Science Get Journal

Science Get Journal
Vol. 01, No. 2, April 2024, 1-8
e-ISSN: 3062-6595

The Influence of Class VII Science Subject Teaching Materials in Improving Critical Thinking

Eka Sriwahyuni[1]*, Tri Putri Wahyuni[2], Atyka Trianisa[3], Ristina Mirwanti[4] , & Dian Permata Sari[5]

[1]*Universitas Pattimura, Indonesia, [2]Universitas Negeri Padang, Indonesia, [3]Universitas Negeri Padang, Indonesia, [4]Universitas Padjadjaran, Indonesia, [5]MAS MTI Batang Kabung Kota Padang, Indonesia

*Co e-mail: ekasriwahyuni280394@gmail.com[1]

Article Information

Received: May 29, 2024
Revised: June 01, 2024
Online: June 08, 2024

Keywords

Critical Thinking Improvement, Quantitative, Science Subject

ABSTRACT

This educational process does not only focus on knowledge transfer; it also develops a wide range of individual potential, including academic abilities, relationships, talents, aptitudes, physical abilities, and the arts. Progressivism education is essential to the understanding and implementation of true education in Indonesia. Progressivism education educates students to face and solve problems in social life. This shows how important education is to produce people who are beneficial to society and the country. This research uses a quantitative approach and is classified as quantitative descriptive research. This research method is conducted by collecting numerical data. This process of collecting and analyzing data is known as research design or research design. This indicates that the research includes planning and conducting it. The design starts with observing and evaluating known research until further evidence is needed. In the research design, a pre-test and post-test control group was used. This test is done with pearson correlation or by comparing r count with r table. Data validity can be seen if rcount> rtable with 5%. If rtable < rcount then it is said to be valid. The results of the T table test show that the t count obtained is 14.450 has a significance value of 0.000, which indicates that the seventh grade science subject matter has a significant effect on improving students' critical thinking skills. Based on the results of hypothesis testing, F table obtained 208.806 or greater than F table (208.806 greater than 4.351).

Keywords: *Critical Thinking Improvement, Quantitative, Science Subject*

https://doi.org/10.69855/science.v1i2.59
https://gpijournal.com/index.php/science

INTRODUCTION

Education is a systematic and conscious effort to create a learning environment in which students can actively develop spiritual strength, self-control, personality, intelligence, noble morals, and skills necessary for themselves, society, nation, and state. This educational process does not only focus on knowledge transfer; it also develops a wide range of individual potential, including academic abilities, relationships, gifts, talents, physical abilities, and arts. Progressivist education is very important for the understanding and implementation of true education in Indonesia. Progressivism education educates students to face and solve problems in social life. This shows how important education is to produce people who are beneficial to society and the country (Sulkifly, 2020).

Education has an important role in improving a nation's human resources (HR) because good education will produce quality hu man resources, who are able to face life's challenges and adapt proactively to changing times. Education is a conscious and planned effort to create a learning environment where students can actively develop their potential, including spiritual strength, self-control, personality, intelligence, and emotional intelligence (Wepo, 2023).

Education is very important to improve a nation's human resources. Good human resources are able to face life's challenges and adapt proactively to changing times. Education is a systematic and conscious effort to create a learning environment in which students can actively develop spiritual strength, self-control, personality, intelligence, noble morals, and skills necessary for themselves, society, nation, and state. Education also plays an important role in increasing students' knowledge by increasing their understanding of the material taught. To achieve national education goals, other supporting factors are needed, such as teacher quality, teacher teaching methods, teacher teaching discipline, student learning discipline, textbooks, and preparation of lesson materials which are prepared in accordance with the current curriculum (Putri, 2020).

So, teaching materials are very important to help students think critically. It not only helps students understand what they are learning, but also helps enhance the values inherent in educational learning. Teaching materials play a role in teacher and student learning activities. Student learning outcomes are indicators of a successful learning process, which show the relationship between critical thinking and student learning outcomes. This shows that critical thinking influences student learning outcomes. Student learning outcomes will be positively correlated with students' level of critical thinking.

The learning resources provided by teachers to students are one component of the learning relationship that influences students' low abilities. Therefore, a creative approach is needed to improve and enhance the quality of science learning by improving the learning process by focusing on students' critical thinking abilities. This is important because students' critical thinking abilities have a significant impact on their learning outcomes, and developing teaching materials that encourage students' critical thinking abilities is an important part of improving educational quality and outcomes (Dores et al., 2020).

