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Literature Study: Integration of Ethnomathematics in Mathematics Learning in Schools

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ABSTRACT

Ethnomathematics is a mathematics learning approach that integrates local culture into the learning process. This method aims to increase students' relevance and understanding of mathematical concepts through the cultural context they are familiar with. This study uses the literature study method to explore various studies that examine the implementation of ethnomathematics in mathematics learning in schools. Research shows that the integration of ethnomathematics can increase learning motivation, understanding of concepts, mathematical abilities in problem solving, and appreciation of local culture. Implementing ethnomathematics in mathematics learning involves developing teaching materials that combine local cultural elements, teacher training, and curriculum adjustments. Various studies show that this approach is effective in improving student learning outcomes, especially in areas with diverse cultural riches. However, there are challenges in implementing ethnomathematics, such as lack of resources, limited teacher knowledge of local culture, and resistance to curriculum change. To overcome these challenges, cooperation between government, educational institutions and local communities is needed. This study also highlights the importance of further research to measure the long-term impact of the integration of ethnomathematics in mathematics learning. Thus, ethnomathematics can not only improve the quality of mathematics learning, but can also contribute to the preservation of local culture.

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INTRODUCTION

Mathematics education has long been considered one of the important pillars of the education system, playing a key role in shaping students' critical and logical thinking skills. However, challenges in teaching mathematics often arise because of the perception that this subject is abstract and detached from the realities of everyday life. One innovative approach to overcome this challenge is to integrate ethnomathematics in mathematics learning.

The role of science and technology (IPTEK) in modern developments is very significant. The educational curriculum needs to develop in line with advances in science and technology, including the integration of culture in school learning. Ethnomathematics brings out cultural wisdom so that it can motivate students in learning mathematics. In learning mathematics, there are several abilities that influence student learning achievement. Among these mathematical abilities are mathematical literacy abilities.

The use of the term ethnomathematics in this paper refers to the writings of Sirate (2015:252). Sirate explains that the term ethnomathematics is a transliteration of the term ethnomathematics. The term ethnomathematics was first introduced by a Brazilian mathematician named D'Ambrosio. D'Ambrosio first used the term ethnomathematics at the congress mathematics ICME 3 in 1997.

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Ethnomathematics is the study of how certain cultural groups understand, express, and use mathematical concepts in the context of their lives. This approach recognizes that mathematics is not a static and universal science, but can be found in various forms and applications in local cultures. By integrating ethnomathematics into mathematics learning, students can see the relevance and real application of mathematical concepts in their daily lives.

The application of ethnomathematics in learning not only helps improve students' understanding of mathematical concepts, but also enriches their insight into the richness of local culture. For example, geometric concepts found in traditional weaving arts, symmetry patterns in regional dances, or numerical calculations in traditional trading systems. Thus, ethnomathematics not only enriches students' learning experiences, but also plays a role in preserving and respecting local culture.

However, the integration of ethnomathematics in the school curriculum is not without challenges. One of the main obstacles is the limited knowledge and resources possessed by teachers to develop and implement ethnomathematics-based learning materials. In addition, resistance to curriculum changes and concerns about achieving academic standards are also barriers to implementing this approach.

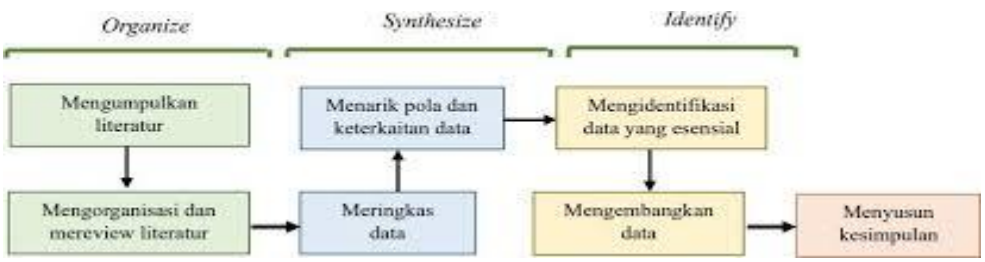
Nevertheless, various studies have shown that the ethnomathematics approach has great potential to improve student learning outcomes. By relating mathematical concepts to a cultural context familiar to students, they become more motivated and involved in the learning process. Therefore, it is important for educators, researchers, and policy makers to work together to develop effective strategies for integrating ethnomathematics in mathematics learning.

This study aims to explore the potential and challenges of integrating ethnomathematics in mathematics learning at school. Through the literature study method, this research will examine various studies that have been carried out regarding the application of ethnomathematics, as well as provide recommendations for more effective implementation in the future. Thus, it is hoped that this approach can become an innovative solution to improve the quality of mathematics education in Indonesia.

