Edumatica: Journal of Mathematics Education
Volume 13 Number 03 December 2023

Submited : 01 December 2022
Revised : 26 December 2023
Accepted : 30 December 2023

Efektivitas Pembelajaran Matematika Melalui Pendekatan PMRI Berbantu Video Pembelajaran Terhadap Kemampuan Berpikir Kritis Siswa

Herlawan[1], Rismayani Armin[2], Iin Rusandi Poa[3]
[1,2,3]Department of Mathematics Education, Dayanu Ikhsauddin University, Indonesia
E-mail: herlawan@unidayan.ac.id[1], armanrismayani@gmail.com[2], iinrusandi@gmail.com[3]

Abstrak

Penelitian ini bertujuan untuk mengetahui keefektifan pembelajaran matematika melalui pendekatan Pendidikan Matematika Realistik Indonesia (PMRI) berbantu video pembelajaran terhadap kemampuan berpikir kritis siswa kelas VIII SMP Negeri 2 Baubau. Penelitian ini merupakan penelitian kuantitatif menggunakan model quasi eksperimen. Populasi siswa terdiri dari siswa kelas VIII di SMP Negeri 2 Baubau, yang berjumlah 11 kelas dengan teknik pengambilan sampel cluster random sampling sehingga di dapatkan sampelnya yaitu kelas 8.2 dan 8.3. Instrumen yang digunakan dalam penelitian ini ialah wawancara dan tes hasil belajar dengan teknik analisis N-gain dan Independent sample t test N-gain. Berdasarkan hasil penelitian diperoleh hasil di kelas ekperimen dalam kategori efektif, hal ini terlihat dari hasil analisis skor N-gain menunjukan skor rata-rata N-gain sebesar 79,51 atau 79,5%. Sementara pada kelas kontrol dalam ketegori tidak efektif, hal ini terlihat dari hasil analisis skor N-Gain menunjukan skor rata-rata N-gain adalah sebesar 25,16 atau 25,2%. Sementara dari hasil nilai uji hipotesis independent sample t test N-gain diperoleh nilai Sig. (2-tailed) adalah 0,000<0,05. Dengan demikian disimpulkan bahwa ada perbedaan efektivitas yang signifikan (nyata) antara penggunaan pendekatan pendidikan matematika realistik Indonesia (PMRI) berbantu video pembelajaran dengan penggunaan pendekatan konvensional untuk meningkatkan kemampuan matematis berpikir kritis siswa kelas VIII di SMP Negeri 2 Baubau.

Kata Kunci: kemampuan berpikir kritis, Pendidikan Matematika Realistik Indonesia, video pembelajaran

The Effectiveness of Mathematics Learning Using PMRI Approach with the Assistance of Learning Videos on Students' Critical Thinking Ability

Abstract

This research aims to determine the effectiveness of mathematics learning through the Indonesian Realistic Mathematics Education (PMRI) approach assisted by learning videos on the critical thinking abilities of class VIII students at SMP Negeri 2 Baubau. This research is quantitative research using a quasi-experimental model. The student population consisted of class VIII students at SMP Negeri 2 Baubau, totaling 11 classes using a cluster random sampling technique so that the samples were class 8.2 and 8.3. The instruments used in this research were interviews and learning outcomes tests using N-gain analysis techniques and independent sample t test N-gain. Based on the research results, the results in the experimental class were in the effective category. This can be seen from the results of the N-gain score analysis showing the average N-gain score of 79.51 or 79.5%. Meanwhile, in the control class in the ineffective category, this can be seen from the results of the N-Gain score analysis showing that the average N-gain score is 25.16 or 25.2%. Meanwhile, from the results of the independent sample t test N-gain hypothesis test value, the Sig value was obtained. (2-tailed) is 0.000<0.05. Thus, it is concluded that there is a significant (real) difference in effectiveness between the use of the Indonesian realistic mathematics education (PMRI) approach assisted by learning videos and the use of conventional approaches to improve the critical thinking mathematical abilities of class VIII students at SMP Negeri 2 Baubau.

