

ETHNOMATHEMATICS WAT HUA LAMPHONG TEMPLE

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Abstract

There are more than 35,000 temples in Thailand alone, ranging in size from magnificent to simple. One of them is the prominent temple in Bangkok, Wat Hua Lamphong. Wat Hua Lamphong is a third-class Royal Buddhist temple located in Bangkok's Bang Rak District. Located on Jalan Rama IV, it functions as a center for spiritual guidance, education, and community activities. The purpose of this study is to describe the results of mathematical exploration as a cultural product through the ethnomathematical bridge to Wat Hua Lamphong Temple. The results of this research are presented in a qualitative form with an ethnographic approach that describes the history, philosophy, and structure of the building and ornament of Wat Hua Lamphong Temple. Data sources were obtained through literature studies, interviews, observations, and documentation. The study results show that (1) Wat Hua Lamphong Temple has several aspects of mathematics in geometry material. Build such as triangles, trapezoids, prisms, and circles, and build spaces such as bowed cones and geometry of reflection transformation, translation, and dilation. Not only geometric shapes but also other aspects are seen in the triangle of the building, two parallel lines, and the rotating object's integral volume. (2) Overall, exploring mathematics and culture through ethnomathematics enriches the learning experience and fosters a deeper appreciation of the cultural dimension of mathematical knowledge.

Keyword: *Ethomathematics; Mathematics; Wat Hua Lamphong Temple; Thailand*

1. INTRODUCTION

Just as the two sides of the currency of education and culture are deeply intertwined, each influencing and shaping the other in significant ways [1], Education serves as a primary vehicle for the transmission and preservation of culture, ensuring that cultural values, knowledge, and practices are passed down from one generation to the following [2],[3] Culture includes ideas, customs, skills, art, beliefs, values, and material objects that define a way of life, influencing behaviour and thoughts regardless of geographical location [4]. In contrast, education is considered an essential need for society because humans will continue to learn throughout their lives. One way to connect education with culture, especially mathematics, is through ethnomathematics.

Ethnomathematics is an interdisciplinary field that explores the relationship between mathematics and culture. It aims to make mathematics learning more meaningful and contextual by integrating cultural elements and social contexts into mathematical education. This approach helps students understand mathematical concepts and enhances their motivation and achievement [5][6].

Ethnomathematics can be applied to a variety of cultural artefacts. For instance, the Muaro Jambi Temple's teaching materials, developed using the ADDIE model, incorporate ethnomathematics to make learning more accessible and culturally relevant, demonstrating high validation and practical scores from teachers and students [7]. Similarly, Sewu Temple's architecture reveals numerous geometric shapes such as triangles, squares, trapezoids, and rectangles, as well as spatial geometries like cubes and pyramids, which are integral to junior high school geometry curricula [8]

Temples, as religious edifices, hold significant cultural and architectural value, particularly in Hindu and Buddhist traditions, where they symbolize the abode of deities [9]. In Thailand alone, there are more than 35,000 temples, ranging from magnificent to simple.

One of them is the prominent temple in Bangkok, Wat Hua Lamphong. Wat Hua Lamphong is a Royal Buddhist temple, classified as third-class, located in Bangkok's Bang Rak District, Thailand. Located on Jalan Rama IV, it functions as a centre for spiritual guidance, education, and community activities; the splendour of the Wat Hua Lamphong temple has distinctive geometric shapes that are often not realized as part of geometric concepts in mathematics, such as the shapes of components and ornaments. This is an exciting study in the context of ethnomathematics-based learning. Exploring geometric concepts within the Wat Hua Lamphong temple can provide a new understanding of mathematical concepts in culture.

2. RESEARCH METHOD

This research is a qualitative study using an Ethnographic approach [6],[10],[11], which is an empirical and theoretical method aimed at describing data about Wat Hua Lamphong Temple through intensive field research conducted over a specific period. The study also seeks to explore Wat Hua Lamphong Temple's components and ornaments and describe its geometric concepts. The research instruments consist of primary and secondary instruments. The primary instruments include interview and observation guides, while the secondary instruments comprise observation and documentation sheets. Data analysis uses the technique of data triangulation.

