IMPLEMENTATION OF ETHNOMATHEMATICS OF TANIMBAR COIL BURNING USING PMRI APPROACH TO CIRCLE MATERIALS

JAKOBUS DASMASELA, MESAK RATUANIK[2]
[1,2]Pendidikan Matematika, Universitas Lelemuku Saumlaki
e-mail: akondasmasela@gmail.com

Abstract

Implementation of learning is based on effective learning planning so that students can absorb the material being taught. The problem in this study is the use of a realistic mathematical approach based on the local wisdom of burning stones in the Tanimbar community. The purpose of this study was to instill students' thinking concepts in solving the local wisdom problems of the Batu Bakar community in Tanimbar by paying attention to a realistic mathematics learning approach. The type of research used is descriptive qualitative research. Implementation of learning conducted in Class VIII, SMP N 1 Kormomolin. The results of learning in this class can be concluded that (1) students' reasoning abilities are very good in understanding mathematical problems contained in the local wisdom of the Tanimbar community. (2) the use of a realistic mathematics learning approach based on tanimbar local wisdom is very good for use in mathematics.

Keywords: Ethnomatematics, PMRI, Batu Bakar

Abstrak

Pelaksanaan pembelajaran didasarkan pada perencanaan pembelajaran yang efektif agar siswa dapat menyerap materi yang diajarkan. Permasalahan dalam penelitian ini adalah penggunaan pendekatan matematis realistik berbasis kearifan lokal pembakaran batu pada masyarakat Tanimbar. Tujuan penelitian ini adalah untuk menanamkan konsep berpikir siswa dalam menyelesaikan permasalahan kearifan lokal masyarakat Batu Bakar Tanimbar dengan memperhatikan pendekatan pembelajaran matematika realistik. Jenis penelitian yang digunakan adalah penelitian kualitatif deskriptif. Pelaksanaan pembelajaran dilakukan di Kelas VIII SMP N 1 Kormomolin. Hasil pembelajaran pada kelas ini dapat disimpulkan bahwa (1) kemampuan penalaran siswa sangat baik dalam memahami masalah matematika yang terkandung dalam kearifan lokal masyarakat Tanimbar. (2) penggunaan pendekatan pembelajaran matematika realistik berbasis kearifan lokal tanimbar sangat baik digunakan dalam pembelajaran matematika.

Kata Kunci: Etnomatematika, PMRI, Batu Bakar

INTRODUCTION

Mathematics education in schools is directed as a vehicle for education to develop all the potential that students have in the form of knowledge, abilities, and basic skills in mathematics. Permendiknas Number 22 of 2006 (Ministry of National Education, 2006: 1) states that: "On every occasion, learning mathematics should begin with an introduction to problems that are appropriate to the situation (contextual problems). Underlying this, it is clear that the term "contextual problems" refers to a very

important field of mathematics education. 'Contextual issues' in this case are very crucial and based on the student's learning paradigm (Ratuanik, 2019).

Today, the learning process is carried out using a conventional classroom style where the teacher-centered learning process always results in students being passive. According to Murniaty, et al (Ahmad & Asmaidah, 2017: 373-384) suggests that the learning process in the classroom has so far been dominated by teachers and teachers have not developed appropriate mathematics learning strategies to overcome these problems. Furthermore, emphasized by Soejadi (Ahmad & Asmaidah, 2017: 373-384) states that in the school curriculum in Indonesia, especially in exact subjects (mathematics, physics, chemistry) so far it has been embedded in habits with the order of learning presentation (1) taught theory, theorem, definitions (2) are given examples and given exercises and questions.

The conventional teaching and learning process results in students not being able to adjust student understanding with the knowledge provided by the teacher so that there is a need for a learning model/approach that is able to make students active in the learning process. Wahyudin (2008:2) explains that children learn through doing (doing) so that they require a lot of direct experience in manipulating, studying, discussing and sharing mathematical ideas. Thus students' mathematical competence can be trained. An approach that can help students is Indonesian Realistic Mathematics Learning (PMRI). The Indonesian Realistic Mathematics Learning Approach (PMRI) views human activity as a concrete and meaningful context in mathematical concepts.

Anwar (Afandi, M: 2013) states that PMRI is an approach to learning mathematics that tries to use students' experiences and environment as primary teaching aids. Furthermore, Gravemeijer (Rahmawati: 2013) explains PMR is a human activity, which is developed with the basic principles, namely (1) Guided Reinvention and Progressive Mathematization (Guided Discovery and Progressive Mathematization; (2) Didactical Phenomenology (Penomena in Learning; and (3) Self developed Models (Ratuanik et al., 2021).

