

Ethnomathematics in Thailand

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Received: 04/09/2025

Revised : 20/09/2025

Accepted: 24/09/2025

Abstract

Ethnomathematics is the study of the relationship between mathematics and culture. In Thailand, where traditional practices and local wisdom remain deeply woven into daily life, ethnomathematics offers a meaningful way to bridge cultural knowledge and formal education. This paper explores how mathematical thinking is embedded in Thai cultural contexts such as temple architecture, textile weaving, rice farming, traditional games, and indigenous measurement systems. It also discusses how incorporating these cultural elements into the classroom can make mathematics more relevant, inclusive, and engaging for Thai students. Despite certain challenges in implementation—such as curriculum constraints, lack of resources, and limited teacher training—ethnomathematics holds great promise for building students' mathematical understanding and cultural identity. The paper concludes with practical strategies for teachers and recommendations for broader educational policy.

Keywords: Ethnomathematics, Thai culture, mathematics education, cultural identity, local wisdom

Introduction

Many students see mathematics as abstract and disconnected from their lives. Yet in reality, math exists all around us—in patterns, measurements, and problem-solving embedded in daily routines and traditional practices. Ethnomathematics, a term coined by Brazilian scholar Ubiratan D'Ambrosio (2001), refers to the way different cultures understand and use mathematical ideas. In Thailand, this includes everything from the geometry found in temple roofs to the logic behind traditional games. This paper focuses on ethnomathematics in Thailand: how it appears in daily life, how it can be used in education, and why it matters. The aim is to highlight the richness of Thai culture as a foundation for mathematical learning and to offer ideas for how teachers can bring local knowledge into the classroom in ways that empower students.

Ethnomathematics: A Cultural Lens on Mathematics

Ethnomathematics challenges the idea that mathematics is universal in form and instead shows that mathematical thinking is shaped by historical, social, and cultural experiences (Gerdes, 1994). It asks us to consider not only what math is taught, but how and why it is used in specific contexts. This approach does not replace formal mathematics but complements it by adding cultural depth and meaning. In countries like Thailand, where there is a strong connection between community practices and daily problem-solving, ethnomathematics provides an especially relevant way to enrich learning. It also aligns with the Thai national curriculum, which encourages learning connected to local wisdom and students' lives (Ministry of Education, 2008).

Cultural Contexts of Mathematics in Thailand

Thailand has its own numeral system still visible in temples, official documents, and signage. Understanding this system offers students an entry point into the historical development of math in Thailand. Additionally, traditional Thai measurement units such as "wa" (length), "rai" (land area), and "chang" (weight) are still used in many rural communities. Learning these units provides realworld applications of conversion, arithmetic, and estimation.

Temple Architecture and Sacred Geometry

Thai temples ("wats") reflect complex geometric design. Their symmetrical layouts, tiered roofs, and intricate decorations embody mathematical principles such as symmetry, proportion, and angle measurement. The golden ratio is often found in traditional Thai art and architecture (Subramanian, 2019). Teachers can use temple visits or photographs to teach geometry, spatial reasoning, and scale. This brings mathematics to life while deepening cultural appreciation.

Weaving and Textile Patterns

Weaving among ethnic communities such as the Karen, Hmong, and Lahu demonstrates mathematics in practice. These textiles often display symmetrical, repeating patterns based on rules and structure. Activities involving pattern analysis, fractions, and coordinate grids can stem from examining local fabrics. In northern Thailand, for example, Karen students have worked with teachers to analyze the ratios in their weaving, linking traditional knowledge with formal math lessons (Promwong, 2017).

Agriculture and Calendrical Systems Rice farming in Thailand is guided by seasonal and lunar calendars, which involve counting cycles, tracking phases, and predicting weather patterns. Farmers also use geometry to plan field layouts and manage irrigation systems. Math lessons that use farming examples can incorporate measurement, data collection, and statistics. Students might calculate the area of rice fields, compare water usage, or graph planting cycles.

Traditional Games and Logical Thinking Games like Makruk (Thai chess), Len Num Tao, and other folk games require strategy, pattern recognition, and logical thinking. Makruk, in particular, encourages planning and spatial reasoning, skills essential to problem-solving in mathematics. Using traditional games in class not only makes math fun but helps students develop key thinking skills.

Ethnomathematics in the Thai Classroom 4.1 Why It Matters Ethnomathematics helps students see that math is not just something invented in textbooks but something that exists in their homes, communities, and heritage. When students recognize math in familiar settings, they are more likely to stay engaged and develop confidence. It also helps validate local knowledge systems and supports cultural pride. For students from minority groups, ethnomathematics can affirm their identity and make school feel more inclusive (Nasir & Cobb, 2007).

Challenges to Integration Despite its benefits, integrating ethnomathematics faces several challenges:

- Many teachers lack training in how to connect culture and curriculum.
- Standardized tests focus more on procedural fluency than cultural relevance.
- There is limited availability of teaching materials that incorporate local knowledge.

Nonetheless, some schools have pioneered programs to include ethnomathematics through project-based learning and community involvement.

Strategies for Teachers Here are some practical ways educators in Thailand can bring ethnomathematics into their teaching: Cultural projects: Have students research math in their daily lives (e.g., family farming practices, textile patterns, temple visits). Community involvement: Invite local artisans, farmers, or elders to share their knowledge. Art and math integration: Use weaving, pottery, or religious art as the basis for geometry and measurement lessons. Math journals: Encourage students to document where they see math in their homes or communities. Fieldwork: Plan trips to local markets, farms, or temples to explore math in real-life contexts. 6. Case Examples from Thai Schools In Chiang Mai, teachers used temple architecture to teach symmetry and angles. Students took photos, identified shapes, and measured angles, later creating scale models of the temple. In Tak Province, Karen students collaborated with their teachers to map out weaving patterns using coordinate grids, learning about area, ratios, and reflections. In Pattani, students explored Islamic art in local mosques to study tessellations and geometric transformations, integrating cultural studies with mathematics. These examples show how meaningful and hands-on math learning becomes when rooted in real life.

Looking Ahead: Policy and Practice To support ethnomathematics more broadly, Thai educational policy must: Encourage the inclusion of local knowledge in curriculum guidelines. Provide professional development for teachers. Fund the creation of culturally relevant textbooks and digital tools. Researchers, teachers, and community members can also work together to document and preserve mathematical practices across Thailand's diverse regions.

Conclusion Ethnomathematics reveals that math is not just a school subject but a way of understanding and organizing the world. In Thailand, rich cultural traditions offer endless opportunities to connect math with students' lives. Whether through temple architecture, rice farming, or traditional games, math becomes more engaging and meaningful when taught through a cultural lens. By embracing ethnomathematics, teachers can help students become more confident learners, proud of their heritage and capable of critical, creative thinking. To fully realize its potential, Thailand's education system must invest in training, resources, and community collaboration.

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