3. RESULTS AND DISCUSSION

History and Philosophy Wat Hua Lamphong Temple



Figure 1. Ground Plan of wat Hua Lamphong Temple

Figure 1 shows ground plan of Hua Lamphong Temple. Wat Hua Lamphong (วัดหัวลำโพง) originated from the early Bangkok (Ratanakosin) era which was originally known as Wat Wua Lampong. His current name was bestowed by King Rama V around 1904 while visiting for the thot kathin ceremony. In 2002 Wat Hua Lampong was appointed by King Rama IX to become a third-class royal temple. Ubosot, wiharn and chedi are unusual because they are built on a raised platform as high as one floor.

Wat Hua Lamphong is an important Buddhist temple and a famous landmark in the heart of Bangkok, known for its unique blend of art, architecture, and compassion. The temple is highly respected by locals and tourists alike for its magnificent architecture and spiritual richness. Founded in the early 20th century, the temple is distinguished by its stunning golden stupas, intricate murals, and detailed carvings depicting various deities and Buddhist stories.

The temple's architecture is a visually striking combination of traditional Thailand elements and modern influences. In addition, the temple hosts various religious celebrations and rituals throughout the year. Wat Hua Lamphong, located in Bangkok, Thailand, is known for its beautiful murals, intricate carvings, and impressive architecture. Built in the late 19th century, the temple has undergone several restorations. One of its most remarkable features is its tiered ceiling,

adorned with intricate carvings and gilded decorations. The central hall of the temple is where various rituals and ceremonies are performed, featuring beautiful murals illustrating episodes from Buddhist mythology.

Locally known as the Temple of Coffins, Wat Hua Lamphong is a place where people can donate money for coffins for those who cannot afford them. This temple is not visited by many tourists but is very popular among Thais. There are many ways to donate at this temple. One popular activity is making large candles from melted wax discs. Another way to get rewards is to buy food for the temple cattle, which helps prevent their slaughter. This activity contributes to the purchase of coffins for the less fortunate.

Wat Hua Lamphong (often referred to as the Temple of Coffins), is known for its compassionate tradition of providing free coffins to those in need, including homeless people who died alone. For non-Buddhists, donating a coffin is considered an act of charity, attracting many visitors to participate through the Ruamkatanyu Foundation at Wat Hua Lamphong. For those who wish to donate a coffin, the recommended donation is 500 baht, although smaller donations are also accepted. and record the amount of their donation on the pink slip. After donating, they receive a pink slip and certificate. They can then pray and attach the slip to the coffin.

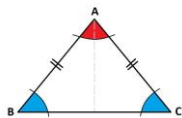
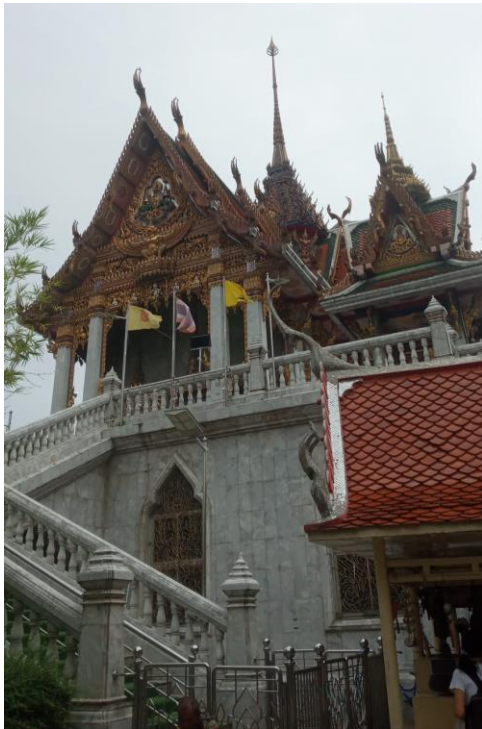
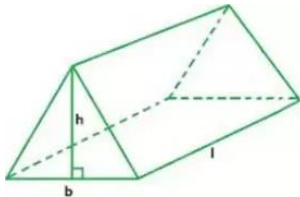
The area around the temple resembles a Chinese temple, attracting many locals to pray, as well as being able to pray again and burn certificates ceremonially in bowls. The temple also hosts a variety of cultural events throughout the year, including music concerts and traditional Thailand dance performances.

