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### To cite this article:

Luzano, J.F.P. (2025). Culturally-responsive mathematics teaching strategies in the contemporary academic tapestry: A scoping review. *International Journal on Studies in Education (IJonSE)*, 7(2), 373-387. <https://doi.org/10.46328/ijonse.347>

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## Culturally-Responsive Mathematics Teaching Strategies in the Contemporary Academic Tapestry: A Scoping Review

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### Article Info

#### Article History

Received:

7 November 2024

Accepted:

18 March 2025

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#### Keywords

Culturally-responsive  
Mathematics education  
Mathematics teaching  
Strategies  
Contemporary academic  
tapestry

### Abstract

This study examines culturally responsive mathematics teaching strategies within the contemporary academic landscape through a systematic scoping review. This investigation explores the evolving role of culturally responsive mathematics instruction in fostering equitable and meaningful learning experiences. The findings reveal two major themes that encapsulate culturally responsive mathematics teaching strategies: (1) *Embedding Culture in Mathematics Lessons*, which includes *Using Real-Life Cultural Examples*, *Incorporating Indigenous Mathematical Concepts*, and *Language and Symbols in Mathematics*; and (2) *Inclusive Mathematics Teaching Strategies*, encompassing *Tailoring Lessons for Diverse Learners*, *Culturally-Fair Assessments*, and *Teacher Training on Cultural Awareness*. These results highlight the critical role of culturally responsive mathematics teaching in enhancing student engagement, comprehension, and inclusivity. The study underscores the necessity of integrating ethnomathematical practices, contextualized learning experiences, and equitable assessments while prioritizing educator training and curriculum reforms. By embedding cultural perspectives into mathematics instruction, educators can create a more inclusive, relevant, and equitable academic environment that acknowledges and values cultural diversity.

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### Introduction

Mathematics education has long been regarded as a universal language of logic and reasoning, yet its instructional approaches have often been criticized for neglecting the cultural backgrounds and lived experiences of diverse learners. Traditional methods of teaching mathematics predominantly rely on Western paradigms of knowledge construction, which may not always align with the cultural contexts of students from indigenous, minority, or historically marginalized communities. This misalignment has raised concerns about the accessibility, engagement, and effectiveness of mathematics education across various sociocultural settings. In an era where globalization and cultural pluralism are reshaping academic landscapes, there is an increasing demand for pedagogical frameworks that embrace cultural responsiveness in mathematics instruction.

Culturally-responsive teaching (CRT) in mathematics education seeks to bridge this gap by integrating students' cultural identities, traditions, and community-based knowledge into instructional practices (Abdulrahim &

Orosco, 2019). CRT advocates for pedagogies that recognize and validate diverse cultural perspectives while fostering mathematical understanding. Research has shown that students who see their cultural experiences reflected in the curriculum are more likely to engage meaningfully with mathematical concepts, develop a stronger sense of academic identity, and achieve higher levels of success (Rigney, Garrett, Curry, & MacGill, 2020). However, despite its theoretical prominence, the practical implementation of culturally-responsive mathematics teaching (CRMT) remains inconsistent and often underexplored in contemporary educational contexts (Ramsay-Jordan, 2020).

One of the critical challenges in implementing CRMT is the lack of comprehensive frameworks that guide educators in designing and executing culturally-relevant instructional strategies (Aronson & Laughter, 2016). While some studies have highlighted successful practices, such as ethnomathematics, real-life contextualized problem-solving, and community-based mathematical modeling, there remains a significant gap in understanding how these approaches translate into diverse classroom settings (Syahnia, Haenilah, Perdana, & Caswita, 2024). Furthermore, research on CRMT often focuses on specific cultural groups, limiting its generalizability and applicability across broader educational contexts (Nur, Waluya, Rochmad, & Wardono, 2020). As a result, there is a pressing need to synthesize and map existing knowledge to provide a cohesive foundation for future research and practice.

Additionally, contemporary mathematics classrooms are becoming increasingly diverse, necessitating a shift in instructional approaches to accommodate learners from various cultural and linguistic backgrounds (Tran & Schepers, 2023). Many mathematics educators, however, face barriers such as a lack of professional training, limited culturally-relevant curricular materials, and institutional constraints that prevent the seamless integration of CRMT strategies (Curry, 2019). These challenges highlight the need for a systematic review of existing literature to identify best practices, uncover gaps in research, and offer actionable insights for educators and policymakers seeking to enhance mathematics instruction through culturally-responsive pedagogies.

Another pressing issue is the underrepresentation of culturally-responsive pedagogies in mathematics teacher education programs (Nagasawa, 2020). While teacher preparation courses emphasize content knowledge and pedagogical skills, they often overlook the critical role of cultural responsiveness in shaping effective mathematics instruction (Yu et al., 2021). This oversight results in educators who may be well-versed in mathematical theories but lack the necessary competencies to address the diverse cultural needs of their students. By examining the scope of CRMT strategies in current educational literature, this review could provide valuable insights into how teacher preparation programs can be restructured to prioritize cultural inclusivity in mathematics education.

Moreover, the rise of digital learning environments and technology-enhanced instruction presents new opportunities and challenges for implementing CRMT (Lee & Hwang, 2022). While technology has the potential to personalize learning experiences and provide culturally-responsive resources, there is limited research on how digital tools can effectively support CRMT in diverse educational settings (Fathani & Pangestu, 2024). A scoping review of contemporary studies on the integration of technology with culturally-responsive mathematics instruction could offer crucial insights into how digital platforms can be leveraged to foster inclusivity and

engagement in mathematics learning.

