

The decolonial perspective of ethnomathematics as a resistance movement

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Abstract

This article is based on the following core ideas: (a) historically, productions in ethnomathematics present research results on knowledge that can be understood as mathematics. (b) one of the powers of ethnomathematics is to break with the common idea of unique, idealized mathematics, distant from the history of humanity, elitist, Eurocentric. Ethnomathematics approaches a decolonial proposal by recognizing and valuing the many knowledges present in social practices. (c) the historical process of colonization implied territorial conquests and the destruction of the cultural roots of colonized peoples. This is a way to eliminate the history of these peoples. (d) The growing participation of researchers from social movements can help to avoid such contradictions. Based on these perspectives, in the first part of this article we emphasize that ethnomathematics, in its political dimension, can help in reflections on decolonization processes, as well as in the recognition of the cultural roots of individuals. In the second part, we present brief metatexts of the articles that make up the dossier “Ethnomathematics: decolonial perspective and resistance movements”, as a way of introducing the reader to recent contributions by Brazilian and foreign researchers, and stimulating debate on the subject.

Key words: Ethnomathematics; Decoloniality; Mathematics Education.

A perspectiva decolonial da etnomatemática como movimento de resistência

Resumo

Este artigo se baseia nas seguintes ideias centrais: (a) historicamente, as produções em etnomatemática têm apresentado resultados de pesquisa sobre conhecimentos que podem ser entendidos como matemática; (b) uma das potências da etnomatemática é a de romper com uma visão arraigada de matemática única, idealizada, ahistórica, elitista, eurocêntrica, aproximando-se, portanto, de uma proposta decolonial, ao reconhecer e valorizar os muitos saberes presentes nas práticas sociais; (c) o processo histórico de colonização implicou em conquistas territoriais e na

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destruição das raízes culturais dos povos colonizados, como forma de eliminar sua historicidade, e (d) A crescente participação de pesquisadores provenientes dos movimentos sociais nesta área pode contribuir para evitar tais contradições. Com base nestas perspectivas, na primeira parte destacamos que a etnomatemática, em sua dimensão política, pode auxiliar nas reflexões a respeito de processos de decolonialidade, assim como no reconhecimento das raízes culturais dos indivíduos. Na segunda parte apresentamos breves metatextos dos artigos que compõem o dossiê “Etnomatemática: perspectiva decolonial e movimentos de resistência”, como forma de apresentar ao leitor as recentes contribuições de pesquisadores brasileiros e estrangeiros, e estimular o debate sobre o tema.

Palavras chave: Etnomatemática; Decolonialidade; Educação Matemática.

La perspectiva descolonial de las etnomatemáticas como movimiento de resistencia

Resumen

Este artículo se basa en las siguientes ideas centrales: (a) históricamente, las producciones en etnomatemática presentan resultados de investigación sobre conocimientos que pueden entenderse como matemáticas. (b) uno de los poderes de las etnomatemáticas es romper con la idea común de las matemáticas únicas e idealizadas, distante de la historia de la humanidad, elitista, eurocéntrico. La etnomatemática aborda una propuesta descolonial reconociendo y valorando los múltiples saberes presentes en las prácticas sociales. (c) el proceso histórico de colonización implicó conquistas territoriales y la destrucción de las raíces culturales de los pueblos colonizados. Esta es una forma de eliminar la historia de estos pueblos. (d) La creciente participación de investigadores de movimientos sociales puede ayudar a evitar tales contradicciones. Con base en estas perspectivas, en la primera parte de este artículo enfatizamos que la etnomatemática, en su dimensión política, puede ayudar en las reflexiones sobre los procesos de descolonización, así como en el reconocimiento de las raíces culturales de los individuos. En la segunda, presentamos breves metatextos de los artículos que componen el dossier “Etnomatemática: perspectiva descolonial y movimientos de resistencia”, como una forma de acercar al lector a los aportes recientes de investigadores brasileños y extranjeros, y estimular el debate sobre el tema.

