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# IMPROVED MATHEMATICAL LEARNING RESULTS OF OPERATING MATERIALS CALCULATE FRACTIONAL NUMBERS THROUGH ETHNOMAMATIC LEARNING GEJOH LESUNG IN CLASS V NGABEAN PONJONG ELEMENTARY SCHOOL STUDENTS

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**Abstract**

Ethnomamatics that associates culture and mathematics certainly have characteristics that support each other. In this paper discussed about how ethnomamatics is appliedto mathematics learning, by associating existing cultural products with the content or concepts of mathematics studied. By looking at various ways of associating culture and mathematics in ethnomamatics, it is characterized by ethnomatteric characteristicsin mathematics learning, especially in learning in schools. This research aims to find out: (1) the learning process of Ethnomamatics Gejoh Lesung on the operating material of calculating fractional fractions of class V in SDN Ngabean Ponjong Gunungkidul Regency, (2) whether the results of learning fractional calculation operating materials can be leveledn through ethnomatematics learning in class V SDN Ngabean Ponjong Gunungkidul Regency. This research instrument is (1) learning outcome tests, (2) student activity observation sheets, (3) observation sheets of learning implementation, and (4) student response questionnaires. Data is analyzed using descriptive analysis. The results showed that: (1) student activity in Ethnomamatics learning Gejoh Lesung based on observations. In cycle II is better because it is in the category of "good" as much as5.56% compared to student activity in the learning process in cycle I which in the category of "sufficient" by 70.55%, (2) at the end of cycle II the observation of observers shows that quantitatively the implementation of learning reachesa core rat valueof 90.05%. Based on the criteria in chapter III meets the criteria "very well" when compared to cycle I which achieves an average score of 80.00% with the criteria "good". (3) Based on the learning outcome score on the initial observation of cycle I and cycle Ishows that many students who have achievedKKM 70 which increased from 27.78% or 5 students at the initial observation to 55.56% or 10 students in cycle I and to 88.89% or 16 students in cycle II.
**Keywords:** Ethnomamatics, Mathematic Learning, Characteristics

## INTRODUCTION

Mathematics as one of the fields of science studied in schools in Indonesia certainly requires a variety of suitable learning approaches and strategies. The number of areas of mathematical studies studied ranging fromelementary level, middle level to college gives rise to many models or learning approaches that are each considered able to improve the quality of

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math learning in school. One of the topics that are being hotlydiscussed in math learning is combining mathematics learning with the culture of life that is around. The term that combines culture and mathematics is known as ethnomatematics (J.B. Darmayasa, Wahyudin, & Mulyana, 2018). Understandingmathematics learning with culture will certainly facilitate the learning process of mathematics itself, where learners will more easily understand every topic studied because it is relevant to their daily cultural life (Staats, 2006)(Katsap & Silverman, 2008) (Sirate, 2012).

In the process of learning mathematics that places culture as one of its supporters, of course, will have differences in its application. With the striking cultural differences thatspread throughout Indonesia, of course, the application of ethnomamatics as one learning approach will have differences between one place and another (Sirate, 2012). Thus, it is necessary to pay attention to how exactly thematic ethnoma characteristicsin the learning of mathematics in school. Of course, these characteristics will be seen in various studies that have been conducted related to the application of ethnomamatics in the learning process in various places in Indonesia according tothe background of the culture where the research is carriedout. According to Kusumah in his article on ethnomamatics (Kusuma, Dewanto, Ruchjana, & Abdullah, 2017), explained that teachers will be more innovative in the process of designing mathematical learning. Teachers capturemathematical ideas based on existing local cultures. With ethnomamatic learning, students are trained to further sharpen their sensitivity, be able to explore mathematical concepts in their cultural environment, and make students appreciate and appreciate their culture more. The process of learning mathematics based on ethnomamatics, divided into three parts, namely: 1) Learn about culture, put culture as a science. The process of learning about culture has been studied directly by students through arts and crafts subjects, arts and literature, painting and drawing. Cultural products that apply in society can be used as amethod of solving mathematical problems. 2) Learn with culture. Learning by culture for students includes the benefits of various forms of cultural manifestations that become a medium of learning or context in the learning process in the classroom. 3) Learn through culture. Learning through culture for students is given the opportunity to demonstrate the achievement of understanding or meaning created in a subject through various cultural manifestations.

