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The Effect of Using Rock Type Classification Comparator Board Media In Contextual Learning on Geography Learning Outcomes Of Class X at SMAN 22 Surabaya

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ABSTRACT: This study investigates the impact of using rock type classification comparator board media in contextual learning on the geography learning outcomes of grade X students at SMAN 22 Surabaya. The research employed a quantitative descriptive approach with a quasi-experimental design, involving pre-tests and post-tests for experimental and control groups. Data were collected through observations, questionnaires, and test instruments. The validity and reliability of the research instruments were confirmed through Cronbach's Alpha values exceeding 0.6. Results indicate that the use of comparator board media significantly enhances student learning outcomes in terms of cognitive, affective, and psychomotor aspects. The Mann-Whitney Test revealed a significant difference between pre-test and post-test scores ($p < 0.05$), while the Spearman Rank Correlation showed varied results, with positive correlations in the affective aspect (0.611) and negative correlations in cognitive (-0.146) and psychomotor (-0.087) aspects. Despite the high cost of the media being a limitation, the tool's functionality and its ability to foster collaborative learning make it effective in improving student engagement and understanding of lithosphere materials. This study highlights the importance of innovative teaching tools in enhancing learning outcomes.

Keywords: contextual learning, comparator board media, geography learning, lithosphere, learning outcomes, student engagement

INTRODUCTION

Teaching materials are everything used by educators in carrying out teaching and learning activities. In the Law on Teachers and Lecturers Number 14 of 2005 Article 8, an educator is required to be able to develop a learning curriculum, carry out educational and learning activities, develop learning materials and utilize information and communication technology in terms of learning (Magdalena, Sundari, Nurkamilah, Nasrullah, & Amalia, 2020). Referring to the Law, teachers must be equipped with several positive competencies such as pedagogical, personality, social and professional. In teaching and learning activities, teaching materials play an important role as a driver of teachers' creativity in delivering lessons. On the other hand, teaching materials can also stimulate student motivation in learning activities. The existence of teaching materials and learning delivery methods has a great impact on student learning outcomes. This is proven in many studies conducted by experts regarding the correlation between teaching materials and learning outcomes (Nurwidayanti & Mukminan,

2018). Every subject that the teacher wants to convey to students, everything comes from teaching materials. According to some experts, teaching materials need to be developed periodically in a contextual manner. This is recommended so that the teaching and learning process carried out by educators and students does not feel boring. Monotonous learning certainly has a bad impact on student development (Adi & Masruri, 2017).

One of the many subjects or subjects, Social Sciences or abbreviated as Social Sciences is a subject or subject that is considered boring. This is because teachers are too monotonous in delivering learning. Apart from the fact that the teaching materials used are less effective, the learning method conveyed by the teacher is only carried out in one direction. It is not uncommon for students to consider that social studies subjects or subjects are subjects that have a lot of lectures. This is because students are not given space to interact and explore freely about the things that have been conveyed by teachers in social studies subjects (Rustono & Lidinillah, 2020).

Factually speaking, this was found at SMA Negeri 22 Surabaya. Students of SMA Negeri 22 Surabaya expressed their boredom with less enthusiastic behavior during teaching and learning activities. Based on the teacher's observations, the enthusiasm of students decreases when Geography lessons with lithosphere material are given (Djafar, Akolo, Pratama, & Stat, 2024). The decrease in student enthusiasm was accompanied by obvious signs such as drowsiness, lack of focus, lack of concentration, and other signs that showed the lack of activity of students in receiving lithosphere material in social studies Geography learning. At SMA Negeri 22 Surabaya, so far the teaching materials used in delivering lithosphere material in social studies Geography learning are still relatively conventional where teachers provide lessons based on package books, power points and posters. The learning method conveyed is still classified as one-way where the teacher explains and the student listens. The responsibility in teaching and learning is still fully held by teachers. As a result, students lack interest in learning independently (Hamzah & Hartoto, 2016).

Lithosphere material in the subject of Geography is closely related to knowledge of various types of rocks on the earth's surface. Some social studies teachers of SMA Negeri 22 Surabaya assume that the decline in students' interest in lithosphere learning is due to the difficulty of students understanding and identifying different types of rocks (Muhtar, Nugraha, & Giyartini, 2020). Thus, it is necessary to innovate teaching materials to increase students' interest and learning outcomes. An innovation in teaching materials that can be done by teachers in providing Geography learning about the lithosphere is to use the media of a rock type comparator board. A rock type comparator board is a medium that displays images and complete information about various types of rocks on earth. This media can help students in studying, comparing, and understanding the characteristics of each rock that makes up the lithosphere (Nurfadhillah, Ningsih, Ramadhania, & Sifa, 2021).

The existence of a comparator board media can support the learning process of students to understand the types of rocks that form the earth's surface. On the other hand, students can also compare and identify different types of rocks that exist visually. Students can actively make direct observations of lithosphere forming rock samples. With the help of comparator board media , teachers strive to package the teaching materials into contextually interesting learning methods. Contextual is a learning approach that focuses on the relationship between learning materials and real situations or contexts in the environment around students (Yuberti, 2014). The existence of media assistance in the form of a rock-type comparator board is expected to improve student learning outcomes in terms of cognitive, affective and psychomotor in geography subjects, especially lithosphere material.

Therefore, in this study, the researcher wants to prove empirically whether the media of the rock type comparator board and the contextual learning method can have an influence on student learning outcomes. Based on the research concept that has been explained, the researcher determined "The Effect Of The Use Of Rock Type Comparator Board Media In Contextual Learning On The Learning Outcomes Of Geography Class X AT SMAN 22 Surabaya" as the research title.

RESEARCH METHODOLOGY

The type of research that will be carried out is quantitative descriptive research, where the researcher will describe the data that has been measured mathematically based on the results that have been obtained from the distribution of questionnaires. The data that has been obtained will be mapped based on the variables to be tested in the study consisting of independent variables and dependent variables (Sunaengsih, 2016). This research will be designed as accurately as possible with the aim of revealing a causality regarding the influence of the use of learning media. In its application, this research will be carried out using the quasi experiment method. The quasi experiment method is a method to manipulate variables in a certain way to affect other variables that are being measured. In the quasi experiment, a control group and an experimental group will be determined to test the pre-test and post-test. Conceptually, the design of the quasi experiment method refers to the following table:

Table 1. Quasi Experiment Method Design

Class X	Pre-test	Treatment	Post-test
Experiment	Y1	X	Y2
Control	Y3	X	Y4

Source: Primary Data 2023

The accuracy of the research design will be based on the concept of Matching Pre-test – Post-test Comparison Group Design with a treatment to reveal the initial state or phenomenon before the change attempt and the subsequent state or phenomenon after the change or after use. The treatment will be equated in the state before and after on an apple-to-apple basis.

