

Ethnomathematics Exploration: Offering Dance Performance (Makan Sirih) Ethnic Malay Deli North Sumatra

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(Received: 4-10-2021; Reviewed: 10-10-2021; Revised: 19-11-2021; Accepted: 14-11-2021; Published: 20-12-2021)



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Abstract

The purpose of this research is to explore a relationship between applied mathematics and a culture called ethnomathematics. The culture that will be used as the research topic is the performance culture of the Dance of Offerings (Makan Sirih) from the Deli Malay ethnic group in North Sumatra. This study is a research that uses descriptive qualitative research methods using an ethnographic approach that analyzes and describes a local culture based on facts obtained in the field. From the results of this study, it was revealed that, in the performance of the Offering Dance (Makan Sirih) in the Malay ethnic Deli of North Sumatra, there were various applications of mathematical concepts such as the concept of sets, counting, functions, and flat shapes. This can lead to new breakthroughs that underlie the formation of new mathematics learning designs for educational institutions. Along with this, this research also aims to improve the public's view of mathematics, that mathematics is a science that also has connections with all forms of activities in daily life.

Keywords: *Ethnomathematics; Offering dance (Eating Betel); North Sumatran Culture*

INTRODUCTION

The era of the 21st century is an era that combines with a period of information advancement, where human resources are required to have superior potential in order to be able to keep up with developments in technology and information (Somantri, 2021). This can be seen from the form of significant changes in various aspects of life, one of which is science and technology. This change can make every job in human life more practical in order to boost the quality of life for the better so that it continues to run gradually. No exception, this also triggers developments in the realm of mathematics. Mathematics is basically a science that deals with concepts such as structures, numbers, and symbols that require accuracy and patience in pursuing them (Wirantasa, 2017). Mathematics as one of the most important basic sciences can contribute to the world of education. In order to be able to answer the problems of the world of education, it is important for mathematics learning to recreate some new learning ideas by means of learning innovations.

Currently learning mathematics has undergone various innovations, this is based on the fact that in the 21st century era educators are required to innovate in order to improve the quality of the learning process that must run more efficiently (Darma et al., 2020). Steps like this are carried out with the aim of creating learning that is unique and can generate interest and interest in learning in students. In addition, it is hoped that innovation in mathematics learning can create the impression of learning to be innovative, creative, and varied. One way to vary a lesson so that it can be of interest to students is to carry out an ethnographic approach to mathematics or what we know as ethnomathematics.

Ethnomathematics means the application of mathematics that is combined with a culture in the local area, for example in certain regional groups, indigenous peoples, urban areas, rural areas, and includes other examples that are still interrelated (Wahyuni & Pertiwi, 2017). Ethnomathematics is considered to be effective in improving and improving the quality of students' mathematical reasoning abilities, as evidenced by several studies that have been carried out on students (Sarwoedi et al., 2018). In linking mathematics with culture in a local area, of course, the culture must have the main requirements for ethnomathematics, namely that culture must have a relationship with mathematics. It is possible for a country to have a variety of cultures that are not the same and unique. Moreover, Indonesia is a country consisting of several regions.

Starting from Sabang to Merauke, the Indonesian state consists of various regions which in each region have a wealth of art and culture, each of which is different from each other passed down from ancestors to posterity (Gunawan et al., 2020). This can underlie that Indonesia is a country that has a variety of cultures. With this cultural diversity, of course, there are many things that can be associated with ethnomathematics. One example of an area that can be categorized as having a variety of cultures from many regions in Indonesia is the province of North Sumatra.

North Sumatra is a regional area that has the fourth most populous population in Indonesia after Central Java, consisting of several ethnic groups such as the Mandailing, Batak Toba, Simalungun, Karo, Pak-Pak, Nias, and Malay ethnic groups (Giawa & Rahmah, 2021). Each of these ethnic groups has a variety of cultures, for example, various traditional processions, various traditional house architectures, dance culture, musical arts, and there are many other things that we can show. Of the many ethnicities and cultures that exist in North Sumatra, this study is interested in raising the focus of research on one of the cultures, namely the performance of the Offering Dance (Makan Sirih) on the Deli Malay ethnicity in North Sumatra.

