



The Effectiveness of Learning Mathematics Through Explicit Instruction Techniques at Santa Maria Private Junior High School Parmonangan Academic Year 2020/2021

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ABSTRACT

The purpose of this research is to determine the effectiveness of learning mathematics through the Explicit Instruction technique with the help of Student Worksheets in teaching triangle material. The instruments used to determine the effectiveness of learning mathematics are the initial test, final test, and observation sheets as well as learning indicators in terms of 4 aspects, namely: student mastery level, student learning completeness, completeness of special learning objectives (TPK), student worksheets. The research subjects were all class VIII students of Santa Maria Parmonangan Private Junior High School, totaling 40 people and the research object was student learning outcomes and Student Worksheets (LKPD). The type of research used is descriptive research in the form of an essay. Before the material is taught, a preliminary test is given to determine the students' initial abilities and difficulties. The results of the initial tests show that students have low abilities. Of the 40 students, the percentage results obtained were 75% incomplete and 25% complete with an average of 46.65. Once applied Explicit instruction techniques with the help of Student Worksheets, carried out post-tests with the results of the percentage level of classical student learning completeness is 85% or an average of 69.4 in other words, classical student learning completeness has been achieved. Based on the TPK criteria, there are 4 TPKs. Of the 4 aspects of the effectiveness of mathematics learning, all of them are complete, namely: 80% Student Mastery Level, 85% Student Learning Completeness, 82.5% Completeness of Specific Learning Objectives, 77.5% Student Worksheets.) By applying explicit instruction techniques with the help of Student Worksheets in learning mathematics students on the material triangle student learning outcomes are increased and effective.

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1. Introduction

According to the opinion (Harningtyas Primadani 2011) Junior High School (SMP) as a part of formal education in Indonesia demands the formation of a reliable Indonesian generation in the future. In addition, SMP is also an appropriate starting point in the framework of educational development efforts concerning the field of mathematics studies.

This research was conducted at Santa Maria Parmonangan Private Junior High School, which is one of the junior high schools in North Tapanuli Regency with good quality, so that it will make it easier for researchers to conduct research. The material chosen in this study is Triangular Material which is one of the main subjects of mathematics in class VIII semester

2. Literature review

2.1 Theoretical Framework

a. Definition of Learning

In the Big Indonesian Dictionary, as quoted by Thobroni & Mustofa (2011: 18) defines the word learning comes from the word *ajary* which means instructions given to people so that they are known or obeyed, while learning means the process, method, action of making people or living things learn.



b. The Effectiveness of a Learning

Effectiveness comes from the word "effective" which means effective (KBBI third edition: 2001). According to Nana Sudjana (2009: 59), effectiveness can refer to the learning process and to learning outcomes.

So what is an indicator of the effectiveness of learning mathematics in this study is only in terms of four aspects, namely:

- 1) Student mastery level
- 2) Student learning completeness
- 3) Completeness of Specific Learning Objectives (TPK)
- 4) Student Worksheets

c. Explicit Instruction Learning Model.

The Explicit Instruction model (direct teaching) is defined as a teaching approach specifically designed to support student learning processes related to well-structured declarative knowledge and procedural knowledge that can be taught with a gradual pattern of activities (Arends, 2001: 264).

2.2 Student Worksheet (LKPD)

Student Worksheets (LKPD) or commonly known as Student Worksheets (LKS) are a learning tool that plays an important role in learning.

2.3 Triangle Matter

Triangle formula

a. Perimeter of the triangle

The perimeter of the triangle is found by adding up all the side lengths of the triangle. The formula for calculating the perimeter of a triangle is:

$$K = \text{Side 1} + \text{Side 2} + \text{Side 3}$$

b. The area of the triangle

- 1) While the formula for calculating the area of a triangle is:

$$L = \times \text{base} \times \text{height} \frac{1}{2}$$

- 2) A triangle if you know the lengths of the three sides.

If it is known that a triangle with side lengths is a, b, and c, as well as the area of L, then $L = \sqrt{s(s-a)(s-b)(s-c)}$

3. Research methodology**3.1 Research sites**

This research is located at Santa Maria Private Junior High School Parmonangan, North Tapanuli Regency, Academic Year 2020/2021.

3.2 Research Subjects and Objects

The subjects in this study were students of class VIII B of Santa Maria Parmonangan Private Junior High School.

The object of this research is student learning outcomes and Student Worksheets (LKPD).

3.3 Types of research

So this research is a descriptive study, namely to determine the results of student mathematics learning and also to determine the effectiveness of the Data Collection Tool

3.4 Observation

Observation, namely making direct observations to the object of research to take a close look at the activities carried out.

a. Student learning outcomes

- 1) Instrument Trial Analysis

After the trial test is held in the trial class, the instruments used in the trial test are analyzed. The things that must be analyzed from the trial test are as follows.