The data used in this study will be divided into two categories, namely primary and secondary data. Primary data is data obtained directly based on observations in the scope of research. On the other hand, secondary data is data obtained indirectly through a bridge or link, either individually or through media that contains information that can support the things being researched (Chan et al., 2019). Primary data was obtained by direct observation. Technically, primary data can be obtained through an observation supported by the distribution of questionnaires or questionnaires. Secondary data can be retrieved through an intermediary in the form of books, reports, literacy, videos or other articles.

In the trial of research instruments, all data obtained will be measured for the validity and reliability of the data. The validity test serves to test the validity of the data that has been obtained. The purpose of the validity test is to find out whether the research instrument is able to accurately measure the variables being studied. Research can be said to be legitimate if the results that appear show similarities in the existence of data collected with the actual phenomenon in the object that has been studied. On the other hand, to find out the extent to which the measurement is reliable or consistent if the variable is measured repeatedly, a reliability test will be used (Yusup, 2018).

In this case, the validity test will be carried out by comparing r calculations to r tables. If the calculated r is valued greater than the table r value, then the data obtained can be said

to be legitimate. However, if the calculated r value is smaller than the table r value, then the data obtained is not substantial. Meanwhile, the reliability test, the research instrument can be said to be reliable if the Cronbach's Alpha value is above 0.6 (>0.6) Both trials of this research instrument will be carried out using application software in the form of SPSS.

RESULT AND DISCUSSION

Result

Review Tools

Based on the values that have been given by the validator regarding the tool review, the calculation of the results obtained is as follows:

Table 2. Tool Review Assessment Results Per Category

Category	Total Value	Total Max Value	(Total Value / Total Value Max) * 100%	Interpretation
Functionality	29	45	64%	Tools fit to use
Visual	15	16	94%	The tool is very worthy of use
Flexibility	19	20	95%	The tool is very worthy of use
Economical	6	10	60%	Less suitable tools for use
TOTAL	69	100	69%	Tools fit to use

Source: Primary Data (2024)

Based on the table above, it can be understood that all categories of functionality, visuals, and flexibility of the tool obtained good grades or in other words, the functionality, visuals, and flexibility of this comparator board are worthy of being used in lithosphere learning. But on the other hand, economically, this comparator board is not feasible to use. This is because the price of the tool in the form of a comparator board is quite expensive when equated with its function. Although there is one category that is assessed by validators or experts as not suitable for use, overall this comparator board is still feasible to use with a final score of 69% and does not limit the functionality of the tool in supporting the learning of lithospheric material in schools.

Validity and Reliability Test

At this stage, all the scores that have been recapped and calculated based on each aspect as presented in Appendix 3 to Appendix 8, will be tested for their overall validity, both pre-test and post test scores. With the results of the calculations obtained, the validity and reliability tests displayed for each aspect at the pre test and post test stages are as follows:

Cognitive Aspects

The results of the validity test of the cognitive aspect of the pre-test stage are as follows:

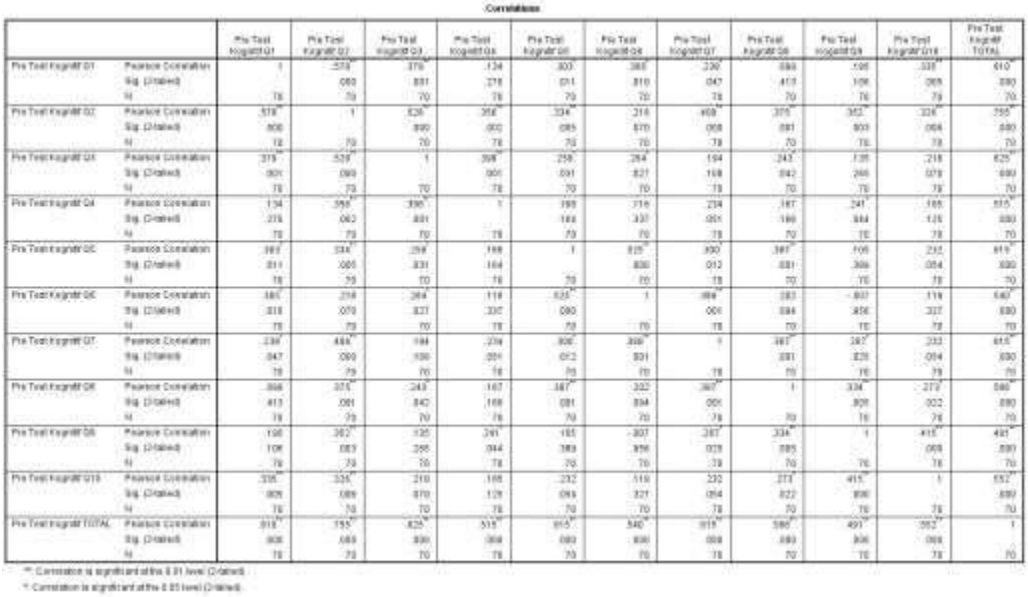


Figure 1. Results of the Validity Test of Cognitive Aspects in the Pre-Test Stage
Source: Primary Data (2024)

As for the results of the validity test of the cognitive aspect of the post test stage, they are as follows:

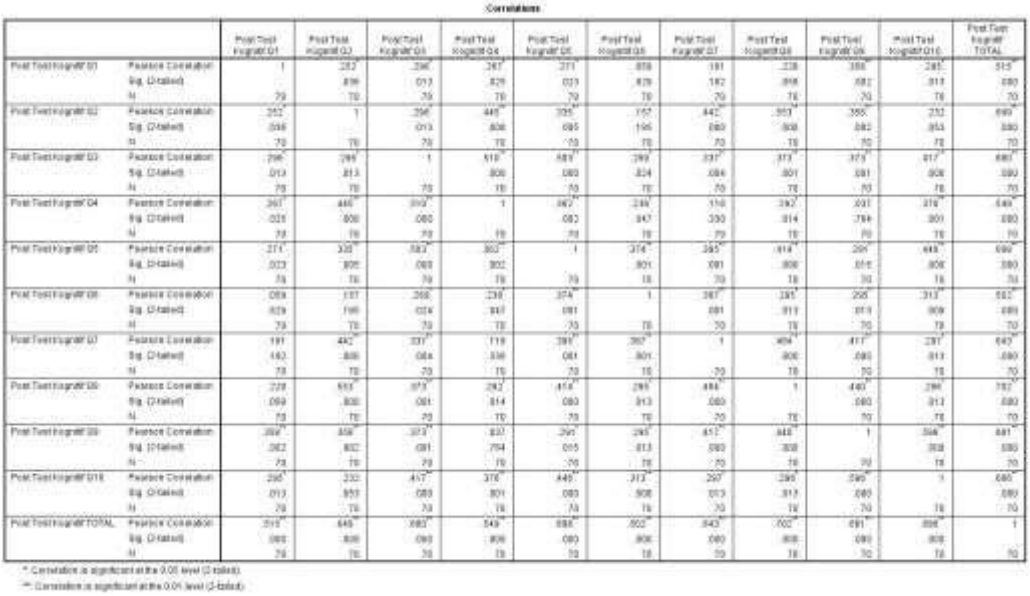


Figure 2. Results of the Validity Test of Cognitive Aspects of the Post Test Stage
Source: Primary Data (2024)

From the two figures above (figure 6 and figure 7), the cognitive aspect has been tested for validity in each treatment, namely pre test and post test. Based on the two figures above, it can be concluded with the simple table below which contains a summary of each validity test result on each question number.