Palabras clave: Etnomatemática; Descolonialidad; Educación Matemática.

1. Ethnomathematics and decoloniality

What are the links between decoloniality and ethnomathematics? How has recent research responded to this increasingly needed debate? In other words, to what extent has ethnomathematics represented a legitimate resistance movement in mathematics education, for the sake of visibility and legitimacy of *South* knowledge? This theme has been deepened, in different ways, by some research groups in Brazil³ and among them, by the *Grupo de Etnomatemática da UFF* (GETUFF), coordinated by the authors of this article. These debates have been held in group meetings, through participation

³ The following groups can be cited: Laboratório de Práticas Matemáticas do Ensino (LaPraME) from UFRJ, and InSURgir - Educação Apesar De, from UFMG.

in events held remotely⁴ and have also generated several publications (FANTINATO; FREITAS; DIAS, 2020)⁵.

The sense given here to the *South* does not necessarily correspond to the geographic *South*, although there may be a partial overlap between them (Santos, 2019). The term *South* has also been used to replace other expressions, such as *Third World countries* or *developing countries*, which have fallen into disuse due to their prejudiced burden (AKKARI; DASEN, 2004). Another expression that is close, but not analogous, is the term *Sulear*⁶, which the physicist and anthropologist Marcio D'Olne Campos formulated and has theorized about (CAMPOS, 1999).

Some authors of the decolonial movement (DUSSEL, 2000; CORONIL, 2000) problematize the naturalized idea that Western sciences are recognized as having European origin, historically contextualizing the formation of Europe and indicating the Asian and African origin of the so-called *Western science*. At the heart of the formation of mathematics as a Western discipline is a complex history of exchange. In this sense, the different decolonial theoretical perspectives⁷ (LANDER, 2000; SANTOS, 2019; CAMPOS, 1999) share their criticisms of the permanence of ways of being and knowing among people in a subordinate situation, which perpetuate the hegemony of Western Eurocentric thought.

The so-called *decolonial turn* does not refer to a single theoretical school, but points to a family of diverse positions that share a view of coloniality as a fundamental problem in the modern era, and also *decoloniality* as a necessary task that remains unfinished (MALDONADO- TORRES, 2011). The political independence of European colonies on different continents did not mean the end of colonialism (SANTOS, 2019), as structures built for 400 years or more do not disappear quickly. According to Grosfoguel (2009), we leave a period of "global colonialism" to enter into an era of "global coloniality". The historical process of colonization implied territorial conquests and the destruction of the cultural roots of colonized people, as a way of eliminating their historicity. In the former colonies, therefore, the coloniality of power (QUIJANO, 2000) remains, being replaced by other forms of internal colonialism, such as racism and xenophobia. Colonial power relations left deep marks on the general understanding of being: "The coloniality of being becomes concrete in the form of liminal subjects, which mark, as it were, the limit of being, that is, that point at which the

⁴ The lecture "Ethnomathematics, Ethnoscience and Decoloniality", organized by the Ethnomathematics Group of UFF and the Programa Dá Licença, took place on October 2, 2020. It was coordinated by Profa. Maria Cecília Fantinato, and included Professors Ubiratan D'Ambrosio and Marcio D'Olne Campos. Access link: <https://www.youtube.com/watch?v=hXqvPWuecMs>

⁵ This topic presents updated excerpts from an expanded article in that publication.

⁶ More information on the researcher's page <https://www.sulear.com.br/> Access on 16.08.20

⁷ Although we recognize that some authors use other expressions, such as *decolonising*, by Boaventura de Sousa Santos, or *Sulear*, by Marcio D'Olne Campos, we have chosen here to adopt the term *decoloniality*.

being destroys meaning and proof to the point of dehumanization (MALDONADO-TORRES 2007, p.257).

