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Educação Matemática Debate

The *Tipiti of Colonialities*: oppression and insurgencies in teaching practices in Amazonian riverside communities

Abstract: This paper reports part of the results of a doctoral thesis that investigated traces and effects of coloniality in the practices of teachers who teach Mathematics in riverside communities in the rural area of Manaus. From conversations with participating teachers, the idea of *Tipiti of Colonialities* emerged, inspired by a technology used by indigenous peoples to squeeze wild cassava, remove its poison, and produce food. As a theoretical reference, we explore connections between Decolonial Thought and Ethnomathematics as a way to visualize paths of insurgency in teaching practices in Mathematics. The results indicate that, despite public school management practices distancing students from their territories, teachers find ways to subvert the *Tipiti de Colonialidades*, as indigenous peoples teach us.

Keywords: Riverside Communities. Teaching Practices. Mathematics Education. Decoloniality.

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DOSSIER — HISTORY OF MATHEMATICS AND CULTURE

El tipiti de colonialidades: opresión e insurgencias en las prácticas de profesores en comunidades amazónicas ribereñas

Resumen: Este artículo presenta resultados de una tesis doctoral que analizó huellas y efectos de la colonialidad en las prácticas de docentes de matemáticas en comunidades ribereñas rurales de Manaus. De los diálogos con los participantes surgió la noción de *Tipiti de Colonialidades*, inspirada en la tecnología ancestral usada por pueblos originarios para exprimir la yuca brava y transformarla en alimento. Como marco teórico, se articulan el Pensamiento Decolonial y la Etnomatemática para vislumbrar caminos de insurgencia en la enseñanza. Los hallazgos muestran que, aunque la gestión escolar pública tiende a alejar a los estudiantes de sus territorios, los docentes generan estrategias de subversión del Tipiti de Colonialidades, siguiendo aprendizajes de los pueblos originarios.

Palabras clave: Comunidades Ribereñas. Prácticas de Profesores. Enseñanza de Matemáticas. Decolonialidad.

O tipiti de colonialidades: opressão e insurgências em práticas docentes em comunidades ribeirinhas amazônicas

Resumo: Este artigo relata parte dos resultados de um doutoramento, que investigou traços e efeitos de colonialidade em práticas de professores que lecionam matemática em comunidades ribeirinhas na zona rural de Manaus. Das conversas com os professores participantes, emergiu a ideia de *Tipiti de Colonialidades*, inspirada em uma tecnologia usada por povos originários para espremer a mandioca brava, retirar seu veneno e produzir alimento. Como referencial teórico, exploramos articulações entre Pensamento Decolonial e Etnomatemática como forma de visualizar caminhos de insurgência nas práticas docentes em matemática. Os resultados indicam que, apesar de práticas de gestão da rede pública distanciam os estudantes de seus territórios, professoras e professores encontram formas de subversão do *Tipiti de Colonialidades*, como nos ensinam os povos originários.

Palavras-chave: Comunidades Ribeirinhas. Práticas Docentes. Ensino de Matemática. Decolonialidade.

1 Introduction

In this article, we present part of the results obtained in a doctoral research project carried out by the first author, under the supervision of the second author. The research was conducted in the Amazon, more specifically with teachers working in schools located in riverside communities in the rural area of the Amazonas capital. It should be noted that, in order to conduct research in the Amazon, one must consider the heterogeneity of the region, which is made up of different indigenous peoples, quilombolas, and riverside communities, with a wide variety of contexts and cultural references. In this sense, it is necessary to critically reflect on hegemonic educational projects that claim development and modernization but are conceived by agents in contexts external or foreign to the Amazon. Oliveira (2018) denounces that the region is still considered the periphery of Brazil, being unknown or stereotyped by most Brazilians.

A conventional view of Mathematics Education is that it is guided by an idea of school focused solely on the acquisition of knowledge, ignoring social and cultural transformations. In recent years, Brazilian researchers, such as Matos (2019), have challenged positions of power sustained by the supposed epistemic universality and alleged political neutrality of Mathematics, present in the imagination of part of society. On the other hand, Walsh (2008) warns that neoliberal, imperial, and globalizing tendencies of capitalism have infiltrated societies as ways of denying local knowledge, reducing it to the status of non-knowledge, while imposing Western knowledge and its assumptions of universality and neutrality as the only legitimate ones capable of organizing and controlling the world.

