

# The Influence of use of PMRI Approach to Transparent Tape Media on the Ability of Troubleshooting Problem Students

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**Abstract.** This study aims to determine whether or not there is an effect of using the PMRI approach to problem solving abilities of elementary school students in grade VI. This research was conducted at Karang Waru Elementary School, Lawang Wetan Subdistrict, Sekayu. This research is an experimental research using Quasi Experimental Design and Pretest-Posttest One-Group research design. In this study the sampling technique used is saturated sampling. The media used in the PMRI approach in this study is transparent tape. Data collection techniques in this study were tests and observations analyzed by looking for the average of the indicators of each student, normality test, homogeneity test, and hypothesis testing using the t-test to see the effect of using the PMRI approach on students problem solving abilities. The results of the final analysis were using the t-test which obtained the results of  $t_{count} > t_{table}$  ( $12,354 > 2,261$ ) with a significance level below 0.025 so it was concluded that the use of PMRI approach had a positive influence on students problem solving abilities.

**Keywords:** PMRI, transparent tape media, troubleshooting problem

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## 1. Preliminary

Mathematics is a mandatory subject given to primary and secondary education, to equip students to be able to think logically, analytically, systematically, critically, innovative, and creative as well as the ability to work together (Khatimah, Dwina, & Jamaan, 2018). To develop such capabilities, education should direct students to the use of various situations and the opportunity to rediscover mathematics in their own way (Muchlis, 2012). To develop such capabilities, education should direct students to the use of various situations and the opportunity to rediscover mathematics in their own way (Muchlis, 2012). The purpose of mathematics education refers to the Permendiknas No. 22 year 2006 quoted (Muncarno & Astuti, 2018) Three of the five are discussing the importance of problem-solving skills in students. In the education curriculum in Indonesia It is said that mathematics education aims to develop students' ability to use mathematics in problem solving and problem solving approach is focus in mathematics learning (Badanstandar national pendidikan, 2006). This means that solving problems in mathematics learning in Indonesia is very emphasized.

A mathematical learning approach that uses real-world situations or a real context and students' experience as a starting point for learning Mathematics (Muncarno & Astuti, 2018). Students are asked to think creatively, looking at issues from various sides, thinking of giving a variety of possible answers based on the information provided. This is expected to be inversely proportional to the learning process that has been implemented, where students think systematically and only focus on one of the most correct answers (Jannah & Zuliana, 2014). Based on this, it takes a learning strategy that directs the

learning process that learners should think creatively through an existing and calculated approach that is effective and appropriately used to encourage students to think Creative Problem solving skills.

To solve the problem of learning is less meaningful, it is necessary to modify the learning process. These modifications include learning approaches and learning materials, the learning in question is the Indonesian realistic mathematics approach (PMRI) (daughter, 2012). PMRI emerged as a special method of mathematics in Indonesia. The initial motivation was to find a modern mathematical replacement that left the early 1990-an. The Realistic math education (PMR) approach (RME) is one of the potential mathematics learning innovations to Improve student connections with mathematical concepts (Danoebroto, 2008). This is similar to the statement (Andari&Komsiatun, 2018) that RME is a mathematical learning approach that must always use everyday life so that students better understand the concept and intent of learning. In learning using the PMRI approach is expected to improve the ability of students to build concepts for problem Solving (Putri, 2012). PMRI also emphasized to bring mathematics to meaningful teaching by relating it in real life everyday that is realistic (Muchlis, 2012). Therefore, the PMRI approach requires realistic or empirical teaching materials, which in this case is a transparent ribbon.

Transparent Ribbon is an object made of woven yarn that easily cut into several parts. Transparent ribbon consists of a wide range of colors. With the fact that transparent tape is easy to cut, making researchers to use transparent tape to be props in fractional material learning in elementary school. The transparency ribbon was once used by (Malla, 2014) as a medium to examine student learning outcomes on fractional material based on cycle I research analysis and cycle II gained an increase from 65% to 87.5%. So the use of media transparency to improve student mathematics learning results is considered effective. The influence of the use of PMRI approaches to problem-solving capabilities was never been carried out by Fuadiah (2009) and concluded that the results of the research showed that both the problem-solving skills and understanding of the students Taught with a significantly better PMRI approach than students are taught with a regular approach.

