

## Research Article

## The Influence of the Realistic Mathematical Approach to the Achievement and Discipline Character of Second Grade Student to Bina Insani Bogor

Muhyani, Regita Amalia Putri Pahlevi \*, Muhammad Fahri

<sup>1</sup>Universitas Ibn Khaldun Indonesia

\*Corresponding Author

Amalia Putri Pahlevi

**Abstract:** This research is to know the effect of realistic mathematical approaches on learning achievement and discipline character in second grade at BinaInsani Bogor Elementary School. This research was the quantitative research with types of quasi-experimental research, the selection of subjects in the quasi-experimental type of Non Equivalent Control Group Design was deliberately chosen by researchers. Using 3 variables, namely the independent variable (X) and the dependent variable (Y1, Y2). Data collection techniques using research instruments are observation, test and documentation. This research resulted in an average data post-test experimental class of 86.8 and the average post-test control class 72.2 so that the obtained  $-t$  count  $>$   $-t$  table  $(-18.142 > -12.903)$ , it can be concluded that there are significant influenced of realistic mathematical approaches to achievement. Discipline character observation data produced an experimental class average of 26.15, and the average after the application of the control class learning was 20.1 so that the obtained  $-t$  count  $>$   $-t$  table  $(-42.121 > -24.852)$ , it can be concluded that there is significant effect of realistic mathematical approaches on learning achievement and discipline character.

**Keywords:** Realistic Mathematical Approaches, Learning Achievement and Discipline Character.

### INTRODUCTION

Mathematics is one of the most important driving factors for the development of science and technology that is useful for developments in the world. According to Bambang Priyo Darminto, "mathematics is a science that emphasizes reasoning activities". Mathematics education aims to increase creativity, intelligence, broaden knowledge, and human experience and insight. This shows that mathematics education is an orderly, planned and continuous series that leads to goals. So that the quality of a learning process will determine the learning outcomes (Prasetyo, Supriyono, & Kurniasih, 2014). According to Ruseffendi states that mathematics is a deductive science that does not accept evidence inductively. Whereas the essence of mathematics according to Soedjadi is to have an object of abstract purpose, resting on agreement and a deductive mindset (Heruman & Ramdhani, 2010).

The National Research Council (NRC) from America has stated: "Mathematics is the key to opportunity". Mathematics is the key to opportunities for success. For a student, the success of learning it will open the door to an advanced career. For citizens,

mathematics will prepare its citizens to compete and compete in the fields of economics and technology. The TIMSS survey conducted by The International Association for Evaluation and Educational Achievement (IAE) is based in Amsterdam, focusing on students' mathematical and cognitive content domains. The content domain includes Numbers, Algebra, Geometry, Data, and Opportunities, while the cognitive domain includes knowledge, application, and reasoning. The survey conducted every 4 (four) years held starting in 1999 placed Indonesia in position 36 of 49 countries, in 2003 in position 25 of 46 countries, in 2007 in position 36 of 49 countries, and in 2011 at position 36 of 40 countries. Meanwhile the three (3) annual PISA study, which was conducted by the Organization for Economic Co-operation and Development (OECD) of a PDD body based in Paris, aims to determine students' mathematical literacy. The focus of the PISA study is the ability of students to identify and understand and use the basics of mathematics needed in everyday life. The study, which began in 2000, placed Indonesia in position 39 of 41 countries, in 2003 in position 38 of 30 countries, in 2006 in position 50 of 57 countries, in 2009 in position 61 of 65 countries and the last in 2012

Quick Response Code



Journal homepage:

<http://www.easpublisher.com/easiehl/>

Article History

Received: 15.08.2019

Accepted: 26.08.2019

Published: 04.09.2019

Copyright @ 2019: This is an open-access article distributed under the terms of the Creative Commons Attribution license which permits unrestricted use, distribution, and reproduction in any medium for non commercial use (NonCommercial, or CC-BY-NC) provided the original author and source are credited.

in position 64 of 65 countries. The TIMSS and PISA studies essentially lie in the strength of pesetra students' mathematical reasoning and in connecting formal mathematical concepts to problems in the real world (Wahyudi, Suyitno, & Walya, 2018).