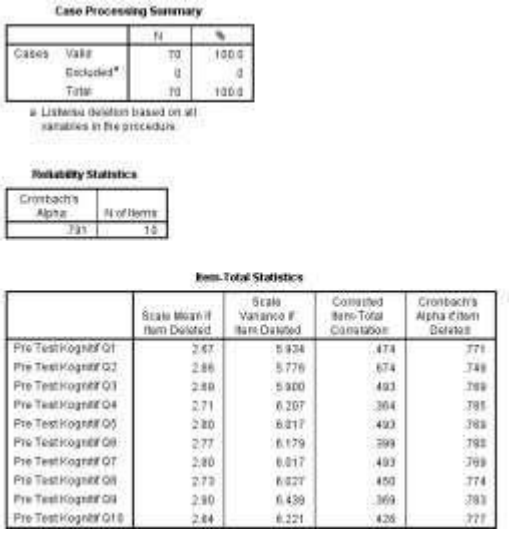
Table 3. Summary of Cognitive Aspect Validity Test Results Pre Test and Post Test Stage

Question	Pre Test			Post Test		
	Correlation Value (r calculate)	**Sig 5%** (r table)	**Ket.**	**Correlation Value** (r calculate)	**Sig 5%** (r table)	**Ket.**
Q1	0.610	0.232	Valid	0.515	0.232	Valid
Q2	0.755	0.232	Valid	0.649	0.232	Valid
Q3	0.625	0.232	Valid	0.680	0.232	Valid
Q4	0.515	0.232	Valid	0.549	0.232	Valid
Q5	0.615	0.232	Valid	0.698	0.232	Valid
Q6	0.540	0.232	Valid	0.502	0.232	Valid
Q7	0.615	0.232	Valid	0.643	0.232	Valid
Q8	0.586	0.232	Valid	0.702	0.232	Valid
Q9	0.491	0.232	Valid	0.681	0.232	Valid
Q10	0.552	0.232	Valid	0.686	0.232	Valid
TOTAL	1	0.232	Valid	1	0.232	Valid

Source: Primary Data (2024)

Based on the table above, the overall correlation value or r calculation that appears is greater (>) than the r value of the table with an error significance of 5% in the number of samples that have been determined as many as 70. So that all questions contained in the cognitive aspect research instrument sheet are declared valid. With the results of the data that are declared valid, a reliability test is then carried out to determine the extent of the reliability of the research instrument in obtaining consistent results if the research instrument is repeated or used in the same operation.

The results of the reliability test of the cognitive aspect of the pre-test stage are as follows:



Case Processing Summary

		N	%
Cases	Valid	70	100.0
	Excluded[a]	0	.0
	Total	70	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.781	10

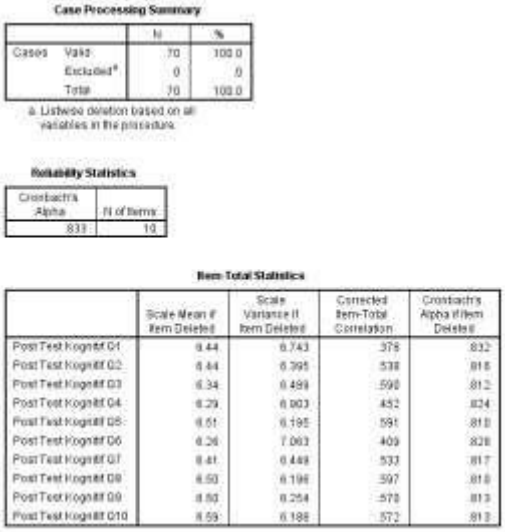
Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Pre Test Kognitif Q1	2.67	5.934	.474	.771
Pre Test Kognitif Q2	2.86	5.776	.674	.749
Pre Test Kognitif Q3	2.69	5.900	.493	.769
Pre Test Kognitif Q4	2.71	6.207	.364	.785
Pre Test Kognitif Q5	2.80	6.017	.493	.769
Pre Test Kognitif Q6	2.77	6.179	.399	.783
Pre Test Kognitif Q7	2.80	6.017	.493	.769
Pre Test Kognitif Q8	2.73	6.027	.450	.774
Pre Test Kognitif Q9	2.90	6.439	.369	.783
Pre Test Kognitif Q10	2.84	6.221	.426	.777

Figure 3. Results of the Cognitive Aspect Reliability Test in the Pre-Test Stage

Source: Primary Data (2024)

As for the results of the reliability test of the cognitive aspects of the post test stage, they are:



Case Processing Summary

		N	%
Cases	Valid	70	100.0
	Excluded[a]	0	.0
	Total	70	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.833	10

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Post Test Kognitif Q1	6.44	6.743	.378	.832
Post Test Kognitif Q2	6.44	6.395	.538	.816
Post Test Kognitif Q3	6.34	6.489	.598	.812
Post Test Kognitif Q4	6.29	6.903	.452	.824
Post Test Kognitif Q5	6.51	6.195	.591	.813
Post Test Kognitif Q6	6.26	7.063	.409	.828
Post Test Kognitif Q7	6.41	6.448	.533	.817
Post Test Kognitif Q8	6.50	6.196	.597	.813
Post Test Kognitif Q9	6.50	6.254	.578	.813
Post Test Kognitif Q10	6.59	6.188	.572	.813

Figure 4. Results of the Cognitive Aspect Reliability Test at the Post Test Stage
Source: Primary Data (2024)

Based on Figure 8 and Figure 9 above in the Reliability Statistics dialog box, it can be seen that the Cronbach's Alpha value that appears in the cognitive aspect of the pre-test stage is 0.791 and in the cognitive aspect of the post-test stage is 0.833. From the data, it can be concluded that the two values are greater than the reliability standard of Cronbach's Alpha value, which is 0.6. Thus, 0.791>0.6 and 0.833>0.6 can be stated that the two cognitive aspect research instruments in the pre test and post test stages are declared reliable and can be used in the same situation repeatedly.