Taking these issues into account, in this paper we discuss manifestations of the *Tipiti of Colonialities* — a concept that emerged in the first author's doctoral research — in the context of teaching and the teaching profession in Mathematics in municipal public schools in Manaus located in riverside communities. The word tipiti refers to a technology learned from indigenous peoples, which consists of a cylindrical basket made of woven straw, used to extract the poison from manioc – a substance that is lethal to humans. The tipiti works by pressing and squeezing the mass inside the basket (Figure 1). The remaining pulp produces one of the main foods on the Amazonian table: cassava flour. The extracted poison, after boiling, is also transformed into a broth called tucupi, also used in the production of typical foods of the region. Throughout the text, we will discuss our understanding of this idea in more detail.

Figura 1: Tipiti (https://pt.wikipedia.org/wiki/Tipiti#/media/Ficheiro:Tipiti.jpg)

In the next section, we discuss our theoretical references, seeking to articulate, in the context of Amazonian riverine communities, Decolonial Thought and some ideas produced within the scope of the Ethnomathematics Program, with respect to Mathematics teaching. Our search for connections between these theoretical fields does not consist solely of pointing out their possible points of convergence, but above all of seeking to highlight how they can contribute to making visible the social practices and knowledge of teachers that have been disregarded or marginalized by the hegemonic academic knowledge in the field in recent

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decades.

2 Connections between decolonial thinking and Ethnomathematics in Mathematics teaching

Oliveira (2018, p. 364) points out that "the end of the colonial period in Brazil did not necessarily mean the end of the colonized mind; on the contrary, it only replaced the forms of colonization". The discourse of modernity presents itself as the foundation for ideas of development that are allegedly emancipatory in nature. Researchers from the Modernity/Coloniality network highlight that coloniality constitutes a discursive instrument in the elaboration of thought and the reproduction of ideas, as pointed out by Escobar (2003). The group defends the option of decolonial thinking, of an epistemic, theoretical, and political nature, as a way of confronting the global coloniality rooted in the Latin American continent. Below are the meanings of *colonialism*, *modern colonialism*, and *coloniality*, according to Maldonado-Torres (2019),

> colonialism can be understood as the historical formation of colonial territories; modern colonialism can be understood as the specific ways in which Western empires colonized most of the 'discovered' world; and coloniality can be understood as a global logic of dehumanization that is capable of existing even in the absence of formal colonies (p. 35-36).

These definitions are necessary to highlight that formal independence does not necessarily imply decolonization, since "the logic and legacies of colonialism can continue to exist even after the end of formal colonization and the achievement of economic and political independence" (Maldonado-Torres, 2019, p. 28). From this perspective, it is clear how Mathematics as a component of the school curriculum has been shaped by colonialism, imposing itself as a supposedly superior, neutral, universal, and fundamental form of knowledge, with approaches that are almost always alien to discussions of a subjective, cultural, or political nature. Maldonado-Torres (2019) also points out that "raising the issue of the meaning and importance of colonialism indicates a decolonial shift in the theme and the beginning of a decolonial attitude" (2019, p. 33). Thus, we believe that it is necessary to break with the presentation of finished and linear knowledge in Mathematics, outside of social, political, and cultural contexts, in order to promote an education that escapes colonial patterns. Pinto and Mignolo (p. 384) point out that a decolonial stance must "involve efforts of subjective, epistemic, economic, and political disengagement or disconnection in the face of the project of Western domination". This statement reinforces the need and urgency to adopt decolonial stances in Mathematics Education as well, given that the discipline is often used as a form of social exclusion for those who fall outside its conventional learning standards.

In Brazil, decolonial thinking has been gaining ground among researchers in the field of education, which can be interpreted as a recognition of and reaction to the colonial heritage that permeates institutions, practices, and conceptions in the Brazilian educational field. Mota Neto (2015) defines decolonial thinking as

> a set of epistemic practices for recognizing oppression, but above all as another paradigm for understanding the world, interested in revealing, rather than hiding, the contradictions generated by modernity/coloniality, in critical dialogue with European theories, but fundamentally developed from a non-Eurocentric perspective of the world, attentive to the realities experienced by peripheral populations and their knowledge, cultures, and strategies of struggle (p. 15).

Mota Neto (2015) points out that the genealogy of decolonial thought contributes to recovering knowledge that emerged as resistance to the colonial matrix of power and that was rendered invisible by epistemic Eurocentrism. Furthermore, the author highlights that this genealogy is not limited to intellectual individuals but, contrary to hegemonic theories, is developed within social movements and marginalized and subalternized population groups. Apoluceno and Souza (2017) observe that, in Brazil, the educational system was initially established under colonial relations of power and knowledge, preserving to this day the logic that so-called *"advanced"* peoples must "educate the peripheral, the Latinos, and the Amazonians, educate them to be civilized and developed" (p. 91). In the Amazon region, with the arrival of the Jesuits in 1549, educational processes were implemented with the aim of collaborating with Portugal's colonizing policy, through the conversion of Amazonian peoples to the Catholic religion and European customs, and the erasure of their cultures and subjectivities.

