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ETHNOMATHEMATIC EXPLORATION OF THE KAJANG LAKO JAMBI TRADITIONAL HOUSE

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Abstract: Exploring ethnomathematics in the Kajang Lako Jambi traditional house is important because in the modern era like today, students' efforts to preserve cultural heritage have begun to fade, the design contains many mathematical concepts such as geometric concepts and this has become a means or source of contextual learning for students, making it easier to understand mathematical concepts. and foster a sense of love for local culture. There are many local wisdom values in the Kajang Lako traditional house, such as religious values, kinship, mutual cooperation and cooperation that need to be instilled in students. This research aims to find out and describe the mathematical concepts found in the Kajang Lako Jambi House. This research is qualitative research using an ethnographic approach. The instruments used in this research were humans as the main instrument, observation guidelines, interview guidelines, documentation and field notes. Data collection in this research used observation, interviews, documentation and field notes. Data analysis techniques are carried out by data reduction, data presentation, and drawing conclusions/data verification. The results of this research describe the architectural design of the Kajang Lako Jambi House. In the architecture of the Kajang Lako House in Jambi, many geometric shapes are applied, the steps on the stairs of the Kajang Lako House apply the concept of number patterns, and the carvings on the house, doors and window screens use the concept of reflection.

Keywords: ethnomathematics, kajang lako jambi traditional house.

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INTRODUCTION

Jambi is an area rich in customs and still strong in culture. One of the cultural elements in Jambi is the Kajang Lako traditional house. The Kajang Lako traditional house is one of the typical traditional houses in Jambi which reflects the reflection and ideals of the Jambi people which is interesting to study, (Wijaya et al., 2021) . The shape of this traditional house is rectangular and resembles a house on stilts, (Rahmadhana & Harisman, nd) . It measures 9 meters by 16 meters and uses ironwood as the main material (Poerwaningtias & Suwarto, 2017) (Wiyana, 2016) . The Kajang Lako traditional house

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is a unique example of Jambi culture that reflects the values and aspirations of the local community. This traditional house is characterized by artistic carvings that symbolize the natural surroundings, such as plants and animals typical of the Jambi area, which are beautifully carved into every part of the building . The roof is in the shape of a boat with a curved top edge which is called a folding seizure which symbolizes the Malay kingdom, apart from that there are rafters at the top which function to prevent rainwater from entering the house, (Poerwaningtias & Suwarto, 2017) .

Exploring ethnomathematics in the Kajang Lako Jambi traditional house is important because in the modern era like today, students' efforts to preserve cultural heritage have begun to fade, the design contains many mathematical concepts such as geometric concepts (Wikaningtyas et al., 2022) , and this becomes a means or source contextual learning for students, making it easier to understand mathematical concepts and fostering a love of local culture. There are many local wisdom values in the Kajang Lako traditional house, such as religious values, kinship, mutual cooperation and cooperation that need to be instilled in students. In full, the value of local wisdom is explained (Wijaya et al., 2021). Firstly, the religious value , namely the construction of Kajang Lako, pays great attention to aspects of taboos, one of which is the location of the land. Religiously, compliance with taboos is proof of obedience. The second local wisdom value is kinship , family values are obtained from the spirit of mutual cooperation in building the Kajang Lako traditional house. The third local wisdom is mutual cooperation and cooperation in the process of building the Kajang Lako traditional house. Apart from that, there are many historical and ancestral values contained in the structure of the Kajang Lako traditional house, such as cultural heritage that has existed since ancient times. The structure of the Kajang Lako traditional house is passed down from generation to generation, making it a symbol of cultural continuity, historical and ancestral values that continue to live and be preserved, (Repin, 2023) so it is deemed necessary to explore the ethnomathematics contained in the Kajang Lako traditional house.

This exploration has three main objectives. First, preserving cultural elements and values in the design, structure and construction process of the Kajang Lako traditional house is very important because age factors cause damage. Therefore, documenting the ethnomathematics elements in the Kajang Lako traditional house is very important.

Second, to provide scientific and empirical evidence about the relationship between mathematics and culture, especially those found in the Kajang Lako Jambi traditional house. Research needs to be carried out involving anthropology, history, mathematics and architecture. Through this approach, researchers can identify and analyze hidden mathematical patterns in the design and structure of the Kajang Lako Jambi Traditional house. Apart from that, this research can pay attention to how Jambi Malay cultural values are reflected in the Kajang Lako traditional house, including in its physical construction, spatial layout and symbols used. Thus, this research can provide a deeper understanding of how mathematics and culture are interrelated and coexist in the context of the traditional architecture of the Kajang Lako Jambi traditional house.