The Offering Dance (Makan Sirih) is a dance from the traditional Malay culture of North Sumatra, which is usually performed at events to welcome important guests with the aim of forming a brotherly relationship between the host in an area or event with a great guest (Marzuk, 2020). Usually, this dance is usually performed in formal or informal events which are considered as part of the opening ceremony of the event. The characteristics of this offering dance performance (Makan Sirih) are that the dancers consist of female dancers and male dancers, instrumental dance accompaniment is also often performed in the form of live performances accompanied by various traditional and non-traditional Malay musical instruments. Not only that, there are many other mandatory and supporting elements in this dance performance, such as tepak sirih, parasol properties, and mangor flowers. This is what underlies the researcher to raise the topic of Offering Dance (Makan Sirih) as the focus of research on ethnomathematics because there are many things that can be related to the application of mathematical concepts.

This study will try to answer questions about "what mathematical concepts are there in the performance of the Offering Dance (Makan Sirih)?" by conducting ethnomathematical exploration on the object of research. It is hoped that the results of this research can be used as a basis in the preparation of a new mathematics learning framework with the aim that the creation of a mathematics learning framework is often considered more attractive to students, fun to learn and provides teachings of cultural values that can be interpreted by students as the nation's next generation.

METHOD

This study uses descriptive qualitative research methods which in essence this research is aimed at revealing various facts, symptoms or events carefully and regularly, about characteristics in populations or special environments that tend not to explain the relationship between objects and do not need to also test the hypothesis (Hardani et al. al., 2020). This study uses an ethnographic approach, which means one part of the approach to research methods in the form of qualitative by making efforts to explore a culture in society in an area (Windiani & R, 2016). This research will be directed in the form of research based on ethnomathematics. In essence, ethnomathematics has the meaning that it is a step used to learn mathematics by connecting an activity or culture found in the community or local area so that it can make it easier for someone to understand mathematics (Hardiarti et al., 2017). The focus of ethnomathematics in this study is the performance of the Offering

Dance (Makan Sirih) in the Malay ethnic Deli of North Sumatra. The data collection techniques used in this study were observation and interviews, the observations that have been made in this study are by observing the facts obtained on the object of the Offering Dance (Makan Sirih) both directly and through documentary videos on *youtube* while interviews were conducted with one of the The mover of the studio that uses the Malay deli cultural dance as a benchmark for learning dance in the studio is the Patria Study Institute of North Sumatra Studio 3 Medan. The data analysis technique carried out in this study uses data analysis techniques with the *Miles* and *Hubermen* model which consists of steps such as reducing the data that has been obtained (*Data Reduction*), presenting the data that has been obtained (*Data Display*), verifying the data (*Data Reduction*). *Verification*), and *Conclusion drawing* (Saleh, 2017).

RESULT AND DISCUSSION

Based on the research activities that have been carried out, there are several parts of the Offering Dance (Makan Sirih) performances such as elements of dancers, musical accompaniment, dance properties, and floor patterns that can be related to the application of mathematical concepts. In the object of this research, the number of dancers participating in the Offering Dance (Makan Sirih) this time amounted to 12 people (one female dancer carrying slap property, six female lead dancers, one male dancer holding a traditional umbrella, two male main dancers, and two female dancers). male dancer wearing a mangor flower property). Here are some descriptions of the relationship between mathematical concepts and the Dance of Offerings (Makan Sirih):

A. set

The set is a group that can be categorized in real terms, both an object and an object (Rizqi et al., 2021). In the offering dance (eating betel) there are several aspects that can be related to mathematics in the set, namely dance participants, dance properties, musical accompaniment, and dance accompaniment musical instruments. In the following, the researcher will describe this section based on the relevance of the application of mathematical concepts as shown in the following image.