METHODS

This research uses a quantitative approach and is classified as quantitative descriptive research. This research method is carried out by collecting numerical data. This process of collecting and analyzing data is known as research design or research design. This shows that this research includes planning and carrying it out. The design begins by observing and evaluating known research until further evidence is needed. In the research design, pre-test and post-test control groups were used. Homogeneous groups, consisting of two groups, are the subject of this research. In research, data collection techniques use questionnaires and observation, as well as documentation. Facts are collected through documentation or physical evidence. After descriptive analysis, the data results are presented in the form of frequency distributions and graphs. Next, calculations are carried out to test the hypothesis. The data analysis method used in this research is inferential statistics.

RESULTS

This section presents the findings of the study obtained through statistical analysis of the data collected from the respondents. The analysis was conducted to examine the reliability of the research instruments, the homogeneity of the data, and the influence of science teaching materials on students' critical thinking ability. The results are presented systematically through descriptive and inferential statistical tests, including reliability testing, homogeneity of variance testing, t-test analysis, and F-test analysis. Each table is accompanied by an explanation to clarify the meaning and implications of the statistical findings.

1. Reliability Testing Results

Reliability testing was conducted to assess the consistency and stability of the research instruments used to measure the variables in this study. A reliable instrument is essential to ensure that the data collected are accurate and consistent across different items within the same variable. The reliability of the instruments was evaluated using Cronbach's Alpha coefficient, with a significance level of $\alpha = 0.05$ and a total of 20 respondents.

Table 1. Reliability Test Results for the Influence of Science Teaching Materials

Variables	Cronbach Alpha Coefficient	The r Table Value α = 0.05 n 20	Conclusion
The influence of science teaching materials	902	0.444	Reliable

Table 1 presents the reliability test results for the variable influence of science teaching materials. The analysis shows that the Cronbach's Alpha coefficient obtained is 0.902, which is higher than the r-table value of 0.444. This result indicates that the instrument used to measure the influence of science teaching materials has high internal consistency and is reliable for data collection.

Table 2. Reliability Test Results for Students' Critical Thinking Ability

Variables	Cronbach Alpha Coefficient	The r Table Value α = 0.05 n 20	Conclusion
Think critically	903	0.444	Reliable

Table 2 shows the reliability test results for the variable students' critical thinking ability. The Cronbach's Alpha coefficient obtained is 0.903, which exceeds the r-table value of 0.444. This finding confirms that the questionnaire used to measure students' critical thinking ability is reliable and capable of producing consistent measurement results.

The results indicate that the variable influence of science teaching materials obtained a Cronbach's Alpha coefficient of 0.902, while the critical thinking ability variable obtained a Cronbach's Alpha coefficient of 0.903. The r-table value at a significance level of α = 0.05 with 20 respondents is 0.444. Since the Cronbach's Alpha values for both variables are greater than the r-table value, it can be concluded that the research instruments meet the reliability criteria. Therefore, the instruments are considered reliable and suitable for use in further statistical analysis.

2. Results of homogeneity of variance

The homogeneity of variance test was conducted to determine whether the data obtained from the research sample had equal variances across groups. This test is a crucial assumption that must be satisfied before performing inferential statistical analyses such as t-tests and regression analysis.

Table 3. Results of Homogeneity of Variance Test

Variables	Degrees of Freedom	Significant Value	Error rate 5% (α = 0.05)	Homogeneity Question if the Sig Value > α
X	2,959	0.94	0.05	Homogeneous

Table 3 shows that the significance value obtained from the homogeneity test is 0.94, which is greater than the error rate of α = 0.05. This result indicates that there is no significant difference in variance among the data groups. Therefore, the data are considered homogeneous, meaning that the assumption of equal variance has been met and the data are suitable for further inferential statistical analysis.

3. T Test Results

The t-test was conducted to examine the partial effect of science teaching materials on students' critical thinking ability. This test aims to determine whether the independent variable has a statistically significant influence on the dependent variable when analyzed individually.

