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Etnomathematic Exploration At Tjoe Tik Kiong Pasuruan Temple

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ABSTRACT
The mathematical concepts that appear in the Tjoe Tik Kiong monastery building are geometry, congruence, congruence, and geometric transformation. The purpose of this research is to find out what is ethnomathematics in Tjoe Tik Kiong Pasuruan Monastery. This type of research is qualitative research with an ethnographic approach. The subjects of this research are one religious figure and one craftsman. The data collection techniques used are observation and interview. The results of this study reveal that there are several ethnomathematics in the Tjoe Tik Kiong Temple. The ethnomathematics obtained at the temple consists of the concepts of flat buildings, space buildings, geometric transformations, congruence, and perpendicularity. The ethnomathematics resulting from this research can then be used for student teaching materials. This teaching material contains questions, discussions, and guides to find out student difficulties. The material of the teaching materials is about the concept of flat buildings, regular hexagon prisms, and geometric transformations. Based on the results of the study, researchers hope to develop teaching materials that are interesting and at the same time introduce various temple buildings in Pasuruan. By utilizing ethnomathematics, it can help teach mathematics from a cultural point of view and be a breakthrough to teach mathematics learning material so that it is not boring.
Keywords: *Ethnomathematics, Tjoe Tik Kiong Temple Pasuruan*

ABSTRAK
Konsep matematika yang muncul dalam bangunan Vihara Tjoe Tik Kiong adalah geometri, kongruensi, kesebangunan, dan transformasi geometri. Tujuan dari penelitian ini adalah untuk mengetahui apa itu etnomatematika di Vihara Tjoe Tik Kiong Pasuruan. Jenis penelitian ini adalah penelitian kualitatif dengan pendekatan etnografi. Subjek penelitian ini adalah satu tokoh agama dan satu pengrajin. Teknik pengumpulan data yang digunakan adalah observasi dan wawancara. Hasil penelitian ini mengungkapkan bahwa terdapat beberapa etnomatematika di Kelenteng Tjoe Tik Kiong. Etnomatematika yang diperoleh di Klenteng terdiri dari konsep bangun datar, bangun ruang, transformasi geometri, kesebangunan, dan kekongruenan. Etnomatematika yang dihasilkan dari penelitian ini kemudian dapat digunakan untuk bahan ajar siswa. Bahan ajar ini berisi pertanyaan, diskusi, dan panduan untuk mengetahui kesulitan siswa. Materi dari bahan ajar adalah tentang konsep bangun datar, prisma segi enam beraturan, dan transformasi geometri. Berdasarkan hasil penelitian, peneliti berharap dapat mengembangkan bahan ajar yang menarik dan sekaligus mengenalkan berbagai bangunan candi yang ada di

Pasuruan. Dengan memanfaatkan etnomatematika, dapat membantu mengajarkan matematika dari sudut pandang budaya dan menjadi terobosan untuk mengajarkan materi pembelajaran matematika agar tidak membosankan.
Kata Kunci: *Etnomatematika, Vihara Tjoe Tik Kiong Pasuruan*

INTRODUCTION

Education plays a crucial role in human development, as it is a necessary step for individuals to engage in societal progress and serves as a means to prepare new generations with the knowledge and skills they need. Another important role of education is to foster the development of abilities and the shaping of character to ensure the emergence of better future leaders. In the realm of education, mathematics is an essential discipline that supports the advancement of other areas of knowledge. It provides a method for solving problems faced by humans, utilizing information, understanding shapes and sizes, applying counting techniques, and, most importantly, developing critical thinking to recognize and apply relationships. Mathematics is also a foundational science rooted in cultural practices and is often applied to explore other fields of study. Culture, in turn, is a multifaceted concept that encompasses knowledge, beliefs, art, morals, laws, traditions, and other skills that individuals acquire as members of society (Kuznetsova et al., 2021). Culturally sensitive math activities can help students see the relevance of mathematics in their culture and help teachers teach more meaningfully.

