

THE ROLE OF ETHNOMATHEMATICS IN THE IMPLEMENTATION OF CONTEXTUAL MATHEMATICS LEARNING

Heri Sopian Hadi¹, M. Gunawan Supiarmo², Muhammad Tahir³, Ondi Asroni⁴

^{1,3,4}universitas bumigora

²Universitas Negeri Mataram

*Email Korespondensi: heri@universitasbumigora.ac.id

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Abstract: Study This aiming For know role ethnomathematics in implementation learning mathematics contextual in school basic . As for the method research used is studies literature with stages *Organize, Synthesize, and Identify* . Research results show that ethnomathematics in implementation learning mathematics is one of the solution used For increase interest Study students . In addition ethnomathematics can also present components learning including constructivism , asking , discovering , society learning , modeling , reflection and assessment authentic . So that ethnomathematics make it easier student For Study geometry , because context used in the form of common culture student see , hear and do as member family and society . Learning contextual based on ethnomathematics naturally No only give knowledge about draft geometry only , but also provide knowledge about culture life public Where student is at .

INTRODUCTION

Mathematics is a science that has a great contribution to the progress of modern technology in the 21st century which is widely used in human life (Mulbar, 2012) . Mathematics learning is also an important part of education that plays a role in developing students' thinking processes in dealing with mathematical problems in class , and training the preparation of such thinking so that it can be used in their future (Dewi Murniati, Candisa Made, & Kirna Made, 2013) .

The 2013 curriculum emphasizes the application of mathematics learning to scientific methods or (Scientific Method) which usually begins with observing mathematical problems that are scientific in nature to encourage students to be active in learning (Richardo, 2017) . However, learning mathematics Now in its implementation by many teachers use the conventional way . So that student difficulty For convey his thoughts , because too much learning focused on the role of teachers (Irawan & Kencanawaty, 2017) . There are several reason difficulty students , namely student feel learning mathematics No own relatedness with

life daily them , and the presentation draft mathematics from abstract to concrete by the teacher not make child interested in Study (Misdalina, Zulkardi, & Purwoko, 2013) .

Learning mathematics moment This should be associated with reality life daily students , because mathematics of course Already ingrained in life student That Alone in the public (Sudirman, Rosyadi, & Lestari, 2017) . Rosa and Orey also said learning in it happen interaction social and cultural is reflection from learning good math (Sudirman et al., 2017) (D'Ambrosio, 1985) also stated the good thing is in the learning process mathematics , context problems used is about culture local local . Learning based on culture This known with ethnomathematics (Asnawati, KD, & Muhtarulloh, 2015) .

Ethnomathematics is a mathematical activity carried out by a particular cultural group. Ethnomathematics is also A approach learning with use culture as point beginning For building and bridging understanding student from informal mathematics towards formal mathematics (Zahroh, 1985) . In addition ethnomathematics called as knowledge knowledge that can give outlook to student that mathematics is an adapted learning error from culture and in No direct can enrich knowledge student about culture That Alone (Richardo, 2017) .

Based on study literature conducted by researchers one of relevant learning with problem learning in paragraphs on is learning contextual based on ethnomathematics (Irawan & Kencanawaty, 2017) (Hariastuti, 2014) (Sudirman et al., 2017) , namely learning mathematics that uses approach contextual with context culture as source Study student in Study mathematics . In addition, this type of mathematics learning can also increase students' knowledge about their culture and build students' love for local culture (Richardo, 2017) .

Based on exposure idea background the back that has been delivered , then the researcher is interested in conducting research with a focus on the formulation of the problem: how the role of ethnomathematics in the application of contextual mathematics learning, especially in geometry material?

Research methods

The purpose of this study is to determine the role of ethnomathematics in the application of mathematics learning with a contextual approach to geometry material. Therefore, the research method used is library research. This research is also commonly called *library research* where researchers will study in depth the knowledge and findings in relevant literature to obtain information, both theoretical information and scientific information about the role of ethnomathematics in the application of mathematics learning, especially geometry material at the Elementary School level.

Library research activities begin with collecting secondary data from research results which are then analyzed. The data are obtained from scientific research journals, scientific reading books, reports from several studies, information from scientific sites accessed on the

internet and other sources relevant to ethnomathematics and mathematics learning in geometry materials.