***Keywords**: critical thinking ability; Indonesia's Realistic Mathematics Education; learning video*

INTRODUCTION

Education is very important to encourage changes in cognitive, affective and psychomotor abilities, furthermore, it is not only about improvement, but education can also be used to improve the standards of learners as individuals, workers, citizens, communities and God's creatures. Education is a stage of learning for learners to understand something and make them think critically. The Law of the Republic of Indonesia Number 20 of 2003 concerning the national education system explains that education is an effort to train students through teaching, guidance and training activities for their future roles (Rahmat, 2018). One of the subjects that must be studied is mathematics.

Mathematics is a science that is hierarchical, systematic, logical and structured starting from simple concepts to very complex concepts. Thus, students must master the basic concepts of learning mathematics (Danoebroto, 2013). Mathematics has a very important role in everyday life. Every moment is often met with situations that require mathematical thinking skills, starting from doing daily activities at home, activities at the office, estimating time, predicting events, etc. However, mathematics learning both in elementary school and elementary school is not always easy. However, learning mathematics both in elementary schools, junior high schools, high schools, and universities, has not shown satisfactory results, both in terms of the learning process, as well as student learning outcomes.

One of the important issues of current mathematics problems is that learning should not only focus on educators and the delivery of material, but should also be able to introduce how the concept is obtained. It can be seen from the reality in the field that math is considered a scary, boring, uninteresting thing. This is because math learning is taught abstractly and is not contextualized with students' daily lives, which results in math learning being less attractive to students. Teachers should guide students in the thinking process with the aim of increasing deeper understanding in order to see mathematical problems from various perspectives with a variety of solutions to overcome these problems.

Based on the problems that I found during the implementation of observations or observations at SMP Negeri 2 Baubau that the learning process is still carried out conventionally through the lecture method where the teaching and learning process is centered on the teacher and students only pay attention and listen to what is conveyed by the teacher so that students do not have independence in learning and thinking independently causing when doing tests, students are not sure of their answers, even some students do not give reasons for their answers. The material provided is only based on textbooks or student worksheets (LKS). This is in accordance with the definition of conventional learning where learning in a classical context that has been accustomed to being done, is teacher-centered, so that its implementation pays less attention to the overall learning situation (Mulyono & Wekke, 2018). As for the weaknesses of the application of this method, namely learning emphasizes the receipt of knowledge, is teacher-centered, less fun, monotonous, limited media use (Helmiati, 2012).

Efforts that need to be made to overcome this problem are by making efforts to improve the learning process. Among them are by using learning methods that can improve students' mathematical thinking skills, to develop students' potential to the fullest, and to take a learning approach that involves students in activities that occur and are experienced by students in their daily lives by utilizing real-life problems. As research has been conducted by Nurmalita & Hardjono (2020) with the title "The Effectiveness of Using the Realistic Mathematics Education Approach (PMR) to Improve Critical Thinking Skills of Elementary School Students", the results of this study show that the Realistic Mathematics Education (PMR) approach is effectively used in an effort to improve the mathematical critical thinking skills of elementary school students. The similarity of the research conducted is that both use the Indonesian Realistic Mathematics Education Approach in providing an increase in students' critical thinking skills. The differences are in the learning methods, population and research methods conducted. In this study using the meta-analysis method and the population used was elementary school students while in the research conducted using the PMRI approach rocked by learning videos and experimental methods with a population of junior high school students. Furthermore, research that has been conducted by Hasniati, Jais, & Herlawan (2020) with the title "Improving Problem Solving Ability Through Realistic Mathematics Education (PMR) in Class VII Students of SMP Negeri 1 Tomia", the results of this study obtained that the mathematical problem solving ability of students in the experimental class using a realistic mathematics approach is higher than the mathematical problem

solving ability of students in the control class using a conventional learning approach. The similarity between this research and the research conducted is that both discuss the application of the PMRI approach. Meanwhile, what distinguishes it is that in this study the dependent variable is students' problem-solving ability, while the research conducted uses the PMRI approach assisted by learning videos with the dependent variable being critical thinking ability. In addition, the subjects in the study were different