Until now, mathematics learning achievements were far from satisfying. This can be seen and proven from the competency test conducted by the teacher both in daily tests and midterm tests. The results obtained show an average score that is still low. From year to year there has been no improvement in achievement. There must be an effort made by the teacher to make improvements or improve the quality of learning carried out in the classroom, as one of the factors that influence student learning achievement. In addition, improving the learning process is expected to be able to change the views and attitudes of students towards mathematics and motivate students to be able to learn mathematics independently so that mathematics achievement is expected to increase (Purnomo, 2016). To solve the problem, it is necessary to find an approach, model or method that can support enjoyable mathematical learning so that it can improve and facilitate students' understanding of mathematics (Subekti, 2013).

The use of approaches, models, methods, and learning strategies is very important in the learning process. Therefore, as a teacher must be able to use an approach that is in accordance with the material and that makes students want to learn mathematics, it can be said that the learning process is not saturated and boring. The choice of approach during the learning process can determine the success of learning activities. The approach commonly used by the teacher is a conventional approach, which is a way of teaching in carrying out teaching, communication tends to be centered on the teacher, and the students only listen and write according to what is delivered by the teacher (Simarmata, 2016).

One approach to mathematics learning that influences the learning process that is fun is the realistic mathematics learning approach. Unlike the conventional approach, the realistic mathematical approach is the same as Active Learning which is child-centered, children play an active role in learning while the teacher only guides and controls each learning. The realistic mathematical approach makes learning more fun because it invites children to participate in the learning process and invites children to solve problems. Students are more motivated to learn and understand material. A realistic mathematical approach makes students understand the problem and its solution real or real. Mathematics lessons are very closely related to forming the character of discipline. In mathematics there are lots of rules for learning or even solving problems. An individual or student is needed to have a character of discipline, where in learning and solving mathematical problems a high level of discipline is

needed. Therefore, learning mathematics can make a person a discipline.

Discipline character education is an important thing to consider in order to foster a person's character. Armed with the character value of discipline will encourage the growth of other good character values such as responsibility, honesty, cooperation, independence and so on. Then seen from the importance of realistic mathematics, researchers want to compare the success of conventional approaches with realistic mathematical approaches to mathematics subjects and disciplinary characters. Because mathematics is a lesson in everyday life and the character of discipline is a character that must be owned by everyone.

Based on the explanation of the problem above, the problem taken in this study is: How about the learning achievement of mathematics by using a realistic mathematical approach in the experimental class in class II at Bina Insani Bogor Elementary School in the experimental class? What is the learning achievement using the conventional approach in the control class in class II at Bina Insani Bogor Elementary School? What is the character of discipline in the learning process by using a realistic mathematical approach to the experimental class in class II at SD Bina Insani Bogor? What is the character of discipline in the learning process by using a conventional approach to the control class in class II at Bina Insani Bogor Elementary School? Is there any influence of the realistic mathematical approach on the achievement and character of discipline on mathematics subjects in the experimental and control classes in class II at Bina Insani Bogor Elementary School?

**METHOD**

This research is a quantitative study with a type of quasi-experimental research (Quasi Experiment) that is doing treatment unless the experimental subjects are not randomized to determine the sample and placed in the experimental group and the control group (Wirawan, 2011). In this study the selection of subjects in the quasi-experimental type of Non Equivalent Control Group Design, Subjects were not randomly selected but were deliberately chosen by the researcher, namely with each experimental class 20 students and control classes 20 students in class II.

**Desain Nonequivalent Control Group**

Group	Pre-test	Treatment (perlakuan)	Post-test
EG (Eksperiment Group)	O <sub>1</sub>	X	O <sub>2</sub>
CG (Control Group)	O <sub>3</sub>	-	O <sub>4</sub>

**INFORMATION:**

- (O1): Experimental Group Pre-test
- (O2): Experimental Group Post-test
- (X): Realistic Mathematics
- (-): Conventional
- (O3): Pre-test Contol Group
- (O4): Contol Group Post-test

The researcher measured the existence of a variable using the research instrument. Variables are symptoms that are the focus of researchers to observe. This study uses 3 (three) variables, 1 Free variable (X) and 2 dependent variables (Y1 and Y2).