Keeping their specificities, the ideas of the decoloniality movement, the *Epistemologies of the South* by Boaventura de Sousa Santos and the *Sulear* proposal by Marcio D'Olne Campos (1999), have in common the critique of the permanence of ways of being and knowing, between people in situations of subordination, which perpetuate the hegemony of Western, Eurocentric thought. These decolonial theoretical perspectives point to resistance movements arising from social movements, based on other logics and knowledge.

In a similar sense, D'Ambrosio (2001) mentions that ethnomathematics, in its political dimension, "fits in the reflection on decolonization" and in the recognition of the cultural roots of individuals. Thus, from the beginning, research in ethnomathematics was already associated, in a way, to a resistance movement, to the decolonial perspective. However, such a process is also subject to contradictions. For example, if investigation adopts Western mathematics to legitimize the knowledge of social groups, or if it assumes an "extractive" perspective of investigation (SANTOS, 2019), it runs the risk of reinforcing the coloniality of knowledge (QUIJANO, 2005). Researchers in the field have tried to deal with these contradictions in different ways. One of them is by the growing participation of researchers from social movements engaged in research that is largely carried out *with* the so-called *subaltern groups*.

Subaltern groups are those that suffer some kind of subordination to hegemonic groups. The term *subaltern*, originally proposed by Antonio Gramsci, is used by the social sciences to designate the marginalized sectors of society and does not refer to a monolithic and undifferentiated category, since "the colonized subaltern subject is hopelessly heterogeneous" (SPIVAK, 2010, p.57). "The term must be rescued, resuming the meaning that Gramsci attributes to it when referring to the "proletariat", that is, the one whose voice cannot be heard" (ALMEIDA, 2010, p.12). For the Indian Gayatri Spivak (2010), the term subaltern describes "the lower strata of society constituted by specific modes of exclusion from markets, from political and legal representation, and from the possibility of becoming full members of the dominant social stratum" (SPIVAK, cited by ALMEIDA, 2010, p.12). Subaltern subjects are made invisible, by the abyssal line (SANTOS, 2019), the exclusion zone, of non-being, experienced by the colonized (FANON, 1968). According to Boaventura de Souza Santos, the abyssal line "marks the radical division between forms of metropolitan sociability and forms of colonial sociability that have characterized the modern Western world since the 15th century" (SANTOS, 2019, p.42-43). This division creates two worlds of domination that present themselves as incommensurable, the metropolitan - of equivalence and reciprocity between "us", who are like "us", fully human, and the colonial - the world of "them", in relation to which any equivalence or

reciprocity is unimaginable, as they are not fully human, as they are on the other side of the abyssal line.

In an interview by Donna Landry and Gerald MacLean (1996), Spivak recalls that the perverse side of the development of capitalism has been the growth of the variety of groups in situations of subordination and social invisibility. Despite being also affected by globalization, among these groups the possibility of social mobility is very limited. Another aspect addressed by Spivak (2010) is the need for an "unlearning" project on the part of intellectuals, who feel entitled to speak for subalterns, as if they were in fact themselves. The author reveals the uncomfortable place and the complicity of the intellectual who believes he can speak for the other and, through him, build a discourse of resistance. "According to Spivak, the postcolonial intellectual's task should be to create spaces through which the subordinate subject can speak so that, when he or she does, he or she can be heard" (ALMEIDA, 2010, p. 14). Many researchers in ethnomathematics have sought to exercise this role of "postcolonial intellectual" referred to by the author.

According to Santos (2019), Spivak (2010) vehemently signaled the tragedy of modern critical sciences, which gave in to the temptation to give voice to the silences of subaltern groups:

The abyssal researcher's naive assumption is that his voice is transparent, that it is not confused with the dominant voices and that it can, therefore, be "given" to the dominated as if they were their own [...] Giving voice is less transparent of what it claims to be; it can be (and often was) either a dominant voice translated into a dominant dialect or a dominant voice selectively translated into a dominant dialect. (SANTOS, 2019, p.256)

