ETHNOMATHEMATICS: EXPLORATION IN KEBYOK ANTING-ANTING DANCE FLOOR PATTERNS FOR LEARNING THE CONCEPT OF GEOMETRY

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ABSTRACT

Ethnomathematics is a realistic approach to learning mathematics that relates mathematical concepts to culture. By learning mathematics relevant to the student environment's culture, students will more easily understand mathematical concepts. This study aimed to examine the ethnomathematical exploration of the Kebyok Anting-Anting dance floor pattern for learning the concept of geometry. This research is qualitative research using the ethnographic method. The instruments used are interviews, observation, and documentation. Data obtained through interviews and observations were analyzed using the analytical method described by Miles & Huberman, there are data reduction, data data display, and conclusion drawing/verification. The results showed that the ethnomathematical investigation in the Kebyok Anting-Anting dance floor patterns for learning the concept of geometry were horizontal lines, vertical lines, squares, rectangles, isosceles trapezoids, isosceles triangles, and parallelograms. It is hoped that various local cultures can be used to introduce other mathematical concepts.

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INTRODUCTION

Along with the times, 21st-century learning has challenges preparing Indonesia's golden generation to utilize technology to support digital progress. In the development of educational technology, it is necessary to have cultural involvement in learning in schools so that students can become a generation of character and maintain and preserve culture. The culture applied

in schools is a concept to understand the learning material. One of the concepts used in schools is the concept of mathematics.

Mathematics is a science that studies forms, quantities, and concepts that are related to one another (Destrianti et al., 2019). Mathematics has always been a difficult subject for students in elementary school. Anggraeni et al (2020) that according to Piaget's theory, elementary school students aged 7-8 years have a concrete thinking model, while mathematics is abstract (Anggraeni et al., 2020). Therefore, students do not only need to memorize the formula, but also understand the meaning of the formula by relating it to everyday life. This is supported by Van de Henvel Panhuizen's theory in Ahmad et al (2020) who found that elementary school-age children would easily forget mathematics and have difficulty applying mathematics when their learning is separated from everyday life (Ahmad et al., 2020). This means that Mathematics does not only teach abstract material concepts, but also real concepts. Therefore, innovation is needed in learning mathematics in the form of concrete examples in a fun way of learning so that students can easily accept the material. One of them is by associating Mathematics with culture or it is called ethnomathematics.

The opinion of Wahyuni et al. (2013) revealed that one thing that can be a bridge between education and culture, especially mathematics education, is ethnomathematics (Wahyuni et al., 2013). Ethnomatematics is mathematics that grows and develops in a particular culture (Dhiki & Bantas, 2021). Cultural practices that allow the inculcation of mathematical concepts and recognize that everyone develops a unique way of doing mathematical activities are called ethnomathematics (Fajriyah, 2018). The application of realistic mathematics learning by using local wisdom or the cultural context of the local population to provide variety when learning and students' higher-order thinking skills are getting better (Kurino, 2019)

The study's results (Dahlan & Permatasari, 2018) show that ethnomathematical-based teaching materials can facilitate students in constructing mathematical knowledge inductively. Ethnomathematics can be studied in various dances to find concepts from mathematics (Maryati & Pratiwi, 2019);(Naja et al., 2021);(Mangkin et al., 2021); (Wahyudi & Putra, 2022)). Previous studies have focused more on activities, dance attributes, and dance moves, while this study focused on floor patterns in the Kebyok Anting-Anting dance formation. According to (Dibia et al., 2006), the easiest to see, as part of the choreography, is the floor pattern,namely the points occupied and the lines that the dancers pass.

This study will explore the ethnomathematics of the Kebyok Anting-Anting dance. Knowledge related to Kebyok Anting-Anting that will be explored is the floor pattern, while mathematics learning is the concept of geometry. Dance is a creative and constructive activity that can generate emotional intensity and meaning (Khutniah & Iryanti, 2012). Dance can be the identity or identity of a particular community. Parts of the art of dance related to mathematics are movement, clothing, and formation (Maryati & Pratiwi, 2019).

