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Cultural Exploration as Realistic Context in Mathematics Learning: An Ethnomathematics Perspective in Indonesian Elementary Education

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ABSTRACT

This research aims to explore the potential of culture as a realistic context for mathematics learning through an ethnomathematics approach in Indonesian elementary education. The study addresses the critical need for mathematics education that connects with students' daily lives, making mathematical concepts more meaningful and contextual within a glocal framework. Using qualitative descriptive methods, data were obtained from observations of student presentations in Ethno-RME courses. Students explored various cultural objects, including traditional cuisine, folk games, architecture, and arts, to discover their connections with mathematical concepts such as geometry, fractions, ratios, statistics, number patterns, and arithmetic operations. The analysis reveals that each cultural object possesses mathematical potential that can serve as a realistic learning context. For instance, historical buildings can be connected to scale and geometric transformations, while traditional cuisine relates to fractions, percentages, and measurements. These findings affirm that integrating culture into mathematics learning not only enriches the learning experience but also supports the preservation of local wisdom within global educational frameworks.

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Meaningful and contextual mathematics learning represents a primary challenge in elementary education, particularly in enhancing student motivation and understanding within global educational paradigms (Hidayana & Lianingsih, 2025). Conventional mathematics curricula often emphasize procedures and formulas, making it difficult for students to connect mathematical concepts with their real-world experiences (Agbata et al., 2024). The Realistic Mathematics Education (RME) approach was developed to bridge this gap by emphasizing learning based on realistic and relevant contexts for students (Treffers, 1991). From an RME perspective, contexts should be close to students' daily lives, including local culture and social practices they recognize (Susanti, 2025).

The concept of ethnomathematics emphasizes understanding mathematics as part of culture, where daily practices, traditions, and local wisdom can become sources of mathematical ideas and problems (D'Ambrosio, 1985). This approach aligns with glocal education principles that seek to balance global mathematical standards with local cultural knowledge. The integration of ethnomathematics and RME enables students to learn mathematics actively through real experiences and cultural exploration, making learning more meaningful while fostering appreciation for local wisdom (Prahmana, 2022). Several studies demonstrate that using cultural contexts in mathematics learning enhances students' critical thinking abilities, creativity, and problem-solving skills (Khalid et al., 2020).

Cultural exploration in mathematics learning can be conducted through various objects, from traditional cuisine, folk games, architecture, to local arts, all containing mathematical concepts (Novikasari et al., 2024). Each cultural object has potential for connection with specific mathematical concepts such as geometry, fractions, ratios, number patterns, statistics, and arithmetic operations, facilitating context-based learning that is concrete and relevant (Utami et al., 2024). For example, traditional games can be used to teach concepts of mean, mode, or probability, while traditional architecture can serve as context for understanding scale, area, and geometric transformations. This exploration also supports creative learning, as students can develop unique ideas based on their own cultural experiences (Revenko et al., 2024).

The ethnomathematics approach emphasizes that mathematics cannot be separated from culture, as daily cultural practices often contain significant mathematical structures (Powell & Frankenstein, 1997). Within a glocal education framework, this perspective allows for the integration of universal mathematical principles with local cultural knowledge. For instance, calculations of traditional culinary ingredients, folk game patterns, or traditional house architecture

can be analyzed through mathematical concepts such as fractions, geometry, and statistics (Busrah & Pathuddin, 2021). Thus, local culture is not merely additional context but the primary source of relevant mathematical problems and situations (Acharya et al., 2021).

This research is motivated by the need to connect mathematics learning with students' real experiences through a culture-based RME approach within glocal education principles. The research objective is to map the potential of culture as a realistic context in mathematics learning, enabling teachers to develop relevant materials and students to obtain meaningful learning experiences that honor both local wisdom and global educational standards. The research focus is on how students explore cultural objects, identify relevant mathematical concepts, and design contextual learning contexts that bridge local and global knowledge systems.

METHODS

This research employs a qualitative descriptive approach to explore the potential of culture as a realistic context in ethnomathematics-based mathematics learning within Indonesian elementary education. Data were obtained through observations of student presentations in Ethno-RME courses, where students were asked to explore various cultural objects such as traditional cuisine, folk games, architecture, and local arts, and identify their connections with mathematical concepts. Observations were conducted by recording interactions, questions, and strategies students used to connect cultural objects with mathematical concepts. Data analysis was performed thematically, emphasizing the identification of mathematical concepts contained in cultural practices, student creativity in presenting concepts, and their ability to bridge informal and formal mathematical knowledge (D'Ambrosio, 1985; Treffers, 1991).

