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Article

The Effectiveness of REACT Strategy in STEM Learning on the Comprehension of 3D Geometric Concepts

Moh. Khoridatul Huda[1]*, Ahmad Fiki Fatkur Rohman[2], Dwi Candra Setiawan[3]

[1]Universitas Islam Raden Rahmat Malang, Indonesia
[2]Universitas Islam Negeri Maulana Malik Ibrahim Malang, Indonesia
[3]Universitas Insani Budi Utomo Malang, Indonesia

Corresponding Address: Moh.Huda@uniramalang.ac.id

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ABSTRACT
The REACT strategy (Relating, Experiencing, Applying, Cooperating, Transferring) is indispensable in STEM education, as it cultivates critical thinking, experiential learning, and practical application, all of which are foundational to effective STEM pedagogy. This research evaluates the effectiveness of the REACT (Relating, Experiencing, Applying, Cooperating, Transferring) strategy with the STEM approach versus traditional learning methods on flat surfaces in 3D shapes, specifically regarding students' comprehension of concepts. The study utilised pre-test and post-test experiments with two groups: an experimental class and a control class - selected randomly through the Randomised Pre-Test Post-Test Control Group Design approach. The research was conducted on grade VIII students of MTsN 2 Kediri. The VIII-A experimental class employed the REACT strategy with the STEM approach, while the VIII-C control class used conventional learning models. The N-Gain Score testing method evaluated the increase in students' comprehension of the mathematical concepts. The findings revealed that the experimental class had an average N-Gain Score of 66%, while the control class had an average score of 49%. The average score for comprehending mathematical concepts for the experimental and control classes was 80,14 and 70,20, respectively. The independent sample t-test demonstrated that the experimental class achieved significantly better results than the control class. The student response questionnaires indicated that the REACT learning model received an average score of 77.71%, categorised as "Good Response." The study concludes that the REACT strategy enhanced students' comprehension of concepts more effectively than conventional learning models.

INTRODUCTION

STEM (Science, Technology, Engineering, and Mathematics) education is vital for multiple reasons: it develops students' critical thinking abilities, contributes to economic growth, promotes scientific literacy, and stimulates innovation and creativity. Additionally, STEM cultivates a diverse skill set, including collaboration, adaptability, and pattern recognition, which are increasingly valuable in a dynamic and technologically driven world. The REACT (Relating, Experiencing, Applying, Cooperating, and Transferring) model significantly enhances STEM (Science, Technology, Engineering, and Mathematics) education by prioritizing experiential and applied learning that aligns closely with real-world contexts. Incorporating the REACT strategy within STEM environments strengthens students' abilities to bridge theoretical knowledge and practical application, fostering both critical and innovative thinking. By engaging students in context-based and cooperative learning experiences, the REACT model not only supports the acquisition of scientific and technological understanding but also empowers students to apply this knowledge in problem-solving, a core objective of STEM education (Putra et al., 2023).

Learning mathematics during junior high school is crucial for students to master and deeply understand mathematical concepts. Understanding this fundamental is crucial since Mathematics topics are related (Danuri et al., 2023). However, interviews conducted by researchers at MTsN 2 Kediri revealed that students face difficulties comprehending mathematical concepts, leading to suboptimal learning outcomes. One of the mathematics concepts students find difficult to imagine is flat-sided 3D objects and their combinations (Ismail et al., 2020). As a result, many students do not pay attention and lack the motivation to participate in mathematics learning. Adopting an engaging and interactive learning model is essential to help students understand mathematical concepts efficiently. One of the approaches is STEM education. This methodology fosters discourse and problem-solving among students, promoting practical proficiency and appreciation for collaborative efforts (Hom & Dobrijevic, 2022). This approach can improve students' awareness of the relevance of mathematics to other sciences to benefit them in their studies and careers (Gijsbers et al., 2020). However, a different finding was discovered: the students have an affinity to pick a career related to science, engineering, and technology, but not mathematics (Putri & Fadly, 2022). Therefore, this study applies the STEM approach to mathematics learning to engage students in mathematics-science integration. This activity develops material and questions about flat-sided 3D objects by incorporating Mathematics and sciences.