With regard to teacher professionalization, it is important to revisit discussions held by education researchers (Lüdke and Boing, 2004; Oliveira, 2010; Tardif, 2013), according to whom those who taught did so out of vocation or priesthood. According to Tardif (2013), it was more recently, from the 20th century onwards, that the act of teaching began to gain professional status. Oliveira (2010, p. 19) conceptualizes *profession* as a set of "specialized activities that have a specific body of knowledge accessible only to a certain professional group, with its own codes and norms, and which fit into a certain place in the social division of labor". However, the researcher questions whether teaching can be included in this conceptualization. She also points out that the notion of professionalization germinates among education professionals based on the organization and expansion of school systems, stating that "the first major struggle for the professionalization of teaching comes up against the functional status which, through the convention of teachers as civil servants and, therefore, state employees, removes their autonomy and self-control over their profession" (Oliveira, 2010, p. 19). Tardif (2013) adds that "professionalization is therefore closely linked to universalization, including for teaching" (559).

In the specific case of Mathematics as a school curriculum component, this demand for professionalization reverberates with the discourses of universality of knowledge that permeate teacher training and practices, contributing to the crystallization of state policies of homogenization of knowledge, codes, and norms of teaching practice. Giraldo (2018) points out that the alleged universality attributed to the discipline corresponds to the conventional idea that the discipline consists of a set of absolute truths, socially and historically decontextualized, which has always been and always will be as it is today, and whose understanding evolves linearly as humanity advances uniformly toward emancipation and intellectual and cultural progress. This conception is challenged by Roque (2012), who argues that it is not even possible to establish continuity between the mathematical practices of Mesopotamia and Greece, for example, which is why one cannot "speak of the evolution of a single mathematics throughout history, but rather of the presence of different practices that we can call 'mathematics' according to criteria that also vary" (p. 14).

Contemporaneously, there seems to be a dominant view in the social imagination that confers on Mathematics a character of epistemic universality, conceiving it as a body of immutable, rigid, correct, and politically neutral knowledge, whose understanding or interpretation is independent of cultural contexts and, therefore, need not and should not be questioned. In this place of supposed universality, there is no room for uncertainty, nor for other knowledge and teaching practices to emerge in everyday school life.

Returning to the idea of modernity and how it became rooted in the social imagination, Pinto and Mignolo (2015) highlight the discourse of universality in modernity, stating that

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"modernity hides the horrors that constitute coloniality" (p. 383) and that "it is interested in presenting itself as an objective, 'natural', necessary, and inevitable reality, thus eliminating any possibility of contestation and re-existence or search for other worlds" (p. 385). In this vein, the contributions of Mota Neto (2015) indicate that the genealogy of decolonial thought allows us to recover knowledge that has been rendered invisible by epistemological Eurocentrism. In the field of Mathematics Education, the Ethnomathematics Program proposed by D'Ambrosio (2011) has contributed to breaking paradigms of the idea of a single, universal Mathematics. According to the researcher, the program's objective is

> give meaning to ways of knowing and doing things in different cultures and recognize why groups of individuals, organized as families, communities, professions, tribes, nations, and peoples, carry out their mathematical practices, such as counting, measuring, comparing, and classifying. (D'Ambrosio, 2008, p. 7)

Mattos (2020, p. 72) states that the Ethnomathematics Program "involves a holistic investigation of how different cultures created or constructed their knowledge in view of the activities developed and the needs that arose in the evolution of each social group" D'Ambrosio (2008) observes that the greatest difficulty of the program lies precisely in overcoming the disciplinary stance within which Mathematics teachers are trained. In this sense, we argue that a decolonial approach to teaching Mathematics can contribute to addressing this challenge by seeking, as D'Ambrosio (2008, p. 7) states, "to teach practices and ideas from the dominant culture without destroying the values of the original culture". Based on this perspective, Tamayo and Mendes (2021) observe that adopting an approach based on decolonial thinking

> it means thinking about Mathematics Education, or Ethnomathematics, that questions itself and, moreover, that opposes racist practices and the Eurocentric project of knowledge that belittles and discriminates against all knowledge that does not submit to the white European cultural matrix, in this case Mathematics — organized disciplinarily — its standards (p. 6).