So that one of the solutions expected to solve this problem is to improve students' critical thinking skills through the PMRI (Indonesian Realistic Mathematics Education) approach assisted by learning videos. The realistic mathematics approach includes a learning approach that connects everyday life in learning mathematics so that students focus on ways of thinking where students involve daily life problems in learning mathematics and not only knowing mathematics in theory. Critical thinking skills are the ability to think reflectively and reasonably in making decisions (Nuryanti, Zubaidah, & Diantoro, 2018). According to Herliati (2022) the purpose of critical thinking is to achieve deep understanding. Understanding allows us to grasp the intent behind the ideas that guide our daily lives. Realistic mathematics education is a learning approach that involves everyday life as a method of learning mathematics which aims to improve students' skills in solving problems, thus students gain knowledge of the essential concepts of the material they learn (Warmansyah et al., 2023).

The PMRI approach is an effort that can improve students' critical thinking mathematical abilities by encouraging students to be more active in the learning process and the understanding received is more stable so that students can build a mathematical concept in their own way through critical thinking skills. Meanwhile, the use of learning videos is expected to transform the material optimally so that students can more easily imagine the situation and more easily understand the concepts learned. Learning video is a learning media that can be used in audio and visual presentations that contain learning materials that contain concepts, principles, procedures, theories and applications of knowledge to facilitate student understanding of learning materials (Wisada, Sudarma, & Yuda S, 2019). Learning videos act as a medium that facilitates the delivery of information from teachers to students. Learning videos can also make it easier for teachers to deliver material through video media. The ease of video playback and the presentation of directed information make learning video media one of the learning media that can improve students' understanding of concepts (Hadi, 2017). In addition, learning videos can also provide benefits in terms of providing unexpected experiences to students, by showing nyta which initially could not be seen so that it can analyze providing experiences to students so that they can present case study presentations so that they can trigger discussions (Yudianto, 2017).

Based on the discussion above, the researcher needs to conduct a study with the title "The Effectiveness of Mathematics Learning through the Indonesian Realistic Mathematics Education Approach (PMRI) assisted by Learning Video on Critical Thinking Ability of Class VIII Students of SMP Negeri 2 Baubau" with the aim of knowing the effectiveness of mathematics learning through the Indonesian Realistic Mathematics Education approach (PMRI) assisted by learning videos on the critical thinking ability of class VIII students of SMP Negeri 2 Baubau.

METHODS

This study aims to determine the effectiveness of the PMRI approach assisted by learning videos on students' critical thinking skills by using two study groups, namely the experimental class group and the control class group, researchers cannot form new classes randomly, because this research is conducted in junior high school. So that the research conducted is a type of quantitative research using an experimental model. Research using experimental methods is a research method that can be used to determine the effect of certain actions on others under controlled conditions or situations (Sugiyono, 2018). The experimental research method used is quasi-experimental design, which is a form of experimental design that has a control group, but does not function as a whole to control external variables that affect the implementation of experimental research (Sugiyono, 2018). The research was conducted in the odd semester of the 2022/2023 school year at SMP Negeri 2 Baubau. The object of research using the population contained in SMP Negeri 2 Baubau in class VIII students with a total of 11 study groups totaling 345 students. The sample used was VIII grade students of SMP Negeri 2 Baubau as many as two classes. Determination of study groups as experimental classes and study groups

 Print ISSN: 2088-2157, Online ISSN: 2580-0779

as control classes was carried out using the Cluster Random Sampling technique (Random sampling based on groups). The regional sampling technique is used to determine the sample when the object to be studied or the data source is very broad (Sugiyono, 2018). Where the 8th grade population consists of 11 classes, the researcher chooses randomly so that the sample is class 8.2 (Experimental Class) and 8.3 (Control Class).

