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Ethnomathematics Study and Educational Values in Fundamental Activities at the Langgar Pusaka of Sapit Village

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Abstract: Most people view mathematics as unrelated to real life or culture-free. However, this view is wrong because mathematics is a product of human activity. In this case, there is a way that connects mathematics with culture called ethnomathematics. This research aims to examine the concept of ethnomathematics and educational values in fundamental activities in the traditional house of *Langgar Pusaka*, Sapit Village, East Lombok. This traditional house not only has cultural and spiritual functions but also contains various aspects of mathematics in its architecture, construction, and ritual activities. This research uses a qualitative method with an ethnographic approach. Data were collected through observation, in-depth interviews, and documentation. The results showed that the fundamental activities found in the Langgar Pusaka traditional house reflect mathematical concepts such as geometry both in the building structure and ritual tools used in traditional processions, measurement, symmetry, and number patterns in ritual traditions. In addition, the fundamental activities carried out in the Langgar Pusaka traditional house contain educational values such as cooperation or cooperation called *berikuk tinjal*, mutual respect (*tindih*), moderation (*semaik*), and being economical (*itiq*). This study has the potential to be used as a mathematics learning resource and can be a reference in integrating local culture with contextualized mathematics learning in schools.

Keywords : ethnomathematics ; educational values; fundamental activities; langgar pusaka

INTRODUCTION

The point of view of most people is that mathematics is culture-free (Hunter, 2021). This point of view continues to grow in society, which results in a gap between informal mathematics and formal mathematics learned in schools, which has an impact on the assumption that mathematics is difficult, abstract mathematics, and mathematics is feared by students (Hattikudur et al., 2016). With this phenomenon, there is an interdisciplinary study that can bridge between mathematics and culture called ethnomathematics (Baker, 2023; Rosa & Orey, 2016). Ethnomathematics aims to discover and understand local mathematical understanding (Rosa & Orey, 2021), and how mathematical concepts are applied by people in everyday life, both consciously and unconsciously (Civil, 2002; Prahmana, 2022). The ethnomathematics approach not only focuses on numerical aspects but also on patterns, structures, symmetry, and the concept of space that is manifested in various cultural activities,

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art, architecture, and social life of the community (Albanese & Perales, 2020; D'Ambrosio, 2016; Mansion, 2022).

A great opportunity to improve the quality of education by integrating the culture that develops in a society in the learning process, especially in mathematics learning by involving student culture (Abdullah, 2017; Agbata et al., 2024; Aikenhead, 2017; Ananda et al., 2024). From various points of view, the uniqueness and diversity of culture can be studied and utilized as a source of learning mathematics (Agbata et al., 2024; Hunter & Hill, 2024; Simamora et al., 2018), including the uniqueness of Sasak culture (Fauzi et al., 2023). Various cultural activities are still preserved by the Sasak people, which can be studied in ethnomathematics studies, such as farming traditions, marriage traditions, death ritual traditions, customs, and so on. Several researchers conducted studies on traditional Sasak art (Alditia & Nurmawanti, 2023; Fauzi et al., 2022), ethnomathematics in traditional Sasak games (Anisa et al., 2023), and ethnomathematics in traditional Sasak games (Anisa et al., 2023), ethnomathematics in the residential architecture of the Sasak people (Fauzi et al., 2022; Supiyati et al., 2019), and ethnomathematics in traditional crafts of the Sasak people (Ahidin et al., 2021; Fauzi et al., 2022; Sabilirrosyad, 2018). Previous studies have mostly conducted studies on Sasak cultural artifacts; apart from looking at ethnomathematics and educational values contained in cultural artifacts, this study also explores ethnomathematics and educational values in fundamental activities in the traditional house of *Langgar Pusaka* in Sapit Village.

The *Langgar Pusaka* traditional house in Sapit Village, East Lombok, is one of the cultural heritages rich in historical, social, and educational values. This traditional house is used as a center of activity for the Indigenous community. When viewed from the form and fundamental activities that exist in it, these traditional households have various patterns and concepts related to mathematics, such as building patterns, size, symmetry, spatial orientation, and traditional rituals. In addition, spiritual and educational values are also integrated into the process of building and utilizing the traditional house.