The data analysis technique used in *library research* includes three stages, namely the first stage *Organize*, at this stage the researcher reviews the literature that is in accordance with the context of the problem to be solved in this study by reviewing one by one from reading the abstract, introduction, methods and discussion. The researcher selects a part of the literature that is considered important to support the research data by searching for the main idea, problem formulation, research objectives and the basis for drawing conclusions. The next is the *Synthesize stage*, synthesize is the researcher's activity of uniting all information related to the results of studies from several literatures which are then summarized into a cohesive whole by paying attention to the location of differences and discussions between literatures both in terms of research problems, objectives, research methods used, final research results and conclusions. Then the last stage is the researcher does *Identify*, the identify stage is the researcher's activity to raise discussions that are considered important or commonly called controversial issues to then be analyzed and rewritten into interesting reading.

Results and Discussion

a. Ethnomathematics

A famous mathematician from Brazil named (D'Ambrosio, 1985) stated that ethnomathematics is defined as a cultural mathematical activity practiced in society. Another opinion says that ethnomathematics is a mathematical activity carried out by a particular cultural group (Asnawati et al., 2015).

Ethnomathematics is also a learning approach that uses culture as a starting point to build and bridge students' understanding from informal mathematics to formal mathematics (Zahroh, 1985). In addition, ethnomathematics is referred to as a science that can provide insight to students that mathematics is one of the learning adapted from culture and can indirectly enrich students' knowledge about the culture itself (Richardo, 2017).

Ethnomathematics was born through the customs of traditional communities, whether in the form of games, buying and selling, traditional music, buildings and others. Some of these things are still preserved by every level of society because they have utility value for life and as one way they love local culture. The development of ethnomathematics originating from culture makes people unaware of the existence of ethnomathematics, because it is considered simple when compared to formal mathematics in schools (Putri, 2017).

Ethnomathematics is a science that has developed recently, especially in mathematics learning in education in Indonesia (Putri, 2017) , so that it has great opportunities for educators as a way to innovate contextual learning by introducing local culture as the context for the given mathematical problems. to students (Richardo, 2017) . Apart from that, advances in science have provided space for the application of ethnomathematics in school learning (Putri, 2017) .

b. Contextual Mathematics Learning in Geometry Material

Contextual mathematics learning is learning that utilizes real situations in everyday life as a problem context that can stimulate students' activeness in learning (Richardo, 2017) . Contextual problems presented by teachers are the first step in students' understanding to understand mathematics material informally which then leads them to formal mathematics understanding (Luh Dewi Murniati, I Made Candiasa, I Made Kirma, 2018) .

Contextual learning is assumed to maximize students' understanding through a scientific environment, by placing students as subjects in this case "working" and "experiencing" themselves, not only limited to "knowing" what they learn. In addition, contextual learning is not only used to provide knowledge to students, but also emphasized so that students interpret the lessons they get. So that students do not understand mathematical concepts only as procedures, but understand concepts and provide benefits to students to solve problems in their lives in the future (Kadir, 2013) .

Research conducted by (Richardo, 2017) suggests that there are seven components that can be presented in the application of contextual mathematics, namely: constructivism, asking, finding, learning communities, modeling, reflection, and authentic assessment. These seven components are also the basis for steps that can be used for contextual learning, this is in line with the statement in the research conducted by (Drs. HM Idrus Hasibuan, 2014) and other research conducted by (Kadir, 2013) .