Indeed, when studying subordinate groups, modern science has always been based on an *outsider* producing science about an *insider*, the latter being conceived as a likely informant, but not as a knowledge provider (Santos, 2019). By taking a legitimist stance (COSTA, 2003), by adopting academic mathematics - "dominant dialect" - in reading and interpreting the speeches of "other" - "dominated dialect", ethnomathematics runs the risk referred to by Boaventura Santos. This is one of the criticisms that can be made to modeling, taken as a way to apply the ethnomathematics perspective to the school context. The same author's criticism of extractive methodologies also applies to some research in ethnomathematics, when the researcher takes the place of the other, speaks - alone - for the subaltern group. In this sense, Spivak warns "of the danger of constituting the other and the subaltern only as an object of knowledge by intellectuals who merely aspire to speak for the other" (ALMEIDA, 2010, p.12-13).

On the other hand, ethnomathematics can be considered a "decolonizing movement" (BERNALES; POWELL, 2018), as it values the mathematical knowledge of groups in situations of subordination. One of the goals of ethnomathematics is precisely to question the Eurocentric myth

that influences school curricula, challenging the idea that mathematics is a neutral discipline and that mathematical knowledge transcends culture (POWELL; FRANKSNTIN, 1997). However, research in ethnomathematics runs the risk of being contradictory to this goal if the researcher does not give up on a Platonic conception of mathematics. Therefore, ethnomathematicians must question the idea of universal and ahistorical mathematics and embrace the pluralization of notions of knowledge, mathematics, rationality, cognition and learning (CLARETO, 2009). To respect this movement, ethnomathematic researchers should seek to know together *with the other*, instead of knowing *about the other* (SANTOS, 2019).

2. About the articles in the Dossier

In this second part of this article, we present small metatexts about the articles and reviews that make up the dossier “Ethnomathematics: decolonial perspective and resistance movements”. This is a way of introducing the reader to recent contributions by Brazilian and foreign researchers, and stimulating debate on the topic.

The first article presents one of the last records of the thought of Ubiratan D'Ambrosio. Claudio Fernandes da Costa spoke with this theorist who is considered the main one in ethnomathematics. In this interview, the author, and other members of the Ethnomathematics Group at Universidade Federal Fluminense, ask D'Ambrosio questions that involve his Ethnomathematics Program and the theories of decoloniality. These questions were presented as instigating means for the interviewee to analyze and formulate scathing criticisms of the different forms of knowledge domination and exclusion. Thus, the interview presents us with the defense of a historical and dialectical conception where life, cultures, human beings and their social relations and with nature must occupy a central place. Furthermore, it discusses issues related to the new Common National Curriculum Base. This is a document that aims to impose curricular practices. In addition, the interview highlights other important themes such as globalization, technology, and remote learning.

In the article written by the authors Carolina Tamayo and Jackeline Rodrigues Mendes, “Decolonial option and other ways of knowing in Education (Mathematics)” some questions are highlighted. They serve to think about the effects of assuming a decolonial option in the field of Mathematics Education, with emphasis on Ethnomathematics. As an example: What to know? What do you know? The authors analyze the coloniality of knowledge that generates a radically excluding process of universality. It also generates classifications and hierarchies of peoples and their historical experiences. Furthermore, it promotes the superiority of knowledge produced by modern society. Ethnomathematics can be a counter-conduct movement within Mathematics and Mathematics

Education, as it involves questioning the narratives of universalization of mathematical knowledge. It involves questioning the promotion of a single truth to say what can be considered knowledge. This can trigger a decolonial movement.

Marcio D'Olne Campos is the author of the article entitled “Academic knowledge in the ethnographies of indispensable local knowledge: ethno-mathematics and other ethno-x”. It highlights historical moments that allow us to understand the movement from social evolutionism to the cultural diversity of modern anthropology. He then leads us to discussions related to ethnography of knowledge, techniques and practices, ethno-x and ethnomathematics. It emphasizes that capturing the universe of meanings from another culture requires the researcher to make an effort to capture the phenomena based on the references of that culture itself, and its native categories. Analyzes the Ethnomathematics Program, and highlights the existence of different conceptions. Thus, it always proposes a critical debate on the separation between academic knowledge and local knowledge of populations from different cultures and social organizations far from the surrounding society.