This research was conducted at Bogor Bina Insani Elementary School in the school year 2018-2019. This study took subjects namely class II A and class II B which amounted to 20 students each. Data retrieval technique is done by using research instruments, namely observation to retrieve discipline character data, test to retrieve achievement data through pre-test and post-test and documentation.

Data collection methods used in this study were observation and tests. The instrument used in conducting observations is the observation sheet. Whereas to measure learning achievement, a test is used. The test used in this study is a written test using material that has the same level as the learning material at the student level which is the sample of the researcher. The test was given twice, namely the pre-test and post-test. Before being used, the instrument was tested for validity and tested for reliability.

Hypothesis testing in this study was carried out through statistical methods using the t-test formula using the SPSS 20 application. In this study, the influence of realistic mathematical learning approaches on learning achievement and the character of discipline was sought.

**RESULTS**

**Achievement Results**

**Experimental Class Test Achievement**

Based on the data the number of pre-test experimental class values with an average of 48.2, while the number of experimental class Post-test values with an average of 86.8. Then it can be concluded that the achievement of student learning outcomes in the experimental class of mathematics using a realistic mathematical approach increases.

**Achievement of the Control Class Test Results**

Based on the data it can be seen that the average value of the control class pre-test and post-test get a pre-test value with an average of 46.2 while the average value of post-test is 72.2. Based on the data on the achievement of student learning outcomes from the second the class is the experimental class and the control class, it can be concluded that there is a difference in the average value between the experimental and control classes. It can be seen that the experimental class is larger and has an increase in student learning achievement by using a realistic mathematical approach compared to the control class which has only a slight increase in student learning achievement. To see real results using SPSS 20 as follows:

**Tabel Paired Sample t Test kelas Eksperimen prestasi belajar**

		Paired Differences					T	Df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	pretest – posttest	-39,00000	9,61359	2,14966	-43,49930	-34,50070	-18,142	19	,000

Based on the results of the above calculations using the Paired Sample t test with the SPSS 20 application in the experimental class, the results of t arithmetic are -18.142 with (df) frequency (n-1) data which is 20-1 ie 19. Decision making sees the results of sig. (2-tailed) is 0,000. This shows that the number is smaller than 0.05. The decision was based on sig. (2-tailed) smaller than 0.05 or Ha accepted. Then there is a

significant difference between the value of the average pre-test and the post-test achievement of student learning outcomes. Whereas if sig. (2-tailed) greater than 0.05, Ha is rejected and Ho is accepted. It can be concluded that the influence of the realistic mathematical approach is more significant on student learning achievement.

**Tabel Paired Sample t Test kelas Kontrol hasil prestasi belajar**

		Paired Differences					T	Df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	pretest – posttest	-34,40000	11,92256	2,66596	-39,97993	-28,82007	-12,903	19	,000

Based on the results of the above calculations using the Paired Sample t test with the SPSS 20 application in the experimental class, the results of t count are -12.903 with (df) frequency (n-1) data which is 20-1 ie 19. Decision making sees the results of sig. (2-tailed) is 0,000. This shows that the number is smaller than 0.05. The decision was based on sig. (2-tailed) smaller than

0.05 or Ha accepted. Then there is a significant difference between the value of the average pre-test and the post-test achievement of student learning outcomes. Whereas if sig. (2-tailed) greater than 0.05, Ha is rejected and Ho is accepted. There is a significant difference between the average pre-test and post-test scores of student learning achievement.

**Table of independent sample t tests on student learning achievement Between Post-tets of experimental class and control class**

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Post-test	Equal variances assumed	,064	,802	-6,327	38	,000	-16,00000	2,52899	-21,11967	-10,88033
	Equal variances not assumed			-6,327	37,474	,000	-16,00000	2,52899	-21,12203	-10,87797

Based on the calculation of the independent sample t test in the experimental class and the control class the results of t count were 6.327 with the number of students 20 people. This decision making looks at the results of the sig. (2-tailed) is 0,000 this indicates that the number is smaller than 0.05, the decision is based on sig. (2-tailed) smaller than 0.05 or Ha accepted, then there is a significant difference between the post-test average value of the experimental class and the control class. It can be concluded that there is an increase in student achievement.