RESEARCH METHOD

This research uses a descriptive content analysis method. The research process follows meta-synthesis to analyze ethnomathematics content from various regions in Indonesia. Data were collected through an extensive literature review and analyzed to identify relationships between cultural practices and mathematical concepts. The literature study process is as follows:

Figure 1: Literature Study Process



The data analyzed is secondary data in the form of research results such as scientific reading books, scientific journals, research reports, internet sites and other relevant matters. The data analysis technique includes 3 stages: First. Organize where in this stage the researcher reads 20 reading sources related to ethnomathematics in mathematics learning at school and will discuss 10 articles related to mathematical understanding, problem solving and love/appreciation of culture.

From several sources it was found that many lessons use ethnomathematics as a learning medium. So it was found that there is a connection between ethnomathematics in increasing students' mathematical understanding at school. This is what underlies researchers to discuss ethnomathematics in mathematics learning.

The next stage is Synthesize, at this stage the researcher gets a summary, namely many of the learning models, ethnomathematics-based learning media used in the learning process and this helps students increase their understanding and love of local culture. The next stage is Identify, at this stage the researcher gets several issues that are not all cultures can be used in learning mathematics, meaning that each culture has its own material that can be studied.

RESULTS AND DISCUSSION

Ethnomathematics is a field that explores the cultural aspects of mathematics, including the ways different cultures view, understand, and utilize mathematical concepts. In recent years, there has been increasing interest in integrating ethnomathematics into educational curricula as a means of fostering cultural appreciation, increasing mathematical understanding, and developing students' mathematical abilities.

This research uses a literature study method approach to investigate the impact of integrating ethnomathematics into mathematics learning at school on students' cultural appreciation, mathematical understanding, and mathematical abilities.

Table 1: Research on several journals related to ethnomathematics in mathematics learning:

No	Researcher	Research Title and Journal Source	Research result
1	Sarwoedi, Desi Okta Marinka, Peni Febriani, InyomanWirne	The Effectiveness of Ethnomathematics in Improving Students' Mathematical Understanding Ability Rafflesia Journal of Mathematics Education Vol. 03 No. 02, December 2018.	From the literature study conducted by researchers by exploring journals from 2015-2017, research results can be drawn that the use of ethnomathematicseffective in students' mathematical understanding abilities. It is proven that from the results of research and several indicators of students' understanding abilities, it is stated that there is an influence of ethnomathematics on students' mathematical understanding abilities, namely in terms of identifying, translating, interpreting symbols, understanding and applying mathematical ideas, making explorations (estimates) and solving

			mathematical problems. .
2	Wahyu Cahyadi, Miftah Faradisa, Sitri Cayani, Fatrima Santri Syafri	Ethnomathematics to Improve Students' Mathematical Problem Solving Abilities. Arithmetic Journal Vol. 2 No. 2 of 2020.	From the literature study conducted by researchers by exploring journals from 2016-2018, research results can be drawn that the use of ethnomathematicseffective in improving students' mathematical problem solving abilities in mathematics learning. Ethnomathematics will help students study, analyze and practice learning activities, especially in flat material, by using culturally relevant problem solving as teaching materials and alternatives in learning.
3	Yus Mochamad Cholily, Anis Farida Jamil, Mayang Dintarini	Assistance in the Implementation of Ethnomathematics-Based Learning for Muhammadiyah Malang Middle School Teachers. Kaibon Abhinaya: Community Service Journal 2021	Based on the mentoring activities that have been carried out, teacher attendance at mentoring training using ethnomathematics reached 100% and from the results of interviews all teachers understood the AkM material after the training was carried out. In the worksheet developed by watching YouTube videos, the connection between ethnomathematics in the Malang mask dance and translation material can increase students' understanding in learning mathematics.
4	Ahmat Fatoni Rizal, Jayanti Putri Purwaningrum, Ratri Rahayu.	Development of an E-Module Based on Ethnomathematics to Develop Mathematical Communication Skills and Student Interest in Learning. Coordinates: Journal of Mathematics and Science Learning Vol. 2, no. 2, July-December 2021.	The research results show that the e-module is declared valid criteria with a score of 3.24. The results of the practicality test for teachers and students obtained an average of 3.28 in the practical category. So it can be concluded that ethnomathematics-based e-module learning media can foster communication skills and interest in learning in class VII students.
5	Hariyu Aflah, Ella Andhany.	Ethnomathematics in Alas Tribe Culture in Southeast Aceh Regency. Scholarly Journal Vo. 6	From the series of explanations on the research results that have been described by the author, there are various mathematical concepts, ideas and activities in the culture of the Alas tribe in Southeast Aceh Regency. Such as algebra, geometry, and intervals.