The article “The formation of mathematics teachers from ethnomathematics: a decolonial look” was written by Hilbert Blanco-Alvarez and Edwin Molano-Franco. It critically presents the categories of transmodernity, intercultural dialogue and analogy, relating them to the formation of mathematics teachers. These categories are used for interpretations of proposals involving Ethnomathematics. The text presents an extensive review of the international literature on teacher education in Ethnomathematics. The authors emphasize that both the initial training of the mathematics teacher, as well as the continuing one, could involve reflections on the colonialism of Western mathematics, and that they could make these educators aware of the importance of establishing intercultural dialogues between different knowledge and actors in society. They also present an experience in the formation of Afro-descendant teachers in Tumaco-Colombia, which had Ethnomathematics as a political proposal for claiming the study of community knowledge.

The article by Éric Vandendriessche and Maria Cecilia Fantinato presents a dialogue involving analyzes of ethnomathematics in Brazil and Europe. It highlights the relationships of this field of research with anthropology, epistemology and education. Its title is “Ethnomathématique au Brésil et in Europe: un dialogue”. It lists points from the authors' personal and academic trajectories, commenting on the approaches in research involving the relationship between ethnomathematics and anthropology and ethnography. It highlights the collaboration of Ubiratan D'Ambrosio and other researchers in the field of ethnomathematics who influenced the paths of his research. Then, it presents reflections on curricula. When curricula are based on ethnomathematics, they would allow for a better understanding of the complexity of the dialogue between different types of knowledge in

the school context. The final part is dedicated to analyzes of the current challenges for ethnomathematics as a research area.

Kécio Gonçalves Leite and Quesler Fagundes Camargos present the article “Impossibilities of bijective mappings between Eurocentric indigenous mathematical knowledge”. It starts with the verification of the existence of mathematical knowledge originated and situated in different sociocultural contexts. For indigenous peoples, the colonization process was quite negative. But indigenous school education currently incorporates among its principles the recognition, appreciation and promotion of the knowledge of each people, as well as their languages, identities, histories and cultures. For this, the didactic resource of bilingualism has emerged as a possibility. But, considering that different languages are based on different reference systems and that the logics of different mathematical knowledge are not equivalent, this bilingualism has still generated issues to be overcome, such as problems arising from the impossibility of using the simple translation of ideas and words.

Fabio Lennon Marchon is the author of the article “The place of fiction in the textual production of Ethnomathematics”. It highlights that the work signed by Ubiratan D'Ambrosio opened a new path within Mathematics Education. It dialogues with fictional literature, film productions, and new digital media. Thus, the author defends that the world of the ethnomathematic text created by D'Ambrosio be seen as a literary object. It analyzes that most of these texts are the result of interviews, debates and lectures, that is, they were initially designed for presentation in front of an audience, with the intention of convincing and persuading them in specific contexts. So, it wasn't just informing something, but also gaining the adhesion of an audience for the ideas presented. In addition, the texts involve the use of different characters, in addition to a game of questions and answers that also serve the purpose of convincing the public, and the reader, of ethnomathematic ideas.

The following article, “On borders: the proposal of the trivium curriculum in the context of Portuguese classes for Haitians” is authored by Marília Prado and Cristiane Coppe de Oliveira. It presents a research excerpt that articulates ideas from the Ethnomathematics Program in an educational context that involves immigrants in the city of São Paulo. The objective of this educational proposal is to remove these immigrants from the borders of invisibility and racism. It emphasizes that, although these Haitian immigrants cross borders from one country to another, they end up remaining on cultural borders due to language difficulties, for example. The same problem appears in relation to social borders, when they carry out precarious jobs. The authors report some results of the application of the participant observation methodology, and written records in a field notebook, such as the possibility of approaching the context of study of these immigrants and the survey of elements about their reality in Brazil, based on reports from your personal experiences.

