Mathematics Education Rooted in Culture: Contributions of Ethnomathematics to Classrooms from K-12 to Higher Education

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Abstract

Understanding the concept of "culture" can serve as a motivational factor for interdisciplinary development within school contexts. It establishes connections among areas such as Mathematics, History, Philosophy, Sociology, Anthropology, and others, revealing its transversal character and its influence on human experiences. In this context, this study investigates how different conceptions of culture, from etymological foundations to their objective and subjective manifestations, impact the teaching and learning of mathematics, highlighting the potential of ethnomathematics to bring formal knowledge closer to students' sociocultural practices. The analysis discusses how values, experiences, and cultural repertoires influence the construction of mathematical meaning and emphasizes the importance of teachers recognizing these elements when planning pedagogical interventions. It is argued that integrating ethnomathematical practices can promote greater engagement, contextualization, and equity by legitimizing different forms of reasoning and connecting school content to students' lived experiences. The article also points to implications for teacher education, emphasizing competencies related to interpreting students' prior conceptions and mediating between cultural and mathematical knowledge. The findings suggest that approaching mathematics through cultural diversity expands learning opportunities and contributes to more inclusive practices at all educational levels. Thus, the study presents a framework that articulates culture, teaching practice, and mathematical development to support educators in contemporary educational contexts.

Keywords: culture; ethnomathematics; mathematics education; culturally responsive teaching; teacher education.

1 Introduction

In recent decades, the pursuit of equity in classrooms has brought the relationship between culture and education to the center of educational debates. In the field of mathematics education, the National Council of Teachers of Mathematics emphasizes that mathematics is not a set of isolated truths, but rather a human practice deeply rooted in social and historical contexts. When teaching ignores the cultural repertoire that students bring from their homes and communities, mathematics may appear abstract and exclusionary. By building connections between academic knowledge and community experiences, as suggested by scholars such as Alan J. Bishop (1988) and Ming-Ying Lai & Rongjin Huang (2025), educators can reduce students' resistance and promote learning that carries authentic meaning. The understanding of culture as a central dimension of human development was consolidated by scholars such as Edward Burnett Tylor (1871), who defined culture as a complex whole including knowledge, beliefs, arts, morals, laws, and customs acquired by individuals as members of society. Complementing this perspective, Bronislaw Malinowski (1970) emphasized that culture is expressed in the everyday practices developed to respond to the needs of life. In school contexts, however, mathematics is often presented in ways that are disconnected from these experiences. When cultural contexts are ignored, mathematics may be perceived merely as a set of formal procedures with little relevance to real-life situations. Within this framework, ethnomathematics emerges as an important perspective for rethinking mathematics teaching. The concept, extensively developed by Ubiratan D'Ambrosio, proposes understanding mathematics as knowledge produced by different cultural groups through their social practices. Scholars such as Paulus Gerdes and Gelsa Knijnik have demonstrated that mathematical ideas can be identified in diverse human activities, reflecting the ways societies organize and transform their environments. For mathematics teachers, this perspective opens new possibilities: rather than considering only formal knowledge, educators are encouraged to value the forms of knowledge embedded in students' social practices. In this sense, culturally responsive teaching seeks to build bridges between formal mathematical knowledge and community-based understandings. By integrating different forms of knowledge, this approach allows students to recognize mathematical thinking within their own lived experiences. The role of the teacher thus becomes that of a mediator who creates learning situations grounded in inquiry, dialogue, and reflection. Considering these issues, this article discusses the contributions of ethnomathematics to mathematics education from K-12 through higher education. In addition to presenting a theoretical discussion grounded in the work of these scholars, the article also introduces a pedagogical application that illustrates how these principles can be incorporated into classroom activities, providing practical support for teachers interested in developing culturally responsive and meaningful approaches to mathematics instruction.