The intersection of mathematics education, cultural responsiveness, and social justice also warrants further exploration. Mathematics, often perceived as neutral and objective, plays a significant role in shaping societal structures and reinforcing power dynamics (Philip & Gupta, 2020). Without culturally-responsive pedagogies, mathematics education risks perpetuating systemic inequalities by marginalizing the voices and experiences of historically underrepresented groups (Abdulrahim & Orosco, 2019). Understanding how CRMT can serve as a tool for social justice and equity in education is crucial for developing more inclusive and empowering learning environments.

Despite the growing recognition of CRMT's significance, there remains a lack of large-scale empirical studies that assess its impact on student outcomes across different educational contexts. While qualitative studies provide valuable narratives and insights, there is a need for more quantitative, mixed-methods research, literature review that examines the effectiveness of CRMT strategies in enhancing students' mathematical performance, attitudes, and self-efficacy. Addressing this research gap is essential for generating evidence-based policies and instructional practices that promote equity and excellence in mathematics education.

As mathematics education continues to evolve in response to the demands of a rapidly changing world, there is an urgent need to consolidate and synthesize existing research on CRMT strategies. A comprehensive scoping review will not only illuminate the current state of knowledge but also identify promising directions for future research, policy development, and classroom practice. By mapping the literature on CRMT, this study seeks to provide educators, researchers, and policymakers with a clearer understanding of how culturally-responsive teaching strategies can be effectively implemented to create more inclusive and equitable mathematics learning experiences.

Given these contextual and theoretical considerations, this study aims to systematically review and analyze existing literature on culturally-responsive mathematics teaching strategies within contemporary educational contexts. Specifically, it seeks to identify key themes, methodological trends, and gaps in research to offer a comprehensive synthesis of current knowledge. This scoping review aspires to contribute to the growing discourse on culturally-responsive mathematics education and inform the development of pedagogical frameworks that better serve diverse learners in today's academic tapestry.

## **Method**

This study employed a scoping review method to systematically analyze and synthesize existing research on culturally responsive mathematics instruction within the evolving landscape of contemporary education. Grounded in the framework established by Arksey and O'Malley (2005), the scoping review serves as a rigorous and structured approach to literature synthesis, prioritizing comprehensive coverage of relevant studies regardless of their methodological paradigms.

Distinct from systematic reviews, which are characterized by narrowly defined research questions and stringent methodological constraints, scoping reviews adopt an exploratory, iterative, and flexible approach. This methodological orientation allows for the refinement of research focus throughout the review process, ensuring adaptability in response to emerging themes and insights from the literature. Additionally, the scoping review framework promotes continuous reflection and methodological adjustments at various stages, enhancing the depth and relevance of the synthesis. Following Arksey and O'Malley's (2005) five-stage framework, this study systematically adhered to each phase of the scoping review process, ensuring methodological rigor and coherence in mapping the existing body of knowledge on culturally responsive mathematics teaching strategies.

### **1. Formulating Research Questions**

The initial phase of this study entailed the formulation of core research inquiries, serving as the foundational framework for the scoping review. To ensure a systematic and structured investigation into culturally responsive mathematics instruction within the dynamic landscape of contemporary education, three distinct research questions were meticulously developed. These questions were designed to delineate the scope of inquiry, guide the identification and selection of relevant literature, and facilitate a comprehensive synthesis of existing research in the field.

### **2. Identifying and Retrieving Relevant Literature**

A systematic and comprehensive literature search was conducted across Google Scholar, ERIC, Scopus, and Web of Science, four highly regarded academic databases known for their extensive coverage of peer-reviewed research. The study focused on scholarly articles published between 2020 and 2024, ensuring the inclusion of recent advancements and emerging perspectives in culturally responsive mathematics education. To enhance the precision and relevance of the retrieved studies, a keyword-driven search strategy was employed. Targeted search terms, including "*Culturally Responsive Mathematics Education*", "*Culturally Responsive Mathematics Teaching Strategies*", and "*Culturally Responsive Mathematics Teaching Strategies in the Contemporary Academic Context*," were systematically analyzed. These search parameters were strategically designed to capture studies that aligned with the research objectives, thereby facilitating a robust and focused synthesis of the existing literature.

### **3. Selection of Studies Based on Inclusion Criteria**

A systematic and rigorous screening process was implemented to assess the relevance and methodological rigor of the retrieved studies. This selection process involved a comprehensive evaluation of each article's abstract, methodology, results, discussion, and conclusion to ensure alignment with the study's objectives. Only studies that provided an explicit and substantive focus on culturally responsive mathematics instruction within the evolving landscape of contemporary education were retained for inclusion. Studies that did not meet these predefined inclusion criteria were systematically excluded. This methodologically robust approach ensured that the review maintained high academic rigor, thematic relevance, and conceptual coherence, thereby strengthening

the integrity of the synthesized findings.

#### 4. Data Charting and Organization

Following the selection of relevant studies, a systematic data extraction process was undertaken to ensure a structured and rigorous synthesis of findings. This phase aligned with established methodologies in systematic literature reviews, wherein key study attributes—including research design, primary findings, and pedagogical or theoretical implications—were systematically categorized. By organizing extracted data into structured analytical frameworks, this approach enhanced the coherence, comparability, and depth of synthesis, thereby ensuring a methodologically sound and comprehensive review of culturally responsive mathematics instruction.