The way students approach learning mathematics can be seen through their attitudes, habits, and the results of their assignments. Some students write the answers without following a coherent flow, use incorrect formulas, or miss out on essential steps (Yulianty, 2019). These issues indicate a lack of understanding of the underlying concepts (Nisak, 2016). In addition, students need to apply and integrate many mathematical concepts and skills during the learning process to solve problems (Tambychik & Meerah, 2010). Therefore, students need to focus on building a solid foundation of concepts to excel in mathematics. One strategy to combat a negative attitude toward mathematics is breaking down problems into smaller components and applying real-world examples (Serin, 2023). This idea is then applied to formulate mathematics problems using a science approach by developing mathematics learning with the STEM method.

To enhance comprehension of concepts and skills, implementing an appropriate learning model is imperative, allowing the students to develop their talents (Utami et al., 2016). One suggested method is the REACT strategy, combined with the STEM approach. Utilising real-life contexts by integrating Mathematics and sciences to contextualise the use of mathematics will improve students' motivation to study (Moreno & Rutledge, 2020). Research has shown that the REACT strategy is highly effective in enhancing the learning experience because it uses constructivism's fundamental principles to facilitate effective teaching and learning (Crawford, 2001). Constructive learning is when students study more actively, and teachers supervise them only. The REACT strategy is a group-based method where students are encouraged to understand and think critically to find the solution by finding the relevant resources and working together in a team (Jeheman et al., 2019).

Furthermore, the REACT strategy has proven to positively impact biology-based context classes (Kaya & Gul, 2021). Therefore, the researcher believes this strategy will be effective for Mathematics with the STEM approach. This strategy develops pre-test and post-test questions using STEM principles by integrating Mathematics and sciences into the learning process.

33 The REACT strategy consists of five main steps: relating, experiencing, applying, cooperating, and transferring. Using this technique, students can discover relevant references and discuss with the team to solve the problems, which leads to understanding concepts well. This strategy is assumed to enhance students' problem-solving skills and avoid memorising formulas or concepts without appropriate understanding. Besides, this strategy can enhance students' mathematical representation, reasoning, and ability to make decisions and engage
11 them actively (Sari & Darhim, 2020). Moreover, the study proves that the REACT strategy is effective in enhancing students' conceptual understanding of chemistry and helps them connect the scientific concept with contextual topics (Karsli & Yigit, 2017) and molecular genetics (Otami et al., 2021), and has a strong effect on science achievement (Akay & Kanadli, 2021) and on social intelligence in primary school students (Zakiah et al., 2020). Considering this, researchers have opted for the highly effective REACT strategy with the STEM approach to improve students' understanding of Mathematics concepts by integrating it with science topics
29 related to daily life. The research question is centred around the effectiveness of the REACT strategy in improving students' understanding of concepts of flat-sided 3D objects.

METHODS

This research hypothesises that implementing the project-based learning model in mathematics learning is ineffective in understanding the concept of grade VIII students at MTsN 2 Kediri. The study applies the quantitative research approach, underpinned by the
12 positivism paradigm, which aims to examine specific populations and samples. It involves collecting data using research instruments, followed by quantitative or statistical analysis to
28 test predetermined hypotheses. This follows the principle of quantitative research, which deals with numerical data or data that can be converted into numbers with some statistical analysis (Sheard, 2018). This approach is commonly used in scientific research and helps maintain the
67 rigor and validity of the study findings.

44 43 The research employs a quasi-experimental approach to investigate the impact of specific treatments on a controlled group of individuals. Quasi-experimental uses non-experimental variation in the primary independent variable, mimicking the experiment designs where one group is exposed to treatment and the other is not (Gopalan et al., 2020). The study utilised a
42 pre-test and post-test control group design, which comprised both an experimental and a control
51 group. The experimental group was exposed to the REACT strategy with the STEM approach, while the control group received traditional learning methods (Table 1).

34 The study was executed in the even semester of the 2022/2023 academic year, while data collection was done between January and February of 2023. It is worth noting that MTsN 2 Kediri boasts 42 classes, with 14 classes for each academic level (VII, VIII, and IX). Additionally, the classes are distinguished alphabetically from A to N for each level.

2 **Table 1**. Research Design

Class	Pre-test	Treatment	Post-test
A	X1	T1	Y1
C	X2	T2	Y2

A: Experimental class C: Control class
T1: Project-based learning T2: Conventional learning

The study analyses quantitative data from primary sources from grades VIII-A and VIII-C, each with 35 students. The data sources were collected through test results, observations, and questionnaires. For accuracy, the research instrument involved learning outcome tests and student questionnaire sheets. The findings of this research provide valuable insights into the key factors that contribute to student's academic performance and learning outcomes and may help inform future educational policies and practices.