Among the dimensions proposed by D'Ambrosio (2011), the educational dimension stands out as particularly relevant to the context of this research. Mattos (2020) denounces that this dimension has, for the most part, been neglected in teacher training courses, which contributes to the perpetuation of the myth of a hegemonic universal Mathematics. The author also emphasizes that one should not ignore the context in which Brazilian school education was established, historically based on the importation and replication of theories that disregard the country's specificities and cultural contexts. Therefore, we understand that, together with decoloniality, the Ethnomathematics Program can contribute to a shift in teaching away from the visions of universality and neutrality conventionally attributed to Mathematics, since it "strengthens roots and identity and empowers members of different social groups", as stated by Mattos (2020, p. 123).

Considering the centrality of Mathematics in the project of colonial domination, we question, in this research, whether the discourse of its supposed universality also operates as a strategy for excluding and silencing other forms of knowledge and practices. Thus, we seek to understand how these discourses affect the teaching profession and the teaching of Mathematics. Therefore, we present the methodological approaches of the research.

3 Methodological approaches

This research was constructed from a qualitative perspective. Furthermore, in dialogue

with decolonial studies, we assumed a political bias, explicitly rejecting the paradigm of neutrality in research, according to which it would be possible to conduct research that was not affected by the subjectivities of the researchers and their interactions with the participants and research contexts. In the specific case of this research, this impossibility of neutrality is further evidenced by the fact that the first author is a teacher in the municipal education network of Manaus and has already worked in contexts similar to those of the participants, as will be described below. Thus, the first author is both a researcher and a participant in the research, since her own experiences profoundly influence the paths of data production and interaction with the other participants. The results reported in this paper are not neutral accounts of an external observation by the researcher on the research subjects, since they are markedly influenced by the impressions and intersubjectivities of the researcher and the other participants. We therefore consider that abandoning a neutral stance makes it possible to be affected throughout the investigative process.

In addition, Mota Neto and Lima (2020) warn of the challenge for research in the field of education to engage in dialogue with other forms of knowledge, beyond those that are standardized, whether through academic research or national curriculum policies. The authors point to some methodological possibilities for research in education from a decolonial perspective. Among these, the narrative method, the methodological design adopted in this investigation, stands out. Sampieri, Collado e Lucio (2013) note that there are no predetermined processes for research based on the narrative method. However, the authors point out some common actions in studies already carried out, which are assumed in this research, such as participant observations and open interviews with descriptive questions. The authors also point out that this method can constitute a kind of intervention, since, when telling a story, one can reflect on issues that were not so clear or conscious.

Based on the choice of the narrative method, the research focused on a specific context of teaching: education in riverside schools in the municipal public education network of Manaus. This is regulated and guided by a curriculum proposal called *Education of the Countryside, Waters, and Forests*. The network has 91 teaching units located between the riverside and the highway zone. Of these, 49 are riverside, most of which are located on the banks of the Rio Negro and the rest on the banks of the Amazon River. For this research, the option was to investigate Mathematics teachers who work in schools located on the banks of the Rio Negro.

The group of participants consisted of three male teachers and one female teacher. As these participants chose not to identify themselves, they were given the pseudonyms João, Francisco, Raimundo, and Maria. These participants were 64, 48, 46, and 40 years old, respectively, at the time of the study. João identifies as brown, Francisco as black, and Maria and Raimundo as white. João has been working in the riverside area since 2010 as a contracted teacher in the Manaus municipal education network. Francisco is a civil servant in the network, working in the riverside area since 2018. Maria taught as a contracted teacher in the riverside area of Manaus between 2006 and 2008, having worked at the beginning of the implementation of the final stage of elementary school in schools in this area, which began in 2005. She currently works in schools in the urban area. Raimundo is a municipal employee and has been working as a teacher in the riverside area since 2020.

The results presented in this study relate mainly to factors that have affected teaching in riverside schools since 2013. The teachers work in schools belonging to the Manaus municipal education network, located in riverside communities in the rural area of the city, on the banks of the Rio Negro. Access to these locations is mainly by river, using school boats. Teachers must travel from their homes to a private port, where they board a boat, usually at 6:30 a.m., to the communities where the schools are located. In schools closer to the urban area of Manaus,

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this trip can be made daily, allowing teachers to go to school and return home every day. In the case of more distant or isolated communities, teachers leave on Mondays and return only on Fridays, staying in the communities throughout the week.

Consistent with the narrative method adopted, the interviews were understood not only as a tool for data production, but above all as *conversations*, as "complex discursive events, forged by the interviewer/interviewee duo, but also by the images, representations, and expectations that circulate" (Silveira, 2002, p. 120). Thus, rather than a mere procedure for *collecting* data, the interviews in this study constitute a construction, a *collective production of meanings*, resulting from negotiations between the interviewer and the participants.