According to Hadi (Julianti: 2020) the role of the teacher in the Indonesian Realistic Mathematics Education (PMRI) approach is formulated as follows: 1) The teacher is only a learning facilitator, 2) the teacher must be able to build interactive teaching, 3) the teacher must provide opportunities for students to actively actively contributes to the learning process itself, and actively assists students in interpreting real problems, and 4) the teacher is not fixated on the material contained in the curriculum, but actively associates the curriculum with the real world, both physical and social. The process of learning mathematics based on the PMRI approach is very closely related to the context of students'

lives, therefore the context of students' lives can be utilized in the process of learning mathematics (Ratuanik & Filindity, 2021).

Tabimbar stone roast is a typical Tanimbar food which is very popular until now, the context of Tanimbar stone roast can be used as a learning medium (Watratan et al., 2021). The correlation between the context of burning stones and learning mathematics is called ethnomathematics. This term was put forward by D'Ambrosio (1984) a Brazilian mathematician with the following definition: "Ethnomathematics is the way different cultural groups mathematize (count, measure, relate, classify, and infer)". According to him, ethno affixes explain all phenomena that form cultural identity which are grouped as language, codes, values, dialects, beliefs, food and clothing as well as habits and behavior. The word mathematics describes a broad view of mathematics including computation or solving, arithmetic, classifying, sequencing, decision making and modeling (Ratuanik, Mesak; Lolonlun,Blasius; Bacori, 2022). The definition of Ethnomatematics according to Rosa & Orey, (Jakobus, et al: 2021) "the ethnomatematical practices of indentifiable cultural groups and may be regaaded as studies of mathematical ideas found in any culturewhich" means that "ethnomatematical practices from cultural groups that can be identified and can be arranged redefined as the study of mathematical ideas found in any culture (Matematika et al., 2022).

This is expected to be a reference in the process of learning mathematics but in reality what happened was not as expected. The results of the researcher's initial interview with the class IX mathematics teacher at SMP N 1 Kormomolin, Kormomolin District, Tanimbar Islands Regency, he said that the ability of students to solve mathematical problems was very low due to weak inculcation of mathematical concepts and the application of mathematics was less contaminated with students' lives.

The same statement was conveyed by the mathematics teacher in grades VII and VIII stating that students' intellectual abilities were low so that the material obtained had to be repeated continuously so that students could understand the material. The math teacher's statement is proven by the list of even semester, 2021/2022 collective copies that were provided. The total number of students in class VIII is 53 consisting of 2 classes with a total of 27 students in class VIIIa. Of all students in class VIIIa, only 1 student fulfills the KKM and 26 other students do not meet the KKM. For class VIIIb, the total number of students is 26 students, only 5 students were able to fulfill the KKM and 21 students did not fulfill the KKM with the KKM at the school being 70.

Based on this problem, the researcher wants to offer a learning approach by utilizing the local wisdom of the stone-fired Tanimbar community to be adapted in learning mathematics as a learning resource. The learning model/approach referred to by researchers is the PMRI approach with an effort to

carry out realistic mathematics learning in the context of the local wisdom of the Tanimbar culture in the form of stone burning.

RESEARCH METHODS

The type of research that the researchers used in this study was an exploratory survey that led to a qualitative approach, Nassaji (2015) who stated that qualitative or descriptive research aims to describe a phenomenon with various characters with its scope. In this study, the researchers focused more on field observation data related to the use of the PMRI approach in the context of the Tanimbar stone-burning culture (Ratuanik, Mesak; Lolonlun,Blasius; Bacori, 2022). The research sample that the researchers used was class VIII SMP Negeri 1 Kormomolin, Kormomolin District, Tanimbar Islands Regency. The use of instruments that research can use is observation sheets and interview sheets. Data analysis according to Miles and Huberman (Rijali: 2019). describes the process of analyzing qualitative research data as follows (Ratuanik & Feninlambir, 2022).
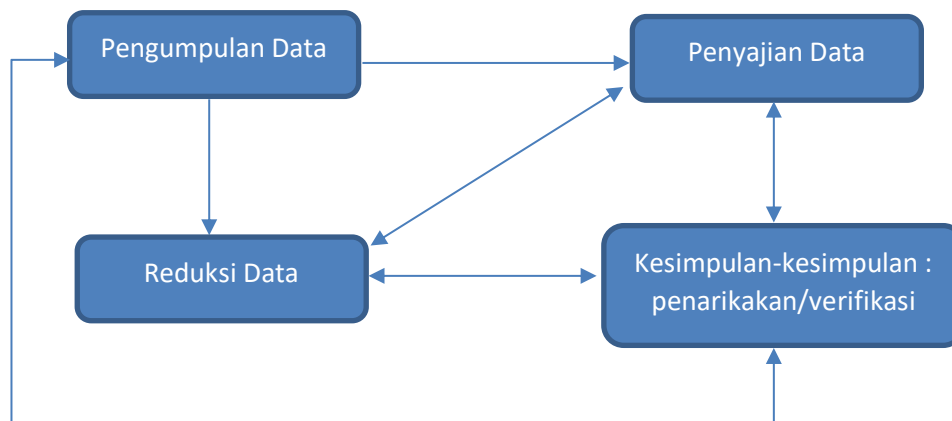
RESULTS AND DISCUSSION

The teaching and learning process carried out in class VIII was very enthusiastic in the teaching and learning process because of the collaboration between learning mathematics and burning stones. The learning process began with the practice of burning stones and continued with teaching material using problems in the context of burning stones. The learning media that the researcher uses has compatibility with the mathematics learning material which is a circle, in this learning process students easily understand the mathematical problems presented by the teacher.