The Kebyok Anting-Anting Dance is a new dance creation that expresses feelings through the order of motion in the rhythm of music and songs. This dance is an expression of joy displayed in the welcoming ceremony. The floor pattern in a dance is also an element of beauty in dance. This study aimed to examine the ethnomathematical concepts contained in the Kebyok Anting-Anting dance floor pattern for learning the concept of geometry.

METHOD

The method used in this research is descriptive qualitative research through an ethnographic approach. Opinion (Sugiyono, 2013) states that the descriptive qualitative method places the researcher as the vital instrument, combines the data collection technique, and the data

analysis is inductive. According to Creswell (Sugiyono, 2013), an ethnographic approach in qualitative research examines a culture in groups in natural conditions through observation and interviews.

The data collection technique in this research is field data collection, which consists of four parts: observation, recording, interviews, and documentation. The research instrument is a human instrument, where the researcher acts as the main instrument that cannot be replaced by another person who acts as a data collector related to the mathematical concepts of the Kebyok Anting-Anting dance floor pattern for learning the concept of geometry. In addition, supporting instruments are used in the form of observations, field notes, interviews, and documentation.

The data analysis technique in this research is descriptive qualitative analysis. Data obtained through interviews and observations were analyzed using the analytical method described by Miles & Huberman (1992) in (Naja et al., 2021); namely, there are three activities in data analysis, including data reduction (data reduction), data presentation (data display), and concluding or verification (conclusion drawing/verification). Data reduction is an assessment and simplification process, often called the selecting stage, so unnecessary data can be removed. Presentation of data (data display) is the stage where the required data can be processed so that a general picture of what has been researched can be obtained. Conclusion drawing/verification is the stage where the data that has been collected can be concluded. The subjects in this study were Aris Suparno, the administrator of the Kembang Sore dance studio, Tulungagung Branch.

RESULTS AND DISCUSSION

Result

The researcher observed the research object: the dance group students from SDN 4 Pakisrejo Tanggunggunung district Tulungagung regency with four children on October 15, 2022, around 08.00 – 09.15 WIB. From these observations, the following results were obtained.

Table 1. Ethnomathematics: Exploration In Kebyok Anting-Anting Dance Floor Pattern For Learning The Concept Of Geometry

| No	Floor pattern	Math Concept	Ethnomathematics
1	Image 1	Horizontal line	The dancers set the distance and form a horizontal line floor pattern.

| 2 | Image 2 | Vertical line | The dancers adjust the distance and form a vertical line floor pattern. |

| 3 | Image 3 | Rectangle A square has four folding symmetries and four rotating symmetries. Around = 4 x sides Large = side x side | The dancers form a square floor pattern. |

| 4 | Image 4 | Rectangular A square has two folding symmetries and two rotating symmetries Around = 2 x (length x width) Large = length x width | The dancers form a rectangular floor pattern |

| 5 | Image 5 | Isosceles trapezoid An isosceles trapezoid has onefold symmetry Around = KL + LM + MN + KN Large = (LM + KN) x ½ x t | The dancers forman isosceles trapezoid floor pattern |
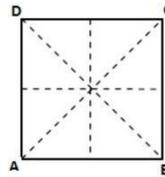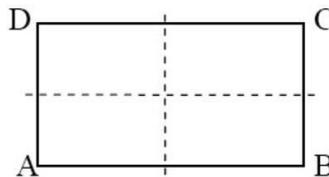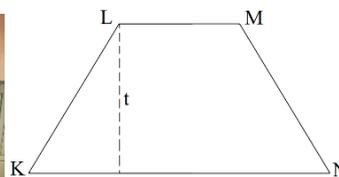
6	Image 6	An isosceles triangle has one-fold symmetry. Around = AB + BC + AC Large = ½ x a x t	The dancers forman isosceles triangle floor pattern.
7	Image 7	Parallelogram A parallelogram rotating symmetries. Two adjacent angles add up to 180° or are complementary (angle A + angle B = 180°, angle C + angle D = 180°). Around = AB + BC + CD + AD Large= a x t	The dancers forma parallelogram floor pattern
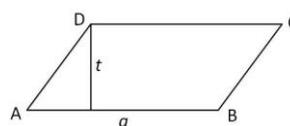
Furthermore, the researchers interviewed Ari Suparno, the administrator of the Kembang Sore dance studio, Tulungagung Branch, located in Sidorejo Village, Kauman District, Tulungagung Regency, on October 16, 2022, at around 14.00 - 14.45 WIB. The results of interviews with informants are as follows.