4 Tipiti of Colonialities

The idea of *Tipiti de Colonialidades* that we propose in this research emerged from the reports of the research participants, in conversations about feelings that affect them during the exercise of their teaching profession in the public school system. The teachers expressed feeling pressured, twisted, as if in a kind of *tipiti,* by the management of the municipal public education system in Manaus. Based on this twisting movement exerted by the forces of state power, evident in the teachers' narratives, the actions of colonialities in operation were observed. In this context, constituted by the impressions derived from the interviews and the place of professional activity, the Amazon, the term *Tipiti of Colonialities* provides a relevant image to describe various aspects of teaching and pedagogical practices in schools in the riverside regions of the Amazon.

This perception of oppression in teaching is expressed by participant Francisco, who states*: "I'll tell you something. I've been doing this for ten years, I've prepared classes and I've been disappointed with several things in education, with several things, with the system".* Francisco's account expresses a feeling related to teaching work in the municipal public school system. When he mentions the *"system",* it is understood that the teacher is referring to state management as an institution of power. Thus, it is clear that *Tipiti de Colonialidades* acts through various actions imposed on the municipal public school system in Manaus. Among these actions, the most recurrent in the teachers' statements refers to the work of the advisors of *Dona GIDE*, as the Integrated School Management (GIDE) became known among teachers, an educational management proposal based on business principles, implemented by the Manaus City Hall. João, another teacher collaborating in the research, reports: *"Now there is a sector there at SEMED. It's GIBE, GIB, something like that, and those guys are a pain in the ass, you know what I mean?".*

To better illustrate the Tipiti imposed on teachers by GIDE's actions in the municipal public school system of Manaus, we present an overview based on research by Aranha (2017) and Pereira (2020). According to Aranha (2017), in July 2013, the Manaus City Hall began negotiations with the Inter-American Development Bank (IDB) to secure a loan that would give rise to the Manaus Municipal Public School System Educational Expansion and Improvement Project (PROEMEM). PROEMEM enabled the inclusion of a number of companies and institutes in basic education in Manaus. Among these is the consulting firm Instituto Áquila, responsible for implementing GIDE in the municipal public school system, as reported by Pereira (2020). According to this author, PROEMEM is organized into four components: 1. Expansion and improvement of coverage of Early Childhood Education and Elementary Education; 2. Improvement of the quality of education; 3. Management, monitoring, and evaluation; 4. Project administration. It is in the third component that GIDE is based, under the guidance of Instituto Áquila consultants.

To enable the implementation of GIDE in schools, 100 teachers were removed from their original duties and, "after a week of technical and operational training, were considered

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qualified to ‘replicate’ the business methodology for the standardization of SEMED schools” (Pereira, 2020, p. 103). These teachers began to act as advisors in the process of applying the methodology proposed by GIDE in the municipal school system. The method used by the Áquila Institute and practiced through GIDE is PDCA (Plan, Do, Check, Action), widely adopted in business contexts. As Pereira (2020) points out, the application of this method results in the generation of an indicator called the Citizenship and Social Responsibility Training Index (IFC/RS). It is in this context that João and Raimundo report how the monitoring carried out by GIDE advisors in schools occurs:

> JOÃO: They went there, but they didn't come into the classroom, right? They came with me, and the only thing they did there was check the diary, see if the diaries were correct, if the classes were all right, you know? According to the checklist they sent, right? I had to do the diary according to their checklist, if everything was in order, but they didn't go into the classroom, if they did, it didn't make any difference to me.
>
> RAIMUNDO: To this day, I still don't really know what GIDE means. No, but the cool thing about GIDE is that you can work with it, mainly because it focuses on descriptors, specific difficulties, specific subjects, and we end up using this data to change or deepen content for students, based on that content, right?

In the teachers' statements, it is clear that they do not fully understand the role of GIDE, defined by Pereira (2020) as monitoring and evaluation. Furthermore, it is evident that teaching work in these schools is conditioned by the completion of checklists or lists of descriptors. On another occasion, teacher Francisco describes in more detail how GIDE's advisory role works, especially with regard to monitoring compliance or non-compliance with these predefined content sequences. Francisco is asked what the consequences would be if he failed to follow exactly the expected proposal for filling out the class diary.