2 Methodology

This article synthesizes theoretical contributions regarding the connections between culture and mathematics education, establishing a bridge between academic rigor and classroom practice. The methodological approach was structured around three main components. First, the study explores the concept of culture as a foundational element of human development. Next, the analysis focuses on ethnomathematics as a pedagogical perspective, drawing on the foundational works of Ubiratan D'Ambrosio and Alan J. Bishop, as well as contemporary discussions by Ming-Ying Lai and Rongjin Huang (2025), which emphasize the role of culture in shaping effective teaching and learning in mathematics. Finally, an integrative analysis was conducted to identify instructional implications and practical challenges that arise in classroom contexts. Although this study does not involve traditional empirical data collection, it systematizes a reflective framework intended to support culturally responsive approaches to mathematics teaching. As an outcome of this synthesis, the final section presents a pedagogical activity that illustrates the integration of formal mathematical knowledge with students' lived experiences, offering a practical resource for educators across diverse educational settings.

3 Relationships Among the Individual, Nature, and Culture

Understanding the relationship among the individual, nature, and culture is fundamental for reflecting on educational processes and, more specifically, on the teaching and learning of mathematics. Culture can be understood as the set of meanings, practices, and forms of knowledge historically produced by human societies through their interaction with the natural and social world. In the anthropological tradition, Edward Burnett Tylor (1871) defined culture as a complex whole that includes knowledge, beliefs, art, morals, laws, customs, and other capabilities acquired by human beings as members of society. This perspective emphasizes that cultural development is deeply connected to social experiences and to the ways individuals participate in collective life. Scholars such as Bronislaw Malinowski (1970) highlight that culture is also manifested in the everyday practices developed by communities to respond to the needs of social life. In this sense, cultural knowledge emerges from interactions among individuals, nature, and the historical contexts in which they live. The relationship between the individual and culture is dynamic and reciprocal. While individuals are influenced by the cultural contexts in which they are situated, they also actively participate in transforming those contexts. Education plays a central role in this process, as it enables the transmission and reconstruction of socially produced knowledge. From a philosophical and social perspective, Terry Eagleton (2005) observes that culture encompasses both material and symbolic dimensions, constituting a space for the production of meanings that guide how people think and act. Thus, understanding culture involves recognizing the ways in which different societies produce knowledge and interpret the world. The relationship between human beings and nature also occupies a central place in cultural construction. Throughout history, communities have developed ways to understand, organize, and transform the natural environment in order to meet their needs. These interactions have given rise to practical knowledge systems present in activities such as construction, agriculture, navigation, and craftsmanship. César Coll Salvador (1994) emphasizes that such practices involve specific forms of reasoning and knowledge organization, often related to solving concrete problems of everyday life. In many cases, these practices incorporate mathematical ideas, even when they are not formalized within academic mathematics. From this perspective, mathematical knowledge cannot be understood solely as an abstract and universal system detached from cultural contexts. Many mathematical ideas emerge from the practical needs faced by communities in their interaction with nature and in the organization of social life. Concepts such as measurement, spatial organization, pattern recognition, and quantitative reasoning often develop from these experiences.

The philosophical reflections of thinkers such as Johann Wolfgang von Goethe and Rudolf Steiner also contribute to understanding the relationship between human beings, nature, and knowledge. Both emphasized the importance of observing natural phenomena as part of a dynamic whole in which human knowledge develops through experience and interaction with the world. In the educational field, recognizing the relationship among culture, nature, and knowledge becomes essential for understanding learning processes. Students arrive at school bringing experiences, knowledge, and ways of interpreting reality that are shaped by their cultural contexts. Valuing these forms of knowledge can support the development of more meaningful learning experiences. In mathematics education, this perspective invites educators to consider how cultural contexts influence both the development of mathematical ideas and the ways students engage with learning. By recognizing the cultural dimensions of knowledge, teachers can establish connections between mathematical concepts and the practices present in students' communities. Thus, understanding the interaction among the individual, nature, and culture provides an important foundation for rethinking mathematics teaching. This approach highlights the importance of recognizing different systems of knowledge and developing pedagogical practices that value students' cultural contexts while also promoting the development of mathematical thinking.