Table 2. Results of interviews with resource persons

No	Question	Answer
1.	What is the origin of the establishment of the Kembang Sore Tulungagung dance studio?	The Kembang Sore dance studio in the Tulungagung branch was established one day after the Kembang Sore dance center in Yogyakarta was established on February 24, 1984. The Kembang Sore dance studio in the Tulungagung branch had previously proposed ten times for the establishment of a studio to the Regent of Tulungagung but failed due to technical errors. It should be noted that the forerunner of the Kembang Sore dance studio in Yogyakarta came from the Kembang Sore dance studio in the Tulungagung branch. Before being submitted to Yogyakarta, Tulungagung had been training for nine months with different training locations. Dance practice site 1) SMP 1 Kauman, 2) Kauman village hall, 3) Village hall Sidorejo, 4) Bolorejo Village Hall, 5) Batangsaren Village Hall, 6) Ex-Assistant Hall of Tulungagung Regent.
2.	What is the purpose of establishing the Kembang Sore Tulungagung dance studio?	To help the government in terms of the art of dance.
3.	When is dance practice held?	Dance practice every Sunday from 08.00 – 14 00. The duration of practice for each class during the pandemic is 30 minutes. The classes are: 1. Pre-Basic Class 1 2. Pre-Basic Class 2 3. Elementary Class 1 4. Elementary Class 2 5. Developer Class 1 6. Developer Class 2 7. Internship Class 1 8. Core Apprentice Class
4.	How many trainers are there in the Tulungagung branch of the Kembang Sore dance studio?	There are seven coaches and 12 assistants. Both trainers and assistants must be certified. Every year there is a coach exam and a level-up. The trainer exams are: 1. Pre-Intermediate Exam 2. Intermediate Exam 3. Advanced Exam Pre-intermediate and intermediate exams are for assistants, while advanced exams are for coaches.
5.	The background or philosophy of the Kebyok Anting-Anting dance?	A rejoicing teenager welcomes the arrival of someone or a guest by dressing or embellishing. The philosophy of the Kebyok Anting-Anting dance is in the lyrics. All dances from the studio have lyrics.
6.	How many people perform the Kebyok Anting-Anting	The Kebyok Anting-Anting Dance is a group dance with an even number.

No	Question	Answer
	Dance?	
7.	What is the child age who can perform the Kebyok Anting-Anting dance?	Those who can perform the Kebyok Anting-Anting dance are teenagers. Why should it be a teenager? It is risky with the property brought, namely the kebyok that comes from raffia.
8.	What kind of event is the Kebyok Anting-Anting Dance performed on?	The Kebyok Anting-Anting dance is a kind of welcoming dance, so it is usually performed when there are guests.
9.	What is the musical instrument for the Kebyok Anting-Anting dance?	Pentatonic musical instrument
10.	What are the forms of floor patterns in the Kebyok Anting-Anting dance?	The recommended floor pattern is a tight, straight, curved circle. Because if the floor pattern is not firm, it will not be meaningful. In development, it can be created as a semi-circle or a horseshoe.
11.	How do Kebyok Anting-Anting tariffs more attractive or sustainable? What activities are carried out?	Not only the Kebyok Anting-Anting dance but all dances are also included in the mandatory material at the Kembang Sore dance studio. The point is that any dance must still exist and be known to the public.