In his article Sirate (2012) wrotethat the integration of ethnomamatics in curriculum and pedagogy reflects developments in mathematics education. The use of the term ethnomamatics as one of the learning approachesis also often used on things that refer tothe cultural ka jian that exists in mathematics. Ethnomamatics approach aims to make the material or topic of school math lessons more relevant and meaningful for students. Furthermore, Sirate revealed that there are five possibilities that ethnomamatic curriculuma can be applied; namely (1) ethnomamatics is designed in an appropriate and meaningful context, (2) delivered in the form of content or special cultural content that is different from general mathematical concepts, (3) The next concept in ethno-mathematics curriculum. Is building the idea that ethnomamatics is at the stage of developing mathematical thinking applied in the field of education, (4) the application of ethnomamatic curriculum can be part of mathematical ideas, (5) Ethnomamatic curriculum is the integrityof mathematicalconcepts and practices into student culture. The goal of developing an ethnomamatic curriculum model is to help students become aware of how students can think mathematically according to their culture and traditions.

Furthermore Putri (2017) posits that the scope of ethnomamatics includes mathematical ideas, thoughts and practices developed by all cultures. Ethnomamatics

also aims to learn how learners understand, articulatefish, process, and finally use mathematical ideas, concepts, and practices so that they are expected to eventually be able to solve problems related to their daily activities. Ethnomamatics usesthe concept of matematika broadly associated with various mathematical activities, including grouping, counting, measuring, designing buildings or tools, playing, determining location, and so on. Ethnomamatics is used as a bridge between learning matematics and culture that is able to provide knowledge with more value to be understood because it is related to customs in accordance with local traditions in mathematical learning. This is because ethnomamatics offers learning based on local culture so that learners can simultaneously get to know and explore the culture owned by their nation.

According to the author's observations, the reality in the field shows that the ability to understand students of SDN Ngabean, Karangasem Subdistrict, Gunungkidul Regency on the operating material of calculating fractional numbers is still low, evidenced by the results of even semester repeats over the last two years, namely 63 in the 2019/2020 school year and 61 in the 2020/2021 school year. One of the causes of low achievementis that the learning applied by teachers is abstract andunrealistic. The learning applied by teachers is not associated with the environment around learners. From the root of the problem, it can be formulated the following problem, namely howto increase the results of learning mathematics of fractional number counting operations through ethnomamatic learning gejoh diung in class V SDN Ngabean Ponjong School Year 2021/2022?

## METHOD

This type of research is classroom*action*research, because it is relevant to classroomlearning problem-solving efforts.

### Working Procedures In Research

The schematic of this study adapted from Iskandar (2010), can be seen in the following chart:

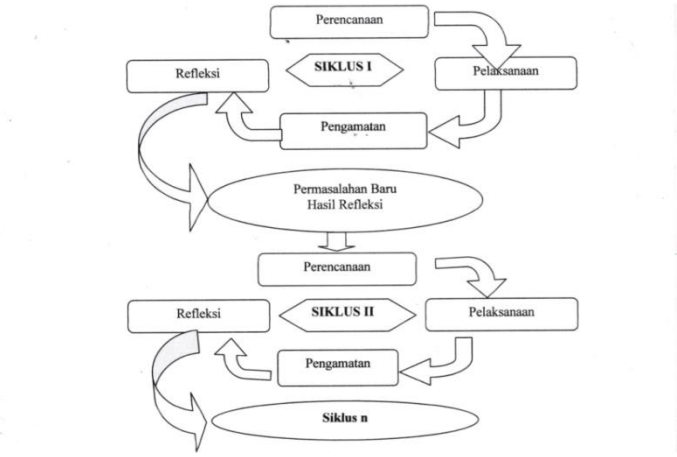


Figure 1.2 Class Action Research Flow (Iskandar 2010:212)

The procedure plan of action of each cycle is as follows.

