LUMEN ET VIRTUS

ETHNOMATHEMATICS: GEOMETRY PRESENT IN THE JIRIPANKÓ INDIGENOUS CULTURE

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ABSTRACT

Even recognizing that the school is a space of knowledge and formation of the subject and that through teaching-learning cognitive knowledge and the ability to recognize the self, the other and the "we" are developed, it is important to demonstrate that cultural knowledge is fundamental for the subject to be able to find himself in this teaching-learning relationship. This article seeks to highlight geometry in the Jiripankó culture, whether in the graphics present in body painting and handicrafts, also recognizing that it is present in the measurement of land in fathoms, as well as in local architecture or rituals. The work is the result of the research carried out for the elaboration of the Course Completion Work (TCC) in the Indigenous Intercultural Degree Course in Mathematics in the program of the Indigenous Intercultural Degree Courses of Alagoas (CLIND/AL) developed by the State University of Alagoas – UNEAL. The research developed was of the qualitative type, carried out through literature review followed by participant observation to identify the geometric shapes present in the graphics and cultural manifestations in the Jiripankó indigenous territory. For this, the research is supported by authors such as D'Ambrósio (1998), Ferreira (2008), Ferreira (1997). A priori, this work intends to recognize and value the mathematical customs within the indigenous culture, as it understands that the methods of counting and the forms of mathematical expressions present in the traditions of indigenous peoples are also important elements for school learning, as it makes this learning more meaningful, specific and communitarian.

Keywords: Ethnomathematics, Indigenous geometry, Jiripankó People, CLIND-UNEAL.

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INTRODUCTION

This article is the result of theoretical-methodological reflections on the geometry present in the Jiripankó indigenous culture, especially in the graphics expressed in body paintings and in the art objects made by the community using wood and clay. Identifying these geometric elements is important for the recognition of cultural diversity and its manifestations represented through forms in different aspects of the daily life of this people.

In this theoretical context, this work aims to recognize and value the mathematical customs within the indigenous culture, including the methods of counting and form of mathematical expressions that are part of the tradition of this people. To this end, we sought to identify the presence of geometric shapes in indigenous culture and how these elements can contribute to resignify the teaching of school mathematics, demonstrating that the knowledge of ethnomathematics is important for teaching in indigenous schools. It is important to record some of this knowledge that is not identified in the teaching-learning process, but integrates the traditional knowledge of this people makes this traditional indigenous knowledge closer to school teachings.

This work is also justified by the recognition of the existence of geometric elements in painting and graphics deeply rooted in indigenous culture as elements of this intrinsic relationship between indigenous mathematics and school mathematics, reflecting the geometric knowledge and mathematical skills developed over generations. Therefore, this relationship between traditional knowledge and school knowledge is fundamental to discuss and analyze indigenous school education, including the Guidelines for Indigenous Educational Policy emphasize that

> [...] indigenous peoples have their own ways of occupying their lands and exploiting the resources that are found on them; they have their own forms of community life; they have their own forms of teaching and learning, based on the oral transmission of collective knowledge and the knowledge of each individual. (BRASIL, 1994, p.176).

Regarding the knowledge and practices of culture in everyday life, D Ambrósio (2002, p.22) points out that

> Daily life is impregnated with the knowledge and practices of culture. At every moment, individuals are comparing, classifying, quantifying, measuring, explaining, generalizing, inferring, and in some way evaluating, using the material and intellectual instruments that are their own culture.

In addition, it is important to point out that when it comes to school geometry, the National Common Curricular Base (BNCC) brings in relation to Geometry when it emphasizes: "Geometry involves the study of a broad set of concepts and procedures necessary to solve problems in the physical world and in different areas of knowledge" (*Idem,* p. 269). In this context, in order for indigenous school education to be viable, we must understand that indigenous education diverges from school education, as the school enters indigenous communities as a formal teaching model that, in turn, is ready, preventing indigenous education from being part of the school curriculum. When it comes to indigenous education, it refers to what is learned in the community or in the social and cultural context in which the indigenous subject is inserted. In this way, all knowledge that was passed on by ancestors is considered valid.

