

**APPLICATION OF GEOMETRY CONCEPT IN KANDINGANG CREATION DANCE
IN EAST SUMBA**

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ABSTRACT

Culture is an integrated and comprehensive whole in a community group, which allows the formation of mathematical ideas that grow in cultural practices. Likewise, in the process of learning mathematics, it is often presented in a certain context or connecting mathematics with everyday life, one of which is by linking it to local or cultural wisdom known as ethnomathematics. This research is a descriptive qualitative research that aims to identify and describe mathematical concepts in Kandingang dance. This research was conducted in Kalumbang, Wangga Village, Kampera District, East Sumba Regency, East Nusa Tenggara Province. The subject of this research is a traditional figure who understands the origin of Kandingang Dance. Kandingang dance is one of the traditional dances originating from East Sumba, East Nusa Tenggara (NTT). Generally this dance is performed by female dancers who wear accessories in the form of tassels made from horses' tails while dancing. Research shows that every movement in the kandingang dance in East Sumba contains various ethnomathematics concepts. In the context of kandingang dance movements, ethnomathematics consists of several geometry concepts seen in every dance movement such as: vertical lines, horizontal lines, arbitrary triangles, equilateral triangles, acute angles and right angles.

Keywords: Ethnomathematics; Kandingang Dance; Geometry

INTRODUCTION

Culture is an inseparable aspect of daily life because it is a whole and comprehensive entity that occurs in a community. It allows mathematical ideas to be integrated into cultural activities so that each individual adopts a unique way of performing mathematical tasks. Education and culture are two inseparable elements in everyday life, because culture is a complete and comprehensive unity in a community, while education is a basic need for everyone in society (A. P. Lubis et al., 2024). Mathematics and culture are intertwined in people's daily lives (Maure & Ningsi, 2018). This can mean that in culture we can find various kinds of mathematical concepts, so that it can clarify that mathematics and culture are interrelated (Dhiki et al., 2024). Likewise, in learning mathematics, it is often presented in a relevant context or connecting mathematics with everyday life, including one of them linking to local wisdom or Indonesian local culture. People often do not realize that they have used various mathematical principles in their traditions and culture (Maure & Ningsi, 2018).

In the field of mathematics, local wisdom-based learning is known as ethnomathematics (Hartanti & Ramlah, 2021). Ethnomathematics is one way to illustrate how strong the relationship between community culture and mathematics is, as well as being an important part of the basic knowledge needed by everyone in society (Maure & Ningsi, 2018). In line with this, education and culture are two elements that cannot be separated in everyday life. Culture is the whole that applies in a community, while education is a necessity (S. I. Lubis et al., 2018). Because of this, learning mathematics by involving culture or ethnomathematics is the right solution to be an alternative in creating a pleasant learning experience and environment (Halima & Putri, 2022). Ethnomathematics can also be defined as a bridge between teachers and students in the process of improving mathematical understanding (Vanesvaria et al., 2022). The existence of ethnomathematics encourages the realization of learning that is linked to culture. It can be seen in the independent curriculum which expects meaningfulness in every material presented in learning and at the same time forms aspects of everyday life (Dewi, 2019). This includes mathematics learning, because mathematics is a form of culture that has actually been integrated in life (Destrianti et al., 2019).

Various cultures inherited by ancestors that we can relate to mathematics, one of which is dance. Dance is the identity or identity of the community in a particular area (Maryati & Pratiwi, 2019). Dance, especially in traditional dances, can be used to teach mathematics so that students can think mathematically and critically, according to their culture and traditions (Candrasari et al., 2023). Aspects of dance that have a relationship with mathematics include dance movements, costumes, and formations (Maryati & Pratiwi, 2019). Another thing in dance that implements the concept of mathematics is the values in the dance itself, such as cohesiveness and togetherness (Darmayanthi et al., 2020). The goal is to make it fun for students and closer to students' daily lives (Wahyuni, 2018).

One of the ethnomathematics studies is the kendingang traditional dance, which is one of the dances that emerged and developed in the East Sumab region, East Nusa Tenggara. This dance was once often performed for major traditional ceremonies of the East Sumba community such as weddings and welcoming important or noble guests (Iki, 2016).

RESEARCH METHODS

This research is a descriptive qualitative research that aims to identify and describe mathematical concepts in Kendingang dance. This research also describes data and facts that explain everything in detail. The source of information is obtained directly from the cultural activities of traditional leaders in dance. This research aims to provide detailed information about cultural studies in traditional dance activities. The instrument in this study is a human instrument, where the researcher functions as the main tool that cannot be replaced by others in collecting data related to mathematical concepts in each movement of the kendingang dance. In addition, additional instruments such as observation, field notes, interviews, and documentation were also used. This information was obtained through interviews and direct observation.