Research Instruments

Learning Outcome Test

The test administered in this study aims to measure critical thinking mathematical ability. The learning outcome tests in this study were in the form of pretest and posttest description tests consisting of 5 questions. The pretest was used to measure students' critical thinking skills before treatment, while the posttest was used to measure students' critical thinking skills after treatment. Before the test was given to the experimental class and control class, the questions were first tested for validity and reliability in the non-sample class, namely class IX_2 and IX_4 where the class had studied number pattern material which was then tested for validity and reliability.

Based on the results of the validity and reliability analysis of the pretest and posttest instruments using IBM SPSS Statistic 22, the validity test was obtained for the KMO Measure of Sampling Adequacy pretest value (0.676) > 0.5 and the KMO Measure of Sampling Adequacy posttest value (0.642) > 0.5. This explains that the validity test can be continued. In addition, the correlation results of each factor of the two tests are also classified as high greater than 0.5 so that based on the results of factor validity testing it can be concluded that all Pretest and Posttest factors are valid. And based on the reliability analysis of the instrument with the SPSS version 22 program, the Cronbach'Alpha value is above 0.6, so the instrument is said to be reliable.

Data Collection Technique

To obtain data on students' critical thinking skills measured through students' mathematics learning outcomes, researchers used the technique of giving learning outcomes tests and interviews. Learning outcomes data were collected using student learning outcomes tests. The test was given before (Pretest) and after (Posttest) given treatment (Treatment). While the interview aims to get clearer information and what is felt and happens to students directly.

Data Analysis Technique

Descriptive Analysis

Descriptive analysis is a statistical analysis that is used with the aim of processing research data by describing or describing the data that has been collected as it is without intending to make research data conclusions that apply to the public or generalizations (Sugiyono, 2018). The data generated from the research were processed using descriptive analysis techniques, namely analysis that aims to describe the value of students' mathematics learning outcomes before and after the application of treatment, namely learning with the PMRI approach assisted by learning videos in experimental and control classes.

Inferential Statistical Analysis

Normality Test

The normality test is used with the aim of knowing the distribution of the research data whether the data is normally or abnormally distributed. The normality test of the data from this study will be processed using the Kolmogrov-Sminov test assisted by SPSS version 22.0 with a significant level of 0.05. The research data is said to be normally distributed if the test results are significant> 0.05. The following are the results of the normality test for the control class and experimental class which can be seen in Table 1.

Table 1. Normality Test Results for Control and Experimental Classes

Kolmogorov-Smirnov Z Asymp. Sig. (2-tailed)	**Control Class**	**Experiment Class**
Pretest	.137	.170
Posttest	.200	.200

Homogeneity Test

The homogeneity test was used with the aim of seeing whether the research data in the population and samples analyzed were homogeneous (similar) or inhomogeneous. The homogeneity test of the research data was analyzed using Levene's Test. The research data is said to be homogeneous if the resulting significance> 0.05. The following are the results of the homogeneity test of the control class and the experimental class which can be seen in Table 2.

Table 2: Homogeneity Results of Control and Experimental Classes

Levene Statistic	**df1**	**df2**	**Sig.**
1.821	1	58	.182

N-Gain Test

According to Hake (Pratiwi, 2014: 151) N-Gain data test is a test of research data that can provide information about the increase in student learning outcomes test scores before and after treatment is applied (Pratiwi & Indrawati, 2018). In research using control and experimental classes, the N-Gain test can be used when there is a significant difference between the average Posttest scores of the experimental and control classes through the independent sample t test. Technically, researchers use the SPSS version 22 program. The formula for calculating the normalized gain score is based on the Archambault formula (Sagita, 2014):

$$N - Gain = \frac{Skor\ posttest - Skor\ Pretest}{Skor\ Maksimal - Skor\ Pretest} \times 100 \quad \ldots\ldots (1)$$

The results of the calculation of normalized gain are then interpreted based on the interpretation of N-gain seen in Table 3 as follows:

Table 3. N-gain Interpretation Results according to Hake (1999)

Percentage (%)	**Interpretation**
< 40	Ineffective
40 - 55	Less Effective
56 - 75	Effective enough
> 75	Effective

RESULTS

This study was conducted at SMP Negeri 2 Baubau Class VIII odd semester of the 2022/2023 school year with the aim of knowing the effectiveness of mathematics learning with the Indonesian Realistic Mathematics Education (PMRI) approach assisted by learning videos on students' critical thinking skills. This study used two classes, namely the experimental class and the control class. The control class consisted of 30 students and the experimental class consisted of 30 students.