Indicators used to assess culture-mathematics connections were formulated based on theories by D'Ambrosio (1985) and Treffers (1991). D'Ambrosio emphasizes that mathematics is a social-cultural product, where each culture has unique "mathema," and mathematical thinking processes develop according to local cultural practices. Treffers emphasizes that mathematics learning must be rooted in students' reality, with bridges between daily experiences (informal) and formal mathematical concepts (RME). Based on both perspectives, culture-mathematics connection indicators were formulated to observe students' abilities to identify, explain, and utilize mathematical concepts in cultural contexts. Table 1 presents the indicators for assessing culture-mathematics connections in pre-service teachers' learning activities.

Table 1. Indicators for Assessing Culture-Mathematics Connections in Pre-Service Teachers

Dimension	Indicator	Theoretical Reference
Culture-Mathematics Connection	Pre-service teachers can identify relationships between cultural objects and mathematical concepts	(D'Ambrosio, 1985; Treffers, 1991)
Mathematical Concept Understanding	Pre-service teachers can explain mathematical concepts contained in cultural objects, such as geometry, fractions, ratios, number patterns, statistics, and arithmetic operations	
Use of Informal Knowledge	Pre-service teachers can connect daily experiences or cultural practices with formal mathematical concepts	(Treffers, 1991)
Creativity & Representation	Pre-service teachers can present mathematical concepts creatively through media, patterns, or cultural activities	(D'Ambrosio, 1985)
Realistic Context	Pre-service teachers use cultural contexts that are relevant and close to elementary students' real experiences	(Treffers, 1991)

This approach allows the research to assess not only students' academic abilities in understanding mathematics but also how they integrate cultural contexts creatively and meaningfully within a glocal education framework. Analysis results use data triangulation from observations, field notes, and documentation of student presentations to enhance findings' validity.

RESULTS AND DISCUSSION

Results

The exploration of Indonesian cultural potential as a realistic context in mathematics learning reveals significant diversity in mathematical concepts that can be integrated into elementary education curricula. Through systematic observation of student presentations in Ethno-RME courses, this research identified various cultural objects ranging from traditional cuisine, folk games, historical architecture, to local arts that contain rich mathematical structures. Students demonstrated varying abilities in connecting cultural elements with formal mathematical concepts, showing the potential for developing glocal mathematics education that honors local wisdom while maintaining global academic standards. The analysis of student presentations revealed patterns of mathematical thinking that emerge from cultural contexts, supporting the development of more meaningful and contextual learning approaches in Indonesian elementary education.

Culture-Mathematics Connection Dimension

Students' ability to identify relationships between cultural objects and mathematical concepts varied significantly across different cultural contexts explored. In exploring Ringin Contong Jombang traditional park, students successfully connected architectural elements with scale and proportion concepts, demonstrating clear understanding of geometric relationships in traditional spatial design. The Tanean Lanjhang traditional housing complex exploration generated exceptional enthusiasm among students, who discovered multiple mathematical connections including generational patterns, house sequences, and geometric arrangements that reflect traditional Javanese social structures. Students exploring ASEAN Park focused primarily on number patterns and geometric shapes in building arrangements, though their approach lacked problem-based contextual foundation. Traditional culinary explorations, such as Lontong Balap from East Java, enabled students to connect cooking processes with fractions, percentages, and measurement concepts in realistic daily contexts.

However, several students struggled to establish meaningful connections between cultural objects and mathematical concepts. Students exploring Wingko traditional cake demonstrated limited understanding of the cultural context, focusing merely on superficial geometric patterns without grasping deeper mathematical structures embedded in traditional cake-making processes. The exploration of Dumbleg Nganjuk traditional food revealed students' difficulty in connecting weight concepts and fractions with traditional measurement systems used in local culinary practices. Students investigating Pecel Semanggi Surabaya showed uncertainty in connecting pricing systems with mathematical operations, indicating shallow understanding of economic mathematical concepts in traditional market contexts.