This research was conducted in Kalumbang, Wangga Village, Kampera District, East Sumba Regency, East Nusa Tenggara Province. The narasumber in this research are traditional leaders who know the background of Kendingang Dance, namely Mr. Titus Wanda (studio owner and coordinator) and also Mr. Lombu Takanjanji, Mrs. Katrina Kahi Liaba, and Mrs. Afliani Lika Leau who act as trainers at the Wai Miripi Tana Mbokar studio. The focus of this research is on hand and foot movements when performing traditional Kendingang dances.

RESULTS AND DISCUSSION

Ethnomathematics is known as a culturally based learning approach where learning mathematics with ethnomathematics is a lesson that uses different ways or methods, this method can be considered as one of the tools that have the ability to make mathematics learning more interesting and meaningful (Ramadhani & Mutmainna, 2023). Therefore, ethnomathematics offers various opportunities for the application of mathematics in society, especially the people of East Sumba. One of them is by taking an approach that can connect mathematical concepts with dance, for example by using kandingan dance.

East Sumba, East Nusa Tenggara (NTT), has a traditional dance called Kandingang Dance. This dance is usually performed in traditional weddings, welcoming guests and various other festive events (Iki, 2016).

In its performances, this dance is usually played by 4-8 female dancers using typical clothing and tassels made from horse tails used for dancing. Accompanied by traditional music, namely gongs and drums, the dancers dance while playing the tassels. Kandingang dance is dominated by foot and hand movements that play the tassel alternately or simultaneously. The rhythm used is usually slow following the graceful movements of the dancer. With compact movements combined with changing formations, this dance looks attractive and beautiful (Iki, 2016).

In the performance, kandingang dancers usually wear East Sumba clothes, namely cloth and shawl (hinggi kombu and teara). The complementary accessories include tiduhai, muti, earrings, sleighs and tassels (Iki, 2016).

The following are some of the results of Ethnomathematics research conducted on Kandingang dances related to the concept of Geometry:

1. A vertical line is a line with a position perpendicular to the earth's surface. The vertical line in kertesius coordinates is described by a line parallel to or coinciding with the y-axis (abscissa) (Bramasti, 2012).



Image 1. Vertical lines in the kandingang dance

The vertical line in the Kandingang dance formation is the arrangement of the dancers in a straight line from front to back, where each dancer stands directly behind the other dancers, forming a perpendicular line.

2. A horizontal line is a line with a horizontal position on the earth's surface. In cartesian coordinates, a horizontal line can be depicted with a line that is parallel or coincides with the x-axis (Bramasti, 2012).



Image 2. Horizontal lines in kandingang dance

In the Kandingang dance formation, the horizontal line is the arrangement of the dancers in a straight line from the left side to the right side or vice versa, with each dancer standing parallel to the same distance.

3. An arbitrary triangle is a triangle whose sides are not equal in length (Bramasti, 2012).



Image 3. Arbitrary triangles in the kandingang dance

In the kandingang dance, a group of dancers with foot movements form an arbitrary triangle, in accordance with the concept of triangular flat geometry.

4. A triangle that has three equal sides and three equal angles is called an equilateral triangle.



Image 4. Equilateral triangle in the kandingang dance

In kandingang dances, dancers make hand movements by stretching straight up to form an equilateral triangle.

5. An acute angle is a type of angle that has a magnitude between 0° and less than 90° (Negoro & Harahap, 2010). Symbols in math $0^\circ < x < 90^\circ$. X is the measured angle magnitude. Right angles are larger than acute angles.



Image 5. Acute angle in kandingang dance

In kandingang dances, dancers make hand movements with one hand bent at the waist so that it forms an acute angle.

6. A right angle is an angle that has a magnitude of exactly 90° (Negoro & Harahap, 2010). A right angle is formed when two straight lines intersect at an angle of 90° . A right angle is represented by the symbol \perp .



Image 6. The right triangle in the kandingang dance

In kandingang dances, dancers make hand movements with one hand extended and bent upwards to form a right angle.

CONCLUSIONS

Based on the research data and discussion, it can be concluded that each style of Kandingang dance movement in East Sumba has ethnomathematics concepts. In Kandingang dance movements, geometry concepts such as vertical lines, horizontal lines, arbitrary triangles, equilateral triangles, acute angles, and right angles are part of ethnomathematics. Based on the research conclusions, the researcher recommends for community members to continue to preserve culture, especially kandingang dance. For educators, they should be able to choose a learning model related to culture to recognize and find out the mathematical concepts in students in every kandingang dance movement.

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