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Systematics Literature Review: Exploration of Ethnomathematics in Community Activities in Buying and Selling and Distribution of Goods

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ABSTRACT: Ethnomathematics examines the relationship between mathematics and culture groups in community activities, it is an approach that can reveal important and unique phenomena about how various cultures implement mathematical principles. This study aims to identify, review, evaluate, and interpret according to the established keywords by analyzing articles within the period of 2020- 2024 related to cultures that use mathematical concepts in community activities, particularly in distribution and trade. Through Systematic Literature Review (SLR), there are 17 article data in the form of journal articles, proceedings, theses, and dissertations which were obtained from the Semantic Scholar and Google Scholar databases. The result of this research is the presence of a different ethnomathematics approach in community activities, particularly in distribution and trade activities based on their culture.

KEYWORDS: Ethnomathematics, Trade, Distribution.

INTRODUCTION

Mathematics has an important role in various aspects of people's lives, especially in economic activities such as buying and selling and distribution of goods. In daily activities, math is used to calculate, determine the amount of goods, as well as needs and distribution. However, many people do not realize that these daily activities involve various mathematical concepts that have become part of the habits or culture of the community, this is part of the culture of the community known as ethnomathematics (Yulianasari, N., & Maulidina, N., 2023). As a result, this condition often leads to a lack of understanding of how mathematics is actually applied in the context of buying and selling and distribution of goods carried out by the community.

Ethnomathematics as a scientific discipline that examines the relationship between mathematics and local culture in community activities as explained by D'Ambrosio in Nuryami, N., & Apriosa, K. D. (2023) that ethnomathematics is mathematics that is located or practiced in the culture of people from both children and adults, from laborers to urban communities. In the context of buying and selling and distribution of goods, people naturally use basic math concepts such as addition, subtraction, multiplication, and division because basically all cultures are supported by the discipline of mathematics. For example, in buying and selling transactions, people often use addition and subtraction operations to calculate the total price of goods and give change (Mauliska, N., & Pratama, L. D., 2022). Multiplication and division operations are also commonly used in calculating the unit price of goods or dividing the number of goods in the distribution process. These processes may be common, but they reflect the use of fundamental mathematical concepts in everyday economic activities.

Understanding ethnomathematics in this context can provide deeper insights into how mathematics is used practically in people's economic lives. Activities such as calculating the amount of goods bought or sold, determining prices based on the amount of goods purchased, and distributing goods with simple calculations all involve basic mathematical concepts (Susanti, E., 2020). This connection shows that math is not only limited to the classroom, but also plays a major role in daily economic interactions.

Although there have been several studies that raise the topic of ethnomathematics, studies that specifically discuss the application of mathematics in buying and selling activities and the distribution of goods are studies that can be carried out. Some previous research on ethnomathematics in community activities found various ethnomathematics concepts in diverse community activities. This is of interest to researchers to conduct a literature review related to ethnomathematics in community activities, especially in buying and selling and distribution. Therefore, this research aims to conduct a literature study to explore the concept of ethnomathematics applied in this context. This literature review will compile a comprehensive picture of how people use mathematical concepts in their activities so that the results of this study are expected to provide a strong foundation for further research and expand understanding of the role of mathematics in socio-economic practices.

METHODS

This study uses the Systematic Literature Review (SLR) method, Triandini et al (2019) state that SLR is used in research to find, review, and evaluate relevant research to answer research questions. This study went through several stages, namely 1) formulation of research questions; 2) literature search; 3) determination of inclusion and exclusion standards; 4) selection of literature; 5) data presentation; 6) data processing; and 7) conclusion drawing. The first research question: Who is involved in using mathematical concepts and their context of implementation? (PP1). The second research question: What mathematical concepts are applied in community activities? (PP2). In the literature search, the Semantic Scholars, Taylor Francis, and Google Scholars databases were used by limiting the search from 2020 to 2024 through the keywords "Ethnomathematics, Goods Distribution, Buying and Selling, and Society."