Observations and evaluations of the character of student discipline are carried out by filling in the discipline character observation sheet through realistic mathematical approaches and conventional approaches (lectures). Below is a description of the value of the discipline character of students in the experimental class and the control class.

**Results of Discipline Character**

**Discipline Character Experiment class**

Based on the data it can be seen that the number of experimental class pre-test values with an average of 15.45 and the post-test average of 26.15. Then it can be concluded that there is an increase in the discipline character of the experimental class using a realistic mathematical approach.

**Discipline character control class**

Based on the data, it can be seen the average value of the control class pre-test and post-test with the average pre-test value of 14.45 and the average value of the post-test 20,1. Based on the data above the students' character discipline values from the class experiment and control class, it can be concluded that there are differences in mean values between the two classes. If you see the comparison of the average value of the experimental class and the control class, it can be seen that the value of the discipline character of the experimental class students has increased more by using a realistic mathematical approach compared to the control class which has only slightly increased the character of discipline.

**The paired table is simple t test of the Experimental class as a result of the character value of Discipline**

		Paired Differences					t	Df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	pretest - posttest	-13,70000	1,45458	,32525	-14,38076	-13,01924	-42,121	19	,000

Based on the calculation of paired sample t test using the SPSS 20 application in the experimental class, the result of t count is -42.121 with (df) frequency (n-1) data which is 20-1 = 19. This decision is seen from the results of sig. (2-tailed) is 0,000 this indicates that the number is smaller than 0.05. The decision was taken

based on sig. (2-tailed) smaller than 0.05 or Ha accepted. Then there is a significant difference between the average value of the pre-test and post-test character discipline. Then it can be concluded that there is a significant influence of realistic mathematical approaches to the character of student discipline.

**Paired sample t test class table Control the results of Discipline Character**

		Paired Differences					T	Df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	pretest – posttes	-6,60000	1,18766	,26557	-7,15584	-6,04416	-24,852	19	,000

Based on the calculation of paired sample t test using the SPSS 20 application in the control class, the results of t count are -24.852 with (df) frequency (n-1) data which is 20-1 = 19. (2-tailed) is 0,000 this indicates that the number is smaller than 0.05. The decision was

taken based on sig. (2-tailed) smaller than 0.05 or Ha accepted. Then there is a significant difference between the average value of the pre-test and post-test character discipline.

**The table of independent sample t tests the character of Discipline**

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Posttest Karakter Disiplin	Equal variances assumed	9,497	,004	-14,567	38	,000	-8,10000	,55607	-9,22570	-6,97430
	Equal variances not assumed			-14,567	29,222	,000	-8,10000	,55607	-9,23691	-6,96309

Based on the calculation of the independent sample t test in the experimental class and the control class the results of t count are 14,567 with the number of students 20 people. Decision making looks at the results of sig. (2-tailed) is 0,000 this shows that the number is smaller 0.05. This decision is based on sig. (2-tailed) smaller than 0.05 or Ha accepted, then there is a significant difference between the average post-test value in the experimental and control classes. It can be concluded that there is an increase in the character of discipline.

**DISCUSSION**

From the research data that has been analyzed, data obtained from the results of student learning in the experimental class and the control class. It can be concluded that there are differences in the average of both classes with the average value of the experimental class pre-test 48.25 and post-test 87.75. While the control class received an average value of 46.2 pre-test and 72.2 post-test. it can be concluded that there are significant differences between the two classes where the experimental class is far superior to the control class. This is because the experimental class uses a realistic mathematical approach while the control class uses a conventional approach (lecture).

In the control class given learning using a conventional approach (lecture), when learning begins, students are given the initial test first as well as the experimental class to determine students' understanding of mathematics. While the final test is given to students after being given understanding and material about the

unit of weight. The conventional approach only provides material explanations that are monotonous and students only pay attention. So that learning objectives are not achieved as expected.

Whereas in the experimental class using a realistic mathematical approach, when the learning process begins, just like the student control class, the initial test is given first, after that it is given treatment using a realistic mathematical approach. In this approach the learning process uses concrete (real) problems and can be imagined by students so students can solve problems and can be imagined by students. The mathematical approach is not only a real problem but can be in the form of games, props or other uses as long as it can be imagined by students.

