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Etnomathematic Exploration Study on The Traditional Dance of Kethek Ogleng

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ABSTRAK

Pembelajaran di sekolah dasar lebih menarik ketika dihubungkan dengan budaya yang ada di sekitar siswa. Penelitian ini bertujuan mengeksplorasi muatan etnomatematika tari tradisional Kethek Ogleng. Penelitian ini menggunakan penelitian kualitatif dengan pendekatan etnografi. Teknik pengumpulan data dengan observasi, dokumentasi, dan wawancara. Teknik analisis data yang digunakan adalah analisis Domain dan Taksonomi. Langkah-langkah analisis memperoleh gambaran umum dan menyeluruh dari objek kemudian dijabarkan ke dalam konsep-konsep. Hasil penelitian yaitu muatan etnomatematika dalam tari tradisional kethek ogleng terdiri dari, pertama, konsep bangun datar lingkaran, konsep ini terdapat pada saat penari melakukan gerakan koprol. Kedua, bangun ruang tabung, terdapat pada alat musik kendang sebagai pengiring tari. Ketiga, sudut, terdapat pada lekukan kaki ketika penari melakukan gerakan melamun. Keempat, satuan waktu terdapat pada durasi lama penari pentas. Kelima, konsep bangun datar persegi, terdapat pada hiasan celana penari. Simpulan penelitian ini membuktikan bahwa tari tradisional Kethek Ogleng yang berasal dari Wonogiri memuat etnomatematika. Oleh karena itu, tari tradisional ini dapat digunakan sebagai media dalam pembuatan desain pembelajaran untuk anak sekolah dasar.

ABSTRACT

Learning in elementary school is more interesting when learning with the culture that surrounds students. This study aims to explore the ethnomathematical content of the traditional dance of Kethek Ogleng. This study uses qualitative research with an ethnographic approach. Data collection techniques by observation, documentation, and interviews. The data analysis technique used is Domain Analysis and Taxonomy. The analysis steps obtain a general picture and a comprehensive concept of the object then into a concept. The result of the research is that the ethnomathematical content in the traditional dance of Kethek ogleng consists of, first, the concept of a circular flat shape, this concept is present when the dancer performs a knuckle movement. Second, build a tube room, which is found on drums as a dance accompaniment. Third, the angle is found in the curve of the foot when the dancer makes a dreamy movement. Fourth, there is a time limit on the duration of the dancer's performance. Fifth, the concept of a flat, square shape, is found in the dancer's pants decoration. The conclusions of this study prove that the traditional Kethek Ogleng dance originating from Wonogiri contains ethnomathematics. Therefore, this traditional tariff can be used as a medium for making learning designs for elementary school children.

1. INTRODUCTION

Learning is a process of interaction between students and educators and learning resources in a learning environment. Learning is assistance provided by educators so that the process of acquiring knowledge and knowledge, mastering skills and character, and forming attitudes and beliefs can occur in students (Mayasari et al., 2019; Oksa & Soenarto, 2020; Widodo & Wardani, 2020). In other words, learning is a process to help students learn well. A good learning strategy is a strategy that can foster student learning activities (Hikmah & Purnamasari, 2017; T. A. J. Wulandari et al., 2019; Zalite & Zvirbule, 2020). For this reason, the teacher must fully understand the material to be delivered and choose the right learning strategy to deliver the material so that it can create a good teaching and learning process. In addition to learning strategies, we also need a media that can be used to assist students in learning (Mustaqim & Kurniawan, 2017; Sanusi et al., 2015; Y. Wulandari et al., 2020).

Culture or habits that exist in the student's environment can be used as a medium in learning. Previous research has shown that the local culture around students can be used as an alternative for teachers in contextual learning of concepts (Budiarti et al., 2022; Prayogi & Danial, 2016; Winangun, 2020). Learning Mathematics with discussion at the same time about culture is called Ethnomathematics (Cimen,

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2014; Nusantara & Rahardjo, 2017) Another opinion explains that ethnomathematics also discusses knowledge, values, language, practices, and cultural behavior, not only mathematical material in groups in an area (Leal Vasquez, Ph.D., 2017). Studies conducted by previous researchers add to the clarity that students inductively construct mathematical knowledge facilitated by ethnomathematical-based teaching materials (Dahlan & Permatasari, 2018; Mania & Alam, 2021). Mathematics learning in schools becomes more relevant and meaningful to ethnomathematics (Shahbari & Daher, 2020). Ethnomathematics in addition to giving a new color in learning Mathematics is also a solution to preserving the local culture around students.