### Cycle I

1. Planning
   At this stage, activities include:
   a. Study the curriculum of even semester of math subjects class V SDN Ngabean Ponjong Gunungkidul Regency.
   b. Establishing the subject matter to be taught is fractional material.
   c. Establish initial scores, current student scores and calculate each student's developmental grades as well as reward each group.
   d. Form a study group of 3-4 people.
   e. Create a Learning Implementation Plan (RPP) in accordancewith

materi with the implementation of Ethnomatematics Gojoh Lesung.

f. Create a student worksheet (LKPD) in accordance with the material with Ethnomatematics Gojoh Lesung.
g. Create an observation sheet to see the condition of teaching and learning.
h. Create a student response questionnaire.
i. Make a test of learning results at the end of the cycle.

2. Implementation

The steps of implementing realistic learning cooperative model with the application of Ethnomamatics Gojoh Lesung is learning that uses the following main activities: (1) initial activities, (2) core activities, and (3) final activities that are in detail the following activities.

Early Activities

a. Condition the classroom in an atmosphere conducive to the progress of learning.
b. Providing motivation about the importance of understanding fractional matter and associating it in everyday life is Gojoh Lesung.
c. Convey the learning goals you want to achieve.
d. Inform about the learning process that will be carried out including the aspects assessed during the learning process.
e. Remind again and Q&A about the concept of fractions.

Core Activities

Understand contextual issues with tasty stages

a. Using learning media that are concrete or real, and easy to understand students, namely images gejoh Lesung.
b. Provide an explanation of the fractional value shown through the demonstration of concrete objects.
c. Solve / work on the problem contained in LKS regarding fractions. Furthermore, direct each group to help each other in doing tasks.
d. Guide learning groups as they work on tasks aboutnumbers using concrete or real learning media.

Solve contextual issues with iconic stages

a. Provides an opportunity for students to mention fractional values based on concrete images of dimple gojoh objects shown by the teacher.
b. Explain and provide some examples and not examples of the operation of counting the sum and subtraction of fractions through the medium ofconcrete object images (contrast and variation theorem).
c. Ensuring students have understood the explanations and examples given by teachers about the operation of counting additions and subtraction of fractions through the medium of defenders in theform of concrete object images.
d. Provide opportunities for students to carry out the operation of counting additions and subtraction of fractional numbers through learning media in the form of concrete object images.

Compare, discuss, and collectanswers with symbolic stages.

a. Provide an explanation of how to write fractional values in the form of symbols or mathematical notation.
b. Ensuring students have understood and can write down various forms of addition and subtraction operations in the form of notation or mathematical symbols based on the teacher's explanation.
c. Give students the opportunity to write down their resultsin frontof the class.
d. Repeating the material when there are students who still do not understand about the operating material of calculating fractional numbers.

Final Activities

a. Guiding students to conclude the subject matter and reflect on the process and results ofthe lesson.
b. Give independent assignments as homework (HOMEWORK) to students.
c. Send moral messages to students.
d. Direct students to read the do'a before going home.

3. Observation and Evaluation Stage

Observations are made including the activeness of students in taking lessons, the implementation of the learning process, and the student's response to that learning. Observations for students are carried out by research teachers while observations of learning implementation are peer. At this stage students will also be given a cycle I learning outcome test to measure the understanding of the material that has been given at the first, second, third, and fourth meetings.

4. Analysis and Reflection

The reflection stage is carried out by referring to the results of observations and evaluation results of cycle I. If it turns out that the target set as an indicator of success has not been achieved, it will be improved or improved learning activities in cycle II.

**Research Subjects**

The subjects in this study were students of Class V SDN Ngabean District ponjong Gunungkidul regency in the 2021/2022 school year as many as 18 students consisting of 7 men and 11 women.