Researchers employ description test questions to validate flat-sided 3D objects, which evaluate students' comprehension of mathematical concepts before (pre-test) and after (post-test) treatment. Creating test instruments with the STEM approach involves determining appropriate materials, developing a grid of questions, creating questions related to the subject, and validating the questions using validators (see Table 2). The test has four essay questions with the rubric assessment in Table 3, while the questionnaire has 20 aspects.

Table 2. Concept Achievement Learning Model Steps

No.	Indicators of Understanding Mathematical Concepts	Question Number	Test Form
1.	Restating a concept of flat-sided 3D objects.	1,2,3, and 4	Essay
2.	Give an example or not an example of a concept of flat-sided 3D objects.		
3.	Apply concepts algorithmically.		
4.	Presenting concepts in various forms of mathematical representation		

(Man & Medan, 2019)

Table 3. Assessment Rubric of Indicators of Understanding Mathematical Concepts

No.	Indicator	Indicators Measured	Score
1.	Restating a concept of a flat-sided 3D object (Write down given information, queried, and basic formulas).	Students did not answer at all.	0
		Write down one of the aspects assessed but the wrong answer.	1
		Write down one of the aspects assessed correctly.	2
		Write down all the aspects assessed but the wrong answer.	3
		Write down all the aspects assessed correctly.	4
2.	Give an example, not an example of a flat-side 3D object.	Students did not answer at all.	0
		Students cannot give examples or not examples of a concept and only rewrite the problem.	1
		Students can only rewrite the questions and write the right formula.	2
		Write questions, formulas, and answers, but the process or result has errors.	3
		Students can write questions, formulas, and answers using the correct process and result.	4
3.	Apply concepts algorithmically to flat-side 3D object materials.	Students did not answer at all.	0
		Students cannot apply concepts algorithmically and only rewrite problems.	1
		Students can only rewrite basic questions and formulas.	2
		Students can write questions, basic formulas, and steps to solve questions in order, but the process or result has errors.	3
		Students can write questions, basic formulas and question-solving steps in the order, and the result is correct.	4
4.	Presenting concepts in various forms of mathematical representation	Students did not answer at all.	0
		Students can explain the questions given.	1
		Students can only explain the questions and formulas used in solving the problem.	2
		Students can explain the problem and the formula used and can answer the problem, but the process or result has errors.	3

(Man & Medan, 2019)

Questionnaires are chosen to gather supporting data on students' responses to the REACT strategy applied to mathematics subjects with the STEM approach, specifically flat-sided 3D objects. A research questionnaire is a standardized tool for data collection containing a series of questions or items to ask participants (Ranganathan & Caduff, 2023). The validated questionnaire instrument was developed through a series of steps that involved creating the syntax of the project-based learning model, developing the components of the questionnaire instrument indicators, and validating the observation instruments. Then, the questionnaire was distributed to the experimental class students after the learning process was complete, with evaluate experience with the REACT strategy with the STEM approach.

The analysis of student responses to questionnaires is carried out using descriptive statistical analysis. This approach describes student responses to learning strategies implemented using the REACT strategy. This analysis examines the categorisation of student response questionnaire average scores using the formula

$$P = \left(\frac{F}{N}\right) \times 100\%,$$

where P, F, and N are percentages of respondents' answers, the number of respondents' answers, and the sum of all ideal scores, respectively (Anisa, 2016).

RESULTS AND DISCUSSION

63 6 The research consisted of six meetings for experimental and control classes. The pre-test was done during the first meeting, while the post-test was carried out during the last meeting. The post-test consists of an essay, observation, and questionnaire. Specifically, the study was 41 carried out with 14 male and 21 female students from experimental and control class pre-test and post-test findings, which are documented in Tables 4 and 5, respectively.

Table 4 summarises the pre-test and post-test results of the experiment class on comprehending mathematical concepts related to 3D objects with flat sides. The table includes 47 the highest and lowest scores, total sum, and average value of the tests. However, it is essential to note that a few students could not meet the minimum completeness limit (KKM) score of 75 in Mathematics. This information can be used constructively to identify areas where students need further support in understanding mathematical concepts related to 3D objects with flat sides.