Based on the steps of Indonesian Realistic Mathematics Learning (PMRI) can be presented in the following table:

Tabel 1. PMRI Learning Steps

PMRI Learning Steps	The learning process in class	Information
Preliminary activities	• The teacher opens the lesson • The teacher takes attendance of students • The teacher conveys the subject matter	In the teacher's preliminary activities: a) Prepare students psychologically and physically to follow the learning process. b) Asking questions that relate previous knowledge to the material to be studied. c) Explain the learning objectives or basic competencies to be achieved. d) Delivering the scope of material and explanation of activity descriptions according to the syllabus.
Core activities 1. Exploration	Understanding contextual issues	The practice of burning stones in Tanimbar with the first stage is to make a hole in the ground as a container for burning stones and the hole forms a circle
	Explain contextual issues	A father wants to cook food traditionally by burning stones, the father has the following ingredients Form the circle needed so that all the ingredients can be cooked in the stone burning hole
2. Elaboration	Solve contextual problems	Students are divided into 4 groups to solve the problems given by the teacher

|		
		regarding stone burning holes that form a circle with the concept of solving problems based on each group
3. Confirm	Compare and discuss answers	The teacher invites each group to present the results of their group's work and provides opportunities for other groups to respond to answers from groups that have presented
Closing Activities	1. The teacher provides feedback and follow-up 2. The teacher evaluates the learning process 3. The teacher concludes the lesson 4. The teacher closes the lesson	The teacher explains the problems discussed in the group by showing the results of each group and the teacher provides conclusions on solving the problems of each group.

Based on the PMRI learning steps in the core activities section and on the elaboration point about solving contextual problems, from the problems given by the teacher the exploration points about explaining contextual problems students are able to solve these problems. The results of problem solving carried out by the 4 groups can be displayed as follows:

1   2   3   4
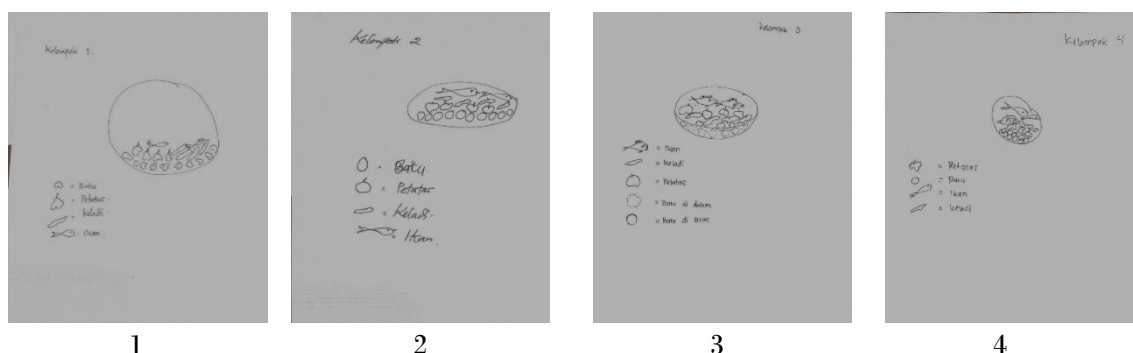
The results of group 1 solved the problem according to the concept they described that the circle is a stone burning container and other objects describe the shape of the ingredients used for cooking, it can be seen that there are 2 fish, 4 patatas, 4 taro and 10 stones which is placed below. The process of placing all the food ingredients in the stone burning container is clearly visible, but the circle that represents the

stone burning container does not look full. The results of group 2 solved the problem by determining the size of the pool circle needed from the amount of material. This cobe group arranged at the bottom of the pond there were 10 stones and covered with other materials, namely 4 patatas, 4 taro and 2 fish. The concept that the group created was based on the completion of the Tanimbar stone burning stages, the circle concept depicted is oval in shape. Group 3's completion step is to make a circular pond by using the 3D concept in drawing a circle of the pool (Mansah & Safitri, 2022; Rezekiah et al., 2022). Placement of the material in the stone burning pit contained 5 hidden stones with the concept of a stone pattern image with dotted lines and 5 stones in the 2nd layer. In the next layer the group placed 4 taro, 4 patatas and on the 2nd layer. finally put 2 fish. The results of group 4 in solving the problem were to make a circle of stone burning holes and put the ingredients in the stone burning holes the same as the previous group.