- a) Reliability of Test Items

$$r_{11} = \left(\frac{n}{n-1} \right) \left(1 - \frac{\sum \sigma_i^2}{\sigma_1^2} \right), \text{ dengan } \sigma_1^2 = \left(\frac{\sum x^2 - \frac{(\sum x)^2}{n}}{n} \right)$$

- b) Validity of Test Items

$$r_{xy} = \frac{n \sum xy - \sum x \sum y}{\sqrt{(n \sum x^2 - \sum x^2)(n \sum y^2 - \sum y^2)}}$$

b. Pretest

The pretest aims to determine the students' initial ability in the sample class.

c. Final ability test (Posttest)

Posttest is used to obtain data on student learning outcomes. The posttest is a test given to class VII-B, after the last learning process has been carried out.

3.5 Data analysis technique

To see the effectiveness of teaching can be seen from:

a. Teaching Effectiveness

1) Student Mastery Level

$$PPS = \times 100\% \frac{K}{SN}$$

2) Classical Completeness

$$D = \times 100\% \frac{X}{N}$$

3) Completeness of Specific Learning Objectives (TPK)

$$PBS = \times 100\% \frac{Z}{W}$$

In this study, teaching is said to be effective if it meets the following criteria:

- 1) Students have a moderate minimum level of mastery
- 2) The classical level reaches a minimum absorption power of $\geq 65\%$ with student mastery reaching a score of 65 and above.
- 3) If the percentage level of completeness is at least 75% of the students have completed learning for all the items related to TPK
- 4) The results of the learning process are said to be effective if the results of the observations are in the good or very good category.

3.6 Research Implementation Procedure

- a. Determining schools that are used as aspects of research, in this case the Santa Maria Parmonagan Private Junior High School for the 2020/2021 Academic Year is designated for research.
- b. Introduction to teaching using student worksheets (LKPD) which teaches mathematics by researchers and discussing it with each other for smoothness when PBM takes place.
- c. Collecting and analyzing research data.
- d. Duplicating and submitting research results.

4. Research Results and Discussion

4.1 Test Trial Results

Before the research instrument (test) is used as data collection, first a test trial is conducted to see the validity of the test and the reliability of the test which can be seen in Appendix 2.

a. Test Validity

Table 1
Summary of Calculation of Test Validity

Problem No.	rhitung	r table	Information
1	0.931	0.312	Valid
2	0.930	0.312	Valid
3	0.930	0.312	Valid
4	0.974	0.312	Valid
5	0.917	0.312	Valid

b. Reliability Test

Table 2
Summary of Test Reliability Calculations

Question Number	Value of Variance Problem
1	87.64
2	86.65
3	86.24
4	77.19
5	87.17
σ_i^2	424.89



By comparing the rcount price to the product moment rtable price with $N = 40$ from the level it is obtained $r_{table} = 0.312$, it turns out that the rcount value $>$ rtable. Thus the question is reliable. $\alpha = 0.05$

4.2 Description of Research Results

a. Description of Pre-test Result Data (Initial Test)

Table 3

Pre-test Result Data Tabulation

Completeness level of learning	Category	Lots of students	Percentage	Pretest mean
0% to <65%	Not complete	30	75%	48.65
$\geq 65\%$ - 100%	Completed	10	25%	

b. Observation Results

Based on the results of observations during learning, it was found that the teacher was able to maintain and improve the implementation of teaching and learning activities using explicit instruction techniques with the help of Student Worksheet (Student Worksheet). From Table 4.4, the average value for the first meeting is 2.94 and the second meeting is 3.5, the result of the observation of mathematics learning is 3.22.

4.3 Post-test Result Data Description (Final Test)

a. Student Mastery Level

Table 4

Student Mastery Level

Mastery Level	Category	Lots of students	Percentage
90% - 100%	Very high	2	5%
80% - 89%	High	4	10%
65% - 79%	Moderate	28	70%
55% - 64%	Low	5	12.5%
0% - 54%	Very low	1	2.5%

b. Students' Completion Levels

Table 5

Students' Completion Levels

Student learning completeness	Category	Many Students	Percentage
0% to <65%	Not complete	6 students	15%
$\geq 65\%$ - 100%	Completed	34 students	85%

c. Completeness of Specific Learning Objectives (TPK) / Learning Outcomes Indicators

Based on the TPK criteria, there are 4 TPKs. Of the 4 TPKs, all of them were complete (TPK I 80%, TPK II 85%, TPK III 82.5%, TPK IV 77.5%).

4.4 Description of Learning Outcomes Improvement Data

Individual Level	Completeness	Pre-Test	Post-Test	Increase (Decrease / Increase)
Not complete		30	6	Down = 24 students
Completed		10	34	Up = 24 students
Average		48.65	69.4	Increase = 23.1

4.5 Discussion

The results of this research show that Triangular learning uses explicit instruction techniques with the help of Student Worksheet (Student Worksheet), students are encouraged to be more active during the learning process, the teacher tries to dig further into students' reasoning power about the topic being taught and this has a significant effect. positive for student learning activities in learning mathematical concepts, especially in the Triangles material.

5. Conclusion

Based on the overall description of the research results it can be concluded that "Triangular Learning using the Explicit Instruction technique with the help of LKPD (Student Worksheets) in class VIII of the Santa Maria Parmonangan Private Middle School in the Academic Year 2020/2021 is increasing and effective.

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