#### 5. Data Synthesis, Analysis, and Interpretation

The final stage of the scoping review involved a systematic content analysis to discern recurring themes, emerging patterns, and critical insights across the selected studies. The extracted data were synthesized and systematically summarized to illuminate significant findings, ensuring a comprehensive understanding of culturally responsive mathematics instruction. Additionally, a conceptual framework was developed, grounded in the existing literature, to provide a structured, theoretical representation of culturally responsive mathematics pedagogy within the dynamic and evolving landscape of contemporary education. This framework serves as a foundational model for future research and instructional practice in the field.

The nitty-gritty of the flow of this scoping review is illustrated in Figure 1.

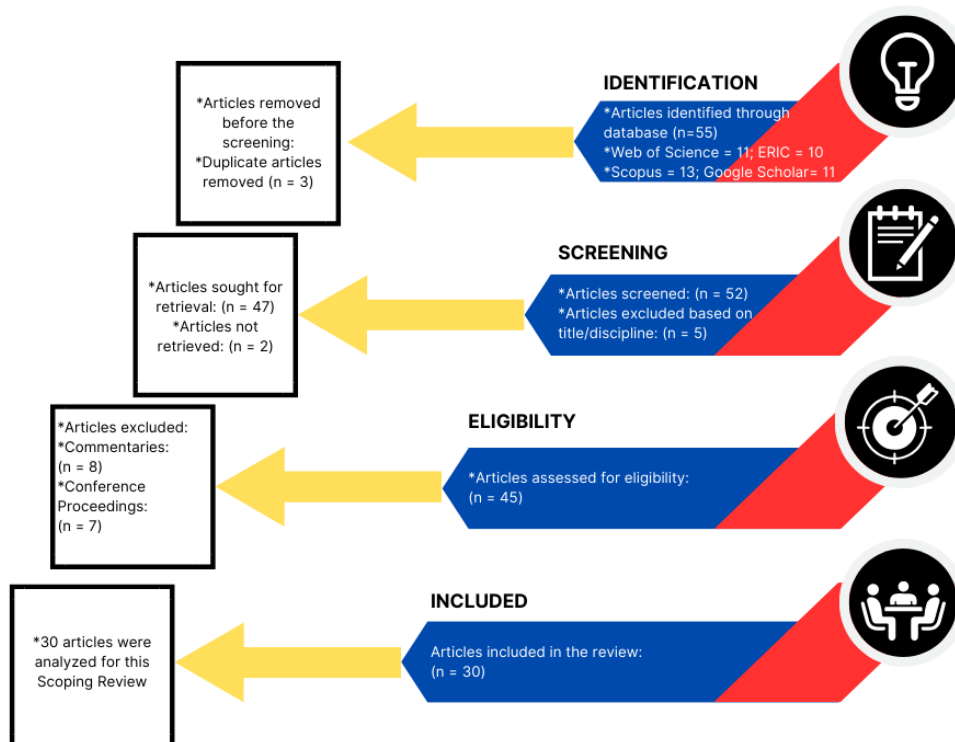


Figure 1. PRISMA flow chart of Searching, Selecting, and Abstracting Articles for the Scoping Review

## Results and Discussion

### Culturally-Responsive Teaching Strategies in Mathematics

Culturally-responsive teaching in mathematics bridges the gap between abstract mathematical concepts and students' lived experiences by integrating their cultural backgrounds into instruction. The first overarching theme, *Embedding Culture in Mathematics Lessons*, emphasizes the importance of using real-life cultural examples, incorporating indigenous mathematical concepts, and utilizing familiar language and symbols to enhance students' engagement and understanding. The second theme, *Inclusive Mathematics Teaching Strategies*, highlights the need for differentiated instruction, culturally fair assessments, and professional development to ensure that all students, regardless of background, have equitable access to mathematical learning. Together, these themes and subthemes emerged for fostering a more inclusive, meaningful, and effective mathematics education that values diversity and acknowledges the role of culture in shaping mathematical thinking.

#### *Embedding Culture in Mathematics Lessons*

Culturally-responsive teaching in mathematics involves integrating students' cultural backgrounds, traditions, and lived experiences into the learning process (Nolan & Xenofontos, 2023). By embedding culture into math lessons, educators create meaningful connections between abstract mathematical concepts and students' daily lives. This approach enhances engagement and comprehension, as learners see the relevance of mathematics in their own communities (Kong, Arizmendi, & Doabler, 2022). Examples include incorporating local measurement systems, traditional patterns, and indigenous problem-solving techniques into instruction. The use of native languages and culturally familiar symbols in mathematical explanations also plays a crucial role in making learning more accessible and meaningful (Hunter, R., Hunter, J., & Gibbs, 2022).

Moreover, embedding culture in mathematics helps students develop a sense of identity and belonging in the classroom (Meng & Liu, 2022). It validates their cultural knowledge as a valuable resource rather than something separate from academic learning (Pichon et al., 2023). This approach also fosters appreciation for diverse mathematical perspectives, encouraging students to recognize the universal yet culturally varied nature of mathematics (Manolino, 2024). When students see that math is not just a rigid, abstract subject but something connected to their heritage, they develop a deeper understanding and motivation to learn (Desai et al., 2021).