**RESULTS AND DISCUSSION**

**Description of Pre-Action Results**

Quantitatively the completion of learning mathematics students of class V SDN Ngabean at the pre-action stage (initial observation) can be seen at Table 1 below:

Table 1. Quantitatively the completion of learning mathematics at the pre-action

| Shoes | Category | Frequency | Percentage (%) |
|---|---|---|---|
| ≥ 70 | Done | 6 | 33,33% |
| < 70 | Not complete | 12 | 66,67% |

**Description of 1 Cycle Research Results**

**Analysis of mathematical learning outcomes**

Table 2. Categories of mathematical study outcome scores in cycle I Class V students of SDN Ngabean

| No. | Interval | Category | Frequency | Percentage (%) |
|---|---|---|---|---|
| 1 | ≥ 90,9 | Excellent | 10 | 55,55% |
| 2 | ≤ 89,9 | Good | 3 | 16,67% |
| 3 | ≤ 69,9 | Less | 2 | 11,11% |
| 4 | ≤ 49,9 | Very Lacking | 3 | 16,67% |
| Sum | | | 18 | 100% |

Quantitatively the completion of learning mathematics students class V SDN Ngabean after the implementation of cycle I can be seen in Table 3 below:

Table 3. Quantitatively the completion of learning mathematics cycle I

| Shoes | Category | Frequency | Percentage (%) |
|---|---|---|---|
| ≥ 70 | Done | 13 | 72,22% |
| < 70 | Not Complete | 5 | 27,78% |

**Student response to Ethnomamatics learning Gejoh Lesung**

As many as one% of students are happy with the learning atmosphere in the classroom, 8% of students are happy with

the approach used by teachers in learning, 84.85% of students feel progress after Ethnomatematic learning Gojoh Lesung, 93.94% of students agree with the learning device(RPP, LKS, Student book) used in the learning process. Based on the results of the analysis it is seen that almost all students argue that the atmosphere of learning in the classroom and the approach used by teachers in learning is new to them. A total of 87.88% of students think that the learning atmosphere in the classroom is new for them, and 96.97% of students think that the approach teachers use in learning is new to them. Thus the student's response to ethnomamatics in class V of SDN Ngabean was positive.

**Student activities towards ethnomamatics learning Gejoh Lesung**

At the tasty stage, the same thing happens when the teacher gives the opportunity to divide the doughnut cake into severalparts used inlearning, some are tempted to eat it, some even grab it, some are just silent and do not pay attention. At the iconic stage, there are students who have not been able to name the value of fractional numbers and operate thembased on images. Likewise at the symbolic stage, there are students who are still confused to write mathematical notes of fractions based on images of concrete objects.

**Implementation of Learning on Ethnomamatics learning Gejoh Lesung**

In some meetings early in cycle I, teachers still often make mistakes in managing learning, for example teachers are still too hasty to immediately enter the core because teachers worry about insufficient time. So that in conveying learning goals, motivating students, and questions to uncover the student's initial knowledge looks very quickly. The implementation of cycle I learning reachedan average value of82.44% with "good" criteria.

**Description of 2nd Cycle Research Results**

**Analysis of mathematical learning outcomes**

Table 4. Statistics score mathematical learning outcomes in cycle II Class V students of SDN Ngabean

**Descriptive Statistics**

| | N | Minimum | Maximum | Sum | Mean | Std. Deviation |
|---|---|---|---|---|---|---|
| Cycle II | 18 | 55.00 | 100.00 | 2785.00 | 84.3939 | 9.58169 |
| Valid N (listwise) | 18 | | | | | |

Table 5. Category of math learning outcome scores in cycle II Students of class V SDN Ngabean

| No. | Interval | Category | Frequency | Percentage (%) |
|---|---|---|---|---|
| 1 | ≥ 90 | Excellent | 15 | 83,33% |
| 2 | 70 – 89 | Good | 1 | 5,56% |
| 3 | 50 – 69 | Less | 2 | 11,11% |
| 4 | ≤ 49 | Very Lacking | 0 | 00,00% |
| Sum | | | 18 | 100% |