The reality that occurs in elementary schools, in learning mathematics has not been connected with the culture that surrounds students. Many teachers still apply traditional learning, namely teaching mathematics symbolically or abstractly (Kencanawati et al., 2020; Safitri, 2017; Zakaria & Syamaun, 2017). Many teachers still use existing book sources even though they have added some real objects as learning media (Lestari & Putra, 2020; Nirfayanti & Syamsuriyawati, 2019). The real objects used by teachers have not been themed on the culture that surrounds students. This affects the existence of the surrounding culture because students do not know it. Cultural preservation can be realized when all citizens know it. The right way to introduce and find out more about culture can be done by making it a learning resource at school. Culture as a source of learning has a lot of impact on students. Learning resources by connecting cultures can improve creative thinking and how to solve problems that students do (Kandakatla et al., 2020; Sumarni et al., 2022). Culture as a learning resource aims to attract interest in participating in learning as well as introduce the culture around students so as to increase the love for the homeland. How to increase the love for the homeland in students by instilling Indonesian cultural values in learning (Kusuma et al., 2017).

Ethnomathematics studies have been carried out by several researchers (Hariastuti, 2019; Kusuma et al., 2017; Nur et al., 2021; Putra & Mahmudah, 2021). More complicated mathematical concepts (geometry) are applied by the community to woven hat motifs (Hartoyo, 2012). Another study was conducted by Edy Tandililing on the development of ethnomathematics based on local culture in West Kalimantan in an effort to develop mathematics learning in schools, especially in elementary schools. The results of the study stated that various types of activities, oral literature, artifacts, traditional games, counting and measuring culture in the Kanayat'n Dayak community can be developed in learning mathematics in schools (Tandililing, 2013).

The next ethnomathematical research was carried out by Pitriana Trandililing about the geometric concepts found in the carvings of the Tongkonan traditional house. The results of the study stated that the geometric concepts contained in the carvings of the Tongkonan traditional house are symmetry, monolinearity, right angles, diagonals, parallel lines, curved lines, squares, rectangles, circles, triangles, diamonds, kites, trapezoids and parallelogram. The most common geometric concept found in all Toraja carvings is triangle (Trandililing, 2015). Research on ethnomathematics in Javanese batik culture by Irma Risdiyanti concludes that Yogyakarta batik contains geometric transformation material (Risdiyanti & Prahmana, 2018). The description above shows that ethnomathematics in terms of geometry and measurement has been carried out in several diverse cultures. This article aims to explore the ethnomathematical content of the traditional Kethek Ogleng dance. The results of this study are expected to be used by teachers in elementary schools in preparing interesting Mathematics learning plans and at the same time being able to preserve regional culture, especially the Kethek Ogleng dance.

2. METHODS

Descriptive qualitative research was chosen by researchers in this study. Descriptive qualitative research is used to obtain complete, comprehensive, and in-depth information (Prahmana & Kusumah, 2017). The ethnographic approach chosen in this study is to explore information as a whole through empirical and theoretical approaches based on field studies. Data collection is divided into two parts, namely data from observations, interviews, and documentation of ethnographic notes which are grouped as field data and reinforced from library data from library studies. This study uses instruments in the form of observation guidelines, interviews, and documentation. The subject of this research is based on the purposive sampling , namely the researcher chooses a subject who has a profession or habit of the subject to the required data. The researcher chose Mrs. Irawati as the subject because she was an extra dance supervisor at the research school. The collected data were analyzed using Domain and Taxonomy basis. Grouping the data in this study related to mathematical concepts according to the category/domain obtained five ethnomathematical groups, namely calculus, geometry, algebra, arithmetic, and statistics. Mathematical ideas in Kethek Ogleng traditional dance are described from the results of describing the domain which is a taxonomic analysis.

3. RESULT AND DISCUSSION

Result

Irawati when interviewed explained that the dance art of Kethek Ogleng which means Kethek is synonymous with monkey, degleng which is considered an absorption of the term Ogleng meaning crazy or crazy. This traditional dance is still alive today and continues to grow and develop. The story of Panji is the source of this dance which is described by Kethek Ogleng as a monkey in disguise of Panji Gunung Sari. Kethek which means monkey, and Ogleng which means gleng are taken from the sound of the gamelan being played. The Kethek Ogleng art in Wonogiri first appeared in Tempursari Village, Sidoharjo District, which is the residence of the dancer, namely Samijo (Diatmoko, 2018). This dance by Samijo is usually performed while walking around, so it is often called tledek mbarang. Samijo once attended an event which was attended by R. Samino, the Regent of Wonogiri, where on that occasion he performed the Kethek Ogleng dance and became famous. The Regent of Wonogiri decided Kethek Ogleng as an iconic dance in Wonogiri Regency and appointed Samijo as an employee at the Wonogiri Bappeda because of his expertise in presenting Kethek Ogleng art.