The concept of the set can be found and stated from the picture above, namely:

- (a) The set of all participants involved in the Performance of the Offering Dance (Makan Sirih) is part of the universal set, which can be stated in the form of registration of the members of the set: $A = \{\text{female dancer holding slap, female lead dancer I, female lead dancer II, dancer female lead III, female lead dancer IV, female lead dancer V, female lead dancer VI, male lead dancer I, male lead dancer II, male dancers using umbrella props, male dancers using, a male singer, a man playing a Malay drum, a man playing the violin, a man playing the arcade, a man playing the keyboard}\}$.
- (b) The set of all dancers in the Performance Dance (Makan Sirih) is part of the subset type, which can be stated in the form of registration of the set members: $B = \{\text{female dancer holding slap, female lead dancer I, female lead dancer II, main dancer women III, female lead dancers IV,}$

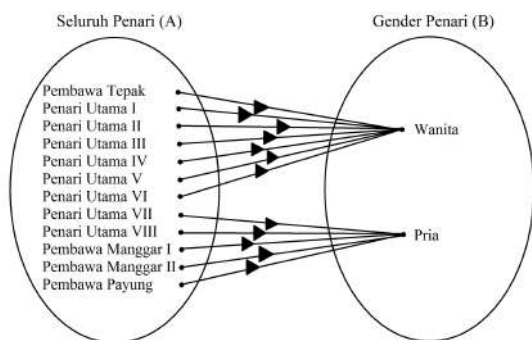
female lead dancers V, female lead dancers VI, male lead dancers I, male lead dancers II, male dancers using umbrella property, male dancers using umbrella property I, male dancers using umbrella property II}.

- (c) The set of all female dancer participants in the Performance Dance (Makan Sirih) is part of the subset type, which can be stated in the form of registration of the members of the association: $C = \{\text{female dancer holding slap, female lead dancer I, female lead dancer II, dancer female lead III, female lead dancer IV, female lead dancer V, female lead dancer VI}\}$.
- (d) The set of all male dancers participating in the Performance Dance (Makan Sirih) is part of the subset type, which can be expressed in the form of registration of the members of the set: $D = \{\text{male main dancer I, male lead dancer II, male dancers using umbrella property, male dancers use umbrella property I, male dancers use umbrella property II}\}$.
- (e) The set of all dance properties in the Performance Dance (Makan Sirih) is part of the subset type, which can be expressed in the form of registration of the members of the set: $E = \{\text{umbrella, manggar, umbrella}\}$.
- (f) The set of all participants of the dance accompaniment musicians in the Dance Performance (Makan Sirih) is part of the subset type, which can be expressed in the form of registration of the members of the set: $F = \{\text{a male singer, a man playing a Malay drum, a man playing a violin, a man playing the arcade, a man playing the keyboard}\}$.
- (g) The set of all dance accompaniment musical instruments in the Performance Dance (Makan Sirih) is part of the subset type, which can be stated in the form of registration of the members of the set: $G = \{\text{mic, violin, keyboard, Malay drum, arkodeon}\}$.

B. Relation function

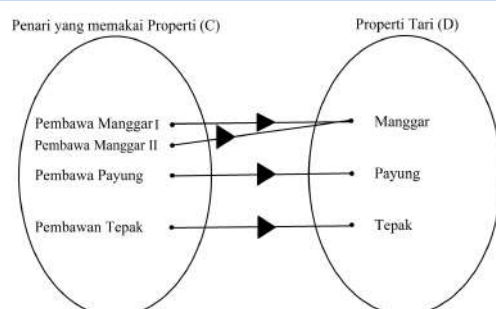
Function in mathematics means a mapping consisting of relational parts where each domain member is attached exactly one to one in the codomain member (Sinaga et al., 2017). In the offering dance (eating betel nut) there are several aspects that can be related to the concept of mathematical science in relational functions, namely dancing, dancers' gender, dancer's properties, musical instruments, and musical accompaniment. As for some examples of function concepts that can be formed into the form of a function relation arrow diagram, they are:

- (a) The first data, it is known that the two sets contained in the Offering Dance (Makan Sirih) are (all dancers) with (dancer gender) stated as $A = \{\text{slap bearer, main dancer I, main dancer II, main dancer III, main dancer IV, the main dancer V, the main dancer VI, the main dancer VII, the main dancer VIII, the Manggar I, Manggar II and Umbrella carriers}\}$ and $B = \{\text{women, men}\}$. Then the domain registration (all dancers (A)) and codomain (gender of dancers (B)) which can be described in the form of an arrow diagram as follows:

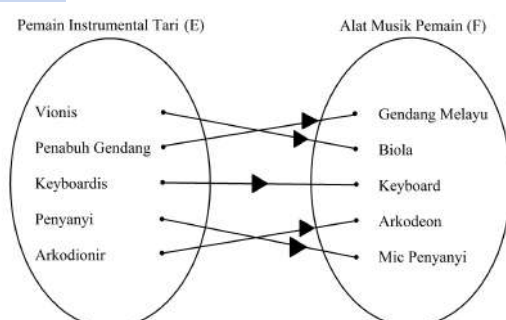


- (b) The first data, it is known that the two sets contained in the Offering Dance (Makan Sirih) are (dancers who use property) with (dance property) expressed as $C = \{\text{manggar bearer I,}$

Manggar carrier II, umbrella bearer, slap carrier} and $D = \{\text{Manggar, umbrella, slap}\}$. Then the domain registration (dancer wearing property (C)) and codomain (dance property (D)) which can be described in the form of an arrow diagram as follows:



(c) The first data, it is known that the two sets contained in the Offering Dance (Makan Sirih) are (dance instrumental players) with (musical instrument players) expressed as $E = \{\text{vionis, drummers, keyboardists, singers, archodioists}\}$ and $F = \{\text{drums withers, violin, keyboard, arcade, singer mic}\}$. Then the domain registration (dance instrumental player (E)) and codomain (musical instrument player (F)) can be described in the form of an arrow diagram as follows:



C. Counting

Basically, counting means all activities in daily life activities that are related to calculating, estimating, and measuring mathematically logic at certain goals which are expressed in the form of mathematical symbols or symbols (Silowati, 2021). In the Offering Dance (Makan Sirih) there are aspects that can be related to the concept of mathematics in counting, namely counting on the variety of motion. As for some examples of counting concepts that can be expressed in various dances, they are divided into 3 types:

(a) Variety I

Variety I is the variety which is known as the Humming Step. This variety consists of an opening salutation movement, using a slow count associated with a variety of soft movements and slow song tempos. Counting activities that can be associated with variance I are:

- (2 8) movement in.
- (1 8) sitting movement.
- (1 8) the prayer movement opens the hands.
- (2 8) swinging movements in a squat and graceful place reciprocated.
- (1 8) half-self or kneeling and graceful movements reciprocated.
- (1 8) swinging motion in place without hands.
- (4 8) Silat I movement for male dancers.

- (2 x8) the movement of waving hands and humming reciprocated.
- (1x8) circular motion to the right while swinging and humming reciprocated.
- (1x8) movement of the right foot and left right croak.
- (1x8) circular motion to the right while swinging and gracefully reciprocated.
- (1x8) movement of the left leg and right and left crouching.
- (1x8) circular motion to the right while swinging and gracefully reciprocated.
- (4 x8) Silat II movements for male dancers with variations on the right, back, left and front.
- (1 x8) the movement of the silat flower on the right and left and gracefully reciprocated begins with the left.
- (1 x8) the movements of the silat flower on the left and right and gracefully reciprocate starting with the right.
- (1 x8) the movement of the silat flower on the right and left and gracefully reciprocated begins with the left.
- (1 x8) the movements of the silat flower on the left and right and gracefully reciprocate starting with the right.
- (1 x4) reciprocated graceful movements.

In variance I, the counting activities that we can state are: (4x8) 2 times, (2 x8) 3 times, (1x8) 13 times, and (1x4) 1 time.

(b) Variety II

Variety II is the variety which is known as the Host Step. This variety consists of sowing and swinging movements, using a medium count associated with a variety of soft movements and medium tempo songs. Counting activities that can be associated with variance II are:

- (2 x8) winnowing swing motion.
- (2 x8) hand movement for male dancers.
- (1 x8) circular swing movement and swing winnowing in place.
- (1 x8) the swinging motion is like sowing flowers.
- (1 x8) hand movement for male dancers.
- (1 x8) movement stretch tampi swing right and left bend the legs.
- (1 x8) a swaying motion to the left while it is like sowing flowers.
- (1 x8) movement stretch tampi swing right hand left bend leg.
- (1 x8) a swaying motion to the left while it is like sowing flowers.
- (1 x8) silat movements of clapping right and left and feet in alternating right and left crosses.
- (1 x8) hand movement for men.
- (1 x8) silat movements of clapping the right and left hands and feet in a cross alternating right and left.
- (1 x8) hand movement for men.
- (2 x8) swing movement of the arms and legs double step and rotate the right side forward two steps.
- (1 x8) silat movements of clapping the right and left hands and feet in a cross alternating right and left.