Ethnomathematics offers a learning approach that provides engaging experiences for students, helping them feel a closer connection to mathematics. It can serve as a program that enables students to understand, express, process, and ultimately apply mathematical concepts, ideas, and practices to solve real-life problems. In school mathematics instruction, the teacher's aim is to build new mental frameworks based on the students' existing knowledge (Barton, 1996). Therefore, when teaching formal mathematics (school mathematics), it is important for educators to begin with the informal mathematics applied in the community. Once students have developed a solid understanding of the mathematics they encounter in daily life, teachers can either expand upon that knowledge or create new mental frameworks by reinforcing the existing ones (Juni et al., 2023).

One of the objects that can be used in ethnomathematical learning is a temple. The temple is a place of worship and worship of Buddhism, Taoism, and Confucianism. Naming Temples sometimes uses names or titles used by gods or goddess main which adored, and no seldom naming temple with location designation the building, or based on community the union (Parajuli, 2023). Temple Tjoe Tik Kiong is a place of worship for the Chinese in Pasuruan, it is estimated that it has existed since century 17th. Temple this built aim for To do worship with Almighty God. In addition, the Tjoe Tik Kiong temple is also a gathering place for residents of Chinese descent, even though they have different religions. Parts of the temple building have carved motifs and mathematical shapes. These mathematical

concepts can be used as material for learning mathematics towards students student.

Based on relevant research, ethnomathematics is related to historical buildings and has unique motifs. Therefore, there is a need for research on ethnomathematics at the Tjoe Tik Kiong Temple with the aim of knowing the geometric concepts in it and making it a student's teaching material . In addition, this research can be used to increase students' interest in learning geometry and as an effort to preserve culture in students.

Based on this description, it is necessary to conduct research to define ethnomathematics at the Tjoe Tik Kiong Temple with the aim of knowing the geometric concepts in it and making it a student's teaching material . This research can be used to increase students' interest in learning geometry and as an effort to preserve culture in students. So, a study is proposed with the research title Etnomathematic Exploration At Tjoe Tik Kiong Pasuruan Temple.

METHODS

This study employs a qualitative research method with an ethnographic approach. Qualitative research is used to explore, identify, describe, and explain the characteristics or features of social phenomena that cannot be adequately explained, measured, or described through quantitative methods. Ethnography involves a detailed description and analysis of the culture of a specific community or ethnic group. The research was conducted in the Gadingrejo District of Pasuruan City. The participants in this study include religious leaders and a builder. The research tools used were observation guides and interview guides. The data collection methods include both observations and interviews. The interview guide most commonly employed is of the "semi-structured" type. During this phase, the researcher begins by asking a set of predetermined questions, then follows up to gain a deeper understanding by observing the process firsthand. This approach ensures that the responses obtained are thorough and provide clear, complete information. Additional data was gathered through field notes and observations (Hadani, 2016). To validate the research, the study also includes documentation, such as photos, which serve as supplementary data to support or strengthen the findings. The research site is located at Jalan Lombok Number 7, Pasuruan City, Pasuruan Regency, and the subjects of the study are the community members who act as the temple's guardians.

RESULTS AND DISCUSSION

The results of this study are based on observations and interviews, it can be seen that Tjoe Tik Kiong temple has ethnomathematical elements. The ethnomathematical elements are: reflection, congruence, rotation, similarity and form geometry. Results This research can be related to several the building that there is on Temple Mandara Giri. Results which obtained that the temple buildings have mathematical elements such as similarity, geometric transformations, and geometric shapes.

In this study, observations were made of several buildings of the Tjoe Tik Kiong Temple.

1. Building Main

The main building is a place of worship. In the main building there are several objects that have mathematical elements as follows.

