

## **The Influence Of *Realistic Mathematics* Approach To Mathematics Problem Solving Capability Of Students Class VII State Junior High School 3 Mandau**

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### **ABSTRACT**

The main purpose of mathematics education is that the students are able to use or apply mathematics which they has been learned in their daily life and on learning the other knowledge. But, the fact is that the students are still low on applying math. So that, the low mathematics problem solving capability of student is the background of this study. This study aims to determine the influence of mathematics realistic approach to mathematics problem solving capability of students in class VII SMP 3 Mandau on academic year 2013/2014. The design research is quasi-experimental research design. The experimental design used in this study was The One Group Pretest-posttest design that includes Quasi Experimental Design Without Control Group with 38 students of class VII SMP 3 Mandau as the sample. The data are collected through test of learning outcomes. The result showed that (1) there is an increase of mathematics problem solving capability of students based on previous treatment is 45.61 % to 66.95 % after treatment. (2) There is a significant influence of realistic mathematics approach to mathematics problem solving capability of students class VII SMP 3 Mandau.

Keywords: Realistic Mathematics Approach, Problem Solving Capability

### **Introduction**

Mathematics is one of subjects which is needed on reasoning. The learning of mathematics is expected to increase the capability and develop the counting capability of students. There are various attempts which have been made to improve the quality of mathematics education. The improvements are still done by the teacher and school side on the learning process aspect and the evaluation aspect of the implementation. So that, the mathematics mastery of students is more meaningful and having a better reasoning. Furthermore, Arikunto (2010) states that the purposes of instructional education describes the knowledge, capability, skills and attitudes which must be owned by the student as a result of the learning outcomes expressed in the form of behavior which can be observed and measured.

The purpose of students on learning mathematics is not just to get the high score in exams, they should be able to solve mathematics problems, so that later they can think systematically, logically and critically on solving their daily life problems later. Generally, the mathematics learning which has been implemented is more priority the outcomes than process, the learning priority is motivated because they want to pass the national final examination. Most of the students are not able to relate about what they had learned with how that knowledge will be used in real life. Educators need to relate the material which had been taught with the real situation to the students, because the learning will be more meaningful if the students have experience, not just know about it.

The learning process which can guide and train students to be able to solve the problem is still not having adequate portion. The various findings indicate a weakness on mathematics learning process because that learning does not prepare students to solve problems. Some findings are: (1) the mathematics learning is limited to solve

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question in the test (Armanto, 2002). The questions are given in the form of objective tests, where students tend to learn math by rote examples of problems or learning the problems which having solution or answer keys. (2) Learning mathematics is separated from the daily experience. (3) The mathematics teacher taught by using conventional methods (Zulkardi, 2005).

In the other side, math is one of the subjects which is less favored by students since they were in elementary school and the mathematics mastery of students is also low (Soedjadi 2001; Officials of the Riau Regional Department of Education (2004). According Supartono (2006), the reality which is still frequently found are there are still many students who have difficulties on learning mathematics. Some causes are; the mathematics learning does not have relation with daily life, the monotone presentation of mathematics learning from abstract concepts into concrete, not be joyful learning. According to Rohani (2005), the students learn mathematics without realizing its usefulness. Meanwhile, according to Zulkardi (2007), there is a big problem on mathematics education in Indonesia. The problem is the capability of students on solving problems which relate to daily life is still low.

Based in the above situation and condition, it is needed a learning approach which involves the role of students actively in learning activities in order to help them to remember the concept and formula of mathematics. One step which can done by teacher as mentor student is selecting the right learning approach. The use of inappropriate learning approach can cause boredom, lack of understanding material, and decreasing the motivation of student on learning. One of the learning approach that can be used is Realistic Mathematics or Mathematics Education Realistic (PMR).

PMR is a learning approach which starts from the 'real' things for students, emphasizing the skills 'process of doing mathematics', discussing and collaborating, arguing with classmate so they can find their own ('student-inventing' as opposed to 'teacher telling') and eventually, mathematics is used to solve problems individually or groups. In this approach, the role of teacher was more of a facilitator, a moderator or evaluator, meanwhile the role of students is to think, communicate, and train the democracy by respecting the other opinions.

Generally, PMR assess the materials which will be taught to students and their rationale (why the material was taught), how students learn mathematics, how the mathematics topics should be taught, and how to assess the progress of students. According to Wijaya (2012), the realistic problem is used as a foundation on building the mathematics concept or referred as a source for learning.

According to Gravemeijer on Tarin (2006), there are five stages that must be passed by students on PMR, namely (1) solving problem; at this stage, the students are asked to solve the problem according to their own way. They are encouraged to find their own opinion or idea. (2) Reasoning; at this stage of reasoning, the students are trained to reason on solving problems. There is a freedom to using method on solving problems responsibility. (3) Communications; Students are entitled to refuse the answer of their friend which is incompatible with their own opinion. (4) Self-confidence; Students are expected to train the self-confidence by presenting their own answer in front of the class. (5) Representation; Students have freedom to choose the form of concrete objects or pictures which is wanted to solve the problem.

Furthermore, Gravemeijer on Tarin (2006), states that the process of RME approach has five characteristics: (1) Using contextual problems; Contextual problems

not only have function as a source of mathematics, but also as a source for re-applying mathematics. Contextual problems as an application and as a starting point from where the mathematics appears. (2) Using a model or a bridge it has vertical instrument; the interest is directed on model development, scheme and a symbol. (3) Using the contribution of students; the big contribution on learning process is expected from the contribution of the students which direct them from their informal methods towards more formal or standard method. This means that all opinions of students are highly appreciated. (4) Interactivity; The interaction between students and teachers, students and students with learning aids is very important on RME approach, so that the students get the positive benefits. (5) Integration with the other learning topics; With this integration will allow students to solve problems and learning time more efficiently.