Quantitatively the completion of learning mathematics students of class V SDN Ngabean after the implementation of cycle II can be seen in Table 6 below:

Table 6. Quantitatively the completion of learning mathematics cycle II

| Shoes | Category | Frequency | Percentage (%) |
|---|---|---|---|
| ≥ 70 | Done | 16 | 88,89% |
| < 70 | Not Complete | 2 | 11,11% |

**Student response to bruner theory-based realistic learning**

A total of 96.97% of students are happy with the learning atmosphere in the classroom, 90.91% of students are happy with the approach used by teachers in learning, 93.94% of students feel progress after thelearning of Ethnomamatics Gejoh Lesung, 96.97% of students agree with the learning devices (RPP, LKS, Student Books) used in the learning process. A total of 93.94% of students think that the learning atmosphere in the classroom is new for them, and 100% of students think thatthe shortening that teachers use in learning is new tothem.

**Student activities towards ethnomamatics learning Gejoh Lesung**

Based on the analysis of data from the observation of student activity in cycle II in appendix 22 showed that in a quantitatif, students' ability in learning is to achieve an average score of 84.21%. Based on the criteria presented in Chapter III, it can be stated that student activity is in a good category.

**The implementation of Learning on ethnomatema**learning**tika Gejoh Lesung**

Quantitatively the implementation of learning reached an average value of 91.07%. Based on the criteria presented in Chapter III, it can be stated that the implementation of learning is in the category is very good.

Based on the value of learning outcomes in initial observation to cycle I and cycle II, it is seen that the number of students who have reached the criteria of completion of at least ≥ 70 increases.t from 33% or people students at initial observation to 75.76% or people students in cycle I and to 96.97% or people students in cycle II. This shows that the completion of classical learning has been achieved, because of the number of students who are studying.Learn more than 80%. The number of students who respond positively to the ethnomamatic learning process gojoh Lesung in cycle I is 33% increased to 75.76%. Hasil has fulfilled the established success indicators. In general, student activity in ethnomamatic learning gojoh Lesung in cycle II is better because it is inkate gori "good" with a percentage of 33% compared to student activities in the learning process carried out in cycle I with the category "enough" with a percentage of 96.97%. At the end of cycle II, the observer's observations showed that quantitatively, learning implementation reached an average value of 88.89%. Based on the criteria presented in Chapter III, it meets the criteria "very high", whencompared to cycle I which reaches an average value of 72.22% with the criteria "good".

**CONCLUSION**

In general, student activity in Ethnomamatics learning Gejoh Lesung in cycle II is better because it is in the category of "good" with a percentage of 88.89% compared to student activities in the learning process carried out in sikl us I with thecategory of "enough" with a percentage of 72.22%. The number of students who responded positively to the ethnomamatic learning process gejoh lesung in cycle I was 11.11% increased to 55.55%. This result meets the indicators of success.the specified silan. Can improve the learning outcome of surgery calculate the fractional number of students class V SDN Ngabean Ponjong Gunugkidul Regency. Thing this is characterized by the average value of the test of learning results on initial observation by increasing to scyclical I and in cycle II. Based on the value of learning outcomes in initial observation to cycle I and cycle II, the number of students who have achieved the criteria of completion of at least ≥ 70 increased from 27.78% or 5 students at the initial observation to 55.57% or 10 students in cycle I and become 88.89% or 16 students in cycle II. This shows that the completion of classical learning has been achieved, because the number of students who achieve learning completion is more than 80%.Based on the results obtained in this study, the advice from this study is information about improving learning

outcomes and student responses through ethnomatematic learning gejoh Lesung on fractional number calculation surgery material shows that realistic learning based on Etnomatika Gejoh Lesung can be an alternative for elementary teachers in varying math learning.

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