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PEDAGOGICAL PRACTICES IN EDUCATIONAL SPACES WITH A DECOLONIAL APPROACH

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Abstract: This article presents the interdisciplinary proposal developed by teachers at Escola Prof^o Dr^o Valter Paulino Estevam, who inserted Afro-Amerindian cultural practices into mathematics teaching, highlighting non-hegemonic knowledge in school education. With a theoretical focus on decoloniality and Ethnomathematics, this qualitative research opposed the traditional form of teaching, based on a Eurocentric epistemology by appreciating the contributions of Afro-Amerindian knowledge in mathematical learning. The teachers' observations were in two classes in the 9th year of elementary school (14-15) and found that the application of this pedagogical resource resulted in reconstruction of narratives and attitudes contrary to hegemonic thinking, in the emancipation and inclusion of students with difficulties in learning mathematics and the construction of alternative knowledge, towards equity and a new organization of society open to diversity.

Keywords: southern epistemology; Decoloniality; Ethnomathematics

INTRODUCTION

When watching a video in which a baby, approximately nine months old, cries after his cell phone is taken away, I was extremely impressed and asked: could the premature or inappropriate use of technology be having a negative effect on the cognitive functions of children and young people? Is there awareness of this situation on the part of those responsible and educators? What actions would promote changes in the habit and frequency of using these instruments? What is the appropriate pedagogy to act to educate these individuals in this regard?

This use, which has been intensifying more and more, promoting practicality and

ease and showing that it is convenient to press the button and have all tasks completed in fractions of a second, may in fact be affecting not only cognitive abilities but also human creativity itself.

According to scientist Nicolelis¹, the gains in minimizing the performance of obsolete and bureaucratic tasks altered cognitive functions, that is, the brain training necessary to maintain memory and memories of how it was performed. We can cite some examples, people no longer remember their telephone numbers, the names of their neighbors, they no longer memorize images that allow them to be taken from one place to another, they need to be reminded of important dates, as they easily forget their cell phone. monopolized our attention.

For the scientist, this world of facilities is influencing survival instincts, intelligence instincts, because in the human creativity is not stimulated and developed, artistic work is despised, artificial creation prevailing, intensifying the lack of interest in reading printed works, for the development of writing and manual production. People run the risk of not knowing how to speak, of not knowing how to write, that is, of not knowing how to communicate verbally. They will have to use a digital intermediary (NICOLELIS, 2023).

It is clear that technology must have a place in our lives, as it is a projection of human beings in the world, it is an attempt to expand our existence on the planet and improve our chance of survival, which is why technology is created (NICOLELIS, 2023). However, an intelligent organism is needed to protect children and young people from these automatic processes that control and roboticize the behavior of the body and mind. And search the cure, encourage the development of collective wisdom and knowledge.

1 Miguel Nicolelis (neuroscientist): "ChatGPT is a great plagiarist of human work and creativity" – (youTube.com) Available 25 Jul. 2023. Miguel Nicolelis is a Brazilian doctor and scientist, leader of a group of researchers in the area of Neuroscience at Duke University (Durham, United States), in the field of physiology of organs and systems.

An intelligent organism that guarantees the externalization of the talents and creativity of these children and young people to transform them into critical and reflective agents, promoting social transformation and consequently, human transformation (NICOLELIS²). In this aspect, the educational field can facilitate the transformation trajectory when they promote alternative teaching methodologies, different learning options and pedagogical resources that highlight the development of cognitive capacity, the improvement of critical and creative intellectuality and not the massification and automation of learning.

Among the learning options, we consider board games to be important in intellectual and cognitive development, in improving creativity, logical reasoning and mainly as a pedagogical resource to make visible African ancestral knowledge, the philosophical meaning of Mancala in African cultures, the appreciation of other ways of learning and understanding mathematics, creating collaborative learning mechanisms, without hierarchizing or eliminating human existence.

Thus, the Mancala board game linked to the cultural reality of elementary school students at Escola Prof^o Dr^o Valter Paulino Estevam was configured as the alternative to develop mathematical thinking, promote collaborative work, empathy, team spirit, overcoming limitations and understanding other ways of learning mathematics. And thus, strengthen knowledge arising from cultural diversity, ancestral traditions and artistic manifestations in general, breaking with hegemonic paradigms in the way of thinking about mathematics.

Breaking paradigms in mathematics teaching

[...] a Mathematics curriculum must seek to contribute, on the one hand, to the appreciation of sociocultural plurality, preventing the process of submission in confrontation with other cultures [...] (PCNs, p. 25, 1997).