> FRANCISCO: Ah, then they talk, I know they talk. So, to stop them talking, we put it in straight away. Ah, you have to put it in, you have to put it in like that. I don't know if they don't teach them properly. If they learn it there and pass it on wrongly to us, I don't know. [...] That was my sadness. If I don't put it in. I get called in there. I have to write a report on why I have to write a report. And if I speak up, I don't write any report, do you think I'm an idiot? So I'm going to say it's wrong, I'm not going to write a report. Ah! So, I don't write any report and they don't even care. Ask if they come here, GIDE, anything. To see my class, anything. “Francisco, where are they, let me talk to your students.” They don't talk to the students, they don't want to know anything. They want to know if it's in your report. You made your plan, do you understand? That's one of the things that really upsets me. Oh, you made your plan? They don't want to know if the student learned or not. I want to know if you made your plan, if it's complete.

According to teachers, advising takes place through the analysis of diaries. This monitoring is based on compliance, or non-compliance, with items that teachers have indicated as a checklist. At the beginning of GIDE's implementation in schools, during training sessions, this checklist was referred to by teachers as the “minimum curriculum.” This designation was promptly denied by GIDE, which characterized it as, in fact, a set of key points from SEMED's curriculum proposal, aligned with the descriptors of the Basic Education Assessment System (SAEB) curriculum matrix. According to teachers' reports, GIDE advisors visit schools and analyze the diaries based on this checklist, limiting their attention to verifying that they correspond. As Francisco states, *“you can't change a single comma of the subject”*. If any discrepancy is identified, explanatory reports are required, disregarding justifications related to everyday school life or the learning process that may have motivated the difference between what is recorded in the journal and what is provided for in the checklist.

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Thus, GIDE's monitoring system seems to position teachers as mere complyers and reproducers of the content included in the aforementioned list. However, as a gesture of resistance and disobedience to the *Tipiti of Colonialities*, teachers report that they fill out the diaries as expected, in order to avoid negative signals in the IFC/RS indicators, while conducting their classes by monitoring the students' learning process, respecting their difficulties and abilities. The IFC/RS is like a signaling system — with green, yellow, and red colors — implemented as a control instrument to manage and evaluate school work by GIDE advisors. Pereira (2020) points out that this index is composed of several variables,

> which at no time were municipal schools asked to comment on the needs of the variable or the percentage of prioritization of each variable. These variables in the IFC/RS instrument have already been passed on to schools in their percentages, defined vertically, as well as the presence of the consultancy itself" (p. 109).

In a unilateral, imposing, and undemocratic manner, it can be observed that, in Manaus, the structure formed by GIDE / Instituto Áquila / PROEMEM / BID managed to impose, with the consent of the municipal public administration, its logic as the official practice of the network. Aranha (2017, p. 4) states that "it is considered that the partnership with the private sector in education conceals the hegemonic interests of big capital in a disguised and camouflaged way to legitimize its projects and programs." Regarding GIDE's activities in his school and, specifically, the functioning of the lighthouses, teacher Raimundo reports:

> RAIMUNDO: Well, when the GIDE advisor comes to the school, she usually asks for the attendance register, mainly to check student attendance. She checks which students have the best attendance, right? And which ones are having the most difficulty with certain content, in certain subjects. Then she talks to the teachers about teaching methods, what we can change, what we can improve.

So, we asked the teacher to explain more about the headlights.

> RAIMUNDO: It's by target, for example, I have a target there that a certain number of students in a given grade would have to pass. For example, ninety percent of the sixth grade class would have to pass. Then eighty-nine percent passed, which means the red light came on.
>
> RESEARCHER: Eighty-nine percent?
>
> RAIMUNDO: Eighty-nine percent, which is below the goal.
>
> RESEARCHER: Oh, so there's no yellow light?
>
> RAIMUNDO: No, just red or green [...]
>
> RESEARCHER: In other words, you have to go after it?
>
> RAIMUNDO: You have to go after it to reach the goal.
>
> RESEARCHER: So do you have to take another test or not? Like, is it a target for the next semester?
>
> RAIMUNDO: It's already a semester target, for the next two months, in this case. It's already a target for us to work towards for the next two months.

We observe that, even in the face of the *Tipiti of Colonialities* imposed by GIDE in the municipal public school system of Manaus, teachers seek loopholes to resist and subvert this

logic, express concern, and perceive the lack of commitment on the part of public administrators and their advisors to the educational guidance offered. An example of this perception is present in the words of teacher Francisco: *"They don't talk to the students, they don't want to know anything. They want to know if it's in your role there. You made your plan, you understand? That's one of the things that really upsets me".* The teacher is referring to visits by GIDE's educational advisors to schools, with the sole purpose of checking that plans, diaries, and checklists match up, in order to turn on the spotlights and require teachers to produce reports, if necessary, a procedure that appears to be punitive in nature.