This study was conducted 4 times including posttest. Before finding out how much the effectiveness of learning mathematics in the classroom through the PMRI approach assisted by learning videos, a trial was first conducted to determine the initial ability of students and continued with different learning treatments in both classes.

The activities of implementing mathematics learning with the PMRI approach assisted by learning videos are: 1) before learning begins first prepare teaching and learning activities and divide students into several study groups 2) The teacher presents a learning video using contextual problems related to everyday life 3) the teacher provides opportunities for students to identify information related to the tanyangan presented 4) The teacher gives problems to students related to the subject matter and students are directed to discuss to solve the problems that have been given by the teacher. 5) The teacher directs students so that students can explain the answers obtained from the results of student discussions. 6) The teacher conveys to students to make conclusions about the important points that appear in the show.7) provide opportunities for students to ask about things that have not been understood. The above activities

 Print ISSN: 2088-2157, Online ISSN: 2580-0779

are in line with Danoebroto (2013), that learning using a realistic mathematics education approach is learning mathematical concepts obtained through students' own thinking processes so that this approach is a learning strategy for students that uses students as the center of learning, and, real problems or everyday situations are used as the starting point of learning. In learning implementation activities there are some obstacles where learning activities in experimental classes use contextual problems related to everyday life.

Conventional learning is implemented by: 1) Students are prepared by the teacher to carry out the learning process in the classroom, 2) delivering learning materials and providing explanations to students, 3) students are given exercise questions by the teacher then students collect the answers they get, 4) at the end of learning the teacher makes conclusions on the material that has been taught. The implementation of the learning in question is in line with conventional learning which is defined as learning in a classical context that is usually carried out in general and is teacher-centered, so that the learning carried out pays less attention to the whole student to learn (Mulyono & Wekke, 2018).

The posttest was carried out after the implementation of the learning was completed for 3 meetings, this posttest was carried out to determine the effectiveness of mathematics learning with the Indonesian realistic mathematics education (PMRI) approach assisted by learning videos on students' critical thinking skills in experimental classes and conventional learning in control classes, obtained the results of students' critical thinking skills between experimental and control classes descriptively and inferentially.

Descriptive Analysis

Results of Descriptive Analysis Before Treatment *(Pretest*)

Pretest score data were analyzed using descriptive analysis of pretest score data. Statistical tests of pretest scores in the control class and experimental class obtained will provide an overview of the state of the two classes descriptively. And based on the results of descriptive analysis of pretest data using the SPSS version 22 program in the control and experimental classes shown in Table 4.

Table 4. *Pretest* Descriptive Analysis Results

Class	N	Minim	Max	Mean	Std. Deviation
Control	30	40	65	50.50	6.991
Experiment	30	10	55	35.00	12.955

Based on Table 4, the minimum pretest value in the control class was 40 and the minimum pretest value in the experimental class was 10. The maximum pretest value in the control class was 65 and the maximum pretest value in the experimental class was 55, the average pretest value in the control class was 50.50 while the average pretest value of the experimental class was 35.50. The standard deviation of pretest scores in the control class was 6.99 while the standard deviation of pretest scores in the experimental class was 12.955.

Descriptive Analysis Results After Treatment *(Posttest*)

Data on posttest scores in the control class and posttest scores in the experimental class were analyzed using descriptive analysis to obtain an overview of the state of the control class and experimental class data descriptively. The results of descriptive data analysis of post-test scores using the SPSS version 22 program are shown in Table 5 below.

Table 5. *Posttest* Descriptive Analysis Results

Class	N	Minim	Max	Mean	Std. Deviation
Control	30	40	75	62.83	9.798
Experiment	30	75	100	86.83	7.598

Table 5 shows that the minimum data value of the control class is 50 and the minimum data value in the experimental class is 75, the maximum data value in the control class is 75 and the maximum data value in the experimental class is 100, the average value in the control class data is 62.83, the average

value in the experimental class data is 86.83, and the standard deviation value in the control class and experimental class is 9.798 and 7.598, respectively.