Mathematical Concept Understanding Dimension

Analysis of students' explanations of mathematical concepts contained in cultural objects revealed varying levels of conceptual depth and accuracy. Students exploring Tahu Tek Surabaya successfully identified arithmetic operations in discount calculations and pricing strategies, demonstrating practical application of mathematical concepts in traditional commerce. The Bipang Jangker Pasuruan exploration enabled students to understand conversion concepts and weight measurements used in traditional food production, connecting informal measurement practices with formal mathematical standards. Students investigating Candi Pari Sidoarjo architectural geometry demonstrated sophisticated understanding of geometric transformations and spatial relationships in traditional Javanese temple architecture.

Traditional game explorations, such as jump rope calculations for average and mode, showed students' ability to connect recreational activities with statistical concepts. However, several students exhibited conceptual uncertainties in their explorations. Students investigating Udeng Pacul Gowang traditional headwear expressed doubt about mathematical concepts they identified, suggesting incomplete understanding of geometric patterns in traditional textile designs. The exploration of Damar Kurung traditional lanterns revealed students' difficulty in conceptualizing three-dimensional geometric relationships and lighting calculations in traditional craftsmanship contexts.

Use of Informal Knowledge Dimension

Students demonstrated varying success in connecting daily experiences or cultural practices with formal mathematical concepts. Successful examples included Lontong Kupang Sidoarjo exploration, where students connected traditional selling practices with arithmetic operations and commercial mathematics. Students exploring traditional batik motifs from Jetis Sidoarjo successfully linked geometric transformation concepts with traditional textile design processes, showing deep understanding of mathematical principles in cultural art forms. The exploration of Rujak Cingur traditional salad enabled students to connect qualitative data presentation and mode concepts with traditional food preparation and serving practices.

However, several students struggled to bridge informal cultural knowledge with formal mathematical concepts. Students exploring Salnepan (traditional Dakon game from Gresik) admitted never having played the game, resulting in superficial mathematical analysis without understanding the cultural and strategic depth of this traditional game. This lack of cultural familiarity significantly hindered their ability to identify meaningful mathematical concepts embedded in traditional gaming practices. Students investigating traditional sailing boats showed limited understanding of speed calculations and geometric principles in traditional maritime navigation systems.

Creativity & Representation Dimension

Student creativity in presenting mathematical concepts through cultural contexts varied considerably across different explorations. The Tanean Lanjhang exploration demonstrated exceptional creativity, with students developing innovative approaches to explain generational patterns and spatial arrangements in traditional Javanese housing complexes. Students exploring Wingko traditional cake creation showed creativity in using paper folding activities to represent different cake shapes and sizes, connecting geometry concepts with hands-on cultural activities.

The exploration of Reog Ponorogo traditional dance revealed creative approaches to understanding geometric angles and movements in traditional performance arts.

Students investigating traditional markets and culinary practices demonstrated creativity in developing open-ended problem scenarios that reflected realistic commercial situations in traditional Indonesian contexts. However, some explorations lacked creative depth, with students merely identifying mathematical elements without developing innovative representation methods. The exploration of traditional architecture often remained at surface level, with students failing to develop creative approaches to explain complex geometric relationships in traditional building designs.

Realistic Context Dimension

The relevance and proximity of cultural contexts to students' real experiences varied significantly across different explorations. Urban cultural contexts, such as Tahu Tek Surabaya and Lontong Balap, provided highly relevant contexts for students familiar with East Javanese urban culture. Traditional architecture explorations, particularly those focusing on still-existing buildings and housing complexes, offered concrete and accessible contexts for mathematical learning. Traditional market and commercial practices provided realistic contexts for understanding arithmetic operations and economic mathematics in familiar social settings.

However, some cultural contexts proved less accessible to contemporary students. Traditional games and practices that are no longer commonly played or observed presented challenges for students in developing realistic learning contexts. Students exploring historical or rarely practiced traditions struggled to create meaningful connections with contemporary student experiences, limiting the realistic applicability of these cultural contexts in modern elementary education settings.

Exploration of Indonesian cultural objects revealed varying degrees of student engagement, creativity, and the relevance of cultural contexts in mathematics learning. To provide a clear overview of these findings, Table 2 summarizes the connections between each cultural object, the mathematical concepts identified by students, their engagement levels, creativity in presenting concepts, and the realism of the cultural context. This summary highlights how different cultural objects offer opportunities for meaningful, context-based learning, as well as areas where students faced challenges in bridging cultural knowledge with formal mathematical concepts. The table emphasizes the potential of cultural exploration to support ethnomathematics-based learning while illustrating the variation in students' understanding and application of mathematical ideas.