CONCLUSION

Each student has a different solution concept, but the basic thinking of students is the same, because the concept of burning stones has been practiced in everyday life, students can be expressed in a series of picture patterns from each group. The way students think basically emerges from the activities students do in everyday life.

REFERENCES

Afandi, M., Chamalah, E., Wardani, O. P., & Gunarto, H. (2013). Model dan metode pembelajaran. Semarang: Unissula.

Ahmad, M., & Asmaidah, S. (2017). Pengembangan perangkat pembelajaran matematika realistik untuk membelajarkan kemampuan pemecahan masalah matematika siswa SMP. Mosharafa: Jurnal Pendidikan Matematika, 6(3), 373-384.

Dasmasela, J., Urath, S., & Nifanngelyau, J. (2021). Etnomatematika Seni Rupa Patung Tumbur. Jurnal Pendidikan Indonesia, 2(01), 36-47.

Julianti, M. (2020). Peningkatan Hasil Belajar Matematika Peserta Didik Kelas Iv Dengan Menggunakan Pendekatan Pendidikan Matematika Realistik Indonesia (Pmri) Di Sd Negeri 2 Way Dadi Bandar Lampung (Doctoral dissertation, UIN Raden Intan Lampung)

Nasional, D. P. (2006). Lampiran Permendiknas Nomor 22 Tahun 2006 tentang Standar Isi Mata Pelajaran Matematika SMP/MTs. Jakarta: Depdiknas.

Mansah, H., & Safitri, I. (2022). The Effectiveness of Improving Student Mathematics Literacy Through The Use of The Facebook Application. *AKSIOMA: Jurnal Program Studi Pendidikan Matematika*,

11(1), 683–693. https://doi.org/http://dx.doi.org/10.24127/ajpm.v11i1.4743

Matematika, P., Budaya, B., Lerebulan, E., Nifmaskossu, R., Grace, E., Matematika, P., Saumlaki, U. L., Bahasa, P., & Saumlaki, U. L. (2022). *Mathematical Learning Based On Tanimbar Culture*. *4*(2), 123–133.

Ratuanik, Mesak; Lolonlun,Blasius; Bacori, Z. (2022). *Peningkatan Kemampuan Pemahaman Konsep Matematika Menggunakan Model Problem Based Learning Pada Materi Pola Bilangan di Kelas VIII SMP Negeri 3 Wertamrian Kabupaten Kepulauan*. *9*(3), 916–930.

Ratuanik, M. (2019). Pemahaman Siswa Kelas VIII B SMP Santo Aloysius Turi Tentang Relasi dan Fungsi Setelah Penerapan PMRI. *Prisma*, *2*, 813–820.

Ratuanik, M., & Feninlambir, S. (2022). Pemanfaatan Software Geogebra pada Materi Lingkaran dengan Menggunakan Model Discovery Learning untuk Meningkatkan Hasil Belajar Siswa Kelas VIII SMP Negeri 1 Tanimbar Utara. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, *6*(1), 1105–1119. https://doi.org/10.31004/cendekia.v6i1.1042

Ratuanik, M., & Filindity, A. (2021). Etnomatematika: Konsep Geometri Pada Perahu Batu Di Desa Sangliat Dol Kecamatan Wertamrian Kabupaten Kepulauan Tanimbar. *Jurnal Pendidikan Dasar Dan Sosial Humaniora*, *1*(2), 109–122.

Ratuanik, M., Wermpinan, W., Bacory, Z., & Batkunde, Y. (2021). Pemahaman Mahasiswa Baru Program Studi Pendidikan Matematika STKIP Saumlaki Tentang Lingkaran Setelah Penerapan PMRI. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, *05*(02), 1322–1331.

Rezekiah, P. T., Safitri, I., & Harahap, R. D. (2022). Analisis Nilai-Nilai Karakter Mahasiswa Program Studi Pendidikan Matematika. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, *6*(2), 1251–1267. https://doi.org/https://doi.org/10.31004/cendekia.v6i2.1325

Watratan, Y., Ratuanik, M., & Srue, O. (2021). Etnomatematika Pertanian Penghasilan Kacang Tanah Desa Lamdesar Timur Kecamatan Tanimbar Utara Kabupaten Kepulauan Tanimbar. *Leibniz: Jurnal Matematika*, *1*, 21–35.

Rahmawati, F. (2013). Pengaruh pendekatan pendidikan realistik matematika dalam meningkatkan kemampuan komunikasi matematis siswa sekolah dasar. Prosiding Semirata 2013, 1(1).

Rijali, A. (2019). Analisis data kualitatif. Alhadharah: Jurnal Ilmu Dakwah, 17(33), 81-95.