36 **Table 4.** Summary of Pre-Test and Post-Test Results for Experimental Class

No.	Criteria	Pre-test	Post-test
1	Lowest score	19	50
2	Highest score	63	100
3	Total	1463	2805
4	Mean	41,80	80,14

Table 5 summarises the pre-test and post-test results of the control class, including the 66 lowest, highest, average, and total sum of pre-test and post-test scores for comprehending mathematical concepts of flat-sided 3D objects of the control class VIII-C. The summary 18 reveals that some students in the control class fail to meet the minimum completeness criteria (KKM) of 75 for Mathematics. Table 8 summarises the questionnaire responses of class VIII-45 A students to a learning model. The questionnaire analyses the effectiveness of the REACT strategy on students' understanding of flat-sided 3D objects.

Table 5. Summary of Pre- and Post-Test Scores for Control Class

No.	Criteria	Pre-test	Post-test
1	Lowest score	32	57
2	Highest score	57	88
3	Total	1463	2457
4	Mean	41,80	70,20

64 Table 6 presents the results of a study, testing the understanding of flat-sided 3D objects 26 by experimental (VIII-A) and control classes (VIII-C). Table 6 displays the average score and standard deviation for the pre-test and post-test of understanding mathematical concepts of flat-74 sided 3D objects in the experimental and control classes. The experimental and control classes were initially deemed less effective based on the pre-test's mean and standard deviation. 13 However, the post-test results show that the experimental and control classes were categorised as effective and quite effective, respectively. Thus, it is concluded that the REACT strategy 23 with the STEM approach implemented in the experimental class is more effective than the

conventional model used in the control class. Effect categories need to be defined to better understand the results in Table 6. Table 7 provides a summary of these categories.

Table 6. Results of Descriptive Statistical Analysis Test of Understanding Mathematical Concepts

	Descriptive Statistics				
	N	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Pre-test experiment	35	19	63	41,79	12,854
Post-test experiment	35	50	100	80,14	13,916
Pre-test controlled	35	32	57	41,80	7,768
Post-test controlled	35	57	88	70,20	12,172
Valid N (listwise)	35				

Table 7. Effectiveness Interpretation Category

Percentage (%)	Interpretation
0% - 40%	Ineffective
40% - 55%	Less effective
56% - 75%	Quite effective
76% - 100%	Effective

Based on the student's scores for each instrument test indicator after implementing the REACT strategy, the results presented in Table 8 leave no doubt that the strategy is highly effective. Specifically, indicators 1, 2, and 4 significantly improve students' achievements, while indicator 3 is remarkably effective. Consequently, these findings demonstrate that the REACT strategy with the STEM approach is an excellent method to help students confidently comprehend mathematical concepts. This finding follows the previous study, showing that the REACT strategy enhances students' mathematical representation, reasoning, and disposition ability (Sari & Darhim, 2020).

Table 8. Results of Student Score Analysis based on Each Indicator

No.	Aspect	Indicator 1	Indicator 2	Indicator 3	Indicator 4
1	Total score	3350	2725	2175	2975
2	Average score	95,71429	77,85714	62,14286	85

After conducting the post-test, we can compare the results of the experimental and control classes to determine which strategy was more effective in enhancing the student's understanding of the concepts of flat-sided 3D objects. To make this comparison, we calculated the students' total scores and took the mean for each class. The results are presented in Table 10. Based on the discoveries, we can conclude that the REACT strategy applied to the experimental class was more effective than the conventional model applied to the control class. The mean score of the experimental class was 80,14, while that of the control class was 70,20.

Table 9. Post-test results for the experimental and control classes

No.	Criteria	Post-test	
		Experiment	**Control**
1	Lowest score	50	57
2	Highest score	100	88
3	Sum	2805	2457
4	Mean	80,14	70,20

A. Prerequisites Instrument Test

1) Normality Test

We need to identify whether the data used is normally distributed using the normality test for further analysis. The normality can be tested by using Kolmogorov-Smirnov test (Mishra et al., 2019) (Schmidt & Finan, 2018) or by measuring skewness and kurtosis values to evaluate the comparability of a provided distribution from a normal distribution (Hatem et al., 2022). However, since there is no agreement on which skewness and kurtosis values signalled a normal distribution (Orcan, 2020), the Kolmogorov-Smirnov test is chosen. The result is represented in Table 10. The table shows significance level is (Sig.) > 0,05, indicating the data is normally distributed. Therefore, parametric statistical tests, such as paired sample t-tests and independent sample t-tests, can be carried out.