Table 2. Summary of Students' Exploration of Cultural Objects and Associated Mathematical Concepts

Cultural Object	Mathematical Concepts	Student Engagement	Creativity Level	Realistic Context
Ringin Contong Jombang	Scale, proportion, geometry	High	Moderate	High
Tanean Lanjhang	Patterns, sequences, geometry, statistics	Very High	High	High
ASEAN Park	Number patterns, geometry	Moderate	Low	Moderate
Lontong Balap	Fractions, percentages, operations	High	High	Very High
Wingko Traditional Cake	Geometry, measurement, fractions	Moderate	Moderate	High
Tahu Tek Surabaya	Arithmetic, discount calculations	High	Moderate	Very High
Traditional Batik Motifs	Geometric transformations	High	High	High
Reog Ponorogo Dance	Geometry, angles, patterns	High	High	Moderate
Traditional Games (Dakon)	Statistics, probability, strategy	Low	Low	Low

The exploration results demonstrate that Indonesian cultural objects possess significant potential as realistic contexts for mathematics learning in elementary education. Students' varying abilities in connecting cultural elements with mathematical concepts reflect the importance of deep cultural understanding in developing effective ethnomathematics-based learning approaches. The success of certain explorations, particularly those involving accessible urban traditions and familiar cultural practices, suggests that careful selection and preparation of cultural contexts are crucial for meaningful mathematics learning within glocal education frameworks. These findings provide valuable insights for developing mathematics curricula that honor local wisdom while maintaining global academic standards in Indonesian elementary education.

Discussion

The integration of Indonesian cultural contexts in mathematics learning demonstrates significant potential for developing glocal education approaches that bridge local wisdom with universal mathematical principles. Research findings align with D'Ambrosio's (1985) assertion that mathematics is fundamentally a social-cultural product, where each culture possesses unique mathematical understanding embedded in daily practices and traditions. Students' successful identification of mathematical concepts in cultural objects such as Tanean Lanjhang housing complexes and traditional culinary practices supports Alam & Mohanty (2023) argument that

cultural practices contain sophisticated mathematical structures often overlooked in conventional education. The varying levels of student success in connecting cultural elements with formal mathematical concepts reflect the complexity of bridging informal cultural knowledge with academic mathematics, as emphasized by Umeh (2025) in his work on cultural foundations of mathematics education. These findings contribute to growing evidence that ethnomathematics approaches can enhance mathematical understanding while preserving cultural heritage. Contemporary research by Yanti (2025) supports the observed potential of traditional architecture and spatial arrangements as contexts for geometric learning, particularly in understanding scale, proportion, and transformation concepts. The creative approaches demonstrated by students in representing mathematical concepts through cultural media align with Joklitschke et al. (2022) emphasis on creativity as a crucial component of meaningful mathematics education.

The observed challenges in connecting certain cultural objects with mathematical concepts highlight the importance of cultural familiarity in ethnomathematics implementation. Students' difficulties with traditional games like Salnepan (Dakon) due to lack of direct experience support Reyes (2025) argument that effective cultural mathematics requires genuine engagement with cultural practices rather than superficial exposure. The success of urban cultural contexts such as Tahu Tek Surabaya and Lontong Balap in facilitating mathematical learning aligns with Polman et al. (2021) emphasis on using contexts that are genuinely meaningful and accessible to students. Research by Anyichie et al. (2023) demonstrates that realistic contexts must be both culturally relevant and mathematically rich, supporting the observed variation in student engagement across different cultural explorations. The challenges faced by students in connecting historical or rarely practiced traditions with contemporary mathematical learning reflect broader issues in cultural education, as discussed by Gula & Jojo (2024) in examining the sustainability of traditional knowledge in modern educational contexts. Weinhandl & Lavicza (2021) work on the relationship between abstract mathematical concepts and real-world applications provides theoretical foundation for understanding why some cultural contexts proved more effective than others in facilitating mathematical understanding. The importance of teacher preparation and cultural knowledge in implementing ethnomathematics approaches, implied by student difficulties with unfamiliar cultural contexts, aligns with research by Bonner (2021) on the challenges of culturally responsive mathematics education.