#### *Using Real-Life Cultural Examples*

Mathematics becomes more meaningful when students see its relevance in their daily lives. By integrating real-life cultural examples into lessons, teachers can make abstract mathematical concepts more concrete and relatable (Masykur, 2023). For instance, problems involving traditional farming, weaving patterns, or local economic practices help students connect classroom learning with their cultural environment (Padang & Lubis, 2023). When students recognize how math applies to their own communities, they are more engaged and motivated to participate actively in learning.

Beyond engagement, using culturally relevant examples fosters a deeper understanding of mathematical concepts

(Hunter & Miller, 2020). Contextualizing math problems within familiar cultural settings allows students to approach problem-solving with confidence, as they can relate new knowledge to existing experiences (Luevano & Collins, 2020). This approach also encourages collaboration and discussions, as students bring their cultural insights into mathematical reasoning. Ultimately, incorporating real-life cultural examples helps bridge the gap between traditional academic learning and students' lived realities.

### *Incorporating Indigenous Mathematical Concepts*

Many indigenous communities have rich mathematical traditions that predate formal schooling, and integrating these into the curriculum enhances students' understanding of mathematical diversity (Shimwandi, Ngololo, & Kanandjebo, 2024). Ethnomathematics, the study of cultural mathematical practices, allows students to explore non-Western ways of thinking about numbers, patterns, and problem-solving (Ruef, Jacob, Walker & Beavert, 2020). For example, indigenous counting systems, geometric patterns in traditional crafts, and community-based financial practices provide alternative frameworks for learning mathematical concepts (Hunter & Miller, 2020). Recognizing these traditions promotes a more inclusive and holistic view of mathematics.

Including indigenous mathematical concepts in instruction also fosters cultural pride and identity among students from underrepresented backgrounds (Naidoo, 2021). When students see their cultural heritage reflected in mathematics, they gain a sense of belonging and validation in the learning environment (Desai, Kurtz, & Safi, 2021). This practice not only enriches mathematical instruction but also promotes respect for different cultural perspectives in problem-solving. It challenges the notion that mathematics is universal in one fixed way, showing students that mathematical thinking is dynamic and shaped by cultural experiences.

### *Language and Symbols in Mathematics*

Language plays a crucial role in mathematical comprehension, and students often struggle when concepts are presented in a language unfamiliar to them (Barwell, 2020). Using students' native languages in instruction can help clarify complex concepts, reduce cognitive load, and enhance understanding. Many students struggle with mathematics not because of the numbers but due to language barriers in word problems and explanations. Translating key terms, using culturally familiar symbols, and allowing students to discuss math problems in their mother tongue make abstract concepts more accessible (Esuong et al., 2024). This approach is particularly beneficial in multilingual classrooms, where students may feel disconnected from the subject due to language barriers.

In addition to language, visual representations rooted in cultural traditions can enhance learning. For instance, using patterns from indigenous textiles or local architecture to teach symmetry and geometry can help students grasp concepts more easily (Yang, Othman, & Hussin, 2024). When mathematical symbols and representations reflect students' cultural knowledge, they become more intuitive and meaningful, leading to deeper learning and retention (Oyoo, 2022). Using culturally relevant symbols or visual aids, such as traditional counting tools or locally recognized diagrams, can make abstract concepts easier to grasp (Parkhouse et al., 2022). This approach



helps students develop confidence in mathematical discussions and problem-solving, ensuring that language and representation do not become obstacles to learning.

### *Inclusive Mathematics Teaching Strategies*

To create an inclusive and equitable mathematics learning environment, teachers may adopt strategies that address the diverse cultural backgrounds of their students. Culturally-responsive teaching involves differentiating instruction to accommodate different learning styles, experiences, and prior knowledge (Jeannin & Ojo, 2021). This may include using storytelling, group discussions, and hands-on activities that align with students' cultural learning preferences. Additionally, culturally-responsive assessments help ensure that evaluations reflect students' true mathematical abilities rather than their familiarity with Western-based testing formats (Bahar & Maker, 2020). By recognizing the impact of culture on learning, educators can design lessons that make mathematics more accessible and equitable for all students.

Professional development plays a crucial role in equipping teachers with the skills needed to implement culturally-responsive teaching strategies effectively (Thomas, 2024). Educators need to continuously reflect on their biases and learn how cultural differences shape students' mathematical understanding. Training programs that focus on culturally-inclusive pedagogy, classroom discourse, and bias-free assessment design are essential in fostering an environment where all students can succeed in mathematics (Stentiford & Koutsouris, 2020). By embracing these strategies, teachers empower learners to confidently engage with mathematical concepts, ensuring that cultural diversity becomes a strength rather than a barrier in the learning process.

### *Tailoring Lessons for Diverse Learners*

In a culturally diverse classroom, students bring different ways of understanding and approaching mathematical problems. To ensure equitable learning, teachers must use differentiated instructional strategies that align with students' unique learning needs (Beisly, Lake, Ross, & Lim, 2023). This could involve using multiple representations of concepts, incorporating hands-on activities, and allowing students to express their mathematical reasoning in ways that resonate with their cultural backgrounds (Tan, Clivaz, & Sakamoto, 2022). Flexible teaching methods help accommodate diverse cognitive styles and prior knowledge, making math more inclusive.