In line with the new paradigm of education as stated by Zamroni on Hadi (2005) on behavior aspects is expected that the students have characteristics:

1. The students are active on discussion, asking questions and ideas, searching the materials which support their subject.
2. Working together and creating learning groups
3. Being democratic, expressing the ideas bravely, defending the ideas and accepting the other ideas.
4. Having good self-confidence

Based on the above interactivity characteristics and the characteristic which must be owned by the students, then the implementation of PMR learning in class on group learning. The groups will be formed heterogeneously based on the academic capability of students and the different genders

### **The Problem Formula**

Is there an influence of realistic mathematics approach to mathematics problem solving capability on students class VII SMP 3 Mandau academic year 2013/2014?

### **The Research Hypothesis**

There is a significant influence of realistic mathematics approach to mathematics problem solving capability on students class VII SMP 3 Mandau academic year 2013/2014.

### **The Research Method**

The design research of this study is a quasi-experimental. In Sugiyono (2010), quasi-experimental research is a method to find the influence of spesific treatment with the other tratment on uncontrolled conditions. The experiment design used is the single group pretest /posttest design (Jackson, 2003), which includes Quasi Experimental Design Without Control Group. The design in this study can describe as follows:

$$O_1 \quad X \quad O_2$$

This design involves one experimental group at each school which will get the treatment approach of realistic mathematics (X).  $O_1$  is the result of pre-test which is given to a sampel about the subject material on form story question. While  $O_2$  is the post-test results which were given to a sample about the subject material after treatment on form story question.

On the implementation of learning, namely "*realistic mathematics approach*" which is done by the teacher of SMP 3 Mandau. Firstly, the teacher was given training to obtain advanced learning. The samples in this study were students class VII on odd semester SMP 3 Mandau with the total 38 students on academic year 2013/2014. These samples were taken using simple random sampling. The instrument in this study consists of learning equipment and data collection instruments. The data are collected by observing and providing the test of mathematics learning. The data which are obtained by observations is analyzed with descriptive analysis and the test data will be analyzed using inferential statistical analysis techniques. The data of learning outcomes were analyzed using t-test at  $\alpha = 0.05$  level.

### **The Result and Discussion**

The results showed that there is improvement on learning process when compared with the previous treatment, where students who never study in a group, the students only use the formulas listed without participating on finding its formula/concept with the teacher. Most of the students has followed the learning process good and quietly because the teacher has been able to monitor the class condition and the readiness of students well. The teacher has conditioned and control time well, the atmosphere of the class was calm, and the students have serious attention to learn and they are also brave on presenting the material in front of the class. Based on that, the students are enjoy on learning in groups. They are also active involved in the group to find the formula/ concept that will be presented. The results showed that the activity of learning after treatment is better than the learning before treatment.

The data analysis of student learning outcomes is done by analyzing the mathematics outcomes data of pre-test and post-tests. The student learning outcomes data were analyzed to test there search hypothesis. The test of paired observation was conducted for test the hypothesis: There is a significant influence of realistic mathematics approach to mathematics problem solving capability of students class VII SMP 3 Mandau academic year 2013/2014. The data results based on the average value of class VII SMP 3 Mandau after treatment is different with the average before treatment, in this case the average after treatment better than the average before treatment. The further tests to determine the influence of realistic mathematics approach to mathematics problem solving capability of students class VII SMP 3 Mandau with academic year 2013/2014 is obtained the value of  $r^2 = 0.4474$  with the influence coefficient or  $K_p = 44.74\%$ . In the other words, it can be concluded that the influence of realistic mathematics approach to mathematics problem solving capability of students class VII SMP 3 Mandau, academic year 2013/2014 is at 44.74%. Furthermore, from the results descriptively showed that there is an increase of mathematics problem solving capability of students from before treatment 45.61% to 66.95% after treatment.

Although the influence of realistic mathematics approach to mathematic problem solving capability on class VII SMPN 3 Mandau academic year 2013/2014 is quite large, but the result of paper daily test on material quadrilateral and triangular plane shape are still found that not all of problem solving indicators has been finished well. The research result of paper daily test can be observed in the following table.

**Table I. The Percentage of Problem Solving Capability Every Indicators**

No	Student Mathematics Problem Solving Capability	Percentage
1.	Be able to identify the known elements, asked, and the adequacy of the needed element	77,19%
2.	Be able to create/arrange mathematic model	66,67%
3.	Be able to choose and apply problem solving strategies in mathematics	57,02%

Based on the above table:

Indicator 1 : is be able to identify the known elements, asked, and adequacy of the needed element. Percentage of the completeness in this first indicator is 77.19%

Indicator 2 : able to create/arrange mathematic model. Percentage of the completeness in this second indicator is 66.67%.

Indicator 3 : able to choose and apply problem solving strategies in mathematics. Percentage of the completeness in this third indicator is 57.02%.

## Conclusions and Recommendations

### Conclusions

Based on the study and result that has been described on the previous discussion, we can conclude that the influence of realistic mathematics approach to mathematics problem solving capability of students class VII SMPN 3 Mandau academic year 2013/2014 is 44,74%.

### Recommendations

Based on the experience that has been got during the study, so researcher give some recommendations as follows:

1. The implementation of realistic mathematics can be used as an alternative of innovative learning that can give the capability of mathematical problem solving better than before and it aims to increase the mathematics learning of students.
2. Because of limited time and fund, so this study just can be done on the small area, so that for the next researcher, this study can be developed with long time in the larger school.

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