N-Gain Test

The following are the results of the N-gain test to see the percentage of improvement or progress in the critical thinking skills of experimental class students with the PMRI approach assisted by learning videos and control classes with conventional learning presented in Table 6 below.

Table 6. Test-Gain Calculation Results of Pretest and Posttest of Experimental Classes

		Mean	Minim	Max
N-Gain Score (%)	Control	25.16	.00	55.56
	Experiment	79.51	50.00	100.00

The data from the N-gain test analysis shown in Table 6 is that in the control class the minimum N-gain score of 0.00 or 0% and a maximum of 55.6% and the average N-gain score of 25.2% are included in the ineffective category. While in the experimental class the minimum N-gain score was 50% and the maximum was 100% and the average N-gain score of 79.5% was included in the effective category.

Thus, it can be concluded that the use of the Indonesian Realistic Mathematics Education (PMRI) approach assisted by learning videos can be interpreted as effective in improving the critical thinking skills of grade VIII students at SMP Negeri 2 Baubau. While the use of conventional learning approaches is interpreted as ineffective in improving the critical thinking skills of grade VIII students at SMP Ngeri 2 Baubau.

The next step to determine whether the difference in effectiveness between the PMRI approach assisted by the learning video (Experimental Class) and the conventional learning approach (Control Class) is significant (real) or not, it is necessary to conduct an independent sample t test on the N-Gain data so that it is necessary to conduct a prerequisite test on the N-Gain data as follows.

N-Gain Normality Test

The N-gain data normality test was carried out to obtain information on whether the data was normally or abnormally distributed. The N-gain data normality test was carried out using the Kolmogrov-Sminov test assisted by the SPSS version 22.0 application with a significant level of 0.05, the data population was categorized as normally distributed if the test results had a significant value > 0.05. The following are the results of the normality test for the control class and experimental class which can be seen in Table 7.

Table 7. N-Gain Normality Test Results of Pretest and Posttest Normality Analysis of Control Classes

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Gain	Control	.155	30	.063	.938	30	.083
	Experiment	.115	30	.200*	.975	30	.674

Based on Table 7, it is known that the value (Sig.) in all experimental and control class data both kolmogorov-smirnov and shapiro-wilk tests > 0.05 so that H_0 is accepted. So, it can be concluded that the N-Gain score data of the experimental and control classes are normally distributed.

N-Gain Homogeneity Test

The homogeneity test is needed to determine whether the N-Gain scores of the experimental and control class data are homogeneous (similar) or inhomogeneous. The N-gain data homogeneity test action carried out using Levene's Test, because this study only compares two variances. The data is declared homogeneous if the significant obtained > 0.05. The following are the results of the homogeneity test of the control class and experimental class which can be seen in Table 8.

It can be seen in Table 8 that the significance value (Sig) Based on Mean is 0.97 > 0.05, thus the variance of the N-gain score data in the experimental class and the data in the control class is homogeneous.

 Print ISSN: 2088-2157, Online ISSN: 2580-0779

Table 8. N-Gain Homogeneity Test

		Levene Statistic	df1	df2	Sig.
N-Gain Value	Based on Mean	2.850	1	58	.097
	Based on Median	1.560	1	58	.217
	Based on Median and with adjusted df	1.560	1	55.363	.217
	Based on trimmed mean	2.960	1	58	.091

Independent Sample T Test N-Gain

Based on the prerequisite test above, it is said that the N-Gain data in the experimental and control classes are normally distributed and homogeneous. Furthermore, an independent sample t test was conducted on the N-Gain data to compare the differences in the effectiveness of using PMRI approaches assisted by learning videos and conventional learning on critical thinking skills. The following are the results of the independent sample t test with N-Gain data in Table 9.