A culturally-responsive approach also means acknowledging different problem-solving strategies. Some students may rely on visual representations, while others may use mental calculations based on traditional counting methods (Thomas, 2024). Encouraging multiple solution paths allows students to apply their cultural knowledge in meaningful ways. When students see their approaches validated, they gain confidence and develop a deeper understanding of mathematical reasoning.

### *Culturally-Fair Assessments*

Traditional assessments often reflect Western perspectives on learning and problem-solving, which may

disadvantage students from diverse cultural backgrounds (Khawaja & Wotherspoon, 2022). Culturally fair assessments ensure that students are evaluated based on their true mathematical abilities rather than their familiarity with a specific testing style (Bahar & Maker, 2020). This can involve designing word problems that use culturally relevant contexts, allowing oral explanations alongside written responses, or incorporating performance-based assessments that reflect students' practical skills.

By making assessments more inclusive, educators can accurately measure students' mathematical understanding and reduce bias in grading (Thomas, 2024). This approach helps identify students' strengths rather than focusing solely on their limitations. When assessments reflect diverse ways of thinking, students feel more comfortable demonstrating their knowledge, leading to improved confidence and academic performance.

### *Teacher Training on Cultural Awareness*

Teachers play a crucial role in creating an inclusive math classroom, but many may not be fully equipped with culturally responsive teaching strategies (Johnson-Smith, 2022). Professional development programs that focus on cultural awareness help educators recognize their biases and understand how culture influences mathematical learning. Training workshops, collaborative learning communities, and exposure to ethnomathematical research can empower teachers to integrate culturally relevant strategies effectively in their instruction (Nganga & Kambutu, 2024).

Equipping teachers with cultural awareness skills benefits not only diverse students but also the overall learning environment (Dolzhenko & Young, 2020). When teachers understand their students' cultural backgrounds, they can build stronger relationships, foster a more inclusive classroom climate, and implement teaching strategies that resonate with all learners (Haniko et al., 2024). Continuous professional development ensures that educators remain adaptable and responsive to the needs of their students, ultimately leading to better learning outcomes in mathematics.

### **Emergent Framework**

Mathematics is often perceived as a universal language, yet the way it is taught and understood is deeply influenced by culture. Traditional approaches to mathematics instruction tend to overlook the diverse ways in which different cultural groups conceptualize numbers, patterns, and problem-solving strategies. The findings form an emergent framework for culturally-responsive mathematics education, emphasizing both content integration and inclusive pedagogy. This framework recognizes that mathematics is not culturally neutral and that students' cultural backgrounds significantly influence their learning experiences.

The first component, *Embedding Culture in Mathematics Lessons*, highlights the importance of contextualizing mathematical instruction through real-life cultural examples, indigenous mathematical knowledge, and language representation. By embedding these elements into lessons, educators make mathematics more relatable, fostering deeper engagement and conceptual understanding. This aspect of the framework challenges traditional, Western-

centric approaches to mathematics instruction by validating diverse mathematical perspectives and ensuring that students see their own cultures reflected in their learning.

The second component, *Inclusive Mathematics Teaching Strategies*, serves as the pedagogical foundation for implementing culturally-responsive mathematics education. It emphasizes the need for differentiated instruction, equitable assessment methods, and continuous teacher development to create a learning environment that accommodates diverse students. This aspect of the framework ensures that culturally-relevant content is not just integrated but also effectively delivered in a way that supports diverse learning needs. Together, these components form a dynamic and adaptable framework that guides educators in fostering an inclusive, culturally aware, and student-centered mathematics classroom. This emergent framework ultimately promotes equitable learning opportunities and empowers students to engage with mathematics in a way that is meaningful and culturally affirming.