Affective Aspects

The results of the validity test of the affective aspect of the pre-test stage are as follows:

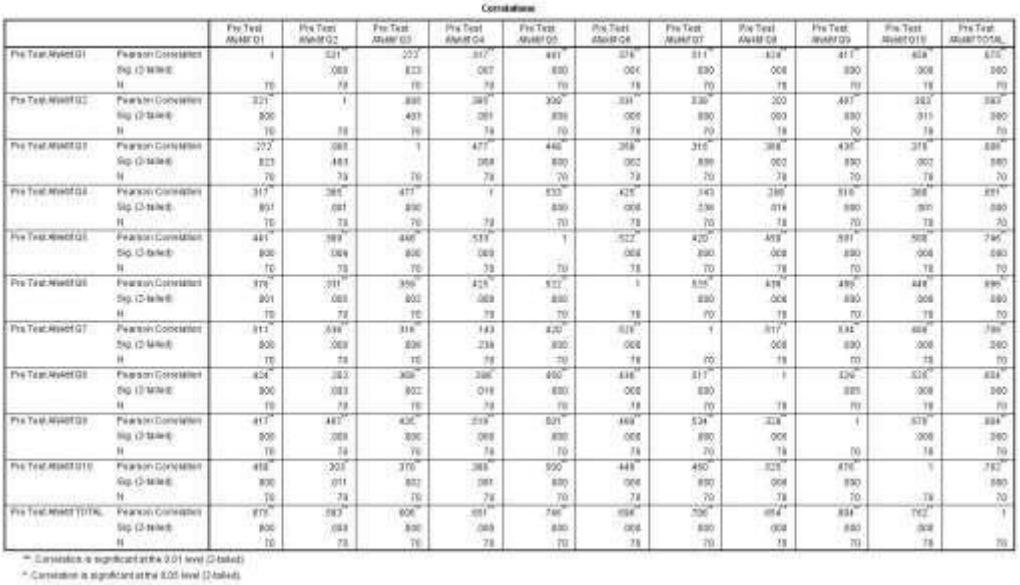


Figure 5. Results of the Validity Test of Affective Aspects of the Pre Test Stage
Source: Primary Data (2024)

As for the results of the validity test of the affective aspect of the post test stage, they are as follows:

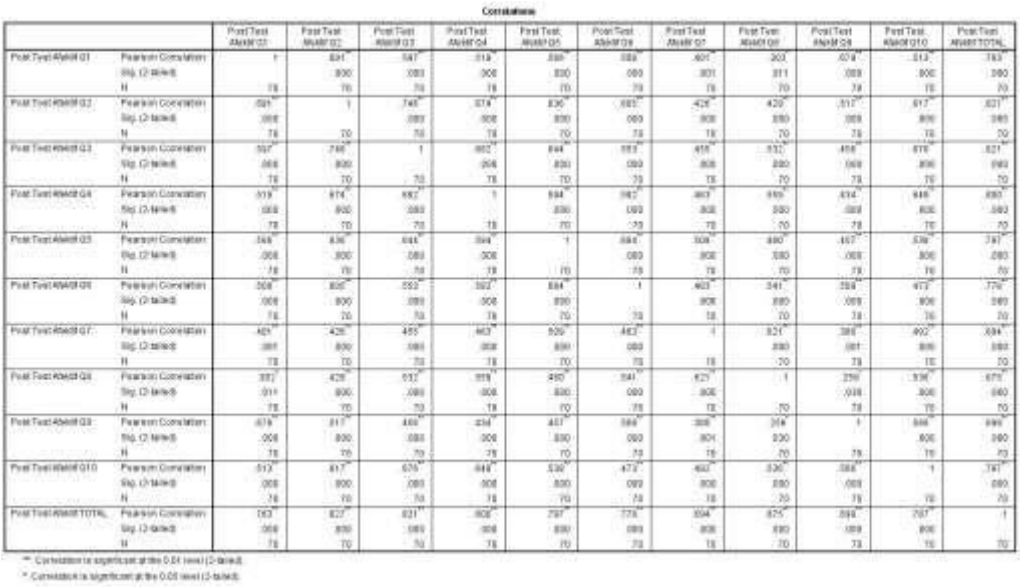


Figure 6. Results of the Validity Test of the Affective Aspect of the Post Test Stage
Source: Primary Data (2024)

From the two images above (figure 10 and figure 11), the affective aspect has been tested for validity in each treatment, namely pre test and post test. Based on the two figures above, it can be concluded with the simple table below which contains a summary of each validity test result on each question number.

Table 4. Summary of Validity Test Results of Affective Aspects of Pre Test and Post Test Stages

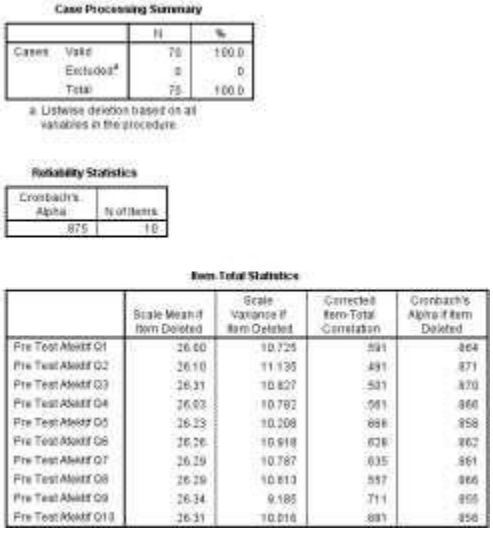
Question	Pre Test			Post Test		
	Correlation Value (r calculate)	**Sig 5%** (r table)	**Ket.**	**Correlation Value** (r calculate)	**Sig 5%** (r table)	**Ket.**
Q1	0.675	0.232	Valid	0.763	0.232	Valid
Q2	0.583	0.232	Valid	0.827	0.232	Valid
Q3	0.606	0.232	Valid	0.821	0.232	Valid
Q4	0.651	0.232	Valid	0.800	0.232	Valid
Q5	0.746	0.232	Valid	0.797	0.232	Valid
Q6	0.696	0.232	Valid	0.778	0.232	Valid
Q7	0.706	0.232	Valid	0.694	0.232	Valid
Q8	0.654	0.232	Valid	0.675	0.232	Valid
Q9	0.804	0.232	Valid	0.699	0.232	Valid
Q10	0.762	0.232	Valid	0.787	0.232	Valid
TOTAL	1	0.232	Valid	1	0.232	Valid

Source: Primary Data (2024)

Based on the table above, the overall correlation value or r calculation that appears is greater (>) than the r value of the table with an error significance of 5% in the number of samples that have been determined as many as 70. So that all questions contained in the affective aspect research instrument sheet are declared valid. With the results of the data that

are declared valid, a reliability test is then carried out to determine the extent of the reliability of the research instrument in obtaining consistent results if the research instrument is repeated or used in the same operation.