In this sense, the notions of numbers acquired before the indigenous subject goes to school come from group experiences. Indigenous games are examples of the teaching of indigenous mathematics, as well as counting games with ouricuri shells, games with cashew nuts, etc. In this same perspective, the geometry present in indigenous paintings, in the measurements by fathoms of land, in the architecture of local constructions that are also part of this list of knowledge that can be transposed to formal school education.

Mathematics is also present in other contexts of indigenous culture, such as the turns that a praiá takes in the terreiro, in the shape of the campiô, in the dozens of caroá necessary to make a garment. In short, they are notes capable of demonstrating that mathematics is part of the culture of the Jiripankó people and that this knowledge should be considered valid as knowledge in indigenous school education. From these notes, it is possible to perceive how much the indigenous school of the Jiripankó people has the possibility of exploring, in a significant way in terms of interculturality, these ways of working with ethnomathematics present in their cultural context to offer a differentiated education as is guaranteed to indigenous peoples by the current legislation. Thus, by recognizing and incorporating cultural diversities, ethnomathematics would promote improvements in the teaching-learning process, being increasingly effective and meaningful for students.

In this way, we can also justify this work from an overview of the problem, which materializes the desire to demonstrate that the traditional knowledge of a people provides several elements to think about ethnomathematics as a common practice in the actions of the indigenous community and that these should be considered in the school curriculum in order to contribute to the consolidation of a differentiated education.

This research is classified as exploratory of the bibliographic type with participant observation, because the author is a Jiripankó indigenous and, in this condition, from the

identification of the object of analysis, reflections were made based on the selected literature on the subject. The contributions of D'Ambrósio (1998), Ferreira (2009), Ferreira (1997) among others, were fundamental to this research.

The text is organized in two parts: a theoretical framework in which important concepts for the understanding of the theme are discussed, as well as a brief characterization of the Jiripankó people and discussion about the geometric elements present in the graphics of body painting and local handicrafts. The second part is the results and discussions in which it is sought to develop an interconnection between the geometric patterns that express the Jiripankó reality and emphasized geometry beyond an aesthetic issue of the painting of the graphics, but in the deepening intertwined with the geometric patterns present in his art whether in handicrafts, weaving, ceramics, body painting, in the spirituality or social organization of the community.

THEORETICAL FRAMEWORK

This study was, theoretically, based on three investigative axes: The Jiripankó people, who are they? Ferreira (1997); (Ferreira (2009); Ethnomathematics in the context of school education of the Jiripankó people, Grupioni (2001) and geometry rooted in Jiripankó culture, Mendonça (2021). In view of the observation and theoretical support, it was sought to understand that having knowledge of spatial relations, proportions and patterns, evidencing the presence and application of indigenous mathematics in various aspects of daily life, denotes that "... teaching is not transferring knowledge, but creating possibilities for its own production or construction." (Freire, 1996, p. 52).

THE JIRIPANKÓ PEOPLE, WHO ARE THEY?

The arrival of José Carapina in Pariconha took place in 1852, when he took root in the source of the Ouricuri, at the foot of the Simão mountain range, as described by Ferreira (2009). The ethnicity was recognized in the 1990s, as a result of a struggle waged with other leaders in the state of Alagoas and partner organizations of indigenous peoples, including the Xucuru-Kariri people of Palmeira dos Índios. This process of struggle is mentioned in the anthropological report of the National Foundation of Indigenous Peoples – FUNAI, on the Jiripankó ethnic foundation.

The origins of the Jiripankó descend from the Pankararu of Brejo dos Padres, an indigenous people from the Northeast concentrated between the municipalities of Tacaratú and Jatobá – PE. The Jiripankó ethnic group is located in the municipality of Pariconha, in the Sertão de Alagoas and according to the latest survey of data from the Special

Secretariat for Indigenous Health – SESAI and data from the Local Health Council, its population is currently estimated at around 450 families. The geographic organization of the villages has as the center of its physical, social and cultural structures and the organization of internal leaders the Ouricuri community, followed by the villages of Figueredo, Tabuleiro, Araticum, Serra do Engenho and Poço d'Areia.

The Jiripankó have the same traditional practices as the Pankararu, the dance of the Praiá, the Umbu Festival, the Boy of the Ranch, among others that are part of the cultural manifestations present in the culture of the Jiripankó.