Table 4. t-Test Results for the Effect of Science Teaching Materials on Critical Thinking Ability

Variables	Unstandardized Coefficients	Standard Coefficients	Sig.
The influence of science teaching materials	1,417	0.959	0,000

As shown in Table 4, the unstandardized coefficient value of 1.417 indicates that an increase in the quality or effectiveness of science teaching materials leads to an increase in students' critical thinking ability. The standardized coefficient value of 0.959 reflects a strong positive relationship between the independent and dependent variables. Furthermore, the significance value of 0.000, which is lower than 0.05, indicates that the effect of science teaching materials on students' critical thinking ability is statistically significant.

4. F Test Results

The F-test was conducted to examine the simultaneous effect of the independent variable on the dependent variable and to evaluate the overall significance of the regression model.

Table 5. F-Test Results of the Regression Model

Variables	Sum of Squares	F	Sig.
Regression	3095,918	208,806	0,000
Residual	266,882	14,827	
Total	3362,800		

Table 5 presents the results of the F-test analysis, showing that the regression sum of squares is 3095.918, while the residual sum of squares is 266.882, with a total sum of squares of 3362.800. The calculated F value is 208.806, with a significance value of 0.000. Since the significance value is less than 0.05, the regression model is considered statistically significant. This finding indicates that science teaching materials have a significant simultaneous influence on students' critical thinking ability.

Based on the results of the homogeneity test, t-test, and F-test, it can be concluded that the data meet the necessary statistical assumptions and that science teaching materials significantly affect students' critical thinking ability, both partially and simultaneously. These findings support the hypothesis that effective science teaching materials play an important role in enhancing students' critical thinking skills.

DISCUSSION

The aim of this research is to find out whether the teaching materials for science subjects in class VII have an impact on students' ability to think critically. To achieve this goal, research was conducted using previously created questionnaires and questionnaires to measure how well students could solve the questions given.

Before carrying out the test, the research site first carried out validation at SMPN. The results show that all indicator items are valid and have positive value because rcount > rtable (> 0.444). Class VII Science Teaching Material variables and variables to improve critical thinking have been used on 20 students who answered questionnaires or 17 senior questions.

After the validation test, a reliability test is then carried out in order to determine the extent to which the measurement results remain consistent. The results of the reliability test show that the correlation between variable scores on the influence of teaching materials for class VII (X) science subjects, the value of the Cronbach alpha coefficient is 0.902 and n = 20 r table 0.444 for a significant level of α = 5%, meaning that the variable rcount is 0.902 > rtable 0.444, so the questionnaire as a measuring tool in this research has met the reliability requirements, then the results of the reliability test on the student critical thinking variable (Y), the value of the Cronbach alpha coefficient is 0.903 and n = 20 rtable 0.444 for a significant level of α=5%, meaning the variable rcount is .903 > rtable 0.444, so the questionnaire as a measurement tool in this research has met the reliability requirements, so it can be used as a measuring tool in subsequent analysis.

Based on the data test results above, we will discuss the results of the classical assumption test, which consists of normality, homogeneity and hypothesis tests, as follows. The influence of teaching materials for class VII science subjects on improving students' independent critical thinking abilities. According to the results of the t test, variables have a significant influence on the dependent variable if the significance level is greater or greater than 5% (0.05). The results of the t test (partial) calculation show that the tcount value is 14,450 with a significance value of 0.00 < 0.05 and the ttable value is 1.72472, which shows that the tcount value is greater than ttable. Therefore, Ha is accepted while Ho is rejected. Thus, it can be concluded that the teaching materials for class VII science subjects partially have a significant influence on students' level of critical thinking.

Apart from that, the F test results show that the Fcount obtained is 208,806 or greater than Ftable, namely 208,806 is greater than 4.351. The sign value is 0.000. Thus, it can be concluded that there are many independent variables that have a significant influence on the influence of science lesson material in class VII on students' ability to think critically. This shows that the independent and dependent variables influence each other, and that this research has both positive and negative effects.

CONCLUSIONS

The purpose of this research is to test the data using the SPPS application program to determine the effect of teaching materials for class VII science teachers' books in improving students' critical thinking abilities. From the discussion above and the results of this research, it can be concluded that the questionnaire used in this research is considered valid if the significance level is less than 0.05 or greater than the table.

