Realistic mathematics and ethnomathematics in improving problem solving abilities

A Irawan*, G Kencanawaty and C Febriyanti
Universitas Indraprasta PGRI, Jakarta, Indonesia

*ari_irawan@unindra.ac.id

Abstract. This study aims to see the improvement of problem-solving skills before and after being given a mathematics-based learning treatment of ethnomathematics. This research method is One-group Pre-test Post-test Design, research location at SDN 08 Ciseuruh which is a culture-based school in Purwakarta Regency. Hypothesis testing using paired t-test. The result of the research can be seen that there is improvement of problem solving ability of students after being given the realistic mathematics learning treatments combined with ethnomathematics. Ethnomathematics is an alternative for subject teachers especially in the field of mathematics by linking existing local culture with realistic mathematics so that the learning of mathematics is increasingly concerned with daily life or students feel the existence and benefits of mathematics in the cultural environment.

1. Introduction
Math problem solving skills acquired by elementary school students is nevertheless extremely basic. This is determined from the way students in dealing with issues that are studies in the form of a story. Problem solving skills are extremely important in mathematics, which in the future can be affected in other fields of study and in everyday life[1]. This reveals that students' problem-solving skills will support the problem solving in everyday life.

It is the ability to understand the basic concepts of mathematics. The relationship between the ability of understanding and problem solving can be emphasized that, if one considers the ability to understand mathematical concepts, then he is responsible to control them to solve problems. Conversely, if one can solve a problem, suddenly the person must have the ability to understand the mathematical concepts that have been studied already[2]. Based on that opinion is absolutely clear problem solving ability of student able to relate concepts of math with real life. The learning process is not only conceptual but conceptual, so it needs a good formula in the presentation of mathematics learning.

The background that encourages the researchers seek to joined the realistic mathematics education with ethnomathematics. Culture-based mathematics lesson (ethnomathematics) means not produced the subject of underdeveloped society or back in the olden days. But how the culture which has become a genuine character nations can continue to survive with the adjusted time and other times today[3]. Realistic Mathematics education (called --- PMR) appears as a special method for mathematics[4] that is the mathematics education innovation in line with the constructivist theory. In the PMR more noted a potential on a child or student who thus must be developed[5]. Main principles in mathematics teaching today is to improve and prepare the learning activities that are beneficial to the students that aims to switch from the paradigm of teaching mathematics to learn mathematics, the
relevance of the students actively in learning must be supported by the organised learning activities that specifically so that the students can do "doing math" to find and build mathematics with facilities by teachers[1]. Ethnomathematics is relatively a new field of study which is supported by many researchers in the field of mathematics education[6]–[9]. That cultural have mathematical elements which applied on daily life[10]. Based on the relevance of ethnomathematics and realistic mathematics education that relate to each other, researchers collaborate to improve troubleshooting capabilities of students in schools.

2. Methods
This research using one groups of pre-test and post-test Design. The object of this research is student grade 6 at SDN 08 Ciseureh Purwakarta district is a cultural based school is bothered introduced by the district government of Purwakarta. The instrument that is applied in the matter arose flat two-dimensional side many.

3. Result and Discussions
The initial activities being offered is to maintain a pre-test i.e. measuring students’ ability before given realistic mathematics learning treatmen. The learning process is completed by the teachers, especially the teacher provide illustrations in daily life with regard to mathematics and is linked with the culture. For example when the teacher illustrates the flat areas. In class, the teacher gives the example realistic to students in the form of traditional objects originating from purwakarta called “hidid” for example wake up square and “tampah” for example wake up flat circle. Then the teacher provides a description of the sections of wakes up the flat and giving extensive travelling and seeking formulas of both wake up.
Gambar 3: Learning Process

Activities at this school is indeed a cultural all based so it will make it easier for researchers in mengkolaborasikan etnomatematika with a realsitik study carried out by the teacher. So many cultural-based program initiated by the school so that the research strongly supported by various factors ekternal in penelitian is an environment that supports learning, discipline and etnomatematika. Judging from the atmosphere of the school, the program refraction created by schools, and culture-based curriculum developed by the school as a supporting factor in this research.