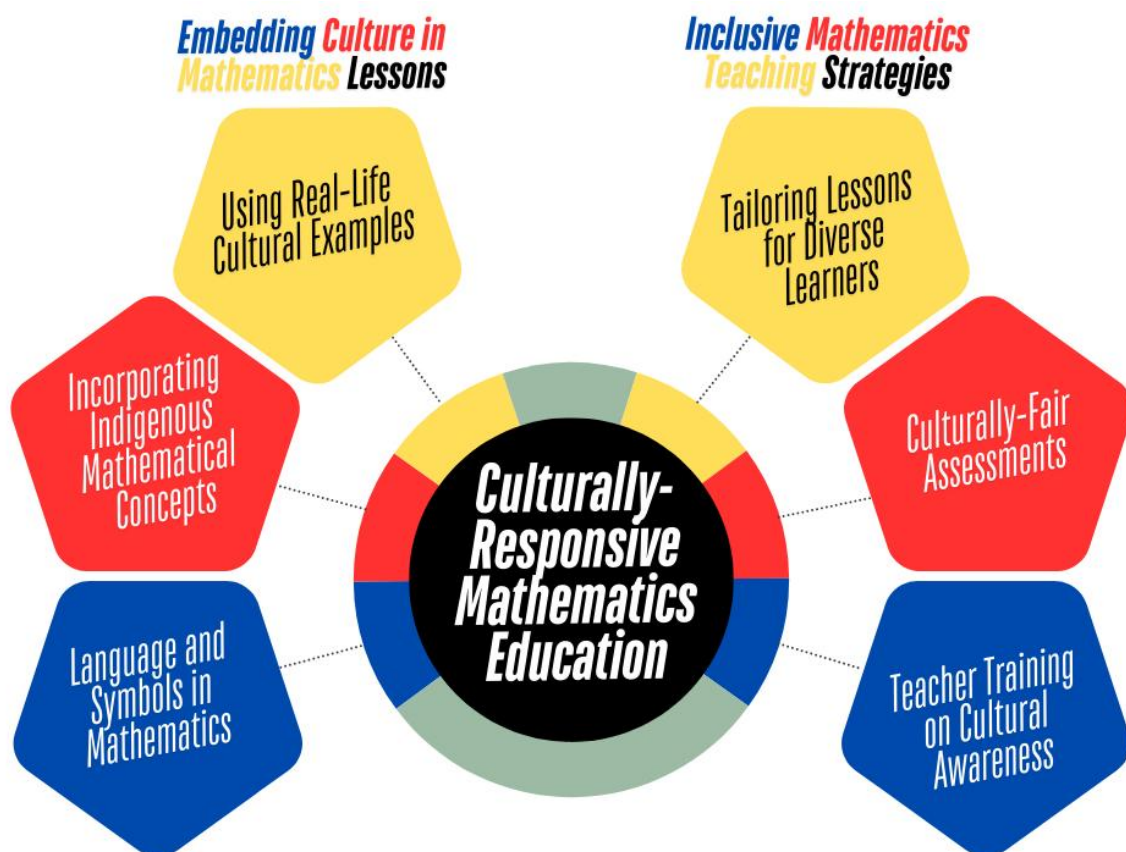


Figure 2. Emergent Framework on Culturally-Responsive Mathematics Education

## Conclusion

This review underscores the critical role of culturally responsive teaching strategies in mathematics education, demonstrating how integrating students' cultural backgrounds into instruction enhances engagement, comprehension, and overall learning outcomes. The theme *Embedding Culture in Mathematics Lessons* component highlights the significance of contextualizing mathematical concepts through real-life cultural

examples, indigenous mathematical knowledge, and language representation. These approaches not only foster a deeper connection between students and mathematical content but also promote inclusivity and recognition of diverse mathematical traditions. By validating students' cultural knowledge as an essential component of their academic development, culturally responsive instruction contributes to a more meaningful and equitable learning experience.

Furthermore, the study emphasizes the importance of the theme *Inclusive Mathematics Teaching Strategies*, which ensure that all learners, regardless of their background, have access to high-quality mathematics education. Differentiated instruction, culturally fair assessments, and sustained professional development for educators are pivotal in creating a mathematics classroom that accommodates diverse cognitive styles and problem-solving approaches. The emergent framework derived from these findings provides a structured, adaptable model that guides educators in fostering an inclusive, culturally responsive, and student-centered approach to mathematics instruction. By implementing these strategies, educators can bridge the gap between traditional mathematics education and the diverse lived experiences of their students, ultimately leading to improved mathematical confidence, achievement, and appreciation.

## **Recommendations**

To effectively implement culturally responsive mathematics teaching, educators may integrate culturally relevant content into instructional design, ensuring that students see their cultural backgrounds reflected in the learning process. This can be achieved by incorporating ethnomathematical practices, real-world cultural examples, and indigenous problem-solving methods into lesson plans. Mathematics curricula may be contextualized to align with students' lived experiences, enabling them to perceive mathematics as an integral part of their everyday lives rather than an abstract and disconnected subject. Additionally, the use of native languages, culturally familiar symbols, and community-based mathematical practices may be reinforced to enhance accessibility and deepen conceptual understanding. Future research may explore innovative pedagogical models that further advance the integration of cultural knowledge in mathematical instruction, ensuring a more context-sensitive and equitable mathematics education.

Moreover, professional development programs may prioritize training for educators in culturally responsive pedagogy, equipping them with the necessary skills to adapt their teaching methods to diverse learning needs. Institutions may invest in teacher training workshops, collaborative learning communities, and ongoing ethnomathematical research to foster a deeper awareness of how cultural influences shape mathematical thinking. Additionally, assessment practices may be restructured to ensure cultural fairness, utilizing diverse evaluation methods that accommodate multiple ways of demonstrating mathematical proficiency. Education policymakers and curriculum developers may actively reform standard assessment frameworks to eliminate biases and support equitable learning opportunities. By institutionalizing culturally responsive mathematics education, stakeholders can create an inclusive academic environment that empowers students to engage meaningfully with mathematics while preserving and celebrating cultural diversity.