The study of ethnomathematics in *Langgar Pusaka* is important to reveal how traditional mathematical concepts are used by the Sapit village community. This can be a relevant learning medium to improve students' understanding of mathematics in a contextualized and meaningful way. Cultural integration in mathematics learning provides opportunities for students to connect their prior knowledge with the subject matter (Amit & Qouder, 2017). Furthermore, this study also reveals the educational values contained in every fundamental activity associated with this traditional house, so it can be an inspiration for local wisdom-based curriculum development. Thus, this study aims not only to explore the mathematical aspects of *Langgar Pusaka* but also to understand the educational values that can be passed on to the next generation. This research is expected to contribute to integrating formal education with local wisdom, as well as strengthening the cultural identity of the Sapit Village community through an ethnomathematics approach.

METHODS

This research uses a qualitative method with an ethnographic approach to explore the cultural aspects of the Sapit Village community. Ethnographic research has a principal purpose, namely to study and deeply understand the patterns of life, values, norms, beliefs, and cultural practices of a community group in a certain context and examine how individuals and community groups interact with their environment, as well as how culture is formed, maintained, or changed over time (Miles & Huberman, 2014; Spradley, 2016).

The subject of this research is the form and fundamental activities carried out by the Sapit Village community in the *Langgar Pusaka* traditional house. Data were collected through field studies by conducting interviews with two culturists, three traditional leaders, and three local people who understand and are directly involved in activities in the *Langgar Pusaka* traditional house. To complement the results of observations and interviews, researchers conducted a literature review and documentation, namely taking pictures of building structures, ritual equipment, and ritual activities.

The data was analyzed using the Miles and Huberman interactive model with the stages of data reduction, where at this stage the researcher carries out the process of simplifying, selecting, and focusing data from field notes, interviews, or observations that are relevant to the focus of the research, then irrelevant or less important data is filtered out, while the main data is summarized or categorized; At this stage, the researcher begins to look for meaning from the data that has been analyzed to produce research findings and to make preliminary conclusions made during the process verified with additional data to ensure its validity and consistency, and the final findings include interpretations and implications relevant to the research focus.

RESULTS AND DISCUSSION

Langgar Pusaka in Sapit Village, Suela Sub-district, East Lombok Regency, is one of the cultural heritages that have high historical value. *Langgar Pusaka* is an ancient mosque used as a place of worship, a center of traditional activities and traditional rituals, and a spiritual place for the local community. As part of the local cultural heritage, the *Langgar Pusaka* traditional house was built with harmony between man and nature in mind. The structure uses natural materials such as wood, bamboo, and reeds, which are adapted to the geographical conditions of Sapit Village on the slopes of Mount Rinjani.

Figure 1. Front door of the *Langgar Pusaka*

There are three main components of the *Langgar Pusaka* building structure, namely the front door, the mosque building as a place of worship and religious rituals, and the pond as a place for ablution and purification.

Figure 2. Mosque building

Figure 3. Telaga (Pond)

As per the results of the interview with Mr. Hadi and Kahfi, he said that "in the *Langgar Pusaka* traditional house, many activities are carried out, such as religious activities in the form of customary maulid (*mulut beleq*) and other traditional ceremonies such as *bubur puteq* and *bubur abang*". Activities carried out at *Langgar Pusaka* include the commemoration of the maulid of the Prophet Muhammad, termed the *mulut beleq*, which is held every 12th rabiul awal; the celebration of *bubur puteq* (white porridge), which is held every 1st of Muharram; and the celebration of *bubur abang* (red porridge), which is held at the beginning of the Shafar month (Hadi, 2024; Kahfi, 2024). These activities use a variety of tools and materials as part of the ritual equipment.