The teaching of mathematics and teaching practices end up being associated with and reduced to fulfilling goals imposed by the GIDE system, disregarding, even, the planning done by teachers based on the needs of students and their contexts, as reported by professor Raimundo when commenting on the definition of these goals. In this scenario, it is observed that the State formally organizes curricular guidelines, selects resources and methods to be used, and develops programs that often prove to be distant from the demands of the communities. This process highlights forms of alienation present in policies such as that of SEMED-Manaus, especially due to the loss of teacher autonomy in planning, evaluation, methods, and teaching techniques.

Thus, the teaching profession in the municipal public school system of Manaus — particularly in schools located in riverside communities — is compressed in this *Tipiti of Colonialities*, with the maintenance of the epistemic privilege of Western knowledge. According to the reports of the teachers participating in this research, their plans and experiences do not find space to constitute valid knowledge, through their practices, within the parameters established by GIDE. The document that teachers refer to as a checklist arrives at schools ready-made, and it is up to them to simply comply with the list of content developed externally.

Another moment in which teachers are subjected to the Tipiti de Colonialidades in the municipal public school system of Manaus occurs with the application of a Student Performance Evaluation (ADE). According to information available on the SEMED-Manaus website[1], this is an internal assessment by the Secretariat, focused on Mathematics and Portuguese language content, applied to students along the lines of the SAEB. The ADE began to be implemented in the network in 2014. In the initial negotiations for its implementation, the initial guidelines indicated that the assessment would be based on the descriptor matrix of the National Institute for Educational Studies and Research (INEP). According to teachers' reports, this guideline was later replaced by the GIDE checklist structure. Regarding the ADE, teacher Francisco reports:

> FRANCISCO: I always thought it was a mistake, I always thought it was a mistake. I think I told you that. When it was ADE, for example, one group took math and the other didn't. But everyone did ADE.
>
> RESEARCHER: No, you hadn't told me about that.
>
> FRANCISCO: When we did ADE, I stayed at a school for a certain semester.
>
> RESEARCHER: You don't do it anymore? ADE?
>
> FRANCISCO: No, they do it now. You see? So, ADE was done without the students having math classes, you see? I was pissed because they ranked the schools. So I was pissed about that. But how?

[1] MANAUS. Municipal Secretariat of Education. City Hall conducts training with administrators of performance evaluations for SEMED students. Available at https://www.manaus.am.gov.br/noticias/educacao/prefeitura-realiza-formacao-com-aplicadores-das-avaliacoes-de-desempenho-para-estudantes-da-semed; accessed on May 2, 2023.

RESEARCHER: But did they still do it?

FRANCISCO: They did it several times, but now they've stopped, they've changed.

It appears that ADE does not only evaluate students — which, in itself, raises questions —, but also extends to Mathematics and Portuguese language teachers, subjects covered in the evaluation, as well as other school stakeholders. As the teacher reported, until recently there was a ranking of schools, in addition to *awards*, such as the granting of 14th and/or 15th salaries to the units that obtained the best scores on the SAEB tests, with ADE being considered, in the words of public managers, as a barometer for these results. As a result, teachers are often led to *train* students for better performance, since the benefits extend to all school professionals. We understand that the time and energy spent on these *trainings* can result in lost opportunities to bring meaning to Mathematics teaching. Teachers perceive the gap between ADE tests and their own perception of the realities of the classroom and their students' learning. On this point, João points out that:

> JOÃO: Once I went to a meeting with people from the ADE coordination team. So, that's what we discussed, you know? That the subjects they taught were not suitable for our students, we discussed that a lot. Because we were teaching one thing, and ADE was teaching another. Besides that, you know, the tests went far beyond what we taught in class. We discussed this a lot.

In the perception of the teachers participating in this research, a universal and unilateral assessment, developed by actors in urban areas, does not take into account the specificities of students in riverside schools. This structure, which we refer to as the *Tipiti of Colonialities,* experienced by teachers in their professional practice, among others pointed out in studies such as those by Aranha (2017) and Pereira (2020), contributes to the maintenance of projects of colonial domination and epistemicide imposed on the peoples of the Global South, particularly in the Amazon, since the period of their colonization. However, this project is not entirely successful, because, even if not completely intentional or conscious, teachers find loopholes and cracks through which they visualize and follow paths of resistance.