The art of Ledhek Mbarang is a simple gamelan music accompaniment that only involves a maximum of 2 singers/dancers (Warto, 2014). Special music such as gangsaran, slepeng, and sampak are played using gamelan which the musicians carry while walking around. The duration of time between 5 and 10 minutes was used to entertain the audience who came, they saw the ledhek mbarang and the Ogleng kethek dance at the crossroads. Dancers and musicians do this for promotional purposes or to offer entertainment in hopes that someone will be interested. During the harvest season in the village, this art is very popular with the community so that it is widely considered by the community for 2-3 months. This entertainment is very popular with the Javanese farming community in addition to entertaining as well as a tradition to complete the ritual ceremony of the planting process. It can be said that the art of ledhek mbarang is the forerunner of the traditional Kethek Ogleng dance. The lone male dancer who demonstrates the Kethek Ogleng dance moves like an attractive monkey (Diatmoko, 2018). There are 3 parts that make up the structure of the Kethek Ogleng dance, namely the behavior of the monkeys (solah kethek), the gait of the kethak which moves uniquely and attractively by using objects around them, and carrying children. The accompaniment music is suwe ora jamu fluency, sweet lenggong fluency, gangsaran. Accompanying musical instruments such as Kendhang, Gong, Penggerong, Demung, Saron, Bonang, and Kempul.

Kethek Ogleng traditional dance movements are divided into 2 types of movements, namely pure and meaningful movements (Hendriyanto et al., 2019). Kethek Ogleng dance movements are purely imitation or imitation of natural monkey movements and distinguish them from other dance movements. Pure motion is motion that contains artistic motion and does not describe something. The uniqueness of the Kethek Ogleng dance movement lies in the authenticity of the monkeys' movements, which at that time were playing in the wild. It is different if it is done by an ape that has been confined in an artificial habitat. The behavior and behavior of apes has changed a lot when compared to apes in their natural habitat. Meaningful movement is the Kethek Ogleng dance movement which contains a specific purpose. These movements include tumbling and acrobatics. These movements are not limited to movements but have meanings that are connected to life. Acrobatics means that life is full of abstractions and zigzags. In addition, the behavior of pranking or interacting with the audience implies that in every life we must interact with fellow human beings. Mutual help and togetherness are always upheld by humans for noble purposes.

Based on the 2 types of movements in the Kethek Ogleng dance above, they are then translated into 6 basic dance movements, namely: First Rolling, slipping, acrobatic movements like falling from a different realm. The beginning of entering the world of life, the spirit of life to undergo the test that will determine one's success in both life in this world and the hereafter is a reflection of this movement. Daydreaming while sitting and turning his eyes in all directions as if he looked restless. This movement has the meaning of painting feelings of disappointment, regret and wonder at witnessing a new world that is considered foreign and full of challenges. Life in this world must be lived with concentration and strong determination. Interact with the audience by walking around the arena. The new environment that makes humans feel curious is depicted in this movement. Human curiosity will motivate humans to think in order to find the best answer for themselves, others, and the environment. Live side by side with nature, animals and the body and everything in it so that life is more meaningful. Interact and annoy the audience with a licking motion. The movement illustrates that life is full of struggles. Humans do not complain about various problems in their lives. Face it with patience, sincerity, effort, work, and prayer, God willing, it will

be easier to find fortune. Humans are given reason to think in finding the best solution in every problem in life. Stay away from envy, jealousy, revenge, pride because it will make life uneasy.

Running movements carry goods from the audience with both hands and mouth. Maximum results are achieved with an attitude of confidence and always take advantage of opportunities described in this movement. In principle, in life, like a game, we can sometimes fall and sometimes win. Interaction with fellow creatures created by Allah SWT will bring humans to peace and happiness. Although happiness is intangible, the indicators of happiness are felt by each person differently depending on the person. Funny movements such as chatting, playing, and joking with fellow dancers and spectators. The spirit of unyielding, cheerfulness, and togetherness in living life is depicted in this movement. The difficulties of life need not be feared. Face all challenges and obstacles in life with a smile. Life is a struggle, the end of the struggle is death. The development of the Kethek Ogleng dance at this time has two versions, namely the classic with a performance time of 7 minutes, while the ballet version has a performance time of 40 minutes. Ballet is a performing art that combines dance and drama. The Kethek Ogleng ballet was introduced in 1972 by combining the Kethek Ogleng dance with the Panji story. The Kethek Ogleng ballet is a folk dance movement with the story of Panji Asmorobangun. The results of data analysis found several ethnomathematics in the traditional Kethek Ogleng dance as follows: Build a flat circle, based on data analysis the concept of circular flat shape in the traditional Kethek Ogleng dance is present during acrobatic movements. The dancers perform acrobatic movements by rolling their bodies so that they appear to form a flat circle. This is presented in Figure 1.