The standard inclusion and exclusion criteria included journal articles or proceedings articles or articles from thesis/dissertation research related to the ethnomathematics concept of buying and selling and distribution in community activities. The literature obtained was then selected and analyzed based on the inclusion and exclusion criteria. On the inclusion criteria: 1) journal articles, thesis/dissertation research, or proceedings published in 2020-2024; 2) articles related to the research theme; 3) articles or proceedings indexed in national journals, ISSN; 4) Research that explicitly or implicitly, directly or indirectly discusses ethnomathematics in the context of community distribution and buying and selling. On the exclusion criteria: 1) articles published before 2020; 2) articles published more than once; 3) research that only discusses mathematical concepts in general, without relating to ethnomathematics in logistics distribution or buying and selling; 4) research articles that are not available in *full-text*. Based on the inclusion and exclusion criteria, articles were selected, resulting in 17 articles. In the next stage, the researcher recorded the articles into a table and then reviewed and studied the articles intensely, especially in the research results section to compare the findings of the articles based on the research questions and then made conclusions.

RESULTS AND DISCUSSION

Article data in the form of journal articles, proceedings articles, theses, and theses documented related to ethnomathematics in buying and selling activities and community distribution are 17 articles presented in the following table.

Table 1. Description of Research related to Ethnomathematics on Buying and Selling Activities and Community Distribution

Researcher and Year	Article Type	Research Results
Mauliska, N., & Pratama, L. D. (2022)	Proceedings	The result of this research is that the mathematical model used by the people of Probolinggo Regency in buying and selling transactions at the Maron traditional market is using an arithmetic model. In this activity there are findings of several arithmetic concepts used, but it has a very big difference with what is taught at school, be it the operations of addition, subtraction, multiplication, and division.
Siregar, S., & Yahfizham, Y. (2023)		The results of this study show that the buying and selling transactions of coastal communities in Sibolga are related to the mathematical concepts involved in the buying and selling process, namely counting and counting activities, there are counting operations in these activities. The emergence of counting activities when mentioning the purchase price. Mathematical concepts appear during counting activities such as addition, subtraction, multiplication and division.
Pramesti, S. L. D. (2021)	Proceedings	The results of this study indicate that the activities of coastal communities who work as fishermen in Wonokerto, Pekalongan Regency in their daily lives show a connection with mathematical concepts contained in the daily lives of the community including number operations, algebraic form operations, relations, and functions, sets, systems of linear equations, and social arithmetic.
Luthfiani, M. I., & Nalim, Y. (2022)	Journal Article	The results of the study concluded that the local cultural wisdom of the coastal communities of Pekalongan City contains many ethnomathematics activities. Among them are ngiteng activity, batik activity, fishing activity and jengklek or engklek playing activity. These activities are related to counting, measuring, building design,

