efforts to develop critical thinking skills are still educational goals which are expected to improve learning outcomes which have an impact on the performance and quality of students. It is important to measure critical thinking skills so that the right techniques can be found to develop and improve these thinking skills. This study aims to describe critical thinking skills and their relationship with science learning outcomes of SMPN students in the city of Mataram. This type of research is a quantitative descriptive study with a sample of 418 Grade VII students and 435 Grade VIII students who were determined using purvosive techniques. Collecting data using test instruments that have been validated by experts and tested for reliability. The results showed that the critical thinking skills profile of the students of SMPN Mataram City was classified as moderate, with an average score of 68.83 for grade seven (VII) and 70.69 for grade eight (VIII). So it can be said that the relationship between critical thinking skills and science learning outcomes is very low as indicated by the R square value. R square for class VII is 0.074, which means that critical thinking skills have an effect of 7% on science learning outcomes. R square for class VII is 0.097, which means that critical thinking skills have an effect of 9% on science learning outcomes. The critical thinking skills of SMPN students in Mataram City needs to be improved by improving the learning process and learning evaluation tools.

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INTRODUCTION

Critical thinking is a systematic process when students make decisions about what they believe and do. Critical thinking is also one of the characteristics of a smart human being as well as one of the basic capital or intellectual capital which is very important for everyone, including students, to face future challenges because critical thinking can encourage students to think broadly and deeply about the subject matter (Ennis, 1993).

As stated by Greenwald & Quitadamo (2014) in the results of their research, namely by focusing on learning efforts that develop critical thinking skills, it is possible to improve student performance which has an impact on improving education and increasing the ability to solve problems as engaged and productive citizens. Critical thinking can be developed through science subjects (science).

In the city of Mataram, there are 24 state junior high schools and one of them is SMPN 2 Mataram which is the favorite junior high school in West Nusa Tenggara Province, SMPN 2 Mataram has many achievements both at the provincial and national

levels. Based on this, the researcher wants to research the SMPN level in Mataram City. Research at the junior high school level in Mataram is also rarely carried out, especially regarding the relationship between literacy and critical thinking skills with student learning outcomes.

As stated by Jufri (2013) the ability to think critically is the application of the aspects of learning outcomes and the multistage of meaning construction, so that an increase in students' critical thinking skills will be followed by an increase in learning outcomes. So it can be concluded that when critical thinking skills increase, the learning outcomes of students will increase. Therefore, research on "Critical Thinking Ability Profile associated with Science Learning Outcomes of SMPN Students in Mataram City" needs to be done.

METHOD

Nine schools from a total of twenty-four schools in Mataram were sampled in this study. The sample in this study were students of class VII and class VIII with 20% of the class of the total class in class VII and 20% of the class of the total class VIII. The research sample was determined by purposive sampling technique based on school rankings. School rankings are determined based on the SMPN National Examination (UN) scores for the 2018/2019 academic year. This type of research in this research is descriptive quantitative descriptive research using the survey method.

The instrument used to obtain data on students' critical thinking skills was a multiple-choice test developed by the researcher. According to Facione (2015) there are five indicators of critical thinking skills that are measured, namely 1) Interpretation, 2) Analysis, 3) Evaluation, 4) Inference, and 5) Explanation.

The data obtained in this study were quantitative, namely data on critical thinking skills, scientific literacy, and science learning outcomes of students in the form of scores. The score obtained by students is calculated using the formula:

Score = (Total Earned Score)/(Maximum Total Score) x100 ..... (1)

Analysis of the Relationship between Critical Thinking Ability and Science Learning Outcomes To analyze the relationship between critical thinking skills (X) and science learning outcomes (Y). To find the relationship between X and Y, namely by using the Simple Regression technique.

RESULTS AND DISCUSSION

The researcher tested the content validity and item validity on the critical thinking skills instrument. Content validity testing was carried out by using expert judgment, while the validity of the items was carried out by being tested on class VII and class VIII students of SMPN 5 Mataram. The results of expert validation on the critical thinking ability instrument are described in Table 1.

Table 1. Results of the Validation of Critical Thinking Ability Instruments

Rated aspect	Grade eight		Seventh grade	
	Average Score	Criteria	Average Score	Criteria
Theory	3.42	Very worthy	3.67	Very worthy
Construct	3.43	Very worthy	3.47	Very worthy
Language	3.67	Very worthy	3.67	Very worthy
Display	3.67	Very worthy	3.33	Very worthy
Average	**3,50**	**Very worthy**	**3,52**	**Very worthy**

While the validity of the items was carried out after the content validity was carried out, by being tested on class VII students who had learned KD 3.1. Applying the concept

of measuring various quantities that exist in oneself, other living things, and surrounding objects as well as the importance of using standard units in measurement. The test results of 50 multiple choice questions were declared valid with r Table, namely 0.374 for class VII and 0.349 for class VIII. For the results of the reliability test, the value of r11 (0.895)> r table (0.374) for class VII and class for class VIII was obtained r11 (0.853)> r table (0.349). Based on the results of the reliability test, the critical thinking ability instrument was declared reliable.