Filipe Santos Fernandes and Eliziara Pereira Coutinho wrote the article “Decoloniality, Rural Education and Mathematics Teacher Training: for an Agrarian Reform of Knowledge”. It studies the relationship between decoloniality, Rural Education and teacher education within a decolonial option. It highlights new possibilities for the University, so that the phenomenon of political-epistemic disobedience takes place. It analyzes that the insertion of Rural Education courses in Universities has caused changes in the conceptions and organizations of Higher Education, especially in teacher training. Furthermore, the power of ethnomathematics thinking helps to deconstruct the pressures on mathematical knowledge. This can indicate new paths for the formative processes of teachers in the area of mathematics. These processes would involve historical, sociocultural and pedagogical aspects present in different forms of life, particularly peasant lives.

The article by José Ricardo and Souza Mafra, entitled “A study of topological properties developed in the elaboration of incised surfaces on curved surfaces: a decolonial reading” presents a study carried out with artisans, residing in the Aritapera region, on the banks of the Amazon River. The artisans produce handmade basins. Women get different shapes and sizes. To work on their curved surfaces, they develop instrumental mechanisms for marking and choosing references, for the elaboration of the items. Thus, the stages of elaboration of these basins involve different manifestations of knowledge, but not only those related to ethnomathematic aspects. These and other perceptions are analyzed by the author, based on ethnomathematic assumptions and theoretical elements based on decoloniality. There is a defense of the need to think of solutions for the balance and permanence of these sociocultural practices.

The production that closes the first part of this dossier is entitled “The distances between the Common National Curriculum Base and ethnomathematics”, by Adriano Vargas Freitas and Maria Cecilia Fantinato. It highlights one of the most recent documents that directly influence educational policies in our country, including the updating of curricular proposals from different educational networks, the approval of textbooks to be distributed to public schools, and the training of teachers, the Common National Base Curriculum. Introduced by the federal government and its various supporters as defining the learning rights of all students, in this production it is highlighted that its implementation would involve the reduction of curricula to a simple object, to a list of previously given contents, which could be configured as a colonization process, standardization, control, and invisibility of difference. In this way, he distances himself from curricular practices aligned with ethnomathematic perspectives.

This dossier also includes the presentation of two reviews prepared by the authors Andréa Thees, with the book “The end of the cognitive empire: the affirmation of the epistemologies of the South” (by Boaventura de Souza Santos, 2019), and Thiago Donda Rodrigues, with the book

“Ethnomathematics: conceptions, dynamics and challenge” (by Maria Cecilia Fantinato and Adriano Vargas Freitas, 2018). Both reviews highlight the main ideas of the works and their organizational methodological forms, inviting the reader to leaf through their pages and follow important questions and reflections that are proposed in them. In common, the defense of recognition and appreciation of different knowledge, which could be the beginning of an important and necessary decolonial movement.

3. Final Thoughts and Acknowledgments

With the growth of academic authorship of representatives of the studied social groups and with the exercise of criticality, ethnomathematics can advance in its decolonizing movement. Ethnomathematics can contribute to the sociology of absences, which "identifies the ways and means by which the abyssal line produces non-existence, radical invisibility and irrelevance" (SANTOS, 2019, p.49), as well as to sociology of emergencies, which "implies the symbolic, analytical and political valorization of ways of being and of knowledge that the sociology of absences reveals to be present on the other side of the abyssal line" (SANTOS, 2019, p.53). This dossier aims to socialize the productions of Brazilian and foreign ethnomathematics researchers, in search of the exercise of resistance movements, adopting a decolonial perspective.

For all these collaborations, we have a lot to thank each of the authors. In this dossier, we have perspectives coming from different contexts and places of speech, which raise several current issues that fuel the debate about the relationship between ethnomathematics and decoloniality.

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