Based on the observation table and interview table, the Kebyok Anting-Anting dance is a dance that comes from the Kembang Sore dance studio. The Kebyok Anting-Anting dance is performed by teenagers in an even number of groups. This dance is usually performed to welcome guests. The property used is a kebyok shaped like a pom-pom made of raffia rope and a scarf. The floor pattern in the Kebyok Anting-Anting dance is suggested to be firm, such as straight lines, curves, and circles.

Discussion

The ethnomathematical exploration in the Kebyok Anting-Anting dance for learning the concept of geometry is only limited to geometric concepts and elementary geometry. Ethnomathematical exploration in this study is the floor pattern in the Kebyok Anting-Anting dance, which consists of horizontal lines, vertical lines, squares, rectangles, isosceles trapezoids, isosceles triangles, and parallelograms. In image 1, the dancers are lined up sideways to form a horizontal line, following the concept of a horizontal line. A line is a collection of regular and continuous points extending in two directions (Mukarromah & Darmawan, 2022). A horizontal line is a line with a horizontal position on the earth's surface. Horizontal lines in Cartesian coordinates are depicted by parallel lines or coinciding with the x-axis (ordinate) (Bramasti, 2012).

In image 2, the dancers line up backward to form a vertical line pattern following the concept of a vertical line. A vertical line is a line that is perpendicular to the earth's surface. The verticalline in the kertesius coordinate is depicted by a parallel line or coinciding with the y-axis (abscissa) (Bramasti, 2012). In image 3, the dancers appear to form a square pattern. Ethnomathematics in this picture is the concept of a square. A square is a flat shape with four

sides of the same length, and all the angles are the same size and right angles (Mukarromah & Darmawan, 2022). In image 4, the dancers appear to form a rectangular floor pattern. Ethnomathematics in this picture is the concept of a rectangle. A rectangle is a quadrilateral that has four right angles (Bramasti, 2012).

In image 5, the dancers appear to form an isosceles trapezoidal floor pattern. The ethnomathematics in this picture is an isosceles trapezoid. An isosceles trapezoid is a trapezoid in which pairs of non-parallel sides are congruent (Isrok'atun, 2016). In image 6, the dancers appear to form an isosceles triangle floor pattern. The ethnomathematics in this picture is an isosceles triangle. A triangle is a 2-dimensional flat shape with three sides in a straight line and three angles (Mangkin et al., 2021). An isosceles triangle is a triangle that has two equal sides and the same angle at the base (Bramasti, 2012). Image 7 shows the dancers forming a parallelogram floor pattern. the ethnomathematics in this picture is a parallelograms. a parallelogram is a flat rectangular shape with parallel sides and the same length (Bramasti, 2012).

CONCLUSION

Based on the data collection and discussion described previously, the study results show that the ethnomathematical exploration of the Kebyok Anting-Anting dance floor pattern for learning the concept of geometry has mathematical elements and concepts. The ethnomathematical explorations in the Kebyok Anting-Anting dance floor pattern for learning the concept of geometry are horizontal lines, vertical lines, squares, rectangles, isosceles, trapezoids, triangles, and parallelograms. The suggestions that can be recommended are that the local community members continue to preserve the existing culture in their area, and educators should be able to choose realistic learning models related to the surrounding culture to recognize and know other mathematical concepts.

REFERENCES

Ahmad, S., Helsa, Y., & Ariani, Y. (2020). *Pendekatan Realistik Dan Teori Van Hiele*. Grup Penerbitan CV Budi Utama.

Anggraeni, S. T., Muryaningsih, S., Ernawati, A., Guru, P., Dasar, S., Keguruan, F., & Pendidikan, I. (2020). *Analisis Faktor Penyebab Kesulitan Belajar Matematika di Sekolah Dasar*. Jurnal Riset Pendidikan Dasar (JRPD), 1(1), 25–37. https://doi.org/10.30595/.V1I1.7929

Bramasti, R. (2012). *Kamus Matematika*. Aksarra Sinergi Media.