The results of the reliability test of the affective aspect of the pre-test stage are as follows



Case Processing Summary

		N	%
Cases	Valid	70	100.0
	Excluded[a]	0	0
	Total	70	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.875	10

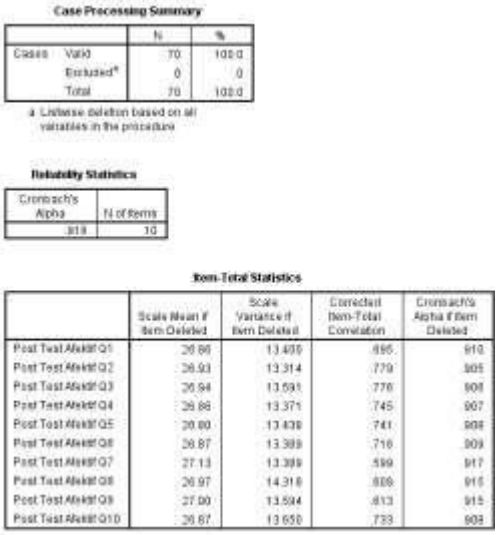
Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Pre Test Afektif Q1	26.60	10.725	.591	.864
Pre Test Afektif Q2	26.10	11.135	.491	.871
Pre Test Afektif Q3	26.31	10.827	.581	.870
Pre Test Afektif Q4	26.03	10.782	.661	.866
Pre Test Afektif Q5	26.23	10.208	.668	.858
Pre Test Afektif Q6	26.26	10.918	.628	.862
Pre Test Afektif Q7	26.29	10.787	.635	.861
Pre Test Afektif Q8	26.29	10.813	.557	.866
Pre Test Afektif Q9	26.34	9.185	.711	.855
Pre Test Afektif Q10	26.31	10.016	.681	.858

Figure 7. Results of the Reliability Test of Affective Aspects of the Pre Test Stage

Source: Primary Data (2024)

As for the results of the reliability test of the cognitive aspects of the post test stage, they are:



Case Processing Summary

		N	%
Cases	Valid	70	100.0
	Excluded[a]	0	0
	Total	70	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.918	10

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Post Test Afektif Q1	26.86	13.403	.695	.910
Post Test Afektif Q2	26.93	13.314	.779	.905
Post Test Afektif Q3	26.94	13.591	.776	.906
Post Test Afektif Q4	26.86	13.371	.745	.907
Post Test Afektif Q5	26.80	13.439	.741	.908
Post Test Afektif Q6	26.87	13.389	.716	.909
Post Test Afektif Q7	27.13	13.389	.599	.917
Post Test Afektif Q8	26.97	14.318	.606	.915
Post Test Afektif Q9	27.00	13.594	.613	.915
Post Test Afektif Q10	26.87	13.650	.733	.908

Figure 8. Results of the Reliability Test of Affective Aspects of the Pre Test Stage

Source: Primary Data (2024)

Based on Figure 12 and Figure 13 above in the Reliability Statistics dialog box, it can be seen that the Cronbach's Alpha value that appears in the affective aspect of the pre-test stage is 0.875 and in the affective aspect of the post-test stage is 0.918. From the data, it can be concluded that the two values are greater than the reliability standard of Cronbach's Alpha value, which is 0.6. Thus, 0.875>0.6 and 0.918>0.6 can be stated that the two sheets of research instruments on the affective aspect of the pre test and post test stages are declared reliable and can be used in the same situation repeatedly.

Psychomotor Aspects

The results of the validity test of the psychomotor aspect of the pre-test stage are as follows:

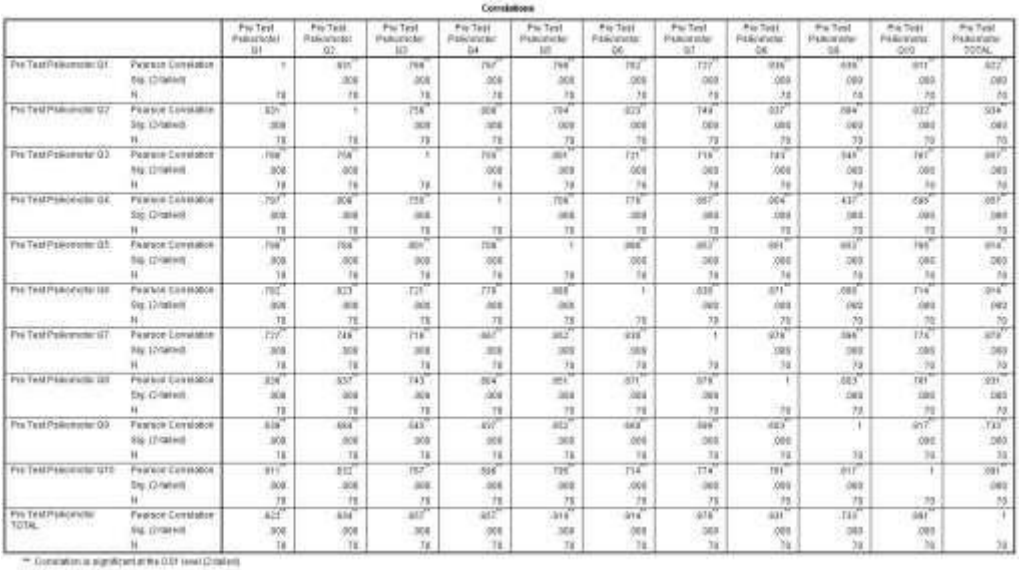


Figure 9. Results of the Validity Test of Psychomotor Aspects in the Pre Test Stage

Source: Primary Data (2024)

Meanwhile, the results of the psychomotor aspect validity test in the post test stage are as follows:

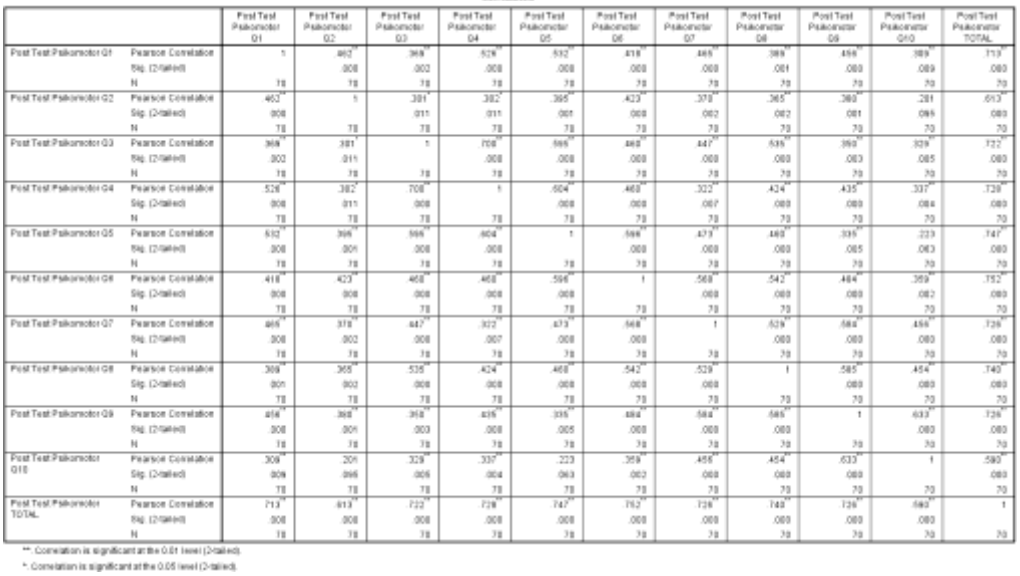


Figure 10. Results of the Psychomotor Aspect Validity Test at the Post Test Stage

Source: Primary Data (2024)

From the two figures above (figure 14 and figure 15), the psychomotor aspect has been tested for validity in each treatment, namely pre test and post test. Based on the two figures above, it can be concluded with the simple table below which contains a summary of each validity test result on each question number.