Third, by referring to the close relationship between mathematics and culture, it is believed that the ethnomathematics contained in the design, structure and construction process of the Kajang Lako traditional house can be an interesting and realistic context for students in learning mathematics. Realistic mathematics education (RME) is a

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learning approach that uses context and contextual problems as the main elements in starting mathematics learning.

Ethnomathematics is a science that is used to understand how mathematics is adapted from a culture in social life and aims to reveal the relationship between culture and mathematics (Marsigit, 2016) . Meanwhile, according to (Setiana, 2020) ethnomathematics examines every form of culture, knowledge, social activities or characteristics of social/cultural groups that can be carried out by other groups.

Learning with an ethnomathematics approach has been proven to increase motivation, achieve students' mathematical abilities, as well as overcome students' boredom and difficulties in learning mathematics, (D'Ambrósio & Knijnik, 2020) ; (Hignasari, nd) . In addition, ethnomathematics exploration of the Kajang Lako traditional house not only helps in preserving culture, but also provides new insights into the relationship between mathematics and culture (Sartika, 2024) . This research aims to explore ethnomathematics in the Kajang Lako Jambi traditional house.

METHOD

Based on the problem in this research, the method applied uses a combination of ethnographic and design research. Ethnographic research emphasizes documenting and describing individuals' daily experiences by observing and interviewing them. Through ethnographic research, ethnomathematics will be explored in the process of building the Kajang Lako Jambi traditional house. There are several aspects that will be identified in the Kajang Lako traditional house such as mathematical ideas, calculating, measuring, finding, designing, playing and explaining.

Data collection techniques were carried out through observation, in-depth interviews with traditional leaders, ninik mamak, traditional holders and so on and documentation studies. In this research, the data collection methods used were observation, interviews and documentation. Observation is used to search for information from data sources such as events, places, objects and recordings. Observation guide as shown in Table 1.

Table 1
Guide to Ethnomathematical Observations in Building the Kajang Lako Traditional House

No	Aspect	Indicator	Form	Information
1.	Mathematical material on the Kajang Lako Jambi traditional house motif	1. Ceiling / Roof 2. House wall 3. House door 4. Pole Buffer 5. Floor 6. Ladder 7. Window	- Geometry - Measurement - Statistics - Arithmetic	
2.	Indicator Mathematics	Activity Measure	- Size - Form - Amount	

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Personal interview sessions were carried out in this research by conducting face-to-face interactions between researchers and informants. The interviewee was asked about his understanding of the motifs used in the Jambi Kajang Lako traditional house residence.

Apart from documenting the results of conversations in interviews using voice recording technology, the documentation used in this research also takes the form of writing, photos or supporting documents in the data collection process. Data analysis is carried out before entering the field, while in the field and after completion. There are three stages carried out in data analysis, namely data reduction, data presentation and drawing conclusions.

RESULT AND DISCUSSION

The Kajang Lako Stage House is a rectangular building measuring 12 meters x 9 meters. Its specialty lies in the construction structure and detailed carvings that decorate the structure of the building. Consisting of 30 poles, which are divided into 24 main poles and 6 plumbing poles, this house has a height of around 2 meters for each pole. One interesting aspect is that each pole has the same shape, following a mathematical pattern of lines because it is made from tubular wood.

Figure 1. Supporting pillars of the Kajang Lako Jambi Traditional House

The bottom of the house has no dividers or walls, so the pillars of the house are clearly visible. The ground beneath it is leveled and slightly raised from its surroundings. Usually, the space under the house is used as a place to relax, for children to play and for mothers to gather. In it, there are mathematical elements such as horizontal lines on the supporting pillars, beams on the supporting poles, and intersecting lines on the ceiling.

The results of observations, interviews and documentation show that there are ethnomathematics found in the Kajang Lako Jambi Traditional House building, such as flat shapes (squares, rectangles, triangles, trapezoids, parallelograms), spatial shapes (tubes and beams, and pyramids), lines (lines). vertical, horizontal lines, parallel lines, curved lines, perpendicular lines), odd numbers and even numbers as well as measurements (angle measurements and length measurements). In detail, the results of the ethnomathematics exploration of the Kajang Lako traditional house can be seen in Table 2 below:

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Table 2. Results of Ethnomathematics Exploratory Observations on Kajang Lako Jambi Traditional House Motifs