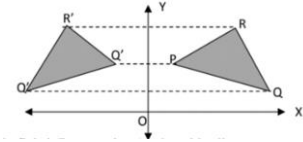
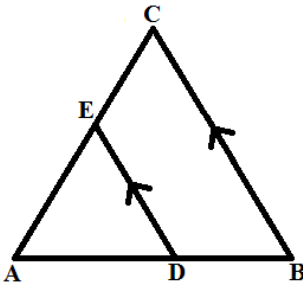
Structure of Wat Hua Lamphong Temple

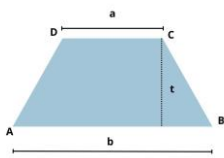
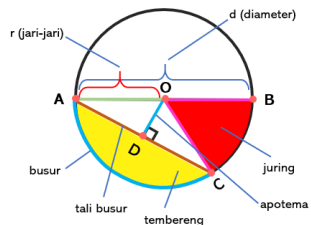
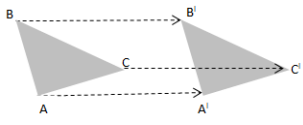
The architecture of Wat Hua Lamphong Temple incorporates numerous mathematical concepts, such as points, lines, planes, space, geometric transformations (reflection, dilation, translation), symmetry, two-dimensional shapes, and three-dimensional forms.

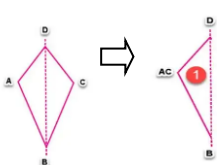
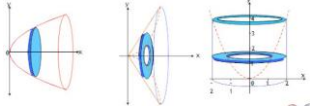
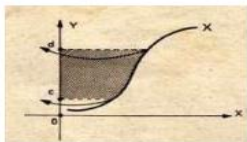
Table 1 presents the ethnomathematics of Wat Hua Lamphong Temple about these mathematical concepts. :

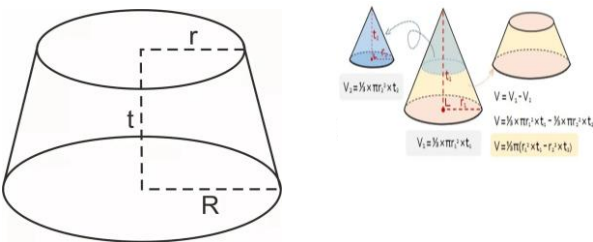
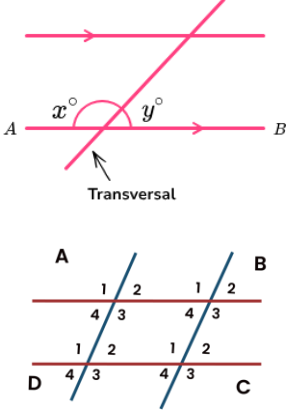
Table 1 Ethnomathematics of Wat Hua Lamphong Temple

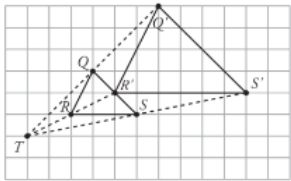
No	Ethnomathematics	Mathematical Concepts
1		 An isosceles triangle is a shape in which the leg length of the triangle is equal. $AB = AC$. It can be referred to as an isosceles triangle with evidence that the length of the legs of the triangle and its angles are also the same.
2		 A triangular prism is a three-dimensional space structure that has two triangular bases and three rectangular upright sides. The two triangular bases are parallel and congruent (of the same size and shape), while the upright sides connect the corresponding pairs of sides of the two bases.