		No. 3 of 2022	Through an ethnomathematics approach, it can provide conceptual understanding, awaken thinking power and learn the meaningfulness of mathematics with real examples in everyday life.
6	Frida Destini, Ujang Efendi, Muhisom, Dayu Rika Perdana, Deviyanti Pangestu, Nindy Profithasari.	The Potential of Lampung Culture-Based Ethnomathematics to Improve the Culture-loving Character of Elementary School Teacher Education Students. Didactics : Vol. 2 No. 2 of 2022.	The research results show that Ethnomathematics is effective in increasing student engagement with a percentage of 92% and can be used as an alternative to help students learn multiplication material in mathematics and increase their love of culture.
7	Aulia Ika Nurhayati, Bambang Eko Susilo.	*Systematic Literature Review*: Implementation of Ethnomathematics learning towards Problem Solving abilities and Cultural Loving Character.	This research was conducted using the Literature Study method for 2015-2021 journal articles, there were 15 national and international articles obtained from the Google Scholar and Scopus databases. The research results show that ethnomathematics learning effectively helps develop students' problem-solving abilities and love of local culture, its implementation is used in an approach attached to the learning model and learning media.
8	Ida Yeni Rahmawati, Wahyudi Hadi, Cahyono, M. Fadlillah.	Traditional APE: Ethnomathematics-Based Cultivation of Love for the Homeland in Early Childhood. Journal of Obsession: Journal of Early Childhood Education vo. 6 of 2022.	Based on the research results, it can be seen that several APEs (Educational game tools) found in the cultural playground that have been developed in the Ponorogo state kindergarten, including APE Engrang Batok, APE Dam-Daman, APE Bakiak, APE Congkak, and APE Engklak contain elements of ethnomathematics. This element is related to the learning process of early childhood on the concept of counting, flat figures, spatial concepts and mathematical logic. APE apart from aiming to preserve traditional games also fosters a sense of love for the country.
9	Teti Trisnawati	Development of Interactive Teaching Materials with an	The validation results of this research show that the validation of mathematics education experts is in very good qualifications with 87.12%, the validation of learning media

		Ethnomathematics Approach Based on Local Culture in Banten on the Basics of Discussing Lines and Series for Middle School Students. Cendikia Journal: Journal of Mathematics Education volume 6, 2022.	experts is in very good qualifications with 87.5%, the validation of language experts is in very good qualifications with 94.23%, Cultural expert validation was very well qualified with 93.75%, and small group trials were very well qualified with 82.23%. Thus, teaching materials with a culture-based ethnomathematics approach75lter in Banten can be used as an alternative choice on the subject of rows and series in class VIII SMP.
10	Hesti Yunitiara Rizki, Anni Mavisiul Hawa.	Implementation of Local Cultural Geometry Ethnomathematics in Developing Students' Nationalist Character. Abdira, Journal Vo. 2 in 2022	The application of Ethnomathematics in cultivating students' nationalist character values in webinar activities was declared to meet the indicators of success. Ethnomathematics material in the form of various local cultures in Indonesia including traditional houses, typical food, batik motifs, musical instruments and others provides significant benefits in cultivating students' nationalist character.

From the journals that have been studied regarding the use of ethnomathematics integration in mathematics learning, the results of the first study show that ethnomathematics integration makes a significant contribution to cultivating cultural appreciation among students. By exploring mathematical concepts in different cultural contexts, students gain a deeper understanding of the cultural significance of mathematics and develop an appreciation for the diverse ways in which mathematical knowledge is constructed and applied in various societies.

Second, this research found that integrating ethnomathematics into the learning process had a positive impact on students' mathematical understanding. By engaging with real-world examples of mathematical concepts embedded in cultural practices, students are able to make meaningful connections between mathematics and their daily lives, thereby leading to a deeper understanding of mathematical principles.

Additionally, research shows that the incorporation of ethnomathematics into the classroom environment has an important impact on students' mathematical abilities. The practical and contextual nature of ethnomathematics-based activities improves students' problem-solving skills, critical thinking abilities, and mathematical reasoning, thereby contributing to improving their overall mathematical proficiency.

CONCLUSION

The implications of these findings are enormous. By integrating ethnomathematics into the mathematics learning process, educators can create an inclusive and culturally responsive learning environment that not only encourages cultural appreciation but also enriches students' mathematics

learning experiences. Furthermore, this research underscores the importance of recognizing and incorporating diverse cultural perspectives in mathematics teaching, as this can result in more effective and engaging teaching, ultimately benefiting students from all cultural backgrounds. In conclusion, the study "Integrating Ethnomathematics to Develop Cultural Appreciation, Mathematical Understanding, and Students' Mathematical Ability" provides valuable insight into the benefits of including ethnomathematics in education.

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