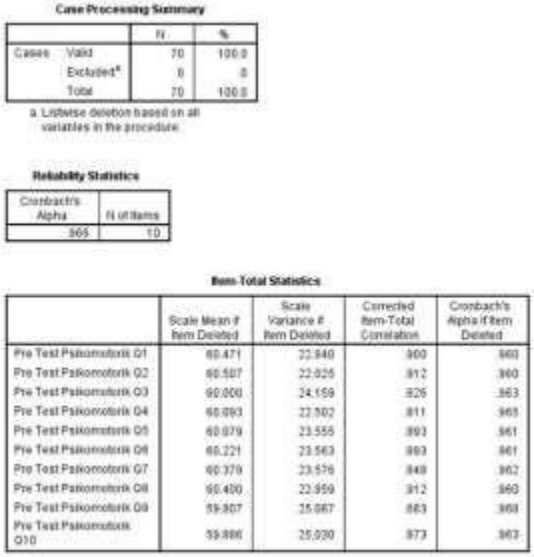
Table 5. Summary of Psychomotor Aspect Validity Test Results Pre Test and Post Test Stage

Question	Pre Test			Post Test		
	Correlation Value (r calculate)	**Sig 5%** (r table)	**Ket.**	**Correlation Value** (r calculate)	**Sig 5%** (r table)	**Ket.**
Q1	0.922	0.232	Valid	0.713	0.232	Valid
Q2	0.934	0.232	Valid	0.613	0.232	Valid
Q3	0.857	0.232	Valid	0.722	0.232	Valid
Q4	0.857	0.232	Valid	0.728	0.232	Valid
Q5	0.914	0.232	Valid	0.747	0.232	Valid
Q6	0.914	0.232	Valid	0.752	0.232	Valid
Q7	0.878	0.232	Valid	0.726	0.232	Valid
Q8	0.931	0.232	Valid	0.740	0.232	Valid
Q9	0.733	0.232	Valid	0.726	0.232	Valid
Q10	0.891	0.232	Valid	0.590	0.232	Valid
TOTAL	1	0.232	Valid	1	0.232	Valid

Source: Primary Data (2024)

Based on the table above, the overall correlation value or r calculation that appears is greater (>) than the r value of the table with an error significance of 5% in the number of samples that have been determined as many as 70. So that all questions contained in the psychomotor aspect research instrument sheet are declared valid. With the results of the data that are declared valid, a reliability test is then carried out to determine the extent of the reliability of the research instrument in obtaining consistent results if the research instrument is repeated or used in the same operation.

The results of the reliability test of the psychomotor aspect of the pre-test stage are as follows:



Case Processing Summary

		N	%
Cases	Valid	70	100.0
	Excluded[a]	0	0
	Total	70	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.965	10

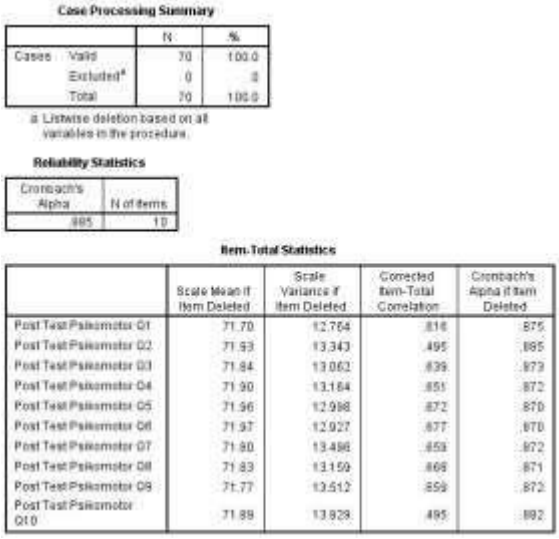
Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Pre Test Psikomotorik Q1	60.471	22.840	.900	.960
Pre Test Psikomotorik Q2	60.507	22.025	.912	.960
Pre Test Psikomotorik Q3	60.000	24.159	.826	.963
Pre Test Psikomotorik Q4	60.093	22.502	.811	.965
Pre Test Psikomotorik Q5	60.079	23.555	.893	.961
Pre Test Psikomotorik Q6	60.221	23.563	.893	.961
Pre Test Psikomotorik Q7	60.379	23.576	.848	.962
Pre Test Psikomotorik Q8	60.400	22.959	.912	.960
Pre Test Psikomotorik Q9	59.807	25.067	.683	.968
Pre Test Psikomotorik Q10	59.886	25.030	.673	.969

Figure 11. Results of the Reliability Test of Psychomotor Aspects of the Pre Test Stage

Source: Primary Data (2024)

Meanwhile, the results of the reliability test of the psychomotor aspect of the post test stage are:



Case Processing Summary

		N	%
Cases	Valid	70	100.0
	Excluded[a]	0	.0
	Total	70	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.885	10

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Post Test Psikomotor Q1	71.70	12.764	.816	.875
Post Test Psikomotor Q2	71.93	13.343	.495	.885
Post Test Psikomotor Q3	71.84	13.062	.639	.879
Post Test Psikomotor Q4	71.90	13.164	.651	.879
Post Test Psikomotor Q5	71.96	12.998	.672	.878
Post Test Psikomotor Q6	71.97	12.927	.677	.878
Post Test Psikomotor Q7	71.90	13.486	.659	.879
Post Test Psikomotor Q8	71.83	13.159	.668	.879
Post Test Psikomotor Q9	71.77	13.512	.659	.879
Post Test Psikomotor Q10	71.89	13.829	.485	.882

Figure 12. Results of the Psychomotor Aspect Reliability Test at the Post Test Stage

Source: Primary Data (2024)

Based on Figure 16 and Figure 17 above in the Reliability Statistics dialog box, it can be seen that the value of Cronbach's Alpha that appears in the psychomotor aspect of the pre-test stage is 0.966 and in the psychomotor aspect of the post-test stage is 0.885. From the data, it can be concluded that the two values are greater than the reliability standard of Cronbach's Alpha value, which is 0.6. Thus, 0.966>0.6 and 0.885>0.6 can be stated that the two sheets of psychomotor aspect research instruments in the pre test and post test stages are declared reliable and can be used in the same situation repeatedly.