No	Ethnomathematics	Mathematical Concepts
3		 If reflected against the x-axis, then the y' coordinate is the opposite of the y-coordinate with the fixed x-coordinate. $P(x, y) \xrightarrow{M_x} P'(x, -y)$ $\Leftrightarrow M_x = \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$ With: $P(x, y)$ = initial coordinate point $P'(x, -y)$ = final coordinate point M_x = mirror matrix against the x-axis
4		 Triangles are built, triangles are built to meet the following conditions: All suitable angles are of equal magnitude. 1. The ratio of the length of the corresponding sides is constant. $\frac{AD}{AB} = \frac{AE}{AC} = \frac{DE}{BC}$

No	Ethnomathematics	Mathematical Concepts
5		 An isosceles trapezoid can be defined as a trapezoid whose unaligned sides are of equal length; and the corners of the base are the same size.
6		 A circle is a flat shape consisting of all points on a plane that are a certain distance from a certain point, the center is a curve traversed by a point that moves in a plane so that its distance from a certain point remains constant. The distance between a point on a circle and its center is called the radius.
7		 If a point P that has coordinates (x, y) is translated as far as (a, b), a point P' with coordinates (x', y') will be generated.

No	Ethnomathematics	Mathematical Concepts
$P(x,y) \xrightarrow{\begin{pmatrix} a \\ b \end{pmatrix}} P'((x+a),(y+b))$		
8		 The symmetry of the kite fold is at the point BD that brings together points A and C. Therefore, BD is the axis line of symmetry.
9		 $V = \pi \int_c^d x^2 dy$  The volume of the rotating object is a product between the area of the base and the height. When the area of the base is expressed by $A(x)$ and the height of the rotating object the length of the hose $[a, b]$.

No	Ethnomathematics	Mathematical Concepts
10		
11		 An angle in a parallel line is an angle that is formed when two parallel lines intersect with another line called a transversal line.

No	Ethnomathematics	Mathematical Concepts
12		 If a point M (x, y) is dilated with respect to the center point (0, 0) with a factor of k multiplier, then the coordinates M' (x', y') will be produced, so that the $M(x, y) \xrightarrow{D[(0,0),k]} M'(x', y')$ The point M'(x', y') can be determined by the following formula. $\begin{pmatrix} x' \\ y' \end{pmatrix} = \begin{pmatrix} k & 0 \\ 0 & k \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix}$

The results of this study can serve as a learning medium and an implementation guide for students and teachers. Interesting learning media can increase students' motivation to learn. When the learning media used is interesting and effective, students are more likely to receive and understand the material presented better [12],[13],[14],[15].

By introducing culture and education, society will have a better understanding and will protect ancestral heritage, especially since it has been recognized as a world heritage.

4. CONCLUSIONS AND RECOMMENDATIONS

Based on the results and discussions that have been explained, the conclusions that can be drawn are as follows: (1) Wat Hua Lamphong is an important Buddhist temple and a famous landmark in the heart of Bangkok, Built in the late 19th century is famous for its unique blend of art, architecture, and compassion, each detailed carving depicting various gods as well as its multi-storey ceiling, It is decorated with intricate carvings and gilded decorations. The central hall of the

temple is where various rituals and ceremonies are performed, featuring beautiful murals illustrating episodes from Buddhist mythology. (2) Wat Hua Lamphong Temple has several aspects of mathematics in geometry material. Build such as triangles, trapezoids, prisms, and circles, and build spaces such as bowed cones and geometry of reflection transformation, translation, and dilation. Not only geometric shapes, other aspects are also seen in the triangle of the building, two lines that are parallel to each other, and the integral volume of the rotating object, (3) Overall, the exploration of mathematics and culture through ethnomathematics not only enriches the learning experience but also fosters a deeper appreciation of the cultural dimension of mathematical knowledge.

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