Table 9. Hypothesis Test of N-Gain Data

		T-Test for Equality of Means		
		t	df	Sig. (2-tailed)
gain	Equal variances assumed	14.806	58	0.000
	Equal variances not assumed	14.806	55.718	0.000

Based on Table 9 above, it is known that the Sig. (2-tailed) value is 0.000 < 0.05. Thus, there is a significant difference in the use of the PMRI approach assisted by learning videos with conventional learning on students' critical thinking mathematical abilities, this indicates that learning mathematics through the PMRI approach assisted by learning videos is effective on the critical thinking mathematical abilities of students in grade VIII SMP Negeri 2 Baubau.

DISCUSSION

The results of the percentage analysis and independent sample t test with N-Gain data obtained are in accordance with the results of student interviews that provide a positive response in following the learning process by applying the PMRI approach assisted by learning videos. The results of student interviews felt that they could understand the learning material with the PMRI approach assisted by learning videos because the meaning that could be conveyed was easier to understand and the learning videos whose explanations could be watched repeatedly so that students felt helped. In line with the opinion that learning videos are learning media that use audio and visual to convey information that contains learning material, both of which contain the delivery of concepts, delivery of principles, delivery of procedures, and theory of knowledge application to facilitate student understanding of a learning material (Wisada et al., 2019). In addition, students who use the PMRI approach assisted by learning videos can correctly describe the steps of working on problems based on indicators of critical thinking skills ranging from identifying the subject matter, analyzing arguments, being able to answer questions, solving problems, making conclusions. Meanwhile, based on the results of interviews with control class students, the results were inversely proportional where students found it difficult to understand the learning material due to the monotonous learning process.

In this case, in the experimental class, students learn using mathematical problems related to everyday life so that they use cognitive reasoning to analyze facts assisted by learning videos to facilitate student understanding, so that students can find mathematical concepts when solving these problems. Conversely, in the control class, students carry out the learning process using the memorization system and the lecture method, from the learning activities that occur in the experimental class and the control class, the mathematical ability of critical thinking of students in the control class and in the experimental class shows very different results.

The research results obtained by researchers have relevance to the results of research conducted by Nurmalita & Hardjono (2020) with the title "The Effectiveness of Using Realistic Mathematics Education Approach (PMR) to Improve Critical Thinking Ability of Elementary School Students". The research in question has the aim of knowing the effectiveness of learning through the Realistic Mathematics Education (PMR) approach to improving the mathematical ability of critical thinking of elementary school students, this study uses a meta-analysis method. The results obtained in this study showed that the use of realistic mathematics education approach (PMR) was declared effective in efforts to improve the mathematical ability of critical thinking of elementary school students, with an increase in the mathematical ability of critical thinking of elementary school students by 6.98% in the low category and the highest category by 46.97% with an average increase value of 28.19%. The difference with the research conducted is in the PMRI approach assisted by learning videos where learning videos are electronic media used by uniting audio technology and visual technology to obtain dynamic and interesting program images so that students are made easier to understand concepts, principles and procedures for mathematical solutions, this is in line with learning videos as electronic media that unite audio and visual presentations to convey learning messages, both learning that contains concepts, principles, procedures, and knowledge application theories to make it easier for students to understand the material of a lesson (Wisada et al., 2019).

CONCLUSIONS

Based on the research results obtained, it can be concluded that learning mathematics through the Indonesian Realistic Mathematics Education (PMRI) approach assisted by learning videos is effective in improving the critical thinking mathematical abilities of grade VIII students at SMP Negeri 2 Baubau.

ACKNOWLEDGMENTS

Mr. Laode Muhammad Sjamsul Qamar, M.T. IPU as the Rector of Dayanu Ikhsanuddin University Baubau. Head of Baubau City Education and Culture Office who has given permission to the author to conduct research in his area. Mr. Drs. Mucadi, as the Principal of SMP Negeri 2 Baubau who has given permission for the author to conduct research, and thanks to mathematics teachers as well as administrative staff and teachers who have provided assistance during the research.

