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[Handwritten signature]

Prof. Dr. Dede Rosyada, MA
Dean of Faculty of Tarbiya and Teacher's Training

REALISTIC MATHEMATICS EDUCATION APPROACH BASED ON CULTURE MAKES MORE MATHEMATICS CONCEPTS MEANINGFUL¹

By
Dr. Saleh Haji, M.Pd²
Email: salehhaji25@gmail.com

Abstract

Learning mathematics is now less use culture as a medium of learning in mathematics for students to understand concepts in math significantly. Consequently, the results of learning mathematics fifth grade at elementary students is low. Realistic Mathematics Education approach based on culture so that students can understand concepts in math significantly, as well as to preserve the culture of the local area. The results were used tabot as a medium in learning math shows there is a growing understanding of the mathematical concepts that significantly: 93% of students understand blocks, 78% of students are able to understand the wide beam, 72% of students understand the content of the beam, and 86% of students can understand the high beams.

Keywords: Approach Realistic Mathematics Education, Culture, Meaningfulness of the concept.

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2. Lecturer in Mathematics Education Program in FKIP University of Bengkulu

A. Introduction

Learning math in school, both elementary school education (SD), High School (SMP), and Senior High School (SMA) currently utilize less culture and social potential in mathematics teaching goals. Although the curriculum has been included that allows the development of local content and cultural potential of the region. Cultural heritage contained in Bengkulu, which can be utilized in the learning of mathematics, among others: tabot, the residence of Sukarno with Fatmawati, Fort Malborough and Jami' mosque artificial built by Soekarno.

Less utilization of the local culture (Bengkulu) caused by, among other math teachers in integrating less creative in cultural and region potential of into the teaching of mathematics. Teachers used to teach traditional math. Mathematical material presented deductively, less associated with daily life. So that learning math is not interesting, not fun and less meaningful.

In mathematics teaching, teachers tend to only refer to the materials contained on mathematics textbooks that do not load the local culture. In addition, more emphasis on mathematics learning achievement and curriculum materials contained on mathematics textbooks used by teachers. Teachers are less developed mathematical skills of students in aspects of understanding the facts, concepts, principles, and skills in performing the algorithm. Learning math is less centered on the students. Students tend to be passive, merely receiving information from the teacher. So that students are less creative.

Such mathematical learning approach are less able to develop mathematical skills of students, still more can help achieve the targeted material in the curriculum. The administration, teachers have the task of teaching mathematics in accordance with the target schools that all matter contained in the mathematics curriculum and textbooks have been delivered to students. However, the mathematical competence of students as stated in the objectives of teaching mathematics is not achieved.

Globalization in all areas can not be avoided at this time. Because the relationship between state and society is so close and easy. Through a network of communications, events that occurred in various countries can be immediately known by people in other countries, even in rural areas though. The effect of globalization has led to the shifting of values contained in the society. As the habit of doing calculations, replaced by the habit

of using a calculator or computer. In addition, many students who are less familiar with the potential of (state) of their respective regions, such as natural and local arts and domestic culture. The potential (state) of an area to be used by the teacher in the learning of mathematics as a medium (context) to bring math concepts to children, so that these concepts easily understood. Elementary school students, junior high, or high school as the object and subject of mathematics learning is expected to play an active role in understanding mathematical concepts through the arts and culture of the local (national) owned by their respective regions.

Connection between cultures with mathematical concepts will give meaning to the concept of math.. Meaningful mathematical concepts will be long remembered by the students. Therefore, the teacher as a learning need to design and implement creative learning with the use of culture in learning mathematics. One approach that can be used by teachers in the use of art and culture is the approach of Realistic Mathematics Education (RME). RME approach utilizing contextual issues to understand math concepts. In addition, the RME approach saw mathematics as a human activity.

This paper will describe the implementation of RME in the learning of mathematics by using culture to understand mathematical concepts are meaningful.

B. Culture of Indonesia

Koentjaraningrat (1984) explains that culture is a system of ideas that are shared by a community supporters include (1) the trust, (2) knowledge, (3) the overall values and norms of relations between individuals in a community that lived, performed, observed, and preserved; (4) the whole way to express feelings with spoken language, written language, songs, games music, dance, painting, or the use of the emblem. Cultural heritage in Bengkulu, among others: tabot, the residence of Sukarno with Fatmawati, Fort Malborough and Jami' mosque artificial built by Soekarno. As a system, the components of culture are interrelated. Such confidence and knowledge related to the knowledge associated with preserved values in society. Culture can also be viewed as a result of the ever-evolving human creation in the community. The development of the value of art and culture covering everything in society (social), individual (personal), nor physical nature actualized in life. Based, culture can be distinguished as cultural subjective and objective

culture. Culture is subjective inner values contained in the truth, goodness and beauty. Because opinion, every individual has the culture of each of the truth which he believed, the policy implemented, and beauty she feels. While the objective is culturally shaped layout birth materialization and institutionalization. Materialization shaped physical objects such as Borobudur temple, Prambanan, and the results of handicrafts. Forms of institutionalization in the form of the values embraced and implemented in a society such as the nature of mutual assistance.