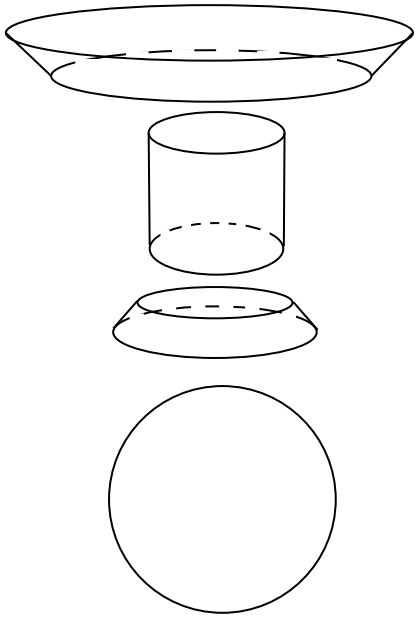
Figure 4. Ritual procession at the traditional *langgar pusaka* house

The ritual is followed by traditional elders, community leaders, and all community members in a sacred manner. The implementation is carried out in cooperation, which is termed *beriuk tinjal*. The procession begins by carrying four *ancak* (offering containers) to *Langgar Pusaka* as a sign of the start of the event. The event also involves the reading of ancient *mushaf* and the use of *jungkat* (a spear held by the preacher during the sermon), which is part of the local cultural heritage.

Figure 5. Traditional ritual equipment at the Langgar Pusaka

The mathematical forms that can be found from the equipment used are as follows:

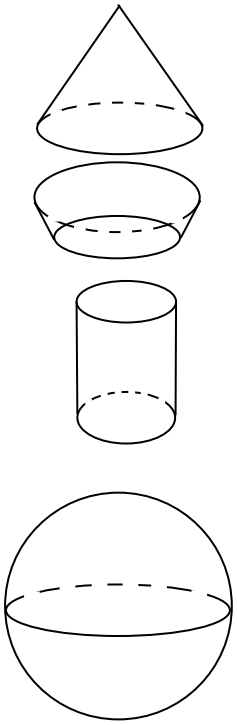
Table 1. Mathematical form of fundamental activity equipment

No	Equipment	Mathematical forms
1	 *Penginang*  *Dulang* *Penginang* is made of brass which is used as a container for water mixed with various kinds of flowers (seven types of flowers) *Dulang* is made of wood that is used as a place for traditional snacks that are handed over by the community.	Judging from the shape of the *penginang* and *dulang*, these utensils are formed from various flat and spatial shapes such as circles, tubes, and cones. 

Ceret and bokor

2 *Ceret* is a water container made of clay that serves as the four glasses of water that have been prayed for by the customary leader.
Bokor is made of brass which functions as a place for rice, raw thread, betel, areca nut and holed money.

The elements of geometry found in *ceret* and *bokor* are cones, tubes, spheres, and parabolas.

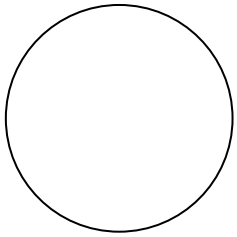


Pangkon

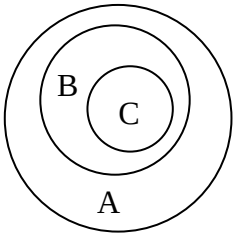
Tembolak

3 *Pangkon* is made of ceramic that is used as a place for *andang-andang* (ritual materials).
Tembolak is made of palm leaves which is used as a food serving hood.

The image of the *pangkon* and *tembolak* is in the shape of a parabola with decorative motifs in the shape of a circle.



Apart from that, it can also be applied in learning sets.



4	 *Sabuk Belo* *Sabuk belo* is a woven fabric with a length of 3-6 meters and a width of 30 cm. This fabric is a traditional woven fabric typical of the community, which is usually used as a belt for women who have just given birth and a base or wrap for heirlooms.	*Sabuk belo* is rectangular with a length of 3 – 6 meters. 	

Every fundamental activity contained in the *langgar pusaka* traditional house is not only a traditional routine, but every part of the activity has philosophical values and educational values. Based on the results of the interview with Moch. Yamin, he said "there are many things that we can take from every traditional activity, both in terms of philosophy and cultural values that can be implemented in education. In every cultural activity in the Sasak community, the most important thing to do is work together (*beriuk tinjal*), then in the process or cultural celebration there are things that should not be done which are called *kemaliq*. There is a philosophy that we often hear from our parents, namely not to waste something (*semaiq*). Not only that, our ancestors also taught us to respect each other which we know as *tindih* and not to do negative things (*sengga*) " (Yamin, 2024). Based on the results of this interview