REFFERENCES

Danoebroto, S. W. (2013). Meningkatkan Kemampuan Pemecahan Masalah Melalui Pendekatan PMRI dan Pelatihan Metakognitif. *Jurnal Penelitian Dan Evaluasi Pendidikan*, *11*(1). https://doi.org/10.21831/pep.v11i1.1419

Hadi, S. (2017). Efektivitas Penggunaan Video Sebagai Media. *Prosiding TEP & PDs*, *1*(15).

Hasniati, H., Jais, E., & Herlawan, H. (2020). Peningkatan Kemampuan Pemecahan Masalah Melalui Pendidikan Matematika Realistik (PMR) pada Siswa Kelas VII SMP Negeri 1 Tomia. *Jurnal Akademik Pendidikan Matematika*. https://doi.org/10.55340/japm.v6i2.268

Helmiati. (2012). *Model Pembelajaran*. Sleman: Aswaja Pressindo.

Herliati, H. (2022). Meningkatkan Kemampuan Berpikir Kritis Matematika Siswa Menggunakan Model Problem Based Learning (Pbl) Di Sdn 001 Kempas Jaya. *JURNAL PAJAR (Pendidikan Dan Pengajaran)*, *6*(5), 1514. https://doi.org/10.33578/pjr.v6i5.8961

Mulyono, & Wekke, I. S. (2018). *Strategi Pembelajaran di Abad Digital*. Kulon Progo: Penerbit Gawe Buku.

 Print ISSN: 2088-2157, Online ISSN: 2580-0779

Nurmalita, R. A., & Hardjono, N. (2020). Efektifitas Penggunaan Pendekatan Pendidikan Matematika Realistik (PMR) untuk Meningkatkan Kemampuan Berpikir Kritis Siswa Sekolah Dasar. *Jurnal Pendidikan Dan Konseling (JPDK)*, *2*(1). https://doi.org/10.31004/jpdk.v1i2.543

Nuryanti, L., Zubaidah, S., & Diantoro, M. (2018). Analisis Kemampuan Berpikir Kritis Siswa SMP. *Jurnal Pendidikan: Teori, Penelitian, Dan Pengembangan*.

Pratiwi, D. T., & Indrawati, D. (2018). Pengembangan Media Papan Rabdologia Modifikasi pada Materi Perkalian Siswa Kelas III. *Jurnal Penelitian Pendidikan*, 1119–1128. Retrieved from https://jurnalmahasiswa.unesa.ac.id/index.php/39/article/view/23960%0A

Rahmat, A. (2018). Pengantar Pendidikan: Teori, Konsep, dan Aplikasi. *Journal of Physics A: Mathematical and Theoretical*, *6*(11), 951.

Sagita, L. (2014). Efektifitas Pendekatan Pembelajaran Matematika Realistik Indonesia (Pmri) Untuk Peningkatan Kemampuan Berfikir Matematis Siswa. *Jurnal Derivat: Jurnal Matematika Dan Pendidikan Matematika*, *1*(2).

Sugiyono. (2018). Metode Penelitian Manajemen, Pendekatan: Kuantitatif, Kualitatif, Kombinasi, Penelitian Tindakan Kelas, Penelitian Evaluasi. In *CV. ALFABETA* (Vol. 6). Bandung: Alfabeta.

Warmansyah, J., Yuningsih, R., Selva Nirwana, E., Ravidah, Putri, R., Amalina, & Masril. (2023). The Effect of Mathematics Learning Approaches and Self-Regulation to Recognize the Concept of Early Numbers Ability. *JPUD - Jurnal Pendidikan Usia Dini*, *17*(1), 54–81. https://doi.org/10.21009/JPUD.171.05

Wisada, P. D., Sudarma, I. K., & Yuda S, A. I. W. I. (2019). Pengembangan Media Video Pembelajaran Berorientasi Pendidikan Karakter. *Journal of Education Technology*, *3*(3). https://doi.org/10.23887/jet.v3i3.21735

Yudianto, A. (2017). Penerapan Video Sebagai Media Pembelajaran. *Seminar Nasional Pendidikan 2017*.