		determining direction and location, playing.
Nelisa, N., Nursangaji, A., Sayu, S., Fitriawan, D., Rustam, R., & Munaldus, M. (2023)	Journal Article	The results showed that there is ethnomathematics in the activities of distributing goods carried out by online traders which can be seen in the material of measurement, sets, number operations, comparison, smallest common multiple (KPK), and social arithmetic.
Kou, D., Nahak, S., & Mamoh, O. (2021)	Journal Article	The results showed that there are mathematical concepts in activities at the Noemuti Traditional Market in North Central Timor Regency, including: the concept of sets, social arithmetic, linear equations, addition, subtraction, multiplication, division, discounts, cardinal numbers and mathematical principles, namely the principle of comparison.
Aziza, Najma (2023)	Thesis	The results showed that from the buying and selling activities at Banyurip Traditional Market in Pekalongan City, it was obtained: 1) Ethnomathematical activities in the form of counting activities and measuring activities, and 2) The mathematical concept in this study focuses on the concept of social arithmetic. Based on the findings during the research, it is known that in the buying and selling activities at Banyurip Market, Pekalongan City, there is a practice of the concept of social arithmetic, but the concept applied has several differences when paired with the concept of arithmetic in mathematics.
Baidawi, M., Khasanah, F., & Una, A. M. W. (2023)	Journal Article	The results found that in the buying and selling of woven fabrics, the Nagekeo community used to use the strategies of addition, subtraction, multiplication, and division. In addition, it uses a barter system. The community measures woven fabrics using cubits and squares.
Wijayanto, G. A. (2021).	Thesis	Based on the research results obtained, traders tend to ignore the number 0 as thousands, tens of thousands, and hundreds of thousands. They tend to say 0, 1, 2, ..., 9 for thousands. 10, 11, 12, ..., 99 for tens of thousands and 100, 101, 102, ..., 999 for hundreds of thousands of course in Javanese. Algorithm counting in fruit sales transactions conducted by fruit traders in rambipuji jember stalls, related to the addition is to get the results of the traders in the process of buying and selling transactions is to add up the value in the thousands first, and ignore the zeros behind it. Based on subtraction, the results of the return calculation are obtained by completing the subtraction first in the tens and above (completing up) or known as counting up. The result of multiplication is that the seller discards zeros and deliberately calculates in stages where in multiplication with large amounts the seller will multiply by the number of half and then add. While related to division, the results obtained by traders are always looking for the middle value where traders always divide by two and then divide again if they want to know the smallest unit.
Nusrah, R. (2024)	Journal Article	The chant counting used by traders is not equipped with definitions, theorems and formulas as found in academic mathematics. However, in practice in the field, some traders admitted that the chant method is easier to apply in the counting process compared to using written algorithms such as paper and stationery as taught in school. Not all

		traders mastered counting bini because the thinking power or logic of thinking of each trader is different which is influenced by several age factors related to life experience. In its application, 3 different cases were found in the calculation process which included addition, subtraction, multiplication, and division. Analysis of mathematical concepts found such as the existence of algebraic manipulation with the process of equalizing the weight of the number value, the distributive nature of multiplication in addition and subtraction, and the discovery of distortion in one of the cases.
Lestari, A., Ainol, A., & Lestari, W. (2023)	Journal Article	The results of this study are salt ponds that have mathematical concepts, among others: 1) Rotation and circle in the windmill; 2) Quadrilateral flat buildings found in the salt field; 3) Arithmetic sequence contained in the harvest of each tribe; 3)
Marta, S. D. (2021)	Thesis	The results of this study concluded that 1) Ethnomathematics in the buying and selling activities of the Madurese community in Situbodo city, namely during the calculation of profit, change, and how to determine the price of goods without using weights; 2) The counting algorithm in the buying and selling transaction carried out by the Madurese community in Situbondo city in the activity of counting is also seen in the way they mention the numbers 1, 2, 3, ... in the Madurese language and also when operating these numbers in addition, subtraction, multiplication, and division operations, as well as ignoring zeros when the seller performs calculations in buying and selling cases.
Yeni, Misa, Aloisius, Loka, Son, Yosepha, Patricia, Wua, Laja. (2024)	Journal Article	The results show that mathematical concepts related to whole numbers include sets, counting, addition, subtraction, division, and multiplication.
Nurjanah, N., Mardia, I., & Turmudi, T. (2021).	Journal Article	The findings show that the mathematical representations of finger symbols and gestures in the "Marosok" Tradition contain basic numbers. These include half, one, two, two and a half, three, four, five, etc. with functions, such as addition and subtraction, which are used to derive other numbers required in livestock trading transactions using specific formulas.
Fauzi, L. M., Hayati, N., Satriawan, R., Ali, M., Juaini, M., & Yazid, M. (2024).	Journal Article	The research findings revealed that Bedeyé activities reflect traditional barter-based trading practices, where goods are exchanged for other goods. The mathematical concepts identified in the Bedeyé tradition include comparative mathematics, set theory, and volume estimation. In addition, the educational values contained in Bedeyé activities include itiq, saling redaq, semaiq, and saling saduq. These mathematical principles observed in the traditional trading system of the Sasak tribe, as demonstrated through Bedeyé activities, can be utilized as educational tools and basic elements for teaching mathematics.
Sudirman, S., Rodríguez Nieto, C. A., Bonyah, E., Takiveikata, S., &	Journal Article	The results of this study show that Indramayu traditional market traders have used mathematical concepts such as addition, subtraction, multiplication and division operations in buying and selling activities. In addition, this study also found that traditional