Table 10. Normality Test for Pre-Test and Post-Test Concept Understanding

One-Sample Kolmogorov-Smirnov Test		Pre-Test Experiment A	Post-Test Experiment A	Pre-Test Control C	Post-Test Control C
N		35	35	35	35
Normal Parameters[a,b]	Mean	41,80	80,14	41,80	70,20
	Std. Deviation	12,849	13,916	7,768	12,172
Asymp. Sig. (2-tailed)		,139[c]	,175[c]	,001[c]	,001[c]
Monte Carlo Sig. (2-tailed)	Sig.	,538[d]	,580[d]	,117[d]	,087[d]

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.
d. Based on 10000 sampled tables with starting seed 2000000.

2) Homogeneity Test

A homogeneity test is also carried out to check the results of understanding the mathematical concept test and identify the homogeneity of students' characteristics. The analysis is represented in Table 11. The table shows the significance level (Sig.) 0,794 > 0,05, indicating a variance of the pre-test and post-test of experimental and control classes is homogenate.

Table 12. Gain Score for Concept Understanding of Experimental and Control Classes

Description	Class			Statistic	Std. Error
NGain-Percentage	Experiment	Mean		66,0928	3,76509
		95% Confidence Interval for Mean	Lower Bound	58,4413	
			Upper Bound	73,7444	
		5% Trimmed Mean		66,8077	
		Median		66,6667	
		Std. Deviation		22,27457	
		Minimum		13,95	
		Maximum		100,00	
		Range		86,05	
	Control	Mean		49,3332	3,27541
		95% Confidence Interval for Mean	Lower Bound	42,6767	
			Upper Bound	55,9896	
		5% Trimmed Mean		49,7330	
		Median		45,5882	
		Std. Deviation		19,37761	
		Minimum		14,00	
		Maximum		78,57	
		Range		64,57	

Table 13. Gain Score Effectiveness Category

Percentage (%)	Interpretation
0% - 40%	Ineffective
40% - 55%	Less effective
56% - 75%	Quite effective
76% - 100%	Effective

19

Table 14. Gain Score Average of Experimental and Control Class

Group Statistics						
	Class	N	Mean	Std. Deviation	Std. Error Mean
NGain_Percentage	Experiment	35	66,0928	22,27457	3,76509
	Control	35	49,3332	19,37761	3,27541

3) N-Gain Score Distribution

a) SPSS Output Frequency Interpretation

To determine the significance level, it is essential to test the effectiveness of both groups. An independent sample test, outlined in Table 15, was conducted to analyse the two groups' performance. The results indicate that the variance of data for N-Gain (%) in the experimental and control classes is homogenous. Levelne's test for equality of variances shows the significance of 0,589, less than the threshold value of 0,05. Based on this finding, we can confidently assume the t-test independent for N-Gain score significance is valid. Furthermore, the 2-tailed significance of 0,001, less than 0,05, shows a significant difference between the REACT strategy with the STEM approach application and the conventional model concerning students' understanding of flat-sided 3D object materials. For more information on the N-Gain scores for the experimental and control classes, please refer to Tables 15 and 16, respectively.

Table 15. Frequency Table

Experimental Class					
		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid	0% - 40% = Ineffective	5	14,3	14,3	14,3
	40% - 55% = Less Effective	6	17,1	17,1	31,4
	56% - 75% = Quite effective	12	34,3	34,3	65,7
	76% - 100% = Effective	12	34,3	34,3	100,0
	Total	35	100,0	100,0	

Table 16. Gain Effectiveness Category

Control Class					
		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid	0% - 40% = Ineffective	13	37,1	37,1	37,1
	40% - 55% = Less effective	8	22,9	22,9	60,0
	56% - 75% = Quite effective	8	22,9	22,9	82,9
	76% - 100% = Effective	6	17,1	17,1	100,0
	Total	35	100,0	100,0	

B. Hypothesis Test

1) Paired Sample t-Test

The Sig. (2-tailed) values obtained from the pre-test and post-test experimental class and the control class were $0,000 < 0,05$ (see Table 17), indicating a difference in the average score of students' mathematical concept understanding test results when using the REACT learning strategy with the STEM approach and conventional learning models, respectively. The REACT learning strategy was more effective in enhancing the mathematical concepts understanding of 8th-grade students. Table 18 shows how effectively the REACT strategy improves students' average mathematical concept understanding test scores. The result indicates that the REACT strategy improves students' understanding of mathematical concepts.