Activities by students who refer to the teaching and learning activities with the approach of the PMR will be indicated at the time of students discussing, interviewing students, working on activities or solve the test [11], [12]. Learning activities are conducted in the form of mathematical learning realistic treatment combined with etnomatematika performed with a variety of activities in between discussions, and activities and resolve a matter that requires reasoning and analysis so that students can progress to explore in solving a mathematical problem.

The results of calculation of pre-and post-test test known to score the lowest before the given treatment amounting to 6, with a maximum score of 15 and an average of 10.87. As for the standard deviation of 2.21, and variance 4.81. As for after the giving of the treatment lowest score was 9, the maximum score 15, with an average 12.81, standard deviation 1.85 with total variance 3.42.

Based on the foregoing note score lowest student was up 3 points if compared to before treatment is given. Similarly, with an average score of students up from 10.87 became 12.81 this indicates that a given form of treatmen of learning mathematics in a realistic combine with etnomatematika to increase the student's score.

| Tabel 1: Hypothesis testing with the paired T test |
|-----------------------------------------------|
| Paired Difference | Mean | Std Dev | Std Mean | Error | 95% Confidence Interval of Difference | T | Df | Sig (2-tailed) |
|-------------------|------|---------|----------|-------|--------------------------------------|---|----|----------------|
| Pre tes - Post tes | -1.944 | 2.09 | 0.35 | -2.65 | -1.23 | -5.561 | 35 | 0.00 |

The value significance < 0.05 (0.000 < 0.05) which means Ho denied. This indicates no difference in average score pre-test before given realistic math learning-based ethnmathematics as to the average score of the post-test after being given realistic math-based learning ethnmathematics. Also, it can be seen in the calculation of the average value of the post-test higher if compared score pre-test. This means the existence of mathematical learning realistic treatment has a big role in improving the ability of the mathematical problem solving of students.

Realistic mathematics learning is essentially exploiting reality and environments that facilitate learners to understand the process of learning math, so that achieving the objectives of better
mathematics education than in the past. That is a reality that is the stuff that real or concrete that can be observed or understood the learners through imagined, while the environment is the environment where learners are good school environment, family a society can be understood or learners. The environment in this case also called the daily life [13]. A study done by combining RME (Realistic Mathematics Education) is an effort to increase the ability of the students in the a variety of things means that learning math is done increasingly meaningful and students increasingly useful because in the process of learning is associated with daily life. Application of PMR gives hope to improve student learning and achievement activity [11]. This is apparent from the results of treatment given increasing his score after a given learning math realistic combined with ethnomathematics.

Etnomatematika itself is one part of mathematics realitik it means things that are related to math that exists in popular culture lifted and dug as well as associated with the various elements of mathematics. PMR approach expected to increase students ' ability to build the concept by using a simple infrastructure and facilities [14]. Therefore the teacher should provide direction and optimize students ' ability in digging the potential and ability of students to further explore a part of everyday life that relate to mathematics. Teachers should not only provide knowledge so, but students should be actively building knowledge in their own minds[15], [16].

In the process of learning math, discipline must be supported with good amenities, modern or traditional. The implementation of technology-based mathematics teaching and learning requires supporting infrastructures, facilities, and resources[17]. The implementation of technology to learning mathematics needs to be a wide range of media, such as supporting facilities and so forth thus guru was also expected to be more creative in creating media or etnomatematika the learning props get in touch with technology.

In PMR, learning should start from something real so that students can be involved in the process of meaningful learning[14]. Dalam kegiatan ini siswa juga berangkat dari hal-hal sehari-hari yang mereka temui lalu digali unsur etnomatematikanya sehingga mereka lebih mudah untuk memahami materi yang sedang diajarakan karena memang mereka sendiri menemukan dan menganalisis dengan baik sehingga peningkatan kemampuan pemecahan masalah matematikapun teratasi. A teacher should analyze students' backgrounds and choose problems related to their background in order to promote students' understanding of problems and finding solutions[18]. Teachers must also accurately in looking at the problems of students, and then was able to provide the right solution for the students so it will be more meaningful and useful learning activities undertaken.

4. Conclusion

Based on the findings in this research we provide a conclusion if it is part of the realistic mathematics education that operates real things to pass on to the students with the associated cultural elements contained math in everyday life. The learning process by hooking these two things will be able to improve problem-solving abilities of students. Because students are able to menganalisisa and to synthesize concepts into the context of everyday life.

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