Integrating cultural aspects of learning mathematics through Realistic Mathematics Education approach will be able to give meaning to the concepts of mathematics as well as to make learning math more interesting and fun. The types of culture that can be integrated in the learning of mathematics with RME approach include: customs, objects / buildings, customs, dances, rhymes, traditional games, customary law, magic, folklore, rituals, music, theater , and puppets.

C. Realistic Mathematics Education (RME)

According to Freudenthal (1971), Realistic Mathematics Education (RME) is an approach to teaching mathematics that view mathematics as a human activity. This means that human activities contain various concepts, principles and skills in mathematics. Human activities in the form of physical activity in the form of mathematical horizontal. While human activities associated with silmbol manipulation and use of formulas included in the math vertical. Fauzan (2002) explains that the RME approach is an approach in which students learn mathematics (in general) based on their daily activities. Student activities for inspiration in finding the concepts, principles, and skills in mathematics. Student activities can be a matter of playing, singing, painting, storytelling and so forth. Associated with art and culture, the students' activities are directed to activities that includes the value of art and culture.

RME is based on constructivist learning theory. According to the constructivist understanding, individuals are always trying to build a theory of reality according to the individual concerned (Gravemeijer, 1991). In order to understand mathematical concepts, individuals develop an understanding of a concept through a familiar activity. Build-up concept cube, kids activities using objects cuboid. The function of the teacher guiding

students and undertake activities conducive classroom atmosphere. In general, the knowledge built into the learner's mind (Bodner, 1986).

Theories on the principles underlying constructivist theories such as social constructivism of Vygotsky and Piaget. Constructivism Vygotsky explained that each child develops in the context of his own culture. Culture can be used as a medium for the development of students' mathematical abilities. Culture associated with objects shaped wake geometry can enhance goemtri students, such as the form of Prambanan temple. Piaget (Setiono, 1983) explains that knowledge is a process or series of acts, not just savings information only. Vygotsky and Piaget explained that constructivists can be considered in terms of cognitive and methodology. In terms of cognitive, Piaget states that all knowledge is constructed and the construction of instruments in the structure is the result of cognitive or cognitive development. Cognitive development depends on how far the children actively manipulate and interact with the environment (Setiono, 1983). Intellectual development of children through successive stages, ranging from sensory motor stage to formal operations. Each stage, the child has a particular activity, while the ability of the methodology, the Nodding Magoon (1992) states that human beings are subject to know and human behavior is the main target and the man has a high capacity for organizing knowledge. To that end, students as subjects in order to organize learning activities so as to obtain knowledge.

Individual activation in constructing knowledge through a process of assimilation and accommodation so that the experience is more specialized knowledge is stored in long term memory someone. Assimilation is the process in which individuals take action on the environment in accordance with the structure of his mind at the time, so the knowledge is absorbed in thought. While the accommodation process is the tendency of individuals to change the response in accordance with the demands of the environment, so that new information has a place at one's schemata.

Schemata was composed by the efforts of the individual student who relies heavily on schemata that have been owned by someone (Ernest in Steffe, 1992). Because of that learning is an active process to develop schemata, so that mathematical knowledge consists of facts, concepts, principles and skills related to each other. Learning is a process of constructing mathematical facts, concepts, principles, and skills (skills)

through an activity. Therefore, learning math should be active and dynamic. This is consistent with the understanding of cognitive development theory which says that human beings are active in relation to its environment (Setiono, 1983)

Realistic Mathematics Education has five characteristics, namely: (1) The use of contexts , (2) The use of models, (3) The use of students' own productions and constructions, (4) The interactive character of the teaching process, and (5) The intertwinement of various learning strands (De Lange, 1987; Gravemeijer, 1994). Characteristic is underlying implementation of learning mathematics. Learning of mathematics begins with the delivery of a context associated with the mathematical concepts that students will learn. context will direct students to the concepts learned. concepts are interrelated. aspect of context in learning mathematics can be related to the arts and culture. As the context of tabot. In solving a problem, students formulate a model that can help in order to get the correct resolution. every student using his own way to solve a problem, depending on the knowledge/experience of its beginning. brainstorm to happen , students interact with other students, teachers, and the environment.

D. Realistic Mathematics Education (RME) Approach based on Culture Making Mathematics Concept More Meaningful

RME approach based on culture is a concept or procedure used in discussing a mathematics materials by applying theories rme and use culture as a means to achieve the goal of learning mathematics. Learning is based on the recognition of culture as a fundamental part of the education, expression and communication of an idea, and the development of knowledge. (Pannen, 2004).