Dejarlo, J. O. (2023).			traders use backward calculations (from front to back) in buying and selling their merchandise. The calculation method used by traditional traders is different from what is usually taught in schools. This method has become a standard pattern to make it easier for them to calculate. Based on this finding, it implies that there are other ways of carrying out information activities that can be used by formal schools.
Rahmasari, A., Mahfudy, S. (2022).	&	Journal Article	Based on the results of the analysis of Sakra community activities in making traditional food, food forms/patterns and in the process of selling traditional food, it can be concluded that there are mathematical activities in the two traditional foods, namely calculating activities, measuring activities, designing activities, and explaining activities.

From the search results, 17 articles were obtained that met the inclusion and exclusion criteria based on the title, abstract, and content of the entire article. Overall, scientific articles were published from 2021 to 2024.

Application of ethnomathematics to community activities (work in the context of buying and selling or distribution) such as Traditional Market Traders (Mauliska, N., & Pratama, L. D., 2022; Kou, D., Nahak, S., & Mamoh, O., 2021; Aziza, Najma, 2023; Baidawi, M., Khasanah, F., & Una, A. M. W., 2023; Wijayanto, G. A., 2021; Nusrah, R., 2024; Marta, S. D., 2021; Yeni, Misa, Aloisius, Loka, Son, Yosepha, Patricia, Wua, Laja.., 2024), Entrepreneurs (Rahmasari, A., & Mahfudy, S., 2022), Farmers (Nurjanah, N., Mardia, I., & Turmudi, T., 2021), fishermen (Lestari, A., Ainol, A., & Lestari, W., 2023; Luthfiani, M. I., & Nalim, Y., 2022; Pramesti, S. L. D., 2021; Siregar, S., & Yahfizham, Y., 2023;), online traders (Nelisa, N., Nursangaji, A., Sayu, S., Fitriawan, D., Rustam, R., & Munaldus, M., 2023). When viewed as a whole in each application of ethnomathematics in community activities (work in the context of buying and selling or distribution) from the existing articles that community jobs that often apply ethnomathematics concepts are traditional market traders. There are many ethnomathematics concepts applied by traditional market traders in carrying out activities, one of which is the operation of addition, subtraction, multiplication, and division (Mauliska, N., & Pratama, L. D., 2022). The use of these operations is also applied by the activities of fishermen (Siregar, S., & Yahfizham, Y., 2023), online traders (Nelisa, N., et al., 2023), and entrepreneurs (Rahmasari, A., & Mahfudy, S., 2022).

CONCLUSIONS

From the literature review of 17 articles related to ethnomathematics in community buying and selling and distribution activities, it can be concluded that mathematical concepts are inherently involved in people's daily activities, especially in economic contexts such as buying and selling in traditional markets and online distribution of goods. These activities include a range of basic mathematical concepts such as addition, subtraction, multiplication and division, as well as more complex concepts such as social arithmetic, sets and algebra. The findings show that communities use various forms of practical mathematics that differ from the academic mathematics taught in schools with an emphasis on practicality and adaptation to the local cultural context. These studies also show that ethnomathematics is not only relevant in economic contexts but can also be used as a pedagogical approach that enriches formal mathematics education because it is able to connect mathematics with real life and local wisdom.

ADVICE

The results of this study open up opportunities for further research in the exploration of the application of ethnomathematics concepts in community activities in buying and selling and distribution, by further exploring how mathematical principles are adapted to the local cultural context so as to identify what the gap is between theoretical mathematics and mathematical practices used by local communities in daily activities and academic mathematics or those usually taught in formal schools.

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