Mathematics teaching and learning is focused on theoretical models based on hegemonic argumentative thinking and specific language, validating knowledge in rigorous proof, formal demonstration and scientific practice. In this dynamic, it does not highlight the plurality of forms of teaching and learning mathematics, but it maintains the content and mechanical method, centered on didactics far from the student's reality and also, excluding the affectivity, corporeality and circularity of the constitution of knowledge.

However, it is important to incorporate ethnomathematics in the curriculum (D'Ambrosio, 2012), to the concrete experiences, cultural practices and other ways of thinking about the fundamentals, as they are alternative forms, legitimate and essential actions for understanding the modes of argument about mathematical nature.

This way, the **resume pass** to be alive to present other teaching approaches, value the knowledge produced in localities (local community), the knowledge produced by ancestors (cultural roots) and the student's physical movements, which promote the harmonious perception of body and spirit, the rhythmic pulsation and the satisfaction of practicing them.

With this, we will have different learning options such as: cultural practices (board games), sports practices, artistic manifestations: theater, musicality, dance, painting, poetic literature, capoeira, among others, allow the student identifies the one with which he will do better, that is, he will be successful. And, influenced by the area

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in which they are successful, the student will have encouragement/reasons to seek to overcome the areas of knowledge with which they have greater difficulty, that is, they will face the barriers that prevent understanding in order to remain in the school space, due to the area of knowledge that you appreciate so much.

The concrete situations in the school space that involve corporeality, movement, representation such as theater, dances, games, collective life, gymnastics, will serve as an anchor/support for the creative and intellectual development of children and young people.

Corporeality must be present at school, as it is the field of the search for wisdom, for communication (Exu) and involves the beauty of the other, the welcoming of the other. And being present in the curriculum means not separating body/mind, reason/emotion in learning areas of knowledge.

Learning this is beyond mental work. It is necessary to link mind and body, because it is not just “I think therefore I am”, but rather: “I exist because I think, because I feel, because I move, because I manifest myself, because I relate”. Being one with the community is characteristic of African and indigenous peoples who value the wisdom of traditional ancestors, bodily actions, and the harmonious movement of space and time. (Souza, 2021).

In this sense, African cultural practices, through board games, were integrated into the mathematics teaching of the investigated school with the aim of valuing the knowledge of the cultural groups to which the students belong, recognizing the importance of producing mathematical knowledge from other cultural groups. non-hegemonic, exploring methodologies that:

Prioritize the creation of strategies, proof, justification, argumentation, critical spirit, and favor creativity, collective work,

personal initiative and autonomy arising from the development of confidence in one's own ability to know and face challenges (PCNs, 26, 1997).

These strategic ways of conducting will allow the school to be an attractive place for learning, by offering teaching methodologies in which the body and mind are highlighted, which is fundamental in childhood and adolescence and also, valuing the knowledge of the cultural roots of the school. student.

BOARD GAMES CULTURAL ARTIFACTS FROM A DECOLONIAL PERSPECTIVE

The traditional curriculum, laid out in Basic Education, presents itself in a Cartesian manner, privileging contents and methods based on unique knowledge and obsolete definitions of conservative purposes (D'Ambrosio,2012).

The dominant school culture in our educational institutions, built fundamentally from the political-social and epistemological matrix of modernity, prioritizes the common, the uniform, or homogeneous, considered as constitutive elements of the universal. From this perspective, differences are ignored or considered a “problem” to be resolved (CANDAUI, 2011, p. 241).

Since the Westernized curriculum does not prioritize non-hegemonic cultures and knowledge in the educational system and still reproduces systematized learning models of memorization and repetition of monotonous procedures, the Ethnomathematic studies have highlighted the need to rethink school culture and direct other demands towards the individual's intellectual and cognitive development.

In this sense, it is up to education to promote educational practices with a view to deconstructing the colonial pedagogical conception rooted in teaching that legitimizes the narrative of specifically European scientific

production, especially in the teaching of mathematics and providing opportunities for other epistemic rationalities, encouraging the overcoming of hegemonic and hierarchical standards in the bosom of the intelligentsia.

An education with a decolonial perspective can be understood as one that leads to paths and debates around interculturality, the fight against non-existence by reasoning critically.

That said, the rethinking of school culture and the insertion of decolonial pedagogical practices at EMEF Prof.º Dr.º Valter Paulino Estevam culminated in the introduction of the board game, Mancala, initially in the teaching training process at EMEF Prof.º Dr.º Valter Paulino Estevam, seeking the teacher's critical/analytical look at school culture based on values, knowledge and cultural practices of dominant groups and at another time, creating strategies in investigative processes to generate decolonial educational processes of African cultures in mathematics teaching.