Dahlan, J. A., & Permatasari, R. (2018). *Pengembangan Bahan Ajar Berbasis Etnomatematika dalam Pembelajaran Matematika Sekolah Menengah Pertama*. In Jurnal Nasional Pendidikan Matematika) (Vol. 2, Issue 1). http://dindik.bantenprov.go.id/

Destrianti, S., Rahmadani, S., Ariyanto, T., Tarbiyah, F., Tadris, D., & Curup, I. (2019). *Etnomatematika dalam Seni Tari Kejei Sebagai Kebudayaan Rejang Lebong (Vol. 2, Issue 2)*. Online.

Dhiki, Y. Y., & Bantas, M. G. D. (2021). *Eksplorasi Etnomatematika Sebagai Sumber Belajar Matematika Di Kabupaten Ende*. AKSIOMA: Jurnal Program Studi Pendidikan Matematika, 10(4), 2698. https://doi.org/10.24127/ajpm.v10i4.4254

Dibia, I. W., Widaryanto, F. X., & Suanda, Endo. Latief, H. (2006). *Tari Komunal*. Lembaga Pendidikan Seni Nusantara.

Fajriyah, E. (2018). *Peran Etnomatematika Terkait Konsep Matematika dalam Mendukung*

Literasi. https://journal.unnes.ac.id/sju/index.php/prisma/

Isrok'atun. (2016). *Pendidikan Matematika II*. UPI Sumedang Press.

Khutniah, N., & Iryanti, V. E. (2012). *Upaya Mempertahankan Eksistensi Tari Kridha Jati di Sanggar Hayu Budaya Kelurahan Pengkol Jepara.* In JST (Vol. 1, Issue 1). http://journal.unnes.ac.id/sju/index.php/jst

Kurino, D. Y. (2019). *Meningkatkan Kemampuan Kognitif Siswa Melalui Predict Observe Explain Enhancing Students' Cognitive Abilities Through Predict Observe Explain* (Vol. 4, Issue 1). http://jurnal.unma.ac.id/index.php/th/article/view/1416/1284

Mangkin, D., Agustina, W., & Huriaty, D. (2021). *Etnomatematika Pada Tari Dadas Bawo SUKU Dayak Ma'anyan* (Vol. 1). https://jurnal.stkipbjm.ac.id/index.php/mipati/article/view/1523

Maryati, & Pratiwi, W. (2019). *Etnomatematika-Eksplorasi Dalam Tarian Tradisional pada Pembukaan Asian Games 2018*. https://jurnal.umj.ac.id/index.php/fbc/article/view/3304

Mukarromah, N. A., & Darmawan, P. (2022). *Etnomatematika Pada Pola Lantai Tari Gandrung Banyuwangi*. http://ejournal.unibabwi.ac.id/index.php/knmipa/article/view/1735

Naja, F. Y., Mei, A., & Sa'o, S. (2021). *Eksplorasi Konsep Etnomatematika Pada Gerak Tari Tradisional Suku Lio*. AKSIOMA: Jurnal Program Studi Pendidikan Matematika, 10(3), 1836. https://doi.org/10.24127/ajpm.v10i3.3885

Sugiyono. (2013). *Metode Penelitian Pendidikan Pendekatan Kuantitatif, Kualitatif dan R&D*. Alfabeta.

Wahyudi, & Putra, A. (2022). *Systematics Literature Review: Eksplorasi Etnomatematika Pada Aktivitas Masyarakat*. *3*(1). https://doi.org/10.46306/lb.v3i1

Wahyuni, A., Tias, A. A. W., & Sani, B. (2013). *Systematics Literature Review: Eksplorasi Etnomatematika Pada Aktivitas Masyarakat*. Prosiding Seminar Nasional Matematika Dan Pendidikan Matematika FMIPA UNY, 1(1), 113–118.