Data on critical thinking skills were obtained through a multiple-choice test which amounted to 20 questions with 5 (five) indicators of critical thinking skills, namely interpretation, analysis, evaluation, inference, and explanation. The results of critical thinking skills are described in Table 2.

Table 2. Data on Critical Thinking Ability of SMPN in Mataram City

No	School name	Seventh grade			Eight grade		
		The number of students	Critical Thinking Ability	Criteria	The number of students	Critical Thinking Ability	Criteria
1	School 1	70	78,00	High	62	76,29	High
2	School 2	53	70,08	High	71	74,78	High
3	School 3	61	68,68	High	68	77,89	High
4	School 4	62	71,53	High	56	69,91	Medium
5	School 5	54	70,09	Medium	54	65,37	Medium
6	School 6	57	70,09	Medium	56	73,39	High
7	School 7	19	47,37	Low	27	56,67	Medium
8	School 8	23	56,52	Low	18	55,28	Medium
9	School 9	19	51,58	Low	23	57,83	Medium
Average			**68,83**	**Medium**		**70,69**	**Medium**

Based on Table 2, the data on the critical thinking ability of SMPN students in Mataram City shows that the average score of students from the nine schools in Mataram City obtained a score of 68.83 with moderate criteria for seventh grade and a score of 70.69 with moderate criteria for grade eight.

Furthermore, an analysis was carried out per indicator of critical thinking ability, each indicator of critical thinking skills for seventh grade and grade eight, which amounted to 4 questions. Data from the analysis of students' critical thinking skills per indicator is shown in Figure 1.

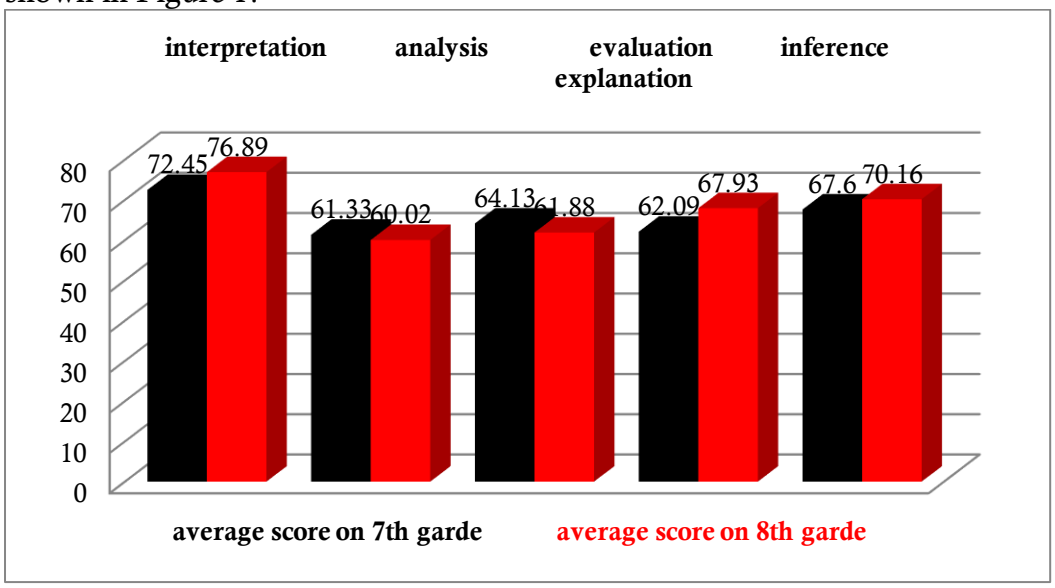

Figure 1. Data on critical thinking skills at SMPN Kota Mataram per indicator

Based on Figure 1, it can be seen that the average score of critical thinking skills of students of SMP Negeri in Mataram for each indicator varies. Interpretation is the highest indicator with an average score of 72.45 in class VII and 76.89 in class VIII because the interpretation indicator question is about the application that exists in everyday life and students are faced with real and demanding events. able to distinguish a living being with a specific purpose, students can understand how to interpret an event properly. The results of this study are supported by the findings of Purwati et al. (2016) stated that the interpretation indicator is the highest indicator with a percentage of 75.25%.

The analysis indicator is the lowest indicator with a score of 61.33 in class VII and 60.02 in class VIII. An analysis is the ability to identify the relationship of several statements, questions, concepts, descriptions, and other forms of representation to reflect and express thoughts, views, beliefs, decisions, reasons, information, and opinions. In the matter of students are required to analyze arguments about the application of Newton's third law, in this case, students are less able to analyze arguments about the application of Newton's third law in everyday life. The statement supporting the results of this study was stated by Oktariani, et al. (2020) stated that low analytical skills are caused by most students being unable to identify or quickly reject strong and relevant counter-arguments.