In this sense, when including cultural artifacts of African ancestry, such as *Mancalas*, allowed us to understand in depth the historical and cultural process of some African peoples, recognize the production of epistemic knowledge of these groups not evidenced in the school curriculum and based on these investigations, teachers promoted alternative interdisciplinary options, especially in teaching mathematics, which went beyond the game rules/techniques. They made visible in school practices, the cultural diversity that highlights localities, territories, knowledge and cultures of Africans. And they led not only to the construction of the student's critical and protagonistic, egalitarian, dynamic and welcoming thinking, but also to the (re) construction of their identity roots.

MANCALA, PRACTICE IN CULTURAL GROUPS ON THE AFRICAN CONTINENT

The Mancala is the generalized name for a set of games of African traditions that consist of sowing, counting and capturing seeds. Your arithmetic calculations made on boards, as if it were a wooden computer it was played especially by the Ashanti people of Ghana. Its rules vary and can be found in many African regions, with different names: Adi, in Dahomey, Andot in Sudan, Wari or Ouri, in Senegal and Mali (CUNHA JR, 2014).

The game was introduced to the American continent by enslaved Africans, including in Brazil under the names Oulu, Walu, Adjí, Ti and Ayo (CUNHA JR, 2024). The game called AYO, was brought by the Yoruba people and began to be called AIÚ (GONÇALVEZ) in Brazil.

Mancalas are games played on wooden boards with two or four parallel rows, with 12, 16, 24, 30 or more holes for each player to deposit the seeds. Its rules vary and the techniques contribute to the development of logical reasoning, encourage logical operations, test hypotheses, and exercise the student's concentration.

At the bases of the house sequences we have two larger cavities that serve as a deposit for the pieces captured during the game by each player (figure 2). In the holes arranged in rows, each house is assigned four seeds, which can be moved or captured, according to the rules of the game.

The objective is to capture as many seeds as possible from the opposing player. To play the game, one of the players will take the seeds from one of their houses and distribute them to the houses, including those of the other player, one in each house, in the anti-clockwise direction. And even if the opponent loses, there is a philosophy of leaving them with at least one seed to be able to sow.

All this complexity and intrinsic skills when playing allow the teacher to address contents of arithmetic, counting, geometry, probability, progressions, number systems and also discuss the mathematical thinking that involves the technique of playing Mancala. And consequently, develop mental calculations, create strategies, use logical reasoning, carry out mathematical operations, and mainly, the social, cultural, intellectual and psychomotor development of the student, revealing values, alliances, empathy.

The first teaching strategy established by the teaching staff was to deepen intramural local knowledge and culture, present in the student's daily life; in the second moment, investigate the historical process and technological and scientific knowledge not disseminated in the teaching material of African peoples that constitute the identity of the Brazilian population; and in the third moment, explain the philosophy behind the African cultural practice, called Mancala.

Teachers highlighted the inclusion of cultural practices (board games) as a teaching methodology as favorable not only as a form of mathematical learning, but as a possibility of interdisciplinary work on historical processes, cultural aspects, the geographic regions of origin of the Mancalas and valuing the knowledge and elements of African ancestry that intertwine with the daily lives of students, families and the community.

The Mancala game is played in pairs (Player A and Player B).

The board has two extreme cavities – reservoirs, always to the player's right, and twelve central cavities – pits – with six for player A and six for player B.

Preparation of the pits: Before starting the game, four seeds are deposited in each of the twelve pits.

Start of the match: A random criterion is used to see which player starts the seeding (example: odd or even). After choosing who will leave first, people greet each other with a handshake, wishing each other a good sowing and a good harvest.

Match development – seeding: One of the players removes all the seeds from one of the holes on their side, distributes them sequentially and in a counterclockwise direction, both in their own holes and, if necessary, in the opponent's holes. Then the other player also chooses a hole on their own side, removes the seeds and distributes them sequentially in the following holes, as the first player did... so they alternate, in a continuous observation of which hole is best to contribute to the own seed harvest and from the perspective of not giving space for others to harvest. Each player controls the six pits on their side, as it is in these pits that the other player will harvest/capture.

Harvesting/capturing seeds: Seed harvesting/capture can only happen when the player is sowing, and his last seed is in an opponent's hole that already contains one or two seeds, forming two or three seeds in that hole. This capture can be single or sequential. For this moment to happen, you need to use strategies to know which hole is the best to remove the seeds for sowing. A player cannot leave the other seedless. In this case, it is worth a forced move to leave seed for the other player. It is not allowed to play twice in succession.