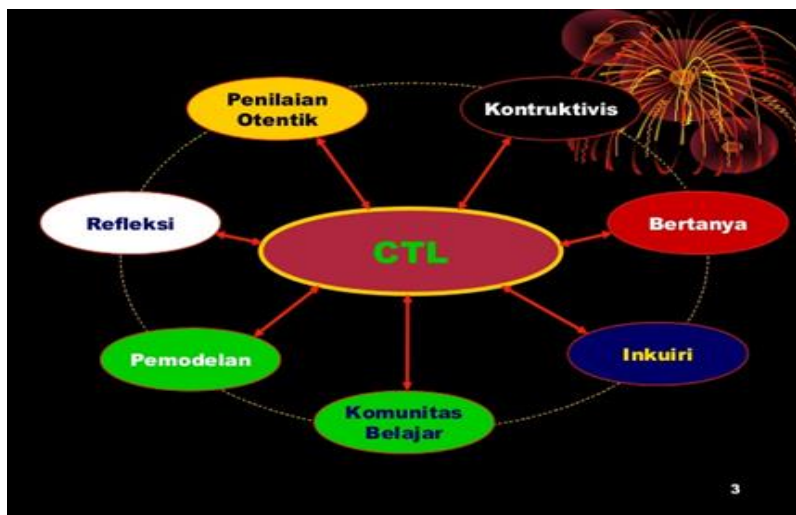


Figure 1 Sketch of components in contextual learning

Mathematics is one of the subjects taught at the Elementary School level to develop students' reasoning. The mathematics material applied at the Elementary School level includes three main topics of discussion, namely number material, statistics material and geometry material (Ulum, Budiarto, & Ekawati, 2018) . Through this article, researchers focus on the study of the role of contextual application of ethnomathematics in geometry material.

Geometry is a mathematical material that contains lines, planes and spaces that are mostly abstract and is one of the difficult discussion materials for students due to the weak absorption of students in understanding it (Nur'aini, Harahap, Badruzzaman, & Darmawan, 2017) . Therefore, there are many studies conducted by previous researchers to find solutions related to problems in the world of education, especially in learning mathematics in geometry material.

Through the explanation of the paragraph above, we can see that geometry is one of the mathematical materials that requires contextual learning, because of its abstract nature and is not easily understood by students (Putri, 2017) . Along with the development of science in the 21st century, many scholars offer solutions to the use of ethnomathematics in contextual learning, where the context of the problems used are real-world problems related to the culture of students' daily lives. This is in line with what was said by (Hidayat et al., 2017) and (Sudirman et al., 2017) .

Mathematics learning using ethnomathematics is a solution presented to overcome complex problems in education. Some of the studies conducted include: research conducted by (Ulum et al., 2018) related to the exploration of geometry in batik motifs.

Another study by (Maure & Ningsi, nd) with the topic of ethnomathematics exploration in the *caci* dance of the Manggarai community. In addition, there is research that explores ethnomathematics in rebana art which is expected to be a source of learning for students by (Putri, 2017) . Furthermore, the use of ethnomathematics in the form of Indramayu batik artwork as a context in learning transformation geometry conducted by (Sudirman et al., 2017) .

c. The Role of Ethnomathematics in Contextual Mathematics Learning in Geometry Material

The 2013 curriculum emphasizes the application of mathematics learning to the scientific method or (Scientific Method) which usually begins with observing scientific mathematical problems that encourage children to be actively involved in the learning process (Richardo, 2017) . In addition to the scientific learning approach, one approach that utilizes the scientific method is also contextual learning (Kadir, 2013) because in this type of learning students are not placed as objects of learning, but as subjects in this case "working" and "experiencing" themselves, not only limited to "knowing" what they are learning.

The learning process with a contextual approach begins by observing an event or incident presented by the teacher in the form of a problem. Then continued with constructivism, asking, finding, learning communities, modeling, reflexes, and authentic assessments, this is in line with research conducted by (Richardo, 2017) . The problems that can be given to students related to culture in life are very diverse, including the use of games, buildings, traditional objects, traditional musical instruments, music, song lyrics, community activities, and others (Putri, 2017) . The role of ethnomathematics in contextual mathematics learning in geometry material is explained as follows:

1. Constructivism

The constructivist view on the mathematics learning process emphasizes that the teacher's role is only as a facilitator to direct students by placing the teacher as a creative mediator. In addition, constructivism also views each student in the class as an individual who already has the ability to construct their own knowledge (Putri, 2017) . Through this ability, students can find solutions to the math problems given, because here the teacher is not only limited to transferring knowledge to students, but must maximize his role in building that knowledge within himself. For example, teachers present relevant teaching methods to attract students' interest so that the learning they feel can be meaningful by

providing the greatest opportunity for students to find or apply their own ideas (Zubaidah Amir M.Pd. Dr. Risnawati, 2015) .

2. Ask

Students are given ample opportunity to ask questions about problems that are not understood and teachers do not have to answer all student questions but rather direct students to find their own solutions to the development of mathematical models that they do. This is intended to develop students' curiosity by using conversation activities in the form of questions and answers with teachers and other students, in short to be involved in the learning community (Ilma & Putri, 2012) .