No.	Aspect	Indicator	Form	Information
1.	Mathematical material on the Kajang Lako Jambi traditional house motif	1. Ceiling / Roof 	- Geometry - Measurement - Statistics	On the roof of the house you can see a mathematical concept, namely a pyramid. Where the pyramid is one of the three-dimensional geometric concepts. There is also a flat trapezoidal shape that can be seen on the roof of the front of the house. Measuring the angles that appear on the roof/roof are obtuse angles and acute angles.
		2. House wall 		On the walls of the house there is a geometric concept, namely a rectangle, and there are vertical lines
		3. House door 		On the door of the house there is a mathematical concept of square and rectangular shapes. There are vertical and horizontal lines, there are right angles. The size of the door to the Kajang Lako traditional house is 200 x 150 cm.
		4. Pole Buffer		In this part of the support pillar there is a one-dimensional geometric concept,

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				namely vertical lines. Apart from that, there are also tubes on the pillars supporting the house. There are 30 pillars supporting a traditional house. The size of each ladder is 200 cm.
		5. Floor 		On the floor of the Kajang Lako traditional house there are elements of vertical and horizontal lines, and rectangular flat shapes arranged parallel.
		6. Ladder  		In the stairs section there is a mathematical concept, namely even numbers, where the number of stairs arranged is 11. In the stairs section there are also flat rectangular shapes, parallelograms. Build a room of blocks on parallel stairs. The size of the main stairs is 270 x 160 cm.
		7. Window 		On the windows of the Kajang Lako traditional house there are carvings with floral motifs, namely the tampuk mangosteen motif and the orange bungo motif. On the windows there are also flat rectangular shapes, the concept of vertical and horizontal

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				lines. Size window House custom awning lako is 190 x 140 cm.
		8. The interior of the Kajang Lako traditional house   		Inside the house there are several rooms such as the main room, aisle and bedroom. After making observations, mathematical concepts such as squares, rectangles, circles and trapezoids were discovered. Get up room blocks , vertical line elements , horizontal lines, curved lines . Wedding measuring 210 x 180 cm.

2.	Indicator Mathematics	Activity Measure	- Size	1. The Kajang Lako traditional house measures 12 m x 9 m. 2. The walls of the house are 4 meters high. 3. The pillars supporting the house measure 2 meters. 4. The inside of the house measures 12 m. The main room measures 12 m x 1.6 m. The main bedroom measures 4 m x 5 m. The aisle measures 210 cm x 180 cm. 5. The main door of the Kajang Lako traditional house measures 200 x 150 cm. 6. Window measuring 190 x 140 cm. 7. The stairs of the Kajang Lako traditional house measure 270 x 160 cm. The front pillar of the stairs is approximately 120 cm high.
			- Form	1. The roof ridge is in the shape of a triangular pyramid and trapezoid 2. Wall House shaped rectangle long 3. House doors are square and rectangular

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				4. Pole buffer shaped tube 5. House floor shaped rectangle long 6. House stairs are rectangular, parallelogram and beam shaped 7. House windows are shaped, rectangular and square
			- Amount	1. Pole buffer House there are 30 pieces 2. 1 main door 3. 1 rear door 4. 2 front windows 5. 4 windows on the right side, 6. Window on the side left 4. 7. There are 3 stairs

CONCLUSION

Based on these findings, it is concluded that in the architecture of the Kajang Lako house there are mathematical concepts. The concept can be seen from the first on the roof of the awning Lako house. The roof of the awning Lako house as a whole is prism shaped. The roof ridge of the awning Lako house is flat, rectangular in shape and the ridge cover of the awning Lako house is called a triangular shade/sail span. The shading/spreading screen is located on both sides of the roof of the house and has the same shape and size, so it can be said that the shading/spreading screen on the awning Lako house applies the concept of congruence. Furthermore, it can be seen that the calculation of stairs also applies mathematical concepts, namely number patterns, the head of the stairs is in the shape of a block, and in calculating the length of the stairs you can use the concept of the Pythagorean theorem.

The windows in the awning Lako house are square. The windows in this traditional house are divided into four which have the same shape and size, so it can be said that making partitions in the windows of this traditional house applies the concept of congruence. Likewise with the doors in this traditional house. The door to this awning Lako house is rectangular and has two doors that have the same shape and size. The layout of the pillars that make up this awning Lako house also applies mathematics, namely the concept of reflection. In the awning Lako house there are several ornaments in the form of carvings, including carvings of bungo tanjung and bungo oranges. The frame on this carving is rectangular. Bungo tanjung and bungo oranges carvings apply the concept of mathematical reflection. In the middle room of the Kajang Lako house there are 2 pillars

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called Krawo. Krawo is divided into upper Krawo and lower Krawo. Krawo is shaped like a block. In the central room there is also a traditional Jambi hallway called Putro Retno. The roof of this hallway is shaped like a rectangular pyramid and the chairs in this hallway are shaped like blocks.

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