In view of the above, we advocate an alignment with Decolonial Thought, articulated with the Ethnomathematics Program, in the teaching of Mathematics, particularly in schools located in riverside communities in the Amazon region of Amazonas. As Tamayo-Osório (2017, p. 46) points out, “the subordination and erasure of the mathematical knowledge and experiences of the colonized reinforce the reproduction of relations of domination”. Thus, in order to confront colonialities, Mathematics teachers must resist the forms of standardization and normalization to which we are subjected, both in their practices and in their training.

5 Final thoughts

In this study, we observed how Mathematics teaching offered to riverside communities by the municipal public education network in Manaus is guided by the pedagogical and epistemic references of a regular urban school. Although official documents include a pedagogical proposal called *Education of the Countryside, Waters, and Forests*, the reports of participating teachers show that the pedagogical guidelines of the municipal system are limited to complying with content lists prepared by actors outside the context of riverside schools. These guidelines suggest that students in the Manaus municipal public education system, whether they live in urban or rural areas, are seen as a single, homogeneous group.

The practices promoted by the Manaus municipal public education system are geared toward an education that distances students from their territories and their relationships with

them. Teachers are required to execute universalized content lists that prioritize the neutrality of Mathematics teaching, rooted in the myth of modernity and guided by the sovereignty of a hegemonic and Eurocentric epistemological model, "which inferiorizes and discriminates against all knowledge that does not submit to the white European cultural matrix" (Tamayo and Mendes, 2021, p. 6). From this perspective, Mathematics teachers in riverside schools are imprisoned and squeezed by the *Tipiti of Colonialities*, urged to adopt teaching practices that leave no room for the recognition and appreciation of knowledge and practices related to the territory in which they work. Matos (2019) highlights the following warning:

> Coloniality is not limited to a formal power relationship between peoples or nations, but is present in the present day in the way that work, knowledge, authority, and intersubjective relationships manifest and articulate themselves, crystallizing hierarchies of beings, knowledge, and worldviews (p. 92).

It should also be noted that most teachers who teach in riverside schools need to travel weekly or daily to the locations where these schools are located, complying with schedules established in relatively rigid school calendars. Therefore, it becomes even more difficult for these teachers to get to know the cultural environment of their students, let alone recognize what they already know and what they are capable of doing. Thus, in addition to all the tensions that generally surround the profession of Mathematics teacher, there is a lack of time to build stronger and deeper relationships with the culture, knowledge, and practices of the communities in which they teach. In this sense, Arroyo (2007) points out that

> one of the determining factors in the precariousness of rural education is the absence of a body of professionals who live alongside rural communities, who come from these communities, who have inherited the culture and knowledge of the diversity of ways of life in the countryside. Most educators commute every day from the city to the rural school and then return to their place of origin, the city, and their urban culture. Consequently, they have no roots in rural culture, nor do they put down roots there (p. 169).

The fact that the vast majority of Mathematics teachers were trained from a perspective that conceives the discipline as a body of unquestionable, epistemologically universal, and politically neutral knowledge may suggest that it would be impossible for these teachers to break with this paradigm. However, the discourses (even if their internal coherence can be questioned) of the teachers participating in this research reveal movements toward teaching practices that, at least to some extent, recognize and legitimize the local cultures of students, even without these teachers demonstrating familiarity with the recent academic debate on decolonial thinking.

Within structures that pressure and oppress them, teachers who teach in Amazonian riverside communities find possibilities for the production of insurgent practices, as do indigenous peoples, who teach us the technology of using the Tipiti to remove the lethal poison from manioc and transform it into flavors and foods for the Amazonian peoples. Inspired by the knowledge and practices of the original inhabitants of the territories we now call Brazil, we point to the potential of insurgent movements to extract and transform the *poisons* that surround teaching and the teaching profession in Mathematics.

Conflicts of Interest

The authors declare that there are no conflicts of interest that could influence the results of the research presented in this paper.

Data Availability Statement

The data produced and analyzed in the paper will be made available upon request to the authors.

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References

ARANHA, Rudervania da Silva Lima. *PROEMEM: a lógica do mercado na educação pública municipal de Manaus.* 2017. 149f. Dissertação (Mestrado em Educação). Universidade Federal do Amazonas. Manaus.

ARROYO, Miguel Gonzalez. (2007). Políticas de formação de educadores (as) do campo. *Cadernos Cedes*, v. 27, n. 72, p. 157-176, 2007. https://doi.org/10.1590/S0101-32622007000200004

D'AMBROSIO, Ubiratan. *Etnomatemática: elo entre tradições e a modernidade*. 4. ed. Belo Horizonte: Autêntica, 2011.

D'AMBROSIO, Ubiratan. O Programa Etnomatemática: uma síntese. *Acta Scientiae*, v. 10, n. 1, p. 7-