The implementation of questioning activities can also make the learning process more lively which is one of the factors of the breadth and depth of the learning context that can be understood by students. In addition, students are trained to think critically by not accepting opinions, ideas raw and free, which encourages students' curiosity to understand more deeply about the theory and makes them study harder (Kadir, 2013) .

3. Find

contextual learning is learning that places students as the subject of learning, while the teacher is only a facilitator. So that students are directed to find mathematical models through mathematical activities that they do themselves. The discovery of mathematical concepts by students cannot be separated from the role of teachers as facilitators to guide and direct students to be independent and make learning meaningful (Kadir, 2013) (Zubaidah Amir M.Pd. Dr. Risnawati, 2015) .

4. Learning community

Contextual learning places more emphasis on social learning, whether between students and teachers, students and other students, and students and their learning environment. (Irawan & Kencanawaty, 2017) . So this learning prioritizes learning by group, conducting discussions to find solutions to mathematical problems. This is in line with what was expressed by (Kadir, 2013) in his research which explains that in contextual learning it is inseparable from group learning activities, working together with other classmates which of course maximizes students' abilities rather than having to learn alone, students can also share experiences about what they have been through and at the same time share ideas related to the results of their understanding which are then compared with their group members to then get conclusions about the answers to the mathematical problems given by the teacher.

5. Modeling

In the process of learning mathematics, modeling is needed which is found by students through contextual problems given by the teacher, this model can be in the form of operations found through mathematical activities that students do by discussing with their group members or the teacher directly provides examples of working on mathematical problems (Drs. HM Idrus Hasibuan, 2014) . In addition, the teacher becomes an initial example that can be captured by students' visuals and then can be imitated to motivate students that they can also do the same (Kadir, 2013) .

6. Reflection

Reflection is a teacher activity that aims to assess, observe, organize, analyze and evaluate what has happened during the learning process. In this case, teachers provide an opportunity at the time approaching the end of learning to reflect either through direct statements about their understanding of the learning material, or through important notes in student books, and impressions or suggestions related to the learning that has been done (Drs. HM Idrus Hasibuan, 2014) .

7. Authentic assessment

Authentic assessment is the teacher's activity of collecting information regarding the development of student understanding using certain techniques that can show whether the learning objectives have been achieved and can be used as evaluation material to correct deficiencies in the learning process.

(Kadir, 2013) explained that there are three activities carried out by teachers, namely: 1) Measuring knowledge through questions and measuring students' skills through direct work in front of the class. 2) Assessment of students' products or performance in solving the given mathematical problems. 3) Teachers provide relevant tasks according to the material applied that can trigger student activity in class, and the problems given must also be contextual in accordance with students' daily life experiences.

Based on the learning stages that have been explained above, it can be seen that the general role of ethnomathematics in contextual mathematics learning is:

1. Makes it easier for students to learn, because the context used is a real problem in the form of local culture.
2. Train students to solve math problems independently and in groups.
3. Providing learning that gets students used to working together
4. Make learning meaningful.
5. train students to become highly social individuals.
6. Creating a fun classroom situation.

7. Learning that can stimulate students to be active and creative.
8. Teaches students to be careful and thorough.
9. Developing students' ability to develop mathematical models.
10. Increase students' curiosity, ability to discover and ask questions.

Berikut contoh gambar pengabdian.



Figure 2. Photo documentation of dedication

Conclusion

Through the presentation of the results and discussion that have been explained in the previous chapter, the role of ethnomathematics in the application of contextual mathematics learning is...

- a. Ethnomathematics makes it easier for students to learn geometry, because the context used is a real problem in the form of culture that they commonly see, hear and do as family and community members, such as traditional buildings, objects, batik cloth motifs, games, community activities, and so on.
- b. Contextual learning based on ethnomathematics certainly does not only provide knowledge about geometric concepts, but also provides knowledge about the culture of life in the society where students live.
- c. Ethnomathematics provides great opportunities for students to develop their problem-solving abilities in accordance with the objectives of implementing contextual learning.
- d. Ethnomathematics is able to present learning that can stimulate students to be active and creative, transfer knowledge about culture, nationalism and build students' love for local traditions and culture.

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