## References

*\*Included articles in the Scoping Review*

- Abdulrahim, N., & Orosco, M. (2019). Culturally Responsive Mathematics Teaching: A Research Synthesis. *The Urban Review*, 52, 1 - 25. <https://doi.org/10.1007/s11256-019-00509-2>.
- Arksey, H., & O'Malley, L. (2005). Scoping studies: towards a methodological framework. *International journal of social research methodology*, 8(1), 19-32. <https://doi.org/10.1080/1364557032000119616>
- Aronson, B., & Laughter, J. (2016). The Theory and Practice of Culturally Relevant Education. *Review of Educational Research*, 86, 163 - 206. <https://doi.org/10.3102/0034654315582066>.
- \*Bahar, A., & Maker, C. (2020). Culturally Responsive Assessments of Mathematical Skills and Abilities: Development, Field Testing, and Implementation. *Journal of Advanced Academics*, 31, 211 - 233. <https://doi.org/10.1177/1932202X20906130>.
- \*Barwell, R. (2020). Learning Mathematics in a Second Language: Language Positive and Language Neutral Classrooms. *Journal for Research in Mathematics Education*, 51, 150-178. <https://doi.org/10.5951/jresmetheduc-2020-0018>.
- \*Beisly, A., Lake, V., Ross, R., & Lim, B. (2023). Helping children feel seen, heard, and understood: preservice teachers' strategies to support diverse learners in math lessons. *Journal of Early Childhood Teacher Education*, 44, 874 - 896. <https://doi.org/10.1080/10901027.2023.2165983>.
- Curry, M. (2019). Culturally Responsive Math. *Theory and Practice: An Interface or A Great Divide?*. <https://doi.org/10.37626/ga9783959871129.0.23>.
- \*Desai, S., Kurtz, B., & Safi, F. (2021). Mathematics Heritage Project: An Exploration Empowering Students' Mathematical Identities. *Journal of Humanistic Mathematics*. <https://doi.org/10.5642/jhummath.202102.05>.
- \*Dolzhenko, I., & Young, J. (2020). Understanding Teachers' Cultural Competencies. *Multicultural Instructional Design*. <https://doi.org/10.4018/978-1-5225-9279-2.ch069>.
- \*Esuong, U., Udo, O., & Effiong, I. (2024). The Use of Mother Tongue in Communicating Mathematics: Implication for Teaching and Learning of Mathematics. *British Journal of Education*. <https://doi.org/10.37745/bje.2013/vol12n24551>.
- Fathani, A., & Pangestu, I. (2024). Development of Problem-Based Senior High School Mathematics Learning Tools with a Culturally Responsive Teaching Approach. *VYGOTSKY*. <https://doi.org/10.30736/voj.v6i2.1037>.
- \*Haniko, P., Thoyyibah, M., Syamsurijal, S., Pasaribu, W., & Ichsan, I. (2024). Culturally Responsive Teaching: Strategies for Promoting Inclusivity in Diverse Classrooms. *Global International Journal of Innovative Research*. <https://doi.org/10.59613/global.v2i4.127>.
- \*Hunter, R., Hunter, J., & Gibbs, B. (2022). Taking an Asset-Based Approach in the Use of a Culturally Located Task to Construct Functional Reasoning. *Teachers College Record: The Voice of Scholarship in Education*, 124, 69 - 88. <https://doi.org/10.1177/01614681221103958>.
- \*Hunter, J., & Miller, J. (2020). Using a Culturally Responsive Approach to Develop Early Algebraic Reasoning with Young Diverse Learners. *International Journal of Science and Mathematics Education*, 20, 111-

131. <https://doi.org/10.1007/s10763-020-10135-0>.
- \*Jeannin, L., & Ojo, E. (2021). Culturally Responsive Differentiated Instruction. *Transformative Curricula, Pedagogies and Epistemologies*. [https://doi.org/10.1163/9789004468443\\_008](https://doi.org/10.1163/9789004468443_008).
- \*Johnson-Smith, L. (2022). Creatively Cultivating a Culturally-Responsive Mathematics Classroom. *Creativity as Progressive Pedagogy*. <https://doi.org/10.4018/978-1-7998-8287-9.ch013>.
- \*Khawaja, N., & Wotherspoon, J. (2022). Learning challenges of culturally and linguistically diverse students: A framework for psychological assessment. *Journal of Psychologists and Counsellors in Schools*, 32, 254 - 267. <https://doi.org/10.1017/jgc.2022.2>.
- \*Kong, J., Arizmendi, G., & Doabler, C. (2022). Implementing the Science of Math in a Culturally Sustainable Framework for Students With and at Risk for Math Learning Disabilities. *TEACHING Exceptional Children*, 56, 44 - 51. <https://doi.org/10.1177/00400599221127385>.
- Lee, H., & Hwang, Y. (2022). Technology-Enhanced Education through VR-Making and Metaverse-Linking to Foster Teacher Readiness and Sustainable Learning. *Sustainability*. <https://doi.org/10.3390/su14084786>.
- \*Luevano, C., & Collins, T. (2020). Culturally Appropriate Math Problem-Solving Instruction With English Language Learners. *School Psychology Review*, 49, 144 - 160. <https://doi.org/10.1080/2372966X.2020.1717243>.
- \*Manolino, C. (2024). Cultural semiotics for mathematical discourses. *Semiotica*. <https://doi.org/10.1515/sem-2023-0030>.
- \*Masykur, M. (2023). Mathematics Learning Model (Based on Multicultural Education). *JUPE: Jurnal Pendidikan Mandala*. <https://doi.org/10.58258/jupe.v8i3.5989>.
- \*Meng, J., & Liu, S. (2022). Effects of Culture on the Balance Between Mathematics Achievement and Subjective Wellbeing. *Frontiers in Psychology*, 13. <https://doi.org/10.3389/fpsyg.2022.894774>.
- Nagasawa, K. (2020). Culturally Responsive Pedagogy in Mathematics., 2, 145-158. <https://doi.org/10.15695/iris.v2i0.4808>.
- \*Naidoo, J. (2021). Integrating Indigenous Knowledge and Culturally based Activities in South African Mathematics Classrooms. *African Journal of Teacher Education*. <https://doi.org/10.21083/ajote.v10i2.6686>.
- \*Nganga, L., & Kambutu, J. (2024). Culturally Responsive Professional Development Programs for Teacher Educators Using Community-Based Collaborative Learning: Lessons Learned from a Native American Community. *Education Sciences*. <https://doi.org/10.3390/educsci14070787>.
- \*Nolan, K., & Xenofontos, C. (2023). Mapping teachers' perspectives on culturally responsive pedagogy in mathematics: from academic achievement to insights and opportunities. *Intercultural Education*, 34, 550 - 567. <https://doi.org/10.1080/14675986.2023.2265855>.
- Nur, A., Waluya, S., Rochmad, R., & Wardono, W. (2020). Contextual learning with Ethnomathematics in enhancing the problem solving based on thinking levels. *JRAMathEdu (Journal of Research and Advances in Mathematics Education)*. <https://doi.org/10.23917/JRAMATHEDU.V5I3.11679>.
- \*Oyoo, P. (2022). Exploring Students' Proficiency in Mathematical Symbolization. *International Journal of Advanced Research*. <https://doi.org/10.37284/ijar.5.1.774>.
- \*Padang, D., & Lubis, M. (2023). Ethnomathematical Exploration of Traditional Agricultural Tools in Hutamanik Village, Sumbul Regency. *Indonesian Journal of Science and Mathematics Education*.