Images of acrobatic movements can be used as a medium for introducing circles to elementary school students. The concept of area and circumference of a circle can be started by introducing the circle from the image of the Kethek Ogleng dance. The concept of building a tube space in the traditional Kethek Ogleng dance is found in the drums used to accompany the dance. The drum is made of wood in the shape of a tube with a lid made of animal skin, usually cows. Definition of a cylinder is a form of space bounded by two congruent parallel sides in the form of a circle and a curved side (Mulyani et al., 2019). This is presented in Figure 2.

Figure 1. One of the movements in the Kethek Ogleng dance shows the shape of a circle.

Figure 2. The kendhang musical instrument used to accompany the Kethek Ogleng dance is in the form of a tubular shape

Images of drums that are shaped like tubes can be used as a medium for recognizing the shape of the tube space. The concept of a tube such as characteristics, volume, and surface area can be conveyed to students by showing the drum music instrument that is commonly used to accompany the Kethek Ogleng dance. The concept of angle in the traditional Kethek Ogleng dance is found in the movement of the dancer's body parts. This is presented in Figure 3. Images of Kethek Ogleng dance movements can be used as a medium to introduce angles to students. There are 3 kinds of angles that students must understand, namely right, acute, and obtuse angles. The concept of the unit of time in the traditional Kethek Ogleng dance is contained in the duration of the dance performance, namely the classic with a performance time of 7 minutes, while the ballet version takes 40 minutes to perform. From the duration of the student's performance, the concept of the unit of time can be introduced. The video of the Kethek Ogleng dance performance can be played first until it is finished then students are notified about the duration of

applying the unit of time. The smallest unit of time from the second to the largest can be started by looking at the duration of the Kethek Ogleng dance performance which lasts for several minutes. The concept of recognizing square shapes in the traditional Kethek Ogleng dance is found in the decoration of the dancer's pants. The decorative motif on the dancer's pants is a black and white square shape. The motif of the dancer's pants decoration can be used by the teacher in introducing the concept of a flat square shape. This is presented in Figure 4.

Figure 3. One of the movements of the limbs of the Kethek Ogleng dancer forms an angle.

Figure 4. The motif on the pants decoration shows a black and white square shape.

Discussion

The traditional Kethek Ogleng dance in Wonogiri Regency is a cultural heritage that must be preserved. The next generation must know and know the traditional Kethek Ogleng dance. The purpose of preservation is, among others, so that future generations will continue to know and recognize the diversity of local cultures which is very interesting (Aisara et al., 2020; Silkyanti, 2019; Yuki, 2020). Indonesian people must continue to respect culture as a means of maintaining its sustainability. The world community is urged by the United Nations through UNESCO to always respect, respect, and accept every cultural diversity (Handayani et al., 2021). Several efforts must be made by Indonesian citizens in an effort to preserve culture, one of which is through the world of education.

The world of education through schools is the right vehicle to help preserve culture, especially the traditional Kethek Ogleng dance. Elementary school students are very appropriate to be a vehicle for introducing culture in the world of education through the learning process (Aisara et al., 2020; Kaban et al., 2021; Sya & Helmanto, 2020). The learning process in schools can be a means of preserving culture by connecting material with culture. Mathematics material can be conveyed more interestingly when it is related to culture. Ethnomathematics is learning mathematics that is found in the culture around students (Ari Irawan & Kencanawaty, 2017; Nur et al., 2020). The process of preserving the traditional dance of Kethek Ogleng can be done with ethnomathematics. Some mathematical concepts can be found in the traditional Kethek Ogleng dance so that it can be used as a teacher's tool in learning Mathematics in elementary schools.