4 Culture and Mathematics Education

The renewal of educational institutions requires teachers to assume an active cultural competence. As highlighted by Lai and Huang (2025), culture matters not only as context but as the very lens through which students process mathematical reasoning. In the context of the United States and other multicultural nations, recognizing this diversity is a matter of social justice. The teacher ceases to be merely a transmitter of formulas and becomes a mediator who, in the words of Alan J. Bishop (1988), promotes "mathematical enculturation,‖ valuing how different groups explain and organize their reality. According to F. Salvador (1974), "[...] In culture, the human spirit becomes objectified: nature provides the material content and humans imprint upon it a spiritual form.‖ However, it is human values that generate and shape cultural elements. Yet we must construct the idea of value - what are values? Clyde Kluckhohn proposes a definition of value: "[...] A generalized and organized conception, influencing behavior, concerning the nature of the world, the place of humans within it, the relationship of humans with one another, and what is desirable or undesirable, as these may relate to the human domain and inter-human relations‖ (Kluckhohn, 1970, p. 36). According to the same author, the concept of value can be compared to the notion of force in the study of physics. We feel the results of physical forces, yet we cannot see them. Human values function in the same way: we feel, observe, and participate in their results in human behavior, but we cannot see them directly. Thus, values can be understood as culturally defined relationships between individuals and the phenomena of experience. They involve normative factors of judgment and choices - present and potential - based on effective elements of approval or disapproval, desirability or undesirability.

In the cultural development of a group or society, people reveal in their works and products a set of values that reflect the reality in which they live - in other words, how they perceive the world. Therefore, the cultural history of a society may be understood as the history of the actions of the people who form that society. What individuals project for themselves is also projected into their creations. The values embedded in this relationship represent explicit or implicit conceptions about human needs and how they may be satisfied, thereby defining - according to ”values‖ - criteria for choosing present or future actions. Teachers working within the school - an environment that is both social and an expression of objective culture - must establish connections between what they believe and the reality of each student. In other words, they must respect and seek ways to connect the diverse forms of culture - values - present in the classroom to the goals of teaching. According to Ubiratan D'Ambrosio (2016), Mathematics Education can be closely related to nature, society, groups, or individuals, and especially to the elements of existing objective culture. Education is fundamentally the education of human beings, aimed at guiding them toward ”Peace.‖ Human beings are the agents who organize and preserve the interactions between nature, society, and culture. Just as education faces challenges, individuals also encounter problems when they become opposed to nature, society, or culture. The objective culture of a society is characterized by compositions that interweave education, religion, science, techniques, the arts, and so forth - that is, the socioeconomic and cultural model of a people. Research related to Mathematics Education may therefore be understood as part of the heritage of education and thus as part of cultural heritage. The products of research in Mathematics Education - principles, techniques, experiences - constitute a traditional asset of education resulting from human development. They become goods and values of education and therefore part of national culture. In an analogous way, studying the development of education, religion, science, and other areas is equivalent to studying the development of culture itself. Similarly, studying the development of research in Mathematics Education is equivalent to studying the principles, methods, techniques, and objectives of a given society. It reveals the development of a specific field within a nation. It represents national culture in relation to a particular domain. These are cultural characteristics that shape the forms of Brazilian education. One of the premises of education is the development of an individual's aptitudes and predispositions, both in relation to oneself and to society. Such development can be achieved through traditional educational institutions - schools, colleges, and universities - but also through non-traditional cultural relationships, such as contact with diverse cultures. Human experience constitutes a broad source of content - rudimentary or modern - for learning in general and for mathematics in particular. Thus, cultural elements are grouped either according to the traditional structures of education or according to the learner's engagement with other cultures. In both cases, education organizes these cultural elements by creating rules and specific practices for educational models that are realized through teaching. In this way, specific contents are taught and individuals are educated. These specific contents - that is, the heritage related to objective culture - are proposed by schools through syllabi and teaching plans; thus, a cultural asset is delineated as a formative asset. A formative asset may therefore be understood as a cultural asset, although the reverse relationship is not always true. It is the teacher's responsibility, in the development of the curriculum, to introduce diverse cultural elements in order to enrich and refine these formative assets.

5 Ethnomathematics as a Pedagogical Possibility

According to Ubiratan D'Ambrosio (2019), Mathematics Education must be useful; it must be engaging and motivate the student, since education is the act of consciously summarizing the essential aspects of cultural universality. This is especially important in relation to mathematics, in the sense of developing methods that reduce the rejection of mathematical content and diminish the fear that some students feel toward the subject. Within the school environment, practical rules are developed and presented, where professional knowledge - specific content - is transferred to the students' social, cultural, and economic context. Faced with this model, the teacher must construct meaning for each situation encountered in this environment. This relationship between the teacher and diverse cultures and social realities tends to make the teacher more capable of adapting to changes and interacting with groups that hold different worldviews. Teacher education should not privilege the mechanical development of activities isolated from the outside world - nor from the individuality of each person - resulting in limited competencies restricted solely to the classroom. Francisco Imbernón (2000) discusses teacher education and emphasizes the importance of developing tools capable of supporting teaching practice, as well as building professional knowledge oriented toward the collective dimension. At this point, teachers should be able to reflect upon their professional practices and determine whether the goals of education have been achieved. It is important to highlight the relevance of initial teacher education focused on the interaction between academic disciplines and the various sociocultural environments in which teachers may work. According to Ubiratan D'Ambrosio (2019), teacher education must encompass not only pedagogical, technical, and scientific issues but also ways of relating, organizing, grounding, and teaching these elements in multicultural school environments. Achieving this balance involves adopting Ethnomathematics, valuing differences, and recognizing that the structuring of mathematical knowledge is relevant and closely connected to the ”values and traditions‖ of a people. Francisco Imbernón (2000) also emphasizes that this model of teacher education should contribute to an educational approach that recognizes the potential need for and benefits of educational innovation. It should create teaching models for specific contexts where educational tasks frequently change due to significant cultural diversity. It should aim at social well-being and revise and improve the content required in teacher education programs, since professional knowledge improves when it is connected with practice beyond the classroom. Ubiratan D'Ambrosio (1998) further discusses cultural diversity, suggesting that we can think in terms of skills (techniques) followed by practices (actions) that are characteristic of cultural groups as ways of understanding, explaining, and interpreting the context in which individuals are situated. This enables individuals to comprehend their reality and interact with it for their own benefit or for that of their group. This context is characterized as ethnographic and meaningful to the student. Philippe Perrenoud (2000) proposes a reflective practice in teaching, that is, analyzing and applying new competencies for instruction. He leads us on a reflective journey in Ten New Competencies for Teaching, the title of his work. Regarding the topic ”Working from students' representations,‖ the author states:

”School does not build from nothing, nor is the learner a tabula rasa, an empty mind; on the contrary, students already ‗know many things,' have asked questions, and have assimilated or elaborated answers that satisfy them provisionally. Because of this, teaching often clashes with learners' conceptions. No experienced teacher ignores this fact: students believe they already know part of what we wish to teach them. Good traditional pedagogy sometimes uses these fragments of knowledge as points of support, but the teacher still transmits - at least implicitly - the following message: ‗Forget what you know, distrust common sense and what you have been told, and listen to me, because I will explain how things really happen.'‖ (Perrenoud, 2000, p. 28)

From the author's words, it is possible to identify that in some cases students' prior conceptions are ignored. However, it is not easy to discard them. It is essential to incorporate them into lessons, demonstrate interest, and seek to understand their roots. It is an important step for teachers to allow space for discussion and avoid immediately repressing students' reasoning with the argument that such spontaneous conjectures might lead to erroneous conclusions about the topic. Instead, teachers must understand what students bring from objective culture and work from this perspective to evaluate such knowledge. Through dialogue with students, teachers can guide them toward the scientific knowledge - Mathematics Education - that we seek to teach. There is therefore a need to seek a theoretical foundation - a conceptual core upon which techniques, skills, and actions for understanding, explaining, and interpreting cultural reality may rely, enabling teachers to understand students' prior conceptions. The analysis through Ethnomathematics becomes essential, since it historically and culturally helps connect mathematical science with history. This implies culturally differentiated groups coexisting in common environments and explaining common elements from different perspectives. As we will observe throughout this text, the activities of individuals primarily arise from motivation generated by the reality in which they are situated. This reality presents situations or problems that, through perception or sensory mechanisms, lead the individual from reality to action. When we recognize that such problems may have cultural approaches, it becomes essential to understand the cognitive differences resulting from these cultural distinctions. In this sense, Ethnomathematics provides the benefit of a cultural perspective, in which the observation of history emerges as a powerful pedagogical instrument that directly supports the learning process through a particularly holistic perspective.

When we understand that the original source of knowledge is nature - the reality in which the individual is situated - knowledge becomes intelligible and holistically ordered rather than separated or grouped into rigid disciplinary structures. The division of knowledge into categories follows predetermined models and therefore encompasses only aspects of reality that fit those models. Such a disciplinary model narrows the global view of reality, and purely historical foundations often contribute little to clarifying some fundamental questions about knowledge. Within Ethnomathematics, however, a holistic perspective allows historical foundations to support a critical model for the generation and production of knowledge, both in its appropriation and its transmission. In this way, creativity fosters knowledge and cultural development; the school fosters the institutionalization of produced knowledge; and education ensures its transmission. Thus, the importance of Ethnomathematics becomes evident - particularly when combined with active methodologies - in the development of the Mathematics curriculum.

6 Mathematics, Culture, and Everyday Life: Bridge

Ethnomathematical Practice in the Teaching of Geometry as Construction

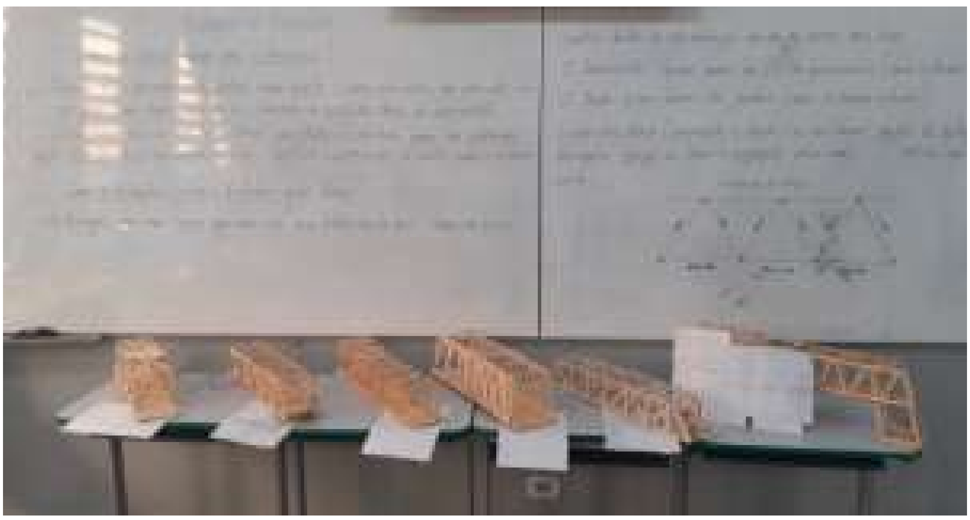
In order to materialize the theoretical assumptions discussed throughout this study - especially those related to Ethnomathematics and the appreciation of sociocultural contexts in mathematics teaching - a practical activity was developed with 30 ninth-grade students in lower secondary education, focused on the study of geometry, with emphasis on the properties of triangles. The proposal was conceived from the understanding that mathematical learning becomes more meaningful when connected to students' everyday experiences. In this sense, the urban context of Sao Paulo was considered, where the presence of bridges, overpasses, and metallic structures that employ triangulation as a structural support principle is common. Such structures are part of students' daily lives, even though they are often not perceived from a formal mathematical perspective. This reality served as the starting point for the development of the activity, establishing a connection between students' empirical knowledge and school-based geometric concepts, in accordance with the principles of Ethnomathematics proposed by Ubiratan D'Ambrosio. The activity consisted of constructing bridge models using popsicle sticks. Students, organized into groups, were challenged to design structures with greater resistance, predominantly using triangular shapes. During the process, students mobilized prior knowledge, formulated hypotheses, and tested different structural configurations. As a culminating activity, a competition was held among the groups, in which the bridges were subjected to progressively increasing loads in order to determine which structure could support the greatest weight. As illustrated in the figures below, which present photographic records of the classroom activity, a dynamic learning environment can be observed, in which students are engaged in processes of construction, experimentation, and hypothesis validation.

Figure 1: *Planning stage (left) and construction stage (right).*

Figure 2: *Construction stage (left) and construction outcome (right).*

During the development of the activity, a progressive expansion in students' ability to apply geometric concepts was observed, particularly with regard to understanding the structural rigidity of triangles. Initially, some groups experienced difficulties in organizing their structures, opting for less stable forms; however, throughout the process they were able to revise their strategies, incorporating triangular elements more consistently. This evolution demonstrates a learning process based on experimentation, error analysis, and the reconstruction of concepts.

Figure 3: *Final product.*



From a pedagogical perspective, the experience demonstrated significant results in terms of student engagement, attention, and participation. A reduction in off-task behavior and an increase in the amount of time students remained focused on the proposed tasks were observed, suggesting greater concentration and interest in the content. Additionally, students showed greater autonomy in problem solving, assuming an active role in decision-making during the construction of the structures.

It is also noteworthy that students began to recognize relationships between form and function in the structures they built, understanding more concretely the application of geometric concepts in real-life situations. This result directly aligns with the theoretical foundations presented earlier, demonstrating that mathematical learning, when culturally contextualized, promotes the construction of meaning and the internalization of concepts. As a culminating activity, a competition was held among the groups in which the bridges were subjected to progressively increasing loads in order to determine which structure could support the greatest weight. During the development of the activity, a progressive improvement in students' ability to mobilize geometric concepts in applied contexts was observed, particularly in their understanding of the structural rigidity of triangles.

Figure 4: *Reflections on theory and practice with Morelo (left) and winning group (right).*

7 Didactic Structure of the Activity: Teaching Geometry with Triangulated Structures

The proposal presented below consists of a simple didactic model that can be applied by mathematics teachers in elementary school classes, early high school, and higher education courses such as Civil Engineering. The objective is to explore geometric

concepts through the construction of triangulated structures, connecting formal mathematical knowledge to real-world applications found in everyday constructions such as bridges, roofs, and metal towers. The activity was designed for three 50-minute lessons and can be adapted according to the pace of the class.

Geometric Foundation: Why Are Triangles More Resistant?

Before the practical activity, it is important for students to understand a fundamental geometric property: the rigidity of the triangle. In geometry, three non-collinear points determine a unique triangle. When its sides are fixed, the figure cannot be deformed without changing the length of its sides. For this reason, the triangle is considered a stable or rigid structure. This does not occur with other shapes. A square, for example, can be deformed while maintaining the same side lengths, turning into a parallelogram. The triangle, however, preserves its shape. This property explains why triangles are widely used in engineering structures, forming systems known as trusses, which increase the strength of bridges, roofs, and towers. This explanation should be presented in a simple way by the teacher, using visual examples or small demonstrations with articulated materials. The activity is organized into three lessons:

First Lesson (50 minutes): Introduction and Geometric Discussion

The lesson begins with a brief discussion about structures found in everyday life, such as bridges, roofs, or power towers. The teacher may present images of these constructions and ask students to observe the geometric shapes present. Next, the teacher explains the rigidity property of triangles, comparing them with squares or rectangles. A simple demonstration can be done using sticks connected with tape or clips, showing how a square can deform while the triangle maintains its shape. At the end of the lesson, the teacher presents the challenge: each group must build a bridge model using triangulated structures.

Second Lesson (50 minutes): Planning and Construction

Students are organized into groups (in this case, 6 groups of 5 students). Each group receives simple materials, such as:

- wooden or popsicle sticks
- hot glue
- graph paper for planning

Before construction, groups should briefly discuss the shape of the bridge and how to use triangles to increase the structure's strength. Then, they begin building their models. During this process, the teacher circulates among the groups, encouraging students to apply the geometric concepts discussed in the previous lesson.

Third Lesson (50 minutes): Testing and Discussion

In the final lesson, each group presents its structure. The bridges can be tested with small weights gradually placed on them. The goal is not only to identify the strongest bridge but also to observe how the use of triangles influences structural stability. After testing, the teacher leads a brief discussion with the class, relating the observed results to the concept of triangle rigidity studied earlier. This moment is important to consolidate learning, showing how a geometric concept can explain solutions used in real constructions.

Possibilities for Adaptation

This model can be easily adapted to different school contexts, as it uses simple materials and allows for various mathematical extensions, such as:

- analysis of symmetry in structures
- comparison between different geometric shapes
- discussion of measurements and proportions

Thus, the activity functions as an investigative lesson model, in which geometric concepts are explored through a practical and collaborative experience.

Implications for Teaching Practice

The described activity shows that the integration between culture and mathematics, as proposed by Ethnomathematics, can be applied concretely in the school context. By considering elements from students' daily lives and valuing aspects of local culture, the teacher promotes more meaningful learning, in which mathematical concepts are perceived as relevant and applicable to different situations. In this process, the teacher's role is fundamental. Acting as a mediator of learning, the teacher organizes didactic situations that encourage participation, dialogue, and investigation. This approach brings mathematics teaching closer to students' cultural experiences, characterizing a culturally responsive pedagogical practice. During the development of the activity, it was observed that contextualizing content contributed to greater student engagement and participation in discussions. The construction of structures and the collective analysis of results supported the understanding of geometric concepts, demonstrating that the articulation between theory and practice can enhance student learning. Thus, valuing local culture and incorporating principles of Ethnomathematics into teaching practice prove to be relevant strategies for promoting more meaningful, participatory, and reality-connected mathematics education.

8 Conclusion

The present study sought to discuss the contributions of Ethnomathematics to mathematics education, emphasizing the relationship between culture, the individual, and learning, while advocating for pedagogical practices that recognize and value students' sociocultural contexts. Throughout the study, it was argued that mathematics teaching, when disconnected from students' realities, tends to assume an abstract and less meaningful character, which may compromise both engagement and conceptual understanding. The theoretical framework presented, grounded in authors who discuss culture, education, and Ethnomathematics, allowed us to understand that mathematical knowledge is neither neutral nor universal in its forms of appropriation; rather, it is deeply related to cultural practices and the lived experiences of individuals. In this sense, valuing everyday knowledge and articulating formal and informal knowledge emerge as central elements in the construction of meaningful learning. The inclusion of the practical experience developed with ninth-grade lower secondary students made it possible to demonstrate concretely how the principles of Ethnomathematics can be operationalized in the classroom. The activity of constructing bridges using popsicle sticks, based on the observation of structures present in the students' urban environment, enabled an effective connection between theory and practice, demonstrating that geometric concepts can be understood more deeply when culturally contextualized. This perspective aligns with the theoretical contributions of Ubiratan D'Ambrosio, who emphasizes the integration of cultural knowledge within mathematics education. The observed results indicated relevant advances in the learning process, expressed through increased engagement, attention, and student participation, as well as the development of greater autonomy in problem-solving and a deeper understanding of geometric concepts, particularly regarding the structural rigidity of triangles. Furthermore, the activity encouraged interaction among students and the collective construction of knowledge - fundamental aspects within a contemporary educational perspective. These findings reinforce that the articulation between theory and practice, mediated through an ethnomathematical approach, not only enriches the teaching process but also contributes to making mathematics more accessible, relevant, and meaningful for students. By recognizing cultural context as a structuring element of learning, teachers expand their possibilities for pedagogical intervention, promoting a more inclusive form of education connected to students' realities. Finally, it is important to emphasize that the model of practice presented in this study may serve as a reference for other educational contexts, offering practical guidance for teachers who wish to integrate culture and mathematics in their classrooms. Thus, Ethnomathematics is reaffirmed as a powerful approach not only in the theoretical domain but, above all, as a pedagogical practice capable of transforming the teaching and learning of mathematics at different levels of education.

References

Alan J. Bishop. (1988). *Mathematical enculturation: A cultural perspective on mathematics education.* Dordrecht, Netherlands: Kluwer Academic Publishers. https://doi.org/10.1007/978-94-009-2657-8

National Council of Teachers of Mathematics. (2024). The intersection of culture and mathematics. https://www.nctm.org/Standards-and-Positions/Position-Statements/TheIntersection-of-Culture-and-Mathematics/

Ubiratan D'Ambrosio. (1998). *Etnomatemática: Arte ou técnica de explicar e conhecer* (4th ed.). São Paulo, Brazil: Ática.

Ubiratan D'Ambrosio. (2002). *Etnomatemática: Elo entre as tradições e a modernidade* (2nd ed.). Belo Horizonte, Brazil: Autêntica.

Ubiratan D'Ambrosio. (2019). *O estado da civilização e a responsabilidade de matemáticos e educadores matemáticos*. São Paulo, Brazil: UNIAN.

Terry Eagleton. (2003). *The idea of culture*. São Paulo, Brazil: Editora UNESP.

Paulus Gerdes. (2012). *Ethnomathematics: Culture, mathematics, education. Collected papers 1979–1991.* Maputo, Mozambique: Instituto Superior Pedagógico.

Francisco Imbernón. (2000). *Formação docente e profissional: Formar-se para a mudança e a incerteza.* São Paulo, Brazil: Cortez.

Clyde Kluckhohn. (1970). *Introdução à antropologia*. São Paulo, Brazil: Cultrix.

Gelsa Knijnik. (1996). *Exclusão e resistência: Educação matemática e legitimidade cultural.* Porto Alegre, Brazil: Artes Médicas.

Gelsa Knijnik., Fernanda Wanderer., Ieda W. Giongo., & Claudia G. Duarte. (2012). *Etnomatemática em movimento*. Belo Horizonte, Brazil: Autêntica.

Ming Yi Lai., & Rongjin Huang. (Eds.). (2025). *Culture matters in mathematics teaching and learning: Research studies in honor of Professor Frederick K. S. Leung*. Cham, Switzerland: Springer. https://doi.org/10.1007/978-3-031-90518-6

Bronisław Malinowski. (1970). *Uma teoria científica da cultura* (2nd ed.). Rio de Janeiro, Brazil: Zahar.

Philippe Perrenoud. (2000). *Dez novas competências para ensinar*. Porto Alegre, Brazil: Artmed.

Antonio Delgado Salvador. (1974). *Cultura e educação brasileiras* (3rd ed.). Petrópolis, Brazil: Vozes.

Rudolf Steiner. (2016). *Conceitos fundamentais para uma psicologia antroposófica*. São Paulo, Brazil: Antroposófica.

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