Normality Test

Based on the results of the total value of each aspect in each sample that has been determined, both at the pre test and post test stages as shown in appendix 9, then a normality test is carried out to determine the distribution of the data that has been collected, whether the data is normally distributed or abnormal. This normality test will focus on the significance value of Shapiro Wilk, due to the number of samples <100. The results of the normality test obtained are as follows:

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Kelas	Statistic	df	Sig.	Statistic	df	Sig.
Hasil Belajar Siswa	Total Pre Test	.133	70	.004	.892	70	.000
	Total Post Test	.154	70	.000	.930	70	.001

a. Lilliefors Significance Correction

Figure 13. Shapiro Wilk Normality Test Results

Source: Primary Data (2024)

With the value or level of significance shown in the figure above, precisely in the Shapiro Wilk column, it can be seen that the data is abnormally distributed with a significance value below 0.05 (sig<0.05). In accordance with the abnormal distribution of the data, the next series of analysis can still be carried out using a series of non-parametric statistical tests.

Mann Whitney Test

To clarify the results of the normality test that have been obtained as shown in figure 18, precisely in the Shapiro Wilk column which is based on the total value of the entire aspect as shown in appendix 9 and to answer the question that has been set in the formulation of the first problem, the results of the Mann Whitney non-parametric statistical test that appear are as follows:

Ranks

	Kelas	N	Mean Rank	Sum of Ranks
Hasil Belajar Siswa	Total Pre Test	70	45.04	3152.50
	Total Post Test	70	95.96	6717.50
	Total	140		

Test Statistics[a]

	Hasil Belajar Siswa
Mann-Whitney U	667.500
Wilcoxon W	3152.500
Z	-7.429
Asymp. Sig. (2-tailed)	.000

a. Grouping Variable: Kelas

Figure 14. Mann Whitney Non-Parametric Statistical Test Results

Source: Primary Data (2024)

With a significance level of 5% and with the data used, the mean result of the total pre test was 45.04 with a sum of ranks 3152.50 and the mean result of the total post test was 95.96 with a sum of ranks 6717.50. The comparison between each of the two values can be said to be very significant with a large difference in value comparison. On the other hand, in the test statistics table, it can be seen that the indigo Asymp. Sig. (2-tailed) is 0.000 or below 0.05 (0.000<0.05). Thus, it can be concluded that there is a significant difference between the total score of the pre test and the total score of the post test.

Spearman Rank Correlation Test

To prove in detail the significant difference between the pre test and the post test, an advanced statistical test was carried out using the Spearman Rank Correlation Test both in total on the results of the pre test and post test scores as well as on each aspect (cognitive, affective and psychomotor). The Spearman Rank Correlation test is carried out to answer the questions that have been set in the formulation of the second problem with the following three objectives:

1. Looking at the level of correlation between the two pre-test and post-test variables both in total and in each aspect.
2. Looking at the direction of the correlation of the two pre-test and post test variables in total and in each aspect.
3. Looking at the level of significance of the relationship between the two pre-test and post-test variables in total and in each aspect.

The results of the Spearman Rank Correlation Test obtained in total at the Pre Test and Post Test stages are as follows:

Total Overall Aspect (Average)

Correlations

			Total Pre Test	Total Post Test
Spearman's rho	Total Pre Test	Correlation Coefficient	1.000	.098
		Sig. (2-tailed)	.	.420
		N	70	70
	Total Post Test	Correlation Coefficient	.098	1.000
		Sig. (2-tailed)	.420	.
		N	70	70

Figure 15. Spearman Rank Correlation Test Results Based on the Average Total Pre Test and Post Test

Source: Primary Data (2024)

With the above data, it can be known that:

a. The total pre test and post test scores have a very weak correlation level with pre test and post test scores of 0.098

b. The direction of the relationship between the two pre-test and post-test variables as a whole (total) showed a positive value of 0.098. This is because the total pre-test score has experienced a considerable increase in the post test score.
c. The relationship between the two pre-test and post-test variables in total has a significant effect as the value that appears is 0.098.

This statement is consistent with the guideline table or reference used by the Spearman Range Correlation statistical test as shown in table 5.

Cognitive Aspects

Correlations

			Pre Test Kognitif	Post Test Kognitif
Spearman's rho	Pre Test Kognitif	Correlation Coefficient	1.000	-.146
		Sig. (2-tailed)	.	.229
		N	70	70
	Post Test Kognitif	Correlation Coefficient	-.146	1.000
		Sig. (2-tailed)	.229	.
		N	70	70

Figure 16. Results of the Spearman Rank Correlation Test Based on the Total Pre Test and Post Test Scores on Cognitive Aspects

Source: Primary Data (2024)

With the above data, it can be known that:

d. The total pre-test and post-test scores have a very, very weak negative correlation level with pre-test and post-test scores of -0.146.
e. The direction of the relationship between the two pre-test and post test variables as a whole (total) showed a negative value of -0.146. This is because the total pre-test score has decreased in the post test score.
f. The relationship between the two pre-test and post test variables in total did not have a significant effect as the value appeared at -0.146.

This statement is consistent with the guideline table or reference used by the Spearman Range Correlation statistical test as shown in table 5.

Affective Aspects

Correlations

			Pre Test Afektif	Post Test Afektif
Spearman's rho	Pre Test Afektif	Correlation Coefficient	1.000	.611**
		Sig. (2-tailed)	.	.000
		N	70	70
	Post Test Afektif	Correlation Coefficient	.611**	1.000
		Sig. (2-tailed)	.000	.
		N	70	70

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 17. Results of the Spearman Rank Correlation Test Based on the Total Pre Test and Post Test Scores on the Affective Aspect

Source: Primary Data (2024)

With the above data, it can be known that:

g. The total pre test and post test scores had a moderate or sufficient correlation level with pre test and post test scores of 0.611
h. The direction of the relationship between the two pre-test and post-test variables as a whole (total) showed a positive value of 0.611. This is because the total value is moderate

or sufficient, it can be said that if a value higher than one variable tends to be related to a higher value than another variable or with another interpretation, a value lower than one variable tends to be related to a lower value than another variable both at the pre-test stage and the post-test stage.

i. The relationship between the two pre-test and post-test variables in total has an average effect (moderate) as the value of 0.611 is in line with the statement that **Correlation is significant at the 0.01 level (2-tailed).

This statement is consistent with the guideline table or reference used by the Spearman Range Correlation statistical test as shown in table 5.