MANCALA BOARD GAME RULE

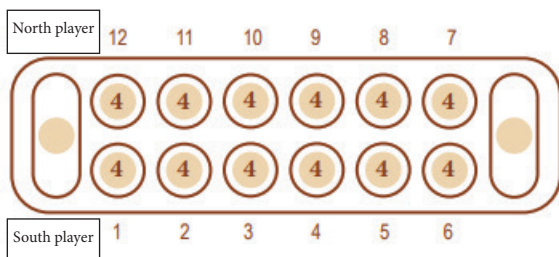


Figure1: Mancala awele

Source: Municipal Department of Education, 2020.

End of match: The total number of seeds on the board are 48. In Mancala AWELE the game can end in one of the following cases: - When one of the players first collects/captures at least half and a few more seeds -twenty-five; -When there are only two seeds on the board.

N'TXUVA BOARD GAME RULES

This Board Game consists of 4 rows and 6 columns of squares. Each player has 2 rows and their respective columns.

The inner ranks are called Attack.

The outer ranks are called Defense.

Moves on the N'txuva Board must be made in a counterclockwise direction (against the clockwise direction). The game has 2 phases. In the first phase, it is only allowed to start the move from squares with more than one piece (2, 3 or more); In the second phase, the houses have only 1 piece, then you can move 1 piece at a time, and it is prohibited to combine these pieces.

GAME OBJECTIVE

The objective of N'txuva is for the last piece in hand to land on an empty space on the inner row of the board (attack), capturing the opponent's pieces. This objective is achieved through simple arithmetic calculations and the creation of strategies.

HOW TO PLAY?

1. Fill the board with just 2 pieces in each space.
2. Take all the pieces from a square and distribute them to the squares immediately to the left, leaving only 1 piece in each box. The initial house is empty.
3. If the last piece in your hands falls on a square with some piece(s), all the pieces from that square are collected and the distribution continues until the last piece lands on an empty square.
4. Two situations can happen when the last piece lands on an empty square: 4.1 - if the said square is on the outer row (defense), the move ends and it is the opponent's turn to play;



Figure two: Board game: Mancala Awele

Source: (Personal archive)

4.2. if the empty square is on the inner row (attack), and if there are at least one or more pieces on the square on the inner row (attack) or on the two squares on the opponent's corresponding column, these pieces are captured by removing them. them off the board.

4.2.1. if both squares in the opponent's column are empty or the inner square is empty, even if the square in the outer row contains pieces, the move ends and it is the opponent's turn to play.

5. The game continues with each player defining targets, making calculations and creating strategies to try to capture the opponent's pieces, always obeying item 4.2.

6. In N'txuva there are no mandatory moves and "escape" is permitted whenever the pieces are threatened by the opponent's next move.

7. After repeated captures and removal of pieces from the board, we reach the 2nd Phase where the houses are left with just one piece. At this stage, the pieces are moved individually, from house to house, capturing pieces from the opponent's squares/columns that are in their path.

8. The game ends when one of the players manages to capture all of the opponent's pieces. Advanced Phase: At the beginning of the game it is possible to establish a rule between the players so that in each successful attack, the player is entitled to an additional withdrawal, for example: the player chooses one and only one square and removes the pieces contained therein. This withdrawal works as a break in the opponent's strategy.



Figure 3: N'txuva Board Game

Source: (Personal archive)

CONSIDERATIONS

Among the different methodological strategies adopted in the teaching-learning process, the teachers explained that board games, as an interdisciplinary approach, occupied a prominent place by valuing and recognizing the production of knowledge from non-hegemonic groups, by highlighting knowledge and expressing the practices African cultures in mathematical learning, since the techniques were assertive in improving the student's ability to calculate, reason, compare and count.

Furthermore, teachers found that por being elements that mobilize learning, distinct from mechanized and obsolete tasks, influenced student behavior, instigating curiosity and the desire to learn, which consequently evidenced the development of creativity and assisted in cognitive processes.

These results meet the expectations defended by the scientist Nicolelis, who claims significant gains occur when minimizing carrying out obsolete and bureaucratic tasks in

development cognitive and, stimulate human creative and intellectual development based on the knowledge/doing present in theater, musicality, painting, capoeira, dances, games, gymnastics, poetic literature, or the production of handwriting.

The evolution of humanity depended on altruism, the development of the collective mind, and trust in others. Technology only helped in this development process, therefore it does not surpass or replace humanity. This is because artistic, scientific, literary, political and economic movements are born from the synchrony between wisdom and knowledge and not from the automation of life, obsolete and bureaucratic tasks.

In this sense, the ethnomathematics will serve as support for this development, as they demonstrate to the concrete experiences, cultural practices and other ways of thinking about mathematics, such as alternative forms and different modes of action regarding the nature of human knowledge (D'Ambrosio, 2012).

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