The educational values contained in each activity are as follows:

Table 2. Educational values contained in fundamental activities

No	Cultural Values	Interpretation
1	*Beriuk tindal* (cooperation)	Every activity in the *langgar pusaka* traditional house is carried out in cooperation, with the community's belief that there is nothing that cannot be solved together.
2	*Kemaliq* (taboo)	In the *langgar pusaka* traditional house, some taboos must not be violated by every community that enters the traditional house environment. For example, before entering the mosque, the community should perform ablution in the lake or pond in front of the mosque and should not open heirloom objects in any way.
3	*Semaiq* (enough)	Their ancestors taught them not to be excessive in anything, including in preparing all the needs in various daily activities so that they do not become redundant.

No	Cultural Values	Interpretation
4	*Sengga* (not less or strange)	Strange is not only interpreted as a number; it is also interpreted as behavior that deviates from the rules that apply in that place. The implementation of this term found in the *langgar pusaka* traditional house is that the community should not do forbidden things that will sin in the environment of the *pusaka* traditional house.
5	*Tindih* (politeness or mutual respect)	The manifestation of mutual respect in every activity in the *langgar pusaka* traditional house, such as the implementation of rituals, is carried out following the direction of the customary elders. After eating, let the parents first wash their hands; do not stand when someone is sitting, and so on.

The integration of mathematical concepts found in this study can be applied in learning mathematics in schools to improve students' understanding and spatial abilities by presenting concrete examples from their surrounding environment and culture. In addition to the mathematical aspect, the activities in *Langgar Pusaka* Sapit Village also reflect educational values, namely 1) religiosity, which means respect for spiritual values through prayer in class; 2) discipline, which relates to punctuality in tasks given by teachers based on mathematical calculations; and 3) cooperation in the form of students' involvement in groups in completing various tasks given by the teacher.

Ethnomathematics can be used as an innovative approach to learning mathematics, with several main contributions such as 1) connecting mathematical concepts with real life; 2) improving understanding of abstract concepts; 3) increasing learning motivation; and 4) encouraging critical and creative thinking. Students are invited to analyze and solve culture-based problems.

CONCLUSION

Based on the results and discussions and previous ethnomathematics studies such as those conducted by (Manik, 2020; Putra et al., 2020), which revealed that in culture many mathematical concepts, patterns and structures are found. Likewise in the fundamental activities that take place in the *Langgar Pusaka* of Sapit Village contain various ethnomathematical concepts, such as geometric shapes contained in the architecture of the *Langgar Pusaka* building, spatial geometry and flat geometry in ritual equipment, the concept of sets, the concept of numbers in calculating time, and the principles of symmetry and proportion in building design. In addition to mathematical aspects, the activities in the *Langgar Pusaka* of Sapit Village also reflect educational values, such as religiosity, discipline, and cooperation. These values are indirectly instilled through the community's habit of worshipping, reciting the Quran, and maintaining and caring for the *langgar* as part of cultural heritage. Ethnomathematics integration can be used as an innovative approach to learning

mathematics, especially in linking academic mathematics concepts with real life in their culture. The introduction of local culture-based mathematics concepts can improve students' understanding and strengthen the connection between science and tradition. This study confirms that the *Langgar Pusaka* traditional house in Sapit Village is not only a place of worship but also a means of education and cultural preservation. Therefore, the utilization of ethnomathematics values in learning can help preserve cultural heritage while improving the effectiveness of education in the area.

The integration of mathematical concepts into the context of local culture can make learning more meaningful and relevant for students. This supports a real-life-based learning approach aligned with the principles of the Curriculum. Educational activities rooted in local culture, such as those in *Langgar Pusaka*, not only introduce mathematical values but also reinforce character values such as religiosity, cooperation, and discipline. This indirectly supports character education within the learning process. The findings of this study can serve as a foundation for developing learning media or modules based on ethnomathematics that utilize local cultural heritage, which in turn can enhance students' motivation and understanding of mathematical concepts. This research opens opportunities for further studies on the development of ethnomathematics-based teaching materials, testing their effectiveness in the classroom, and exploring other mathematical concepts within local cultural traditions.

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