Table 17. T-test of Concept Understanding Post-Test of Experimental and Control Classes

Paired Samples Test									
		Paired Differences							
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	Pre-test experiment - Post-test experiment	-38,357	14,653	2,477	-43,390	-33,324	-15,487	34	,000
Pair 2	Pre-test control - Post-test control	-28,400	10,664	1,803	-32,063	-24,737	-15,756	34	,000

Table 18. Paired Sample T-Test for Mathematical Concept Understanding

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre-Test Eksperimen	41,79	35	12,854	2,173
	Post-Test Eksperimen	80,14	35	13,916	2,352
Pair 2	Pre-Test Kontrol	41,80	35	7,768	1,313
	Post-Test Kontrol	70,20	35	12,172	2,057

2) *Independent Sample t-Test*

Based on the output shown in Table 19, the significance value Sig. (2-tailed) is 0,002, which means the difference between the class's average scores with the REACT strategy and the conventional class exists. The related statistical descriptive analysis can be checked in Table 20. In the output of descriptive statistical results in the paired sample t-test for student learning outcomes in the experimental class post-test, there was an average value of 80,14, while for the student learning outcomes test in the control class post-test using a conventional learning model of 70,20. Based on these outputs, it can be concluded that implementing the REACT learning strategy in mathematics learning is effective in understanding the mathematical concepts of grade VIII students in building flat-sided space material compared to conventional learning models.

Table 19. Independent Sample T-Test of Concept Understanding

Independent Samples Test								
		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower	Upper
Test Result	Equal variances assumed	,069	,794	,002	9,943	3,125	3,707	16,179
	Equal variances not assumed.			,002	9,943	3,125	3,705	16,181

Table 20. Group Statistics Post-Test for Concept Understanding of Experimental and Control Classes

Group Statistics					
	Class	N	Mean	Std. Deviation	Std. Error Mean
Test Result	Post-test experimental class (REACT)	35	80,14	13,916	2,352

Group Statistics				
Class	**N**	**Mean**	**Std. Deviation**	**Std. Error Mean**
Post-Test control class (conventional)	35	70,20	12,172	2,057

Research by Ulum (2018) and Silmina (2020) supports the effectiveness of the REACT strategy in enhancing students' learning outcomes and science process skills. Ulum's findings highlight significant improvements in students' science skills, while Silmina demonstrates that students taught mathematical concepts via REACT achieve a stronger conceptual understanding than those taught through conventional methods. Further research at MTsN 2 Kediri City confirms this, with t-test results (Sig. = 0.002 < 0.05) indicating a statistically significant advantage of REACT over traditional approaches for mathematical comprehension.

CONCLUSION

The results of the research conducted at MTsN 2 Kediri on flat-sided 3D objects conclude that using the REACT learning strategy with the STEM approach is highly effective in improving student's understanding of concepts. Based on the findings, we confidently assert that the experimental class, VIII-A outperformed the control class, VIII-C, which used a conventional learning model.

The experimental class demonstrated a higher level of effectiveness than the control class based on the average score of the test results of understanding mathematical concepts. All the indicators in the test instrument showed an effective level of student achievement. The N-Gain Score analysis revealed that 66% of the experimental class students' understanding of mathematical concepts fell under the moderately effective category, whereas only 449% of the control class students' understanding fell under the less effective category. These results suggest that applying the REACT learning strategy with the STEM approach effectively enhances students' understanding of mathematical concepts. Therefore, it can be confidently concluded that the REACT learning strategy effectively improves students' mathematical concept comprehension.

The statistical analysis confirms that 35 students responded to the student response questionnaire for the REACT learning strategy in mathematics. Analysing the experimental class data led to a finding that the student's responses to the questionnaires using this learning model had an average score of 77.71%, indicating a "good" response. This confirms that implementing the REACT learning strategy effectively enables grade VIII students to comprehend mathematical concepts and develop positive mathematical attitudes toward flat-sided 3D objects.

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