The mathematical concepts found in the traditional Kethek Ogleng dance are based on research results, including the concepts of circular flat shapes, tube shapes, angles, units of time, and a flat square shape. Previous research has also found mathematical concepts in the culture that surrounds society. The concept of geometric transformation can be found in Yogyakarta batik motifs (Prahmana & D'Ambrosio, 2020). Balinese batik motifs contain elements of mathematical transformations such as translation, reflection, and rotation (A. Irawan et al., 2019). The concept of a circle can be introduced to students by taking one of the traditional dance movements of Kethek ogleng, namely the koprol movement. This movement is the rotation of the dancer's body by rolling forward. The rotation of the dancer's body will form a circle. The rotation of an object such as a piece of land will form a circle with a point O in the middle as the center of its rotation (Hasrullah et al., 2021). The Kethek Ogleng dance movement was the beginning of introducing the concept of the circle in the form of features, area, and circumference. Elementary school students are more interested when learning is delivered with a prefix using the media around them. The use of media around makes students feel memorable when participating in the learning process and has an impact on learning outcomes.

The concept of the tube space structure can be introduced to students by showing one of the musical instruments used to accompany the traditional Kethek Ogleng dance, namely the drum. The drum

is made of wood with a hole in the middle like a big pipe and on both sides of the side circle there is animal skin as a cover. A shape with a lid and a circular base is a simple definition of a cylinder (I. M. Wulandari & Anugraheni, 2021). The concept of a tube with a drum model can be a means of starting to introduce tube material to elementary school students. The concept of a tube in the form of characteristics, surface area, and volume can be conveyed to students. Learning outcomes will increase when learning is more memorable with the use of real media around students. The concept of angle can be introduced to students when paying attention to the body movements of the Kethek Ogleng dance dancers, namely on the feet. The lower leg and thigh that bend at the knee can be used as a teacher as a real model when introducing the concept of angle. The use of a realistic or real learning approach is very helpful for students in understanding the concept of lines and angles (Ramadhani & Prahmana, 2019). The concept of angle includes 3 kinds, namely acute, right, and obtuse angles. An acute angle is an angle that measures less than 90 degrees. A right angle is an angle that measures 90 degrees. An obtuse angle is an angle that measures more than 90 degrees. Understanding the angle with real media will make it easier for students to learn it.

The concept of the unit of time can be introduced to elementary school students after paying attention to the traditional Kethek Ogleng dance. The duration of the dance in a few minutes can be used by the teacher as a medium to introduce the unit of time. This real media makes it easier for students to understand the material. Time unit learning using realistic or real mathematics learning models is very appropriate to be carried out in elementary schools (Nurohmah, 2018; Safitri, 2017; N. P. R. Wulandari et al., 2020). The concept of a flat square is a shape that consists of four sides of the same length. The square is a decorative motif on the pants of Kethek Ogleng dancers. The decorative motif in the form of a square on the dancer's pants is black and white. Decorative motifs on the pants of Kethek Ogleng dancers are real media that can help students recognize squares. Media is a tool that teachers can use in conveying a message from the subject matter (Andini & Supriadi, 2018; Ariessanti et al., 2020; Pramita et al., 2019).

These findings can be used by elementary school teachers as a means of determining learning models, especially mathematics and useful for increasing students' awareness of the surrounding environment. The model used by the teacher can increase problem-solving creativity and increase environmental awareness to students (Abdillah et al., 2022; Yasunaga et al., 2020). Teachers can apply ethnomathematics to connect learning materials with the surrounding culture. Previous researchers concluded that the determination of the season system and funeral dates in the people of Yogyakarta can be used as a medium for learning mathematics (Prahmana et al., 2021). Other studies recommend ethnomodeling as an ethnomathematical methodological approach used in developing didactic situations in new learning models (Umbara et al., 2021). Cultural experiences can be used in the learning and teaching of geometry materials (Sunzuma & Maharaj, 2021). The use of culture in mathematics is commonly called ethnomathematics. The application of ethnomathematics to the traditional Kethek Ogleng dance is expected to have an impact on the quality and learning outcomes achieved by students. The ethnomathematical approach in realistic mathematics learning is proven to make it easier for students to understand and simplify the concept of functions to be more meaningful (Herawaty et al., 2020). Previous research has shown that the application of ethnomathematics greatly influences learning outcomes. Students who follow the ethnomathematics-based learning process experience a drastic increase in class average between before and after the learning process (Shahbari & Daher, 2020). Other research shows that students' mathematical understanding increases when teachers implement ethnomathematical-oriented realistic mathematics learning designs (Widada et al., 2018).

4. CONCLUSION

The results of this study indicate that the traditional Kethek Ogleng dance originates from Wonogiri and is still preserved and contains ethnomathematics. The mathematical concepts in the traditional Kethek Ogleng dance are in the form of the concept of a flat circle, a tube, an angle, a unit of time, and a flat square shape. Learning mathematics will be more fun when the teacher can make the culture around students as a medium of learning. Culture such as traditional dance actually has a lot to do with mathematics.

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