Psychomotor Aspects

Correlations

			Pre Test Psikomotorik	Post Test Psikomotorik
Spearman's rho	Pre Test Psikomotorik	Correlation Coefficient	1.000	-.087
		Sig. (2-tailed)	.	.475
		N	70	70
	Post Test Psikomotorik	Correlation Coefficient	-.087	1.000
		Sig. (2-tailed)	.475	.
		N	70	70

Figure 18. Results of the Spearman Rank Correlation Test Based on the Total Pre Test and Post Test Scores on the Psychomotor Aspect

Source: Primary Data (2024)

With the above data, it can be known that:

j. The total pre-test and post-test scores had a very weak negative correlation level with pre-test and post-test scores of -0.087.

k. The direction of the relationship between the two pre-test and post test variables as a whole (total) showed a negative value of -0.087. This is because the total pre-test score has decreased in the post test score.

l. The relationship between the two pre-test and post-test variables in total did not have a significant effect as the value appeared at -0.087.

This statement is consistent with the guideline table or reference used by the Spearman Range Correlation statistical test as shown in table 5.

Discussion

Based on the results obtained in sub chapter 1, it can be seen that there is one category of tool assessment (tool review) that is declared unsuitable for use, namely the price category or economic level of the tool. The appointed experts agreed that the price of an aid in the form of a comparator board is quite expensive. It is considered that the tool in the form of a comparator board can actually be redesigned and remade as simple as possible without compromising the functionality of the tool. There are so many aspects or factors that can be designed or remade, such as one of them is the main basic material of the board in the comparator tool. The basic material of the board can be made using simple materials such as plastic or wood with low quality so that the comparator board tool can be reached by students, more economical and affordable.

With the existing price (priced) and with a less feasible assessment, but the comparator board can still be used in learning, it's just that the procurement of tools used for learning is a little limited where one tool in the form of a comparator board is used jointly by several groups (students). Limited procurement of tools can actually also have many positive impacts such as:

1. Collaboration: Learning together collaboratively allows fellow students or fellow learners to be able to solve problems and understand the material well. Collaboration allows for the exchange of ideas and thoughts that can enrich the understanding of all students.
2. Experience Exchange: Each student has a different experience and understanding of the tools used. By learning together, students share and exchange experiences and knowledge to help enrich collective understanding.
3. Developing Social Skills: Learning together allows students to interact directly with other study peers. This can indirectly develop social skills, such as the ability to communicate, collaborate, and adapt to group situations.
4. Increases Motivation: Learning collectively can increase motivation because it is enriched with support and encouragement from fellow students or fellow learners. A sense of involvement and commitment in a group can also increase motivation to learn.
5. Broadening Perspectives: Learning with other students makes it possible to hear different viewpoints and approaches to the material. This can help in broadening perspectives and understanding of the topic being studied.
6. Building Teamwork Skills: Learning by using tools together is a good exercise for building teamwork skills, which are indispensable in a variety of contexts, both in the workplace and in collaborative projects (Rahma, et al., 2023).

Thus, a less significant assessment of the entire assessment category does not mean that the existence of an aid is not meant to be maximized, or in other words, a poor assessment of a tool does not necessarily mean that the tool does not function at all (Arif, 2007). What strengthens this statement is due to the small number of factors assessed from the economic category and the small number of reviewers (validators).

With the existing comparator board aids, and a series of learning activities carried out, the comparator board aids were declared to have a positive and significant effect on the learning outcomes of grade X students of SMA Negeri 22 Surabaya as shown by the output of Uji Mann Whitney. Meanwhile, the Spearman Rank Correlation Test makes it clear that overall the results obtained in the pre test and post test results give a correlation value of 0.098 with a very weak interpretation. This is due to the influence of outliers that are able to affect the correlation value of the Spearman Rank Correlation Test based on the weaknesses of the data used in the analysis. Outlier is a data value that has a far greater comparison than the average or median of the data. If this happens, then the value raised in the Spearman rank Correlation Test can be high or even low as the output obtained in this study because the data does not have a normal distribution (Sugiyono, 2020).

Evaluatively, the learning outcomes of grade X students of SMA Negeri 22 Surabaya produced quite varied outputs based on the state of data distribution. For example, in the cognitive aspect, the Spearman Rank Correlation Test indicates a very, very weak negative score at the correlation level of the pre-test and post-test stages with a correlation value of -0.146. Furthermore, in the affective value, the output produced is also quite varied, but in this case the correlation level at the pre-test and post-test stages indicates a fairly positive value with a correlation of 0.611. Meanwhile, in the psychomotor aspect, it produces a low negative value at a very weak correlation level with a correlation value of -0.087. The overall variation in grades that appear in each aspect is due to several obstacles experienced by students, both comprehension (cognitive) obstacles in students' academics and technical obstacles caused by the situation at school.

Some of the technical obstacles that occur at school when students work on pre-test and post-test research instruments are as follows:

1. Students receive guidance from BK (Counseling Guidance) teachers on the sidelines of working on research instruments so that students cannot complete one or all aspects at the pre test or post test stages.
2. Students receive guidance from the organizers of school activity competitions on the sidelines of working on research instruments so that students cannot complete one or all aspects at the pre test or post test stages.
3. Students are in a state of unfitness or lack of health on the sidelines of working on pre-test and post-test research instruments.

Of the above technical obstacles that occur in tandem or on the sidelines of the work of research instruments, of course it can affect a significant decrease or increase in value as shown in the negative results of the Spearman Rank Correlation Test. In this case, the Spearman Rank Correlation Test produces one aspect with a positive correlation on the interpretation of the sufficient and two aspects with a negative correlation on the interpretation of the very weak. Positive results are caused because two variables (pre test and post test) have rank values that increase at the same time while negative results are caused because both variables (pre test and post test) have rank values that do not increase or even decrease (Firdaus, Nashiroh, & Djuniadi, 2020). Negative results are reasonable results that are not caused by data errors, these results appear because there is an opposite relationship between the variables tested which is caused by several technical obstacles that occur in schools when working on pre-test and post test research instruments as well as differences in the academic level of students in working on pre-test and post test research instruments.

CONCLUSION

The research concludes that the use of rock type classification comparator board media in contextual learning positively impacts the learning outcomes of grade X students at SMA Negeri 22 Surabaya, as evidenced by the significant differences in pre-test and post-test scores shown in the Mann-Whitney Test and further clarified by the Spearman Rank Correlation Test, which yielded a very weak correlation value of 0.098. The evaluation of learning outcomes before and after using the contextual learning approach shows varied results. In the affective aspect, there is a positive correlation with a Spearman Rank Correlation value of 0.611, indicating a one-way increase in the tested variables. However, in the cognitive and psychomotor aspects, the correlation values are negative (-0.146 and -0.087, respectively), reflecting a decrease in the tested variables. This variation highlights the differing impacts of the contextual learning media on various aspects of student learning.

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