The results of the assessment of the disciplinary character of grade 2 students at Bina Insani Elementary School, namely the experimental class and control class in mathematics learning activities in the experimental class experienced an increase and in mathematics learning in the control class using a conventional approach only slightly increased. It can be concluded that there are differences in the average values in both classes where the experimental class gets an average value of pre-test 15.45 and post-test 26.15 and the control class has an average pre-test 14.45 and post-test test 20,1.

Observations were carried out for 4 meetings in the experimental class and the control class. The first meeting of the dick class found that no students in the

qualifications were seen, but it was found that almost all students had invisible qualifications, then in the second meeting there were only a few students who were in the qualification, at the third meeting only a portion of students who achieve qualifications are seen and some of them are still not visible and at the fourth meeting only 60% of those who achieve the qualifications are seen and some of them are still in the qualifications not yet seen. This means that students only experience a slight increase in independent character behavior.

Whereas in the experimental class, for the first meeting, before being treated using a realistic mathematical approach no one was in the qualifications seen, each meeting had an increase which at the beginning of the first meeting was still not seen, when the second meeting there were several students who were in qualifications. then in the third meeting some students began to experience improvement and at the fourth meeting after being treated after using a realistic mathematical approach almost all students had achieved qualifications very visible and became a habit of students meaning students had experienced an increase in behavior that was in accordance with observable discipline indicators. Aside from the increasing character of student discipline, student achievement also increases.

Thus it can be concluded that there are differences between the data of the two classes where the experimental class is more significant and superior to the control class. This is because the experimental class gets treatment using a realistic mathematical approach compared to the control class that only uses a conventional approach.

### CONCLUSION

From the results of the study and based on the sources of data obtained, the authors can draw conclusions as follows: Based on the research that has been done, mathematics learning achievement in the experimental class has gotten a huge increase by using realistic mathematics. The increase was seen from the results of the post-test which increased from the pre-test. Unlike the experimental class, the control class experienced only a slight increase in learning achievement. Because the control class uses a conventional approach (lecture) which results in a slight

increase in learning achievement. Based on research and observation, the character of discipline in the experimental class increased from the initial observation of learning to the final observation of learning. In this increase realistic mathematics has an influence on the character of discipline. Unlike the experimental class, observations in the control class experienced only a slight increase in the character of the discipline. Due to the influence of the right approach to improve the character of discipline.

The realistic mathematical approach is very influential on the achievement and character of discipline. Because it makes students think more logically and real and invites students to participate in solving everyday problems, especially in the process of learning mathematics.

### REFERENCE

1. Heruman, & Ramdhani, B. (2010). *Model Pembelajaran Matematika di Sekolah Dasar*. Bandung: PT Remaja Rosdakarya.
2. Prasetyo, A., Supriyono, & Kurniasih, N. (2014). Eksperimentasi Model Pembelajaran Pendidikan Matematika Realistik Indonesia terhadap Prestasi Belajar Matematika Siswa. *Pendidikan Matematika*, 9 (1), 1-8.
3. Purnomo, Y. (2016). Pengaruh Sikap Siswa pada Pelajaran Matematika dan Kemandirian Belajar Siswa terhadap Prestasi Belajar Matematika. *JKPM*, 2 (1), 93-105.
4. Simarmata, G. (2016). Perbedaan Hasil Belajar Siswa yang Menggunakan Pendekatan Kontekstual dengan Pendekatan Konvensional pada materi Operasi Pecahan di kelas VII SMPN 1 Siantar. *Jurnal Tematik*, 4 (1), 48-56.
5. Subekti, E. E. (2013). Menumbuh Kembangkan Berpikir Logis dan Sikap Positif terhadap Matematika melalui Pendekatan Matematika Realistik. *Jurnal.upgris.ac.id*, 1 (1), 1-10.
6. Wahyudi, Suyitno, H., & Walya, B. (2018). Dampak Perubahan Paradigma Baru matematika terhadap Kurikulum dan Pembelajaran Matematika di Indonesia. *Jurnal Ilmiah Kependidikan*, 1 (1), 38-47.
7. Wirawan. (2011). *Evaluasi Teori, Model, Standar, Aplikasi dan Profesi*. Jakarta: PT. Rajagrafindo Persada.