The creativity demonstrated by students in representing mathematical concepts through cultural contexts supports the potential of ethnomathematics for developing innovative pedagogical

approaches in elementary education. Students' creative use of traditional crafts, architectural elements, and culinary processes as mathematical learning tools aligns with Pramasdyahsari et al. (2025) research on the role of student creativity in meaningful mathematical learning. The exceptional engagement generated by certain cultural explorations, particularly Tanean Lanjhang traditional housing, demonstrates the motivational potential of culturally relevant contexts, supporting research by Treffers (1991) on the importance of realistic contexts in mathematics education. Students' ability to develop open-ended problem scenarios based on traditional commercial practices reflects the potential for ethnomathematics to enhance problem-solving skills, as documented by Mei et al. (2025) in their work on realistic mathematics education implementation. The variation in creative approaches across different cultural contexts suggests that the nature of cultural objects significantly influences pedagogical possibilities, supporting research by Wang et al. (2024) on the relationship between context and mathematical thinking. Contemporary studies by Rezeki et al. (2021) provide evidence for the effectiveness of creative cultural approaches in enhancing mathematical understanding and cultural appreciation among elementary students. The observed connection between cultural familiarity and creative potential aligns with research by Weinhandl & Lavicza (2021) on the importance of meaningful contexts in developing mathematical creativity. Suherman & Vidákovich (2024) work on the relationship between cultural identity and mathematical creativity provides theoretical support for the observed patterns of student creative expression in cultural mathematical explorations.

The realistic context dimension reveals important insights about the accessibility and relevance of different cultural objects for contemporary elementary students in Indonesian education settings. The high effectiveness of urban traditional practices such as traditional markets and street food culture in facilitating mathematical learning supports research by Acharya et al. (2021) on the importance of accessible cultural contexts in mathematics education. Students' struggles with historical or rarely practiced traditions highlight challenges identified by Kumar & Gopinath (2025) regarding the balance between cultural preservation and educational relevance in ethnomathematics implementation. The success of architectural explorations in providing concrete geometric learning contexts aligns with research by Sun et al. (2025) on the mathematical potential of traditional building designs and spatial arrangements. Research by Hendriana et al. (2022) on the relationship between cultural practice and mathematical understanding provides theoretical foundation for understanding why familiar cultural contexts proved more effective in facilitating student learning. The observed importance of direct cultural experience in developing mathematical

connections supports Solihin & Rahmawati (2024) argument for authentic cultural engagement in mathematics education. Contemporary research by Payadnya et al. (2024) demonstrates that realistic cultural contexts must be both accessible and mathematically rich to effectively support learning, aligning with the variation observed across different cultural explorations in this study. The implications for teacher education and cultural preparation, suggested by students' varying success with different cultural contexts, reflect broader challenges in implementing culturally responsive education identified by Mark & Id-Deen (2022).

The mathematical concept understanding dimension reveals both the potential and challenges of integrating formal mathematical knowledge with cultural contexts in elementary education. Students' successful identification of geometric transformations in traditional batik motifs and statistical concepts in traditional games supports research by Roza et al. (2024) on the mathematical richness of cultural practices. The varying levels of conceptual depth demonstrated by students across different cultural explorations align with Almpani & Stefaneas (2025) research on the complexity of bridging informal and formal mathematical knowledge. Students' difficulties with certain mathematical concepts in cultural contexts reflect challenges identified by Putra et al. (2024) regarding the need for careful scaffolding in realistic mathematics education implementation. The success of culinary explorations in facilitating understanding of fractions, percentages, and measurement concepts supports research by Purwasi et al. (2025) on the mathematical potential of daily cultural practices. Contemporary studies by Mirzaei et al. (2025) provide evidence for the effectiveness of cultural contexts in enhancing conceptual understanding while maintaining student engagement and motivation. Research by Hunter & Miller (2022) on the development of mathematical thinking through cultural contexts provides theoretical support for the observed patterns of conceptual understanding across different cultural explorations. The importance of cultural knowledge in developing mathematical understanding, evident in student struggles with unfamiliar traditions, aligns with research by Naidoo (2021) on the relationship between context familiarity and mathematical learning effectiveness.