But does the use of the PMRI approach with transparent ribbon media in the fractional material learning process will positively affect the students ' problem solving skills? Therefore, specific research on this matter is necessary. This research aims to test whether mathematics learning by using PMRI approach with the media is transparent ribbon positively impacting problem solving ability of students in class VI elementary school.

## 2. Method

This research is quantitative research conducted by the research method of pre-Experimental design i.e. one-group Pretest-Posttest. The samples in this study were students of Grade VI Elementary School in the village of Waru, with the sampling technique being saturated sampling because the study involved all students in the research class.

Where the experimental research design was given a pretests to learners to know the early skills of the students. After the pretests is carried out then the next thing is to give students learning with Pedekatan PMRI using transparent ribbon media. After learning is performed, a posttest will be held. The data collection techniques used in this study are tests and observations. Tests are used as instruments to view students ' problem-solving skills. While observation is done to get supporting data in order to strengthen the test results. For testing the problem-solving capabilities are analyzed by using the average looking of indicators of each student, test normality, homogeneity test, and hypothesis testing using the T-Test. The Data collected is derived from the scoring indicators described in table 1 below.

**Table 1.** Scoring Guidelines for Troubleshooting Abilities Test

Indicator	Score			
	3	2	1	0
1. Demonstrate understanding of problems	Write down what is known	Write down what is known	Write down what is known and asked, one is true	None written

	and what is asked, almost asked, right right
2. Choose the right approach and troubleshooting methods	Write the Writing the Write down the None appropriate mathematical correct mathematical used (the formula) written rules, correct rules (formulas), in less precise, calculation calculation is correct calculation
3. Resolve the problem	Resolving problems almost incorrectly Doesn't solve the problem appropriately correctly

**Table 2.** Calculate students pretest-posttest scores

Name	Understanding of problems		Strategy Planning Problem solving		Implementation of strategy plan Solving questions and checking results		Average pretest (%)	Average posttest (%)
	Pretest	Posttest	Pretest	Posttest	Pretest	Posttest		
Student 1	66,67	100	66,67	100	100	100	77,78	100
Student 2	33,33	66,67	0	33,33	0	33,33	11,11	44,44
Student3	0	33,33	33,33	66,67	33,33	66,67	22,22	55,56
Student 4	66,67	100	66,67	66,67	100	100	77,78	88,89
Student 5	0	33,33	33,33	66,67	33,33	66,67	22,22	55,56
Student 6	0	33,33	33,33	66,67	0	66,67	11,11	55,56
Student 7	33,33	66,67	33,33	66,67	33,33	66,67	33,33	66,67
Student 8	66,67	66,67	66,67	100	66,67	100	66,67	88,89
Student 9	66,67	100	100	100	66,67	100	77,78	100

**3. Result and discussion**

The learning carried out using the PMRI approach of Transparent Ribbon media was held during one meeting. To see if there is a positive influence on the use of PMRI approach with transparent ribbon media to problem solving ability test results of problem solving capability. Final data analysis includes testing of normality, homogeneity, and hypothesis testing. Before going into the final analysis. Table 2 below is the result of calculation of pretests and posttest students based on the design used by researchers.

Table 2 above shows the calculation of pretests and posttest scores of students. The average value of pretests and Posttest is the value used for the final analysis. In this research, analysis of normality test using the help of downloaded SPSS 23.0 with Kolmogorov-Smirnov test shown in table 3 below.

**Table 3.** Test normality test problem solving ability

<i>Kolmogorov-Smirnov<sup>a</sup></i>			
	<i>Statistic</i>	<i>Df</i>	<i>Sig.</i>
<i>Pretest</i>	.216	9	.200*
<i>Posttest</i>	.232	9	.176

From table 3 above, it is known that the data posttest value sig. = 0.176 > 0.05 so that H0 received. Further, it can be concluded that the classes are researched with normal distribution.