- <https://doi.org/10.24042/ijsme.v6i2.17003>.
- \*Parkhouse, H., Bennett, E., Pandey, T., Lee, K., & Wilson, J. (2022). Culturally Relevant Education as a Professional Responsibility. *Educational Researcher*, 51, 474 - 480. <https://doi.org/10.3102/0013189X221092390>.
- Philip, T., & Gupta, A. (2020). Emerging Perspectives on the Co-Construction of Power and Learning in the Learning Sciences, Mathematics Education, and Science Education. *Review of Research in Education*, 44, 195 - 217. <https://doi.org/10.3102/0091732X20903309>.
- \*Pichon, E., Wattar, D., Naji, M., Cha, H., Jia, Y., & Tariq, K. (2023). Towards linguistically and culturally responsive curricula: the potential of reciprocal knowledge in STEM education. *Language, Culture and Curriculum*, 37, 10 - 26. <https://doi.org/10.1080/07908318.2023.2221895>.
- Ramsay-Jordan, N. (2020). How Secondary Mathematics Preservice Teachers Grapple with Enacting Culturally Responsive Practices at Placement Sites. *International Journal of Science and Mathematics Education*, 1-17. <https://doi.org/10.1007/s10763-020-10091-9>.
- Rigney, L., Garrett, R., Curry, M., & MacGill, B. (2020). Culturally Responsive Pedagogy and Mathematics Through Creative and Body-Based Learning: Urban Aboriginal Schooling. *Education and Urban Society*, 52, 1159 - 1180. <https://doi.org/10.1177/0013124519896861>.
- \*Ruef, J., Jacob, M., Walker, K., & Beavert, V. (2020). Why indigenous languages matter for mathematics education: a case study of Ichishkĭin. *Educational Studies in Mathematics*, 104, 313 - 332. <https://doi.org/10.1007/s10649-020-09957-0>.
- \*Shimwandi, R., Ngololo, E., & Kanandjebo, L. (2024). Indigenous Knowledge Content & Mathematics Curriculum. *Jumuga Journal of Education, Oral Studies, and Human Sciences (JJEOSHS)*. <https://doi.org/10.35544/jjeoshs.v7i2.93>.
- \*Stentiford, L., & Koutsouris, G. (2020). What are inclusive pedagogies in higher education? A systematic scoping review. *Studies in Higher Education*, 46, 2245 - 2261. <https://doi.org/10.1080/03075079.2020.1716322>.
- Syahnia, S., Haenilah, E., Perdana, R., & Caswita, C. (2024). Ethnomathematics-based Problem Based Learning (PBL) Model to Increase Students' Critical Thinking in Mathematics Learning. *Lectura: Jurnal Pendidikan*. <https://doi.org/10.31849/lectura.v15i2.20985>.
- \*Tan, S., Clivaz, S., & Sakamoto, M. (2022). Presenting multiple representations at the chalkboard: bansho analysis of a Japanese mathematics classroom. *Journal of Education for Teaching*, 49, 630 - 647. <https://doi.org/10.1080/02607476.2022.2150538>.
- \*Thomas, C. (2024). District Certified Culturally Responsive Elementary Teachers and Their Mathematics Teaching Practices. *Journal of Urban Mathematics Education*. <https://doi.org/10.21423/jume-v17i1a480>.
- Tran, L., & Schepers, O. (2023). Making mathematics meaningful for culturally and linguistically diverse students with a mathematics learning disability: a focus on culturally responsive practices. *Frontiers in Education*. <https://doi.org/10.3389/educ.2023.1276423>.
- \*Yang, Y., Othman, A., & Hussin, H. (2024). Knowledge Distillation and Transfer Learning Combined for Innovative Visualization Teaching of Non-Heritage Designs. *Applied Mathematics and Nonlinear Sciences*, 9. <https://doi.org/10.2478/amns-2024-1022>.


Yu, M., Liu, Y., Soto-Lara, S., Puente, K., Carranza, P., Pantano, A., & Simpkins, S. (2021). Culturally Responsive Practices: Insights from a High-Quality Math Afterschool Program Serving Underprivileged Latinx Youth. *American journal of community psychology*. <https://doi.org/10.1002/ajcp.12518>.

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