The informal knowledge dimension highlights the critical importance of connecting students' lived experiences with formal mathematical concepts through cultural contexts. Students' success in linking traditional commercial practices with arithmetic operations supports research by Mariana & Sasmita (2024) on the effectiveness of familiar contexts in bridging informal and formal mathematical knowledge. The challenges faced by students in connecting unfamiliar cultural practices with mathematical concepts align with research by D'Ambrosio (1985) on the necessity

of genuine cultural engagement in ethnomathematics implementation. Students' ability to connect traditional textile design with geometric transformation concepts demonstrates the potential identified by Budiarto et al. (2020) for cultural practices to serve as bridges to formal mathematical understanding. The observed importance of direct cultural experience in facilitating mathematical connections supports research by Fahlevi & Lubis (2025) on the relationship between cultural participation and mathematical learning. Contemporary research by Lennon-Maslin et al. (2024) provides evidence for the effectiveness of hands-on cultural activities in developing mathematical understanding, particularly in geometric and spatial concepts. The variation in students' ability to connect informal cultural knowledge with formal concepts reflects broader challenges identified by Jacob & Dike (2023) in implementing culturally responsive mathematics education. Research by Oladejo et al. (2022) on the importance of meaningful cultural engagement provides theoretical foundation for understanding the observed patterns of success and difficulty in connecting informal and formal mathematical knowledge through cultural contexts.

The informal knowledge dimension emphasizes the importance of connecting students' lived experiences with formal mathematical concepts through cultural contexts. Successes in linking familiar cultural practices, such as traditional commerce or textile design, with arithmetic and geometric concepts support research on the effectiveness of accessible and meaningful contexts in bridging informal and formal knowledge (Alam & Mohanty, 2024). Challenges in connecting unfamiliar cultural practices align with (D'Ambrosio, 1985) and highlight the necessity of genuine cultural engagement for effective ethnomathematics implementation. The culture-mathematics connection dimension demonstrates that Indonesian cultural heritage provides rich contexts for elementary mathematics education within glocal frameworks. Students' varying success in identifying mathematical relationships reflects the complexity of connecting abstract concepts with concrete cultural objects (Solihin et al., 2025). High engagement in explorations of traditional architecture and spatial arrangements supports findings on the motivational potential of culturally relevant contexts El Bedewy et al. (2024), whereas difficulties with unfamiliar traditions highlight the need for careful selection and preparation of cultural materials.

Overall, the findings provide strong evidence for the effectiveness of ethnomathematics in fostering contextual, meaningful, and culturally responsive mathematics learning. Students' creative representations of mathematical concepts through cultural contexts illustrate the potential to enhance both mathematical understanding and creative thinking (Haque, 2024). The variation in success across cultural contexts underscores the importance of teacher preparation and culturally

informed curriculum design, supporting glocal approaches that balance local wisdom with universal mathematical principles (D'Ambrosio, 1985; Ibnu Fitrianto & Muhammad Farisi, 2025; Treffers, 1991). These insights inform the development of mathematics education that respects cultural diversity while maintaining academic rigor and global relevance.

CONCLUSION

This study demonstrates that Indonesian cultural contexts offer substantial potential as realistic foundations for elementary mathematics learning through ethnomathematics approaches. Exploration of diverse cultural objects, including traditional cuisine, folk games, architecture, and arts, revealed rich mathematical structures that effectively bridge students' informal cultural knowledge with formal mathematical concepts. Students' varying success in connecting cultural elements with mathematics highlights the importance of cultural familiarity and active engagement in meaningful learning. High engagement and creativity in accessible cultural contexts suggest the potential for developing glocal mathematics curricula that honor local heritage while maintaining academic rigor. Challenges with unfamiliar or historically distant contexts emphasize the need for careful selection of cultural materials and teacher preparedness. The integration of creative representations and realistic problem contexts provides valuable insights for innovative pedagogy that enhances both mathematical understanding and cultural appreciation.

Future research should focus on strengthening teacher education in cultural knowledge and ethnomathematics implementation. Schools and curriculum developers should systematically document local cultural practices and collaborate with cultural experts to integrate authentic contexts in mathematics education. Teacher preparation programs should include mandatory ethnomathematics training to support culturally responsive instruction. Policymakers should promote glocal education frameworks that recognize local culture as a core educational resource. Long-term studies on the impact of ethnomathematics on student learning, cultural identity, and global competencies are recommended to guide widespread adoption in elementary education.

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