In the approach to learning mathematics, integrated into the local culture as a medium for learning mathematics to motivate the students to apply knowledge of mathematics, working cooperatively, and the perceived linkage between various concepts in mathematics. As a learning approach to facilitate the process of imaginative, metaphoric, creative thinking, and well aware of the culture (Yumiati and Rahayu, 2007). Participation by and through various forms of cultural embodiment provides the freedom for students to learn math and gain insight and integrated the principles in a subject, and

new things around them meaningful. Learning math by integrating the culture of making learning mathematics as an arena of exploration for both students and teachers, in the search for understanding and achieving scientific understanding and rational in the field of mathematics, to realize the development of skills to achieve expertise, as well as a strategy to achieve understanding and developing these skills .

In addition, in this approach, students will interact with the culture, through RME approach, including the appreciation of culture. Cultural appreciation invites an individual to think and work across various fields of science, because the real culture of integrating various branches of science into a real form.

Learning by integrating culture can be divided into three kinds, namely learning about the culture, learn the culture, and learn through culture (Yumiati and Rahayu, 2007).

Learning about the culture of putting art and culture as a field of science (Directorate of Education Workforce Education and Man Power, 2004). The process of learning about the culture, is well known for this, eg department of humanities, majoring in art and literature, majoring in painting, music, drama, dance. Cultural learned in a particular subject or course, about the culture and to the culture. In this sense, culture is not integrated with other disciplines.

Learning the culture. Culture is introduced to students as a way or method to learn a particular concept (Directorate of Education Workforce Education and Man Power, 2004). Learning the culture through the RME approach includes the use of various forms of manifestation of culture as a context for learning. Context is direct and guide students in solving a problem and at the same time understand the mathematical concepts that terkandaung in the contextual issues.

In studying the culture, the culture and its manifestations as a medium of learning in mathematics learning, the context of examples of concepts or principles in mathematics, as well as the context for the application of the principle or procedure (algorithm)

For example, to introduce the shape beams through Tabot (typical culture of Bengkulu). Besides being able to understand the shape of the beam, fifth grade elementary students can understand the city of Bengkulu ribs beam, high beam, the beam

pedestal and breadth of the field, diagonal beams, corners that are on the block, and the content of the beam. Understanding the concept of cube and its parts are made through concrete objects Bengkulu cultural outcomes through PMR approach provides an understanding of these concepts are meaningful.

Tabot used as contextual issues in the application of PMR. Contextual problems are solved by the students through discussions and other activities. Discussions with the teacher's guidance, students can solve problems correctly and also to understand the concept/principle of cone, wide field alan, broad sheets, and significantly higher cone. The results of evaluations and observations about the meaningfulness of the concept / principle of the cone as follows.

Table 1 Understanding Meaningful Concept and Sections Beams Through RME based on Culture (Tabot)

Beem	Meaningful		
	Less	Medium	High
Shape	2%	5%	93%
Broad areas of base	9%	13%	78%
Fill block	10%	18%	72%
High beams	5%	9%	86%

Step-by-step RME approach based on culture in mathematics learning as follows.

1. Prepare equipment class to learn and condition conducive
Teachers examine student learning and the completeness of the class, including materials that will yield the culture media used in the study of mathematics, like Tabot.
2. Delivering mathematics topics and learning objectives
Topics covered on the 'cone'. The purpose of learning so that students can recognize

geometrical cone and can determine the height of the cone, mats and blankets vast areas of cones.

3. Delivering contextual issues related to culture
Teachers deliver contextual issues related to culture (Tabot). The issue presented in the form of contextual a routine or non-routine issues
4. Students solve problems by discussing contextual and teacher;
Students perform activities using objects (images) culture in solving the problem. Students do activities invention (reinvention), and reflection. Students who have difficulty asking friends and teachers. Similarly, good students provide information to students who are weak. They were his opinion. So they obtained a settlement issues and conclusions. During the problem solving activities by students, teachers observe and guide.
5. Students present their problem solving and findings obtained.
Some students are given the opportunity to present the results of problem solving and the findings obtained in the class. Other students to respond. Finally obtained the correct settlement agreement and the findings obtained.
6. Student teachers together to formulate conclusions
Teachers guide students in formulating a final conclusion about the correct problem solving and findings obtained.

The results showed that students' understanding of concepts, principles, and algorithms significantly. Students understand the relationship of concepts and principles to the beam with everyday life. In addition, students find different ways to solve a problem.

Another finding is that students take pleasure in learning mathematics. Because they have the opportunity to perform physical activity in solving a problem. In addition, they held discussions with friends and obtain guidance by the teacher.

E. CONCLUSION AND RECOMMENDATIONS

1. Conclusion

Realistic Mathematics Education approach based cultures make understanding math concepts become more meaningful.

2. Suggestion

Teachers are advised to use the Realistic Mathematics Education approach to improving meaningful concepts in mathematics.

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