Test homogeneity using Levene Statistic test with the help of downloaded SPSS, which is shown table 4 below

**Table 4.** Test homogeneity test Problem solving ability

Levene Statistic	Posttets		
	df1	df2	Sig.
7.817	2	4	.042

From table 4 above, it is known that the data posttest value sig. = 0.042 < 0.05 until H0 is rejected. It can then be concluded that the studied class is not homogeneous. A hypothesis test is conducted to determine if the PMRI approach with transparent ribbon Media has a positive effect on the problem solving ability in elementary school students.

a. Hypothesis

H0:  $\mu_1 = \mu_2$  (PMRI approach with transparent ribbon Media does not have a positive effect on the problem solving ability in elementary school students)

Ha:  $\mu_1 > \mu_2$  (PMRI approach with transparent ribbon Media has positive effect on problem solving ability in elementary school students)

b. Hypothesis Testing criteria

H0 received if  $T_{hitung} > T_{tabel}$  with a significant level of opportunity 5% obtained Freedom Derajak  $n_1 + n_2 - 2$

c. Calculation

The calculations on this study used the help *software* of the SPSS downloaded with the *Independent-samples T Tes* test. Table 5 Below are the results obtained

**Table 5.** Test-t Test

Model		Unstandardized Coefficients		Standardize	T	Sig.
		B	Std. Error	d		
				Beta		
1	(Constant)	40.816	3.022		13.508	.000
	<i>pretest</i>	.716	.058	.978	12.354	.000

a. Dependent Variable: *posttest*

To find out if there is a positive influence on the use of PMRI approach to problem solving skills students can be seen in table 5 above that  $T_{hitung}$  pretests is greater than this (12.354 > 2.261) with significance level below 0.025. Research results conducted by this researcher in line with the research conducted (Malla, 2014) which conducts research to look at problem solving skills of students on the subjects of Mathematics elementary School fractional material using media ribbon Transparency. The research conducted by Malla shows that the use of media tape transparency on fractional material has an influence on the students ' problem solving skills, which is the percentage of student learning outcomes (> 80%) and expressed in very high criteria.. Similar research was conducted by (Oftiana&Saefudin, 2017) to see the influence of Pmri approach to the ability of problem solving students mathematics and obtained that

Thitung > this is  $3.094 > 1.67469$  so  $H_0$  rejected, which means Learning to use the PMRI approach affects students' mathematical problem-solving skills. Similar research has been conducted (Anisa, 2014) using PMRI approach and the overall average score of students' attitudes toward learning with mathematics education of 4.16 is greater than 3, which includes a positive attitude criteria to Problem-solving and mathematical communication skills. (Fitriani & Maulana, 2016) conducted a study using the realistic mathematical approach of Indonesia to see the understanding and problem solving mathematically students seen from the average value that the experiment class gained is greater than Control classes of 70.03 and 60.06. This proves that the use of the Indonesian Realistic Mathematics Education (PMRI) approach has a positive influence on understanding and solving the mathematical problems of students.

#### **4. Conclusion**

Based on the research and discussion as mentioned above, it can be concluded that there is a positive influence on the use of PMRI approach with transparent tape media to students' problem solving skills. The positive arrangement use of PMRI approach with transparent ribbon media can be seen by researchers based on test and observation as well as indicators and scoring guidelines that researchers have set in table 1 then calculated based on test-T. Because  $T_{hitung} > T_{tabel}$  then drawn the conclusion  $H_a$  accepted that there is a positive influence use of PMRI approach with transparent ribbon Media to problem solving ability in students.

Based on the results and there are some suggestions, preferably in every teacher mathematics learning using adequate learning media according to the material to be taught, so that students are able to see the content of objects related with the material learned is fractional. Advice to other researchers, that the media used does not have to be transparent ribbon. Researchers who want to research with similar titles can make modifications about the media that will be used to apply the use of this PMRI approach to the learning process.

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