On the evaluation indicator, students obtained a score of 64.13 in class VII and 61.88 in class VIII. In the evaluation questions, students are required to be able to evaluate a statement based on kinship charts on the classification of living things, but most students cannot answer correctly because they are not able to test the truth of the statement based on the graph. The results of this study are supported by the findings of Wiyoko (2019: 30) who found that the evaluation indicators were in the low category with a score of 30.20%.

The inference indicator obtained an average score of 62.09 in class VII and 67.93 in class VIII. This is because students have been involved a lot in the learning process, based on the results of observations, the learning model used by the State Junior High School in Mataram is mostly PBL (problem-based learning) using the discussion, question, and answer, and experiment method, so that when faced with demanding questions Inference ability, namely identifying and selecting elements to draw a conclusion or make a conclusion, students can answer questions well.

The Relationship between Critical Thinking Ability and Science Learning Outcomes

The relationship between critical thinking skills and science learning outcomes of students is very low indicated by the value of R Square. R Square is used to determine the strength of the relationship between critical thinking skills and student learning outcomes. The simple regression test results are shown in Table 3

Tabel 3. *Summary Output*

	Regression Statistics	
	Seventh grade	Eight grade
Multiple R	.271[a]	.315[a]
R Square	.074	.099
Adjusted R Square	.071	.097
Standard Error	18.082	17.425
Observations	418	435

Based on Table 3. Summary output can be seen that the relationship between critical thinking skills and learning outcomes is very low indicated by the value of R Square. R Square for class VII is 0.074 which means that critical thinking skills have an effect of 7% on learning outcomes and the R square for class VIII is 0.099 which means that critical

thinking skills have an effect of 9% on learning outcomes. The results of these findings are supported by the results of research conducted by Ramdani, D, and Badriah, L. (2018: 42) who found that critical thinking skills with science learning outcomes through guided inquiry models based on blended learning have a low positive relationship with value. R Square of 0.371.

Table 4. ANOVA Analysis Results

	Model	Sum of Squares	Df	Mean Square	F	Sig.
7th	Regression	10793.083	1	10793.083	33.010	.000[a]
	Residual	136018.678	416	326.968		
	Total	146811.761	417			
8th	Regression	14507.407	1	14507.407	47.779	.000[a]
	Residual	131473.062	433	303.633		
	Total	145980.469	434			

Based on Table 4, the results of ANOVA analysis for class VII obtained Fount (33.010)> F-table (3.86) and for class, VIII obtained Fount (47.779)> F-table (3.86) so that this test shows that Ha is accepted. This means that there is a relationship between critical thinking skills and science learning outcomes.

Table 5. Regression coefficients

		Unstandardized Coefficients		Standardized Coefficients		
	Model	B	Std. Error	Beta	t	Sig.
7th	(Constant)	38.801	4.470		8.680	.000
	Critical Thinking Skills	.366	.064	.271	5.745	.000
8th	(Constant)	33.203	4.075		8.148	.000
	Critical Thinking Skills	.390	.056	.315	6.912	.000

Based on Table 5, the simple regression equation for class VII is Y '= 38.801 + 0.366X1. From the regression equation, it can be concluded that from each addition of one unit of the independent variable (critical thinking ability), the value of the dependent variable (science learning outcomes) will increase by 0.366. While the simple regression equation for class VIII is Y '= 33,203 + 0.390X1. From the regression equation, it can be concluded that from each addition of one unit of the independent variable (critical thinking ability), the value of the dependent variable (science learning outcomes) will increase by 0.390.

CONSLUSSION

The profile of the critical thinking ability of students of SMP Negeri in Mataram City is categorized as moderate, namely with an average score of 68.83 for grade seven (VII) and 70.69 for grade eight (VIII) with the interpretation indicator being the highest indicator with an average score. The average is 72.45 in class VII and 76.89 in class VIII, analysis is the lowest indicator with an average score of 61.33 in class VII and 60.02 in class VIII, evaluation of 64.13 in classes VII and 61, 88 in class VIII, inference of 62.69 in class VII and 67.93 in class VIII and explanation of 67.60 in class VII and 70.16 in class VIII.

The relationship between critical thinking skills and science learning outcomes is very low indicated by the value of R Square. R Square for class VII is 0.074, which means that critical thinking skills have an effect of 7% on science learning outcomes. R square for class VIII is 0.097, which means that the ability to think critically has an effect of 9% on science learning outcomes

RECOMMENTATION

It is important to further research related empirical tests on the use of learning models to improve students 'critical thinking skills considering the results of this study indicate that the students' critical thinking category is still in the moderate category. The analytical indicator in this study is the lowest identified indicator so that it needs to be studied further through other empirical studies.

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