- (1 x8) hand movement for men.
- (1 x8) silat movements of clapping the right and left hands and feet in a cross alternating right and left.
- (1 x4) open left and right hand movements and step back and forth.
- (1 x4) open right and right hand movements and step back and forth.
- (1 x4) open left and right hand movements and step back and forth.
- (1 x4) open right and right hand movements and step back and forth.
- (1 x8) swinging hand movements and circular steps to the right.
- (1 x8) Step sluggish movement.

In variance II, the counting activities that we can state are: (2 x8) 3 times, (1 x8) 16 times, and (1x4) 4 times.

(c) Variety III

Variety III is the variety which is named as Zapin's Step. This variety, which consists of the core movement of Zapin's footsteps, uses fast counts associated with fast movements and fast song tempos. Counting activities that can be associated with type III are:

- (1x8) the movement of zapin's footsteps swinging to the right
- (1x8) zapin's footsteps swinging move left
- (1x8) the movement of zapin's footsteps swinging to the right
- (1x8) zapin's footsteps swinging move left

In variance III, the counting activities that we can state are: (1x8) 4 times.

(d) Variety IV


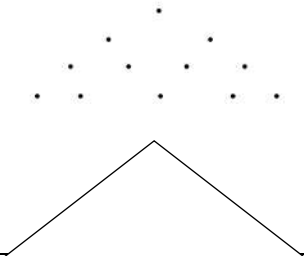

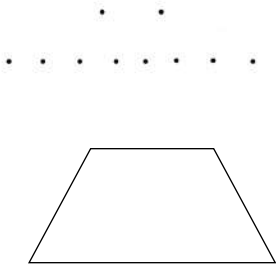

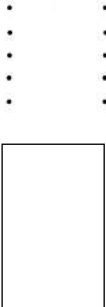
Variety IV is the variety known as Pulau Sari. The mini body consists of a core cover movement, using fast counts associated with fast movement variety and fast song tempos. Counting activities that can be associated with variety IV are:

- (2 x8) left and right leg movement.
- (2 x8) swing back and forth.
- (2 x8) movement. Step by *step*, *double step* one.
- (2 x8) the movement of S rotates on the left and right and hands pinch on the clothes.
- (2 x8) left and right leg movement.
- (2 x8) movement of steps back and forth and finger jendit (thumb meets middle finger).
- (1 x8) motion leaving the event.
- (1 x8) salute gesture farewell.

In variance III, the counting activities that we can state are:, (2 x8) as much as 6 times, and (1 x8) as much as 2 times.

D. Flat Geometry

Flat geometry is a form of geometric embodiment that does not have a volume form composed of two dimensions of width and length on an object to be measured (Ulum et al., 2018). In the Offering Dance (Makan Sirih) there are several aspects that can be related to the concept of mathematical science in flat geometry, namely the floor pattern in dance, dancers' properties, and musical instruments. As for some examples of floor patterns in dance that can be formed:

Floor pattern drawing	Point shape floor pattern	explain
		<p>If the points of the floor pattern are connected, it will form a flat isosceles triangle.</p>
		<p>If the points of the floor pattern are connected, it will form a flat isosceles trapezoid.</p>
		<p>If the points of the floor pattern are connected, they will form a rectangular flat shape.</p>

CONCLUSIONS AND SUGESTION

The conclusion that can be drawn from the results of research in the performance of the Offering Dance (Makan Sirih) on ethnic Malays in North Sumatra is that a lot of mathematics can be associated with the Performance of the Offering Dance (Makan Sirih). Dance participants, dance properties, musical accompaniment, and musical instruments can be associated with mathematical concepts such as sets, functions, and geometrical shapes. Variety of dance can be associated with the mathematical concept of counting. The pattern of dance movements can be related to the mathematical concept of flat geometry. The ethnomathematics of the Malay deli performance of the Offering Dance (Makan Sirih) in North Sumatra is expected to be a new breakthrough to promote the concept of learning mathematics by linking dance culture in the North Sumatra area. This can also improve the public's

view of mathematics, which turns out to be an applied concept that can be found in one's own culture. So according to the research results, ethnomathematics is a unique form of applied mathematics learning because a person can learn mathematics and get to know one's own culture at the same time.

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