Thus, it can be concluded that the respondents in the research were based on the results of hypothesis testing. The results of the Ttable Tcount test show that the tcount obtained of 14,450 has a significance value of 0.00, which shows that class VII science lesson material has a significant

influence on improving students' critical thinking abilities. Based on the results of the hypothesis test, the F table is 208.806 or greater than the F table (208.806 is greater than 4.351).

REFERENCES

Dores, O., Cahyadi, D., & Susanti, S. (2020). Analysis of Students' Critical Thinking Abilities in Mathematics Subjects.https://media.neliti.com/media/publications/437574-none-d6ef5bac.pdf

Fauzih, U. 2015. Research Design for the Development of Integrated Science Teaching Materials with Light and Color Themes for Middle School Science Learning. Journal: National Innovation and Science Learning, Bandung, Indonesia, (574)

Khotimah, K, et al. 2016. The Influence of Critical Thinking Abilities and Responses to Multirepresentational Teaching Materials on Learning Outcomes. Lampung University Fkip, (1).

Lestari, B, P, et al. 2019. The Influence of Inquiry-Based Microbiology Teaching Materials on the Critical Thinking Ability of Students at IKip Budi Utomo Malang. Journal of Biology and Applied Education, 4(1), 22-28.

Lieung, W, K. 2019. The Influence of the Discovery Learning Model on Elementary School Students' Critical Thinking Skills. Journal of Primary Education, Faculty of Teacher Training and Education, Masamus University

Nordin, B. A, 2013. Curriculum Towards Earning Critical, Creative and Innovative Thinking Skills. Juku: Asia Pacific Journal of Curriculum & Teaching, 10-15.

Nuryanti, L, et al. 2017. Analysis of Critical Thinking Abilities of Middle School Students. Journal of Education: Research and Development Theory, 3(2)155-158.. Purnomo Heru, et al., 2016. Development of Teaching Materials and Science Assessment Instruments with the theme The Beauty of My Country. Completion of 2013 Curriculum Teacher and Student Books. Prima Edukasia Journal, 4(1) .

Prasetyono N, R, et al 2018. The Influence of Science Learning Based on the Four Pillars of Education on Critical Thinking Ability. Jipva (Veteran Science Education Journal).

Putri, SA (2020). Improving Student Learning Outcomes. Gurubinar.id.https://gurubinar.id/blog/meningkatkan-hasil-belajar-peserta-didik?blog_id=104

Rohmatin, N,O. 2012. Critical Thinking Profile of Middle School Students in Solving Geometry Problems Seen from IQ Level. Mathematics Education Study Program, Darul'Ulum Jombang Islamic Boarding School University, Gamatika Vol III.

Seoyono, Y. 2014. Development of Mathematics Teaching Materials Using an Open-ended Approach to Improve High School Students' Critical and Creative Thinking Abilities. Journal of Mathematics Education, 9(2), 205-218.

Sugiyono, Quantitative Qualitative Research Methods and R&D. Alfabeta Publishing, Bandung.Susilowati, S, 2017. Development of science teaching materials integrated with

Islamic values to improve science learning outcomes. Journal of Science Education Innovation, 3(1), 78-88.

Sulkifly. (2020, October 12). Educational Psychology Concept. Dosen.ung.ac.id.https://dosen.ung.ac.id/Sulkifly/home/2020/10/12/kompak-psikologi-pendidikan.html

Susilawati, et al. 2014. Development of Physics Teaching Materials Containing Lifeskills for High School Students. Indonesian physics journal, (54)

Wahyuni, S, 2015. Development of Science Teaching Materials to Improve Junior High School Students' Critical Thinking Abilities. Journal of Physics Education, Faculty of Teacher Training and Education, Jember University, 5(2), 20896158.

Wepo. (2023, March 30). The Role of Education in Improving the Quality of Human Resources and the Economy - Sharia Economics. Sharia Economics Study Program.https://an-nur.ac.id/esy/peran-pendidikan-dalam-meningkatkan-kualitas-source-daya-human-dan-Ekonomi.html

Zakaria, 2020. Integrating Critical and Creative Thinking Skills in Indonesian Language Learning in Elementary Schools. Madrasah Ibtidaiyah Teacher Education Study Program (PGMI), Tanggerang.

Zulhelmi, et al, 2017. The Influence of Interactive Learning Media on Improving Students' Critical Thinking Skills. Indonesian Journal of Science Education, 5(1), 72-80.