Figure 1. Reflection on the Y axis

Figure 2. Geometric Shapes

a) Kung Tek Teng
Kung Tek Teng is a pagoda that has the function of trusting someone when installing and turning on the lamp it will be given good luck. In Kung Tek Teng, it has the shape of holes that contain lamps. The lamp holes have a translational concept because the lamp holes experience the same point displacement and the same direction.

b) Replica Weapon
In the main building there are various kinds of replicas of weapons that are usually used for events religious. In building main there is various shapes

replica weapon like on picture 1. there is replica weapon which has the concept of reflection which is located at the end of the replica which has a mirrored shape about the y-axis. In Figure 2. there is a replica of a weapon that has a flat-up concept. The concept of a flat shape is located at the end of the -shaped replica circle.

2. Carving

Based on resultsstudy is known that carving which is at in Temple Tjoe Tik Kiong have various type motive like carving dragon, plant, bird Hong , and so on. Each form of these carvings has a different meaning and purpose. The carvings also have the concept of transformation geometry, namely reflection.

Figure 3. Reflection on the -axis X

Figure 4. Reflection on the axis Y

As in figure 3. the engraving has the concept of reflection reflected on the X axis and in the table of figure 4. there is also an engraving which has the concept of reflection reflected on the axis Y.

3. Pagoda

Pagoda working as monument and beauty only so that Public around or outside can see the beauty of the temple building. The pagoda building has 7 levels. It adheres to the Javanese belief system regarding odd numbers such as 1, 3, 5, 7, etc.

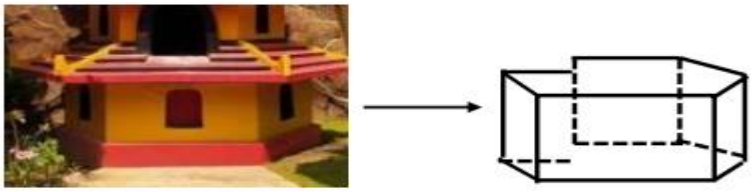

Figure 5. Pagoda Pedestal

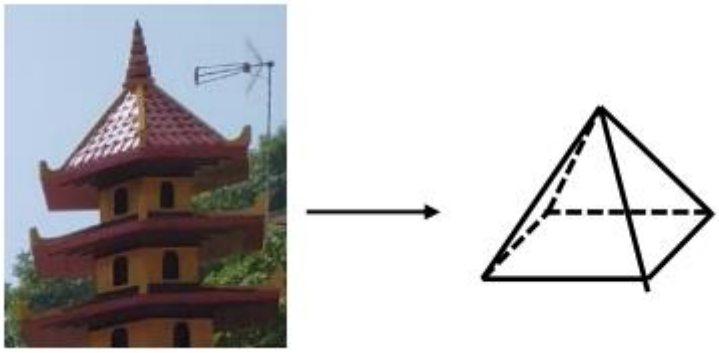

Figure 6. Edge of the Pagoda

The pagoda has mathematical elements as shown in Figure 5. The base of the pagoda is in the form of a regular hexagon. While in Figure 6. the end of the pagoda roof is draft mathematics that is shaped pyramid rectangular and form roof on each level has the concept of similarity.

CONCLUSION

The conclusion of this study is based on the results of data analysis and discussion, there are several ethnomathematics at the Tjoe Tik Kiong Temple. The ethnomathematics obtained at the Temple consists of the concepts of flat shapes, spatial shapes, geometric transformations, similarity, and congruence. The ethnomathematics generated from this research can then be used for student teaching materials. This teaching material contains questions, discussions, and guidelines to find out students' difficulties. The material from teaching materials is about the concept of flat shapes, regular hexagonal prisms, and geometric transformations. Based on the results of the research, the researcher hopes to develop interesting teaching materials and at the same time introduce various temple buildings in Pasuruan. By utilizing ethnomathematics, it can help teach mathematics from a cultural point of view and become a breakthrough for teaching mathematics learning materials not to be boring.

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