> Even though they migrated far from the Pakararu nucleus, the Jiripankó kept in touch with their relatives and frequently visited Brejo dos Padres, including for indigenous festivals. It was through the relations they maintained with their Pankararu relatives that the Jiripankó Chief Genésio Miranda da Silva achieved the recognition of his people. As a young man, Genésio had been initiated into the closed rituals of the Pakararu and until the age of 19 he frequented the terreiro and the Poró (ritual house) in Brejo dos Padres. In the 1980s, the Jiripankó community, seeking their recognition and rights as indigenous peoples, decided to send representatives to Brasília (Ferreira, 1997, p.35).

In addition to the manifestations mentioned above among the Jiripankó, the handicraft practice is common, the work with wood, feathers, fibers and seeds makes indigenous handicrafts an attraction not only for the internal community, but also for the external community.

ETHNOMATHEMATICS IN THE CONTEXT OF SCHOOL EDUCATION OF THE JIRIPANKÓ PEOPLE

Ethnomathematics is a field of study that recognizes the practice of teaching mathematics in the culture of certain peoples, including indigenous communities, going beyond traditional forms of teaching and learning. It seeks to understand how different cultures use and develop mathematical concepts in the context of their everyday experiences. When applied to the school environment, ethnomathematics promotes a more adequate view of the discipline, recognizing that mathematics is present in different forms in cultural environments around the world. Also, we can observe that it promotes an inclusive and contextualized view in the understanding of mathematical concepts in the context of their common experiences.

In this sense, D'Ambrosio (2005) states that

> Each individual carries with them cultural roots, which come from their home, since they are born. He learns from parents, friends, the neighborhood, the community. The individual spends a few years acquiring these roots. Upon arriving at school, there is usually a process of improvement, transformation and replacement of these roots (p. 41).

When exploring the relationship between ethnomathematics, school, and indigenous culture, it is essential to recognize that mathematics is not an isolated entity, but rather a cultural and social practice. Pereira & Santana (2020, p. 18) say that "knowledge about sociocultural artifacts is specific to each indigenous ethnodimensional territory, which corroborates the strengthening of ethnic and cultural identity and their traditional knowledge".

Indigenous communities have their own mathematical systems that often differ from the conventional methods taught in Western schools. Ethnomathematics seeks to incorporate local cultural elements into practice, recognizing the knowledge that exists in traditions. In this sense, Grupioni (2001, p.39) suggests that "indigenous peoples should be assured the right to quality education, which respects and values their knowledge and traditional knowledge and allows them access to universal knowledge, so that they can actively participate as full citizens of the country".

The indigenous Jiripankó people have particular ways of counting, measuring, and solving mathematical problems, which reflect their unique relationship with the environment and nature. Ethnomathematics seeks to include local cultural elements in practice, recognizing the knowledge that exists in traditions. Again, Pereira & Santana (2020) reflects that the praxis of indigenous sociocultural mathematics is closely associated with mathematical cultural productions and artifacts, such as: arrows, baskets, boats, necklaces, hollows, spears, wooden spoons, boards, among others.

In this way, each indigenous community brings its reflections on the sociocultural aspects where ethnomathematics is developed and used in their cultures and ways of life. Corroborating, D'Ambrosio (2009, p. 66) points out that

> Despite the localist approach of Ethnomathematics, it has extensive experience of the way in which diversity operates to create meanings and mathematical knowledge in different social groups around the world, as well as the way it is contextualized and used in the organization of local knowledge systems to encode different meanings in each culture. Thus, Ethnomathematics has accumulated knowledge about how social groups are aware of their needs and under what conditions they use their local mathematics to address them.

Finally, ethnomathematics in school, especially when applied to indigenous culture, represents an enriching approach that recognizes and celebrates diversity in mathematical practice. This not only enriches mathematics education but also promotes respect and appreciation for the various forms of mathematical knowledge present around the world.

GEOMETRY ROOTED IN JIRIPANKÓ CULTURE

Geometry is considered one of the three major areas of mathematics along with calculus and algebra. It deals with the forms of objects present in mother nature, as well as the positions occupied by these objects, their relative relationships and properties. Geometry is present in primitive objects through points, line, plane, space, etc. and so it also appears in the Jiripankó culture.

The Jiripankó have the same traditional practices as the Pankararu of Brejo dos Padres/PE. The dance of the praiá, the Umbu Festival, the Boy from the Ranch, among others that make up the calendar of cultural manifestations present in the culture of the Jiripankó. The traditional Umbu festival is held every year and is celebrated in the rainy months. In the month of December, the first fall of the fruit of the umbu tree takes place, when the indigenous people consider it to be the offering of the fruits or the time of abundance. When they find the fruit ripe, the Jiripankó arrows the umbu as a way of announcing the arrival of the harvest.

On the same day, the indigenous people perform a ritual called puxada do cipó. It is a practice compared to tug of war, similar to the traditional game of other ethnic groups in the country. Among the Jiripankó, the competition takes place with the pulling of the mucunã vine (*Mucuna Pruriens*), a climbing plant of the *Fabaceae family*, which use a harmonious competition between the beach and people from the community. In the cosmological sense, through this ritual one obtains signs of fertile years in the village or as they say "year of plenty".

This rite is the passage to celebrate the umbu festival or Imbu Race with four Saturdays and Sundays of traditional dances in the terreiro celebrating the harvest of the Jiripankó people during the year. At the festival there are offerings to the enchanted, with slaughters and baskets of fruit and food harvested from the traditional garden. The end of the festival takes place between the end of February and the beginning of March, however, this festival does not have a fixed date, but the months must be the same and they carry out according to the mobilization and raising of financial resources for the umbu festival to take place.

Photograph 1 represents mathematical content through geometric patterns in handicrafts, enabling the study of symmetries and repetitions in baskets, measurements and proportions used in traditional activities. The construction and use of the baskets involves the concept of capacities (quantity, price difference and weight) and even geometric structures that can be observed in the wefts of the braiding and other forms of artistic expression (the basket figure is formed by several loops built with vines).

Therefore, mathematics plays a key role in the construction of indigenous baskets, where geometric knowledge is applied in a practical and intuitive way. Indigenous baskets, in addition to being utilitarian, often have meanings that can reflect the identity and culture of the peoples who produce them. Thus, the image is deeply integrated into the cultural practice and daily life of the Jiripankó people.

Photograph 1: Women carrying the basket at the umbu festival.



Photo: Wyrakitã Terê, 2020.

In the culture of the Jiripankó, clay or toá is a main natural element used to reproduce the indigenous body graphics. During sacred rituals, such as the Ranch Boy festival and the Umbu Race, indigenous body painting is made composed of geometric and artistic symbols that adorn the bodies of men and women who dance during the ritual. The geometric form of the painting makes it possible to reflect on the forms of writing and ancient symbols present in the memory and practice of ethnomathematics under the cultural reproduction of the Jiripankó.

Regarding body painting, Mendonça (2021) emphasizes that symbols have been resignified over time and only the most important ones are maintained and passed on to the following generations. The author classifies the graphics of this people into two categories: ancestral and traditional. The ancestral graphics are those present in the Pankararu People and the traditional ones are those adopted by the Jiripankó who keep some symbols

inherited from their ancestors. Thus, "even ancestral symbols, which were adopted in full – such as the cross and small circles – had their aspects resignified, becoming traditional for the Jiripankó and starting to be reproduced, similar to what also occurred with their dispositions on their bodies." (Mendonça, 2021, p. 47).

Analyzing from the indigenous geometric context, the most common symbols in Jiripankó graphics are geometric shapes and they are represented in photograph 2. In this way, it is noticeable that mathematics integrates cultural elements through content such as: the area of the triangle that is found in the child's body and the length of the vertex of the praiá, built of Croá fiber, among others.

Photograph 2: Ranch Boy's Party



Photo: Wyrakitã Terê, 2023.

Any traditional celebration of some indigenous communities, such as the Jiripankó, in the Sertão de Alagoas, is characterized by a festival, rich in symbolism and meanings, which involves various cultural elements, including dances, songs, rituals and, directly or indirectly, the use of mathematical concepts in the organization and execution of the activity.

Understanding and valuing the mathematics present, especially at the Rancho Boy's Festival, can enrich indigenous education, connecting school knowledge to traditional knowledge. This helps to preserve and transmit indigenous culture to new generations, while recognizing the complexity and richness of indigenous mathematical traditions.

According to Orey and Rosa (2004, p. 30)

> It is not the premise of ethnomathematics to disdain the models developed by academic mathematics or Western traditions, but to consider as valid all the ways of explaining and understanding reality, which are formulated and accumulated by different peoples and cultures. Still, the authors add: The culture of each group represents the set of data that are related to the knowledge acquired and accumulated, to the values and also to the ways of seeing the world, which were transmitted from one generation to another, such as language, words, concepts and symbols. (p. 30)

In this way, studying the written symbols of native peoples and correlating them to the mathematical writing of these peoples is also to enable a new *praxis* for teaching. From the intercultural perspective, the possibility of implementing indigenous education is perceived, in fact, as a model of differentiated education.

Still on the subject of graphics, Mendonça (2021, p.7) says that "considering body graphics as a point of memory of the Jiripankó indigenous people developed, in the course of a long historical formation, consequently refers the discussions to the context of their origin". In this way, studying the written symbols of the original peoples and correlating them to the mathematical writing of these peoples is also to enable a new *teaching praxis* as stated above. Considering body graphics as a point of memory of the Jiripankó indigenous people, developed in the course of a long historical formation, consequently refers the discussions to the context of their origin. Also, the area of the rectangle of the square of the triangle and the area of a circle. Looking at photograph 3, one can see the symbolism represented by body painting using geometric shapes of symbolic elements that include lines, circles, triangles and other patterns with analytical geometry content represented by angles and symmetries that have deep cultural meanings.

Furthermore, the graphics represented on the indigenous body characterize a rich and significant cultural practice, used to express identity, spirituality and connection with nature. These graphics, brought in photograph 3, are drawings or paintings made directly on the body, often using strokes to mark the identity within the community. They can be applied to different parts of the body, such as the face, arms, legs, back, and chest and their meanings vary according to the cultural context and ritual of the people, reflecting the deep relationship of indigenous peoples with their identity and the world around them.

The practice of body graphics is a way of transmitting knowledge and cultural values. In educational contexts, both within and outside indigenous communities, graphics can be studied and valued as part of the cultural heritage of these peoples. On this point, Mendonça (2020, p.54) states that during rituals, body painting

It works as a link between the human and the sacred, justifying its use and, at the same time, reinforcing the memories and identity of those involved. It maintains, therefore, the necessary particularities for it to represent the past, memories, identity and religion, which are: 1) "material", marked by clay and its place of collection, place of use and the graphics themselves; 2) "functional" because it is necessary in rituals due to religion; and 3) "symbolic", because it entails different meanings recognized as traditional.

Photograph 3: Painted godparents at the Ranch Boy's party.



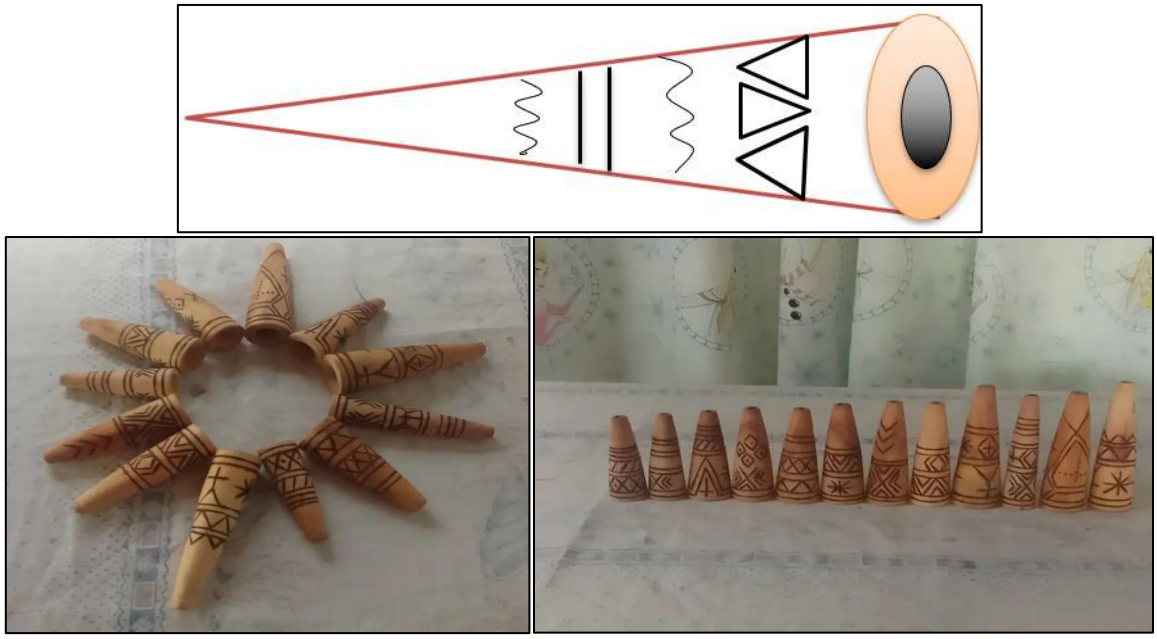
Photo: Wyrakitã Terê, 2020.

We also find graphics in the Campiô, the maracá, the bow and arrow, the club and other indigenous artifacts of the Jiripankó. This geometry is found until the way the craftsmen make these artifacts and this requires mathematical knowledge, that is, applied mathematical knowledge. The inspiration of the Jiripankó comes from mother nature herself to idealize and reproduce in her visual arts geometric shapes in different lines. These lines are straight, parallel, curved, perpendicular and are seen in the drawings in the form of triangles, rectangles, squares, etc. We can consider that graphics are lines that have geometric and symmetrical patterns that are present in the body painting of the indigenous people as well as worked on ceramics and in the making of baskets. Corroborating, Vidal (1992) sees the graphics on the skin as cultural meanings and also states that individuals are classified in the midst of the society they live in and the relationship with each other and with nature.

Observe the illustration of the pipes or Campiô used by the indigenous people in the sacred rituals of the Jiripankó culture and tradition. Through it it is possible to work the area

of a triangle, the graph of a Cartesian plane and the difference from one point to another in the shape of size, capacity and the geometric designs of the graphics.

Figure 1: Drawing of the pipes or Campiô (geometric shape) next to the real pipe with graphics of different strokes.



Source: Carried out by the author, 2024.

To make it, the artisan uses the root of the jurema in an artisanal way, uses mathematics to measure the size (about 20 cm long), the object is inscribed with hot iron graphics, containing symbologies in geometric shapes adding meanings typical of the Jiripankó worldview, meanings such as the passage of forests, waters, herbs, etc.

Observing these mathematical elements, we realize that the community itself points out ways for indigenous educators to think about the effectiveness of a teaching practice based on interculturality. In this sense, this practice allows us to go beyond the wall of the indigenous school, identifying the existence of other forms of learning, as we have seen in the paintings and graphics and in the games and games present in the social and cultural context in which the indigenous subjects are inserted. By acting in this way, the school recognizes and values the traditional knowledge that each people carries with it.

Also, indigenous cultures use geometry in the construction of their dwellings, in the planning of villages and in the creation of utilitarian objects, such as baskets and ceramics, employing the use of geometric shapes such as circles, triangles and squares being common in various patterns and artifacts. The houses in the village follow specific geometric patterns, allowing for involuntary identification of geometric information. Also, in the construction of their dwellings and community structures, such as hollows or houses,

geometry is fundamental, as it is often based on simple geometric shapes that are chosen for their stability and efficiency in the use of materials.

Photo 4: Indigenous man in front of the ritual house – Poró.



Photo: Wyrakitã Terê, 2020.

In addition, painting and graphics in indigenous cultures go beyond aesthetics, they have symbolic meanings and correlations with their rituals. According to Mendonça (2020, p. 53) "[...] the small circles of the paintings, for example, would be a kind of tribute to the founding families". In addition to the bodies, the graphics are also found in objects made of ceramics, fabrics and wood. They are composed of geometric patterns, such as straight lines, curves, spirals and repetitive shapes as can be seen in photograph 4 presented above. These patterns are not only decorative, but carry narratives, stories, and ancestral knowledge related to the community that synthesize elements linked to beliefs in their contexts. In this sense, Gerdes (1992) reports that the understanding of the concept of right angle of a rectangle was developed by man in his activities. Thus, geometry in indigenous crafts represents a rich source of expression of applied mathematical knowledge.

The relationship between mathematics and indigenous culture is based on observations of nature and the need to solve practical problems, such as measuring land, counting people or objects, the construction of houses expressing various geometric aspects and other specific situations. Ultimately, geometric patterns require understandings of mathematical concepts and principles, and often involve calculations that ensure that patterns are performed in coherent, contextualized, and accurate ways. These situations are viewed in the contexts of the Jiripankó people.

In this bias of the relationship between mathematics and culture, Jiripankó expressed in photography 5 demonstrates that handicrafts incorporate geometric concepts in a practical and aesthetic way. In it, geometric patterns that include points, lines and planes are commonly used in a precise way, evidencing a deep understanding of proportions and symmetry and, also, involving an intuitive understanding of geometry and the physics of materials. These graphic elements express the particular characteristics of the people who reproduce it.

Photo 5: Handmade work involving reproduction of local graphics.



Photo: Wyrakitã Terê, 2023.

In the face of so many possibilities to work on the ethnothematic context in school education, there are also some challenges to be faced. First, with a curriculum "imposed" by the State aimed at meeting educational goals that prevent teachers from indigenous schools from working in a more contextualized way. Secondly, it is important to question whether over time indigenous educators have lost interest in the cultural appreciation of our oral narratives, in paintings, our geometric aspects and traditional games. To strengthen and value indigenous knowledge, it is essential that it be incorporated into the school curriculum, promoting the intertwining between indigenous education and school education.

We believe that the school is a fundamental space for the strengthening of culture when it manages to adapt its contents to local knowledge.

For the elaboration of this work, some steps were followed that are described in the methodology presented below. It is fundamental to understand the path taken in the preparation of the text and analyses presented.

METHODOLOGY

The present work is the result of an ethnographic research carried out in the Jiripankó indigenous community, based on bibliographic references that discussed the theme, together with direct and indirect observations that involved a dossier of reports and lived experiences. To carry it out, we resorted to readings on the subject and in this trajectory we realized that there are few writings on the subject so far in Alagoas. In this way, the academic works on ethnomathematics carried out in other indigenous communities served as a basis for the research.

Nesse contexto, segundo Fiorentini and Lorenzato (2012, p.68)

> Research is exploratory when the researcher, faced with a problem or theme that is still poorly defined and known, decides to carry out a study in order to obtain more enlightening and consistent information or data about it. A survey is considered descriptive when the researcher wants to describe or characterize in detail a situation, a phenomenon or a problem.

This is a qualitative research carried out, initially, through a literature review and followed by participant observation to identify the geometric shapes present in the paintings, graphics and cultural manifestations present in the Jiripankó indigenous territory. These elements were identified through body painting and handicrafts, as well as in traditional constructions and games, demonstrating the presence of ethnomathematics in the reality of indigenous subjects and, also, how these practices bring possibilities to improve the context of mathematics teaching at school, as they are present in the daily life of the Jiripankó people.

RESULTS AND DISCUSSION

In order to achieve the final results proposed and respond to the chosen objectives regarding the identification of geometric shapes in the Jiripankó culture, the research brought to light the expression of the geometric graphics present in different elements of the Jiripankó culture as well as other geometric elements present in this territory. Dealing with the importance of geometric shapes in the culture of the Jiripankó brought a contextualized

and significant look at the use of mathematics, as geometric devices are not only aesthetic elements, but they carry deep symbolic meanings. Thus, it was observed and described in the study that geometric shapes are often present in their artistic expressions, such as in weaving, ceramics and body painting, and often represent concepts of nature, spirituality and ancestry.

These forms can reflect the Jiripankó people's understanding of nature, community relations, and the necessary balance between their material and spiritual reality. In addition, the photographs presented throughout the work showed that geometric shapes are used to transmit knowledge and stories, passing through traditions and teachings from generation to generation. These forms were inherited, in essence, from the ancestors from whom this people descended: the Pankararu of Brejo dos Padres/PE. Even though over time these symbols have been resignified, as Mendonça (2021) rightly states, some remain present, demonstrating that these elements are part of the identity of this people.

Thus, geometry in the Jiripankó culture is a way of preserving and strengthening cultural identity, also within an educational perspective, keeping alive the values and historical vision of this indigenous people. Although school knowledge is not the object of this analysis, this correlation is constant throughout the text because it understands the school as a space capable of intertwining traditional and formal knowledge and contributing significantly to the appreciation of the cultural knowledge of each community. In addition, when school content is taught in context with the students' reality, we make teaching more meaningful and pleasurable.

In this way, it is possible that the school of the Jiripankó people can take advantage of its indigenous mathematics to work on mathematical content in the classroom. In the case discussed here, using the graphics of this people to teach geometry. By acting in this way, it allows students to recognize themselves at school and not see the content as something distant from their reality.

When painting their bodies in toá, it is possible that there is no mathematical awareness about the geometric shapes employed, but recognizing them in mathematics classes makes this teaching more meaningful. That is why contextualized teaching is so important in the teaching-learning process. Below we make some considerations to finish the work.

FINAL CONSIDERATIONS

For the above, mathematics is present in different contexts of indigenous culture, verifying that this deep and varied presence is not always explicitly recognized. However,

despite the indigenous culture being very diverse, having varieties of geometric shapes present in its arts, cultural practices, crafts, constructions and social organization, ethonomathematics is an area of mathematics that should be more studied and explored, thus showing several recognitions of its scope, manifesting that there are several ways of looking at practical geometry involved with mathematics.

In this sense, it was observed that in the Jiripankó indigenous community, mathematical knowledge is integrated into daily practices, such as agriculture, housing construction, paintings, and graphics in the creation of artifacts. Counting, pattern recognition, symmetry, and the use of geometric shapes are other clear examples observed of how mathematics involves the Jiripankó people. Thus, for Santos (2019) and Albuquerque and Karajá (2018), the graphic design elaborated for body painting and other artifacts of elements within an indigenous community is common, as the drawings derive from a graphic pattern of great symbolic value.

Therefore, mathematics, in its various forms, plays the role of an essential tool in indigenous cultures, contributing to the transmission of knowledge, the maintenance of traditions and the survival of communities, showing that the mathematical context is visible and manifests itself in different ways in each culture, especially the Jiripankó object of this analysis. By investigating the existence of geometry, painting and graphics are rooted in indigenous culture as elements of identity.

Thus, by identifying these elements, it is perceived how much the indigenous school has possibilities to explore cultural knowledge and use it as a means of working associated with the formal knowledge of the curriculum. Ethnomathematics presents itself as a strong ally in the offer of a differentiated education as guaranteed to indigenous peoples by the current legislation. Thus, school education in the Jiripankó people has great potential to meaningfully explore interculturality, promoting an education that respects and values both traditional knowledge and knowledge from the non-indigenous world.

This includes teaching mathematics and science in a way that is rooted in their cultural context, as well as recognizing and valuing indigenous forms of knowledge in areas of study, especially geometry, that present and apply a social organization that builds a more inclusive society that respects the diverse forms of knowledge and life. inside and outside the indigenous school.

For all that said, it was perceived that geometry was evidenced as an essential tool for adapting to the environment and for the preservation of cultural identity, bringing, whether formal or informal, a mathematical thought that manifests itself in different ways in the community studied. In summary, the Federal Constitution of (1988) and Law No. 9,394

of December 20, 1996, (Law of Guidelines and Bases of National Education – LDBEN) seek to transform Brazilian education, making it more inclusive, specific and representative for the various cultures that make up society. However, for this transformation to be complete and lasting, it is necessary that work like this can bring information, recognition and appreciation of indigenous forms of knowledge for the construction of scientific knowledge, especially how geometry in the Jiripankó culture preserves and strengthens their cultural identity.

The results presented here do not exhaust the theme and, for this reason, it is hoped that this work will serve as a motivation for future works to emerge and that they can dive more deeply into the analysis of the mathematical knowledge present in the Jiripankó culture. In this way, everyone wins, because the community better understands its daily life and its culture, as well as promotes more meaningful school learning in line with what is recommended by educational legislation. Therefore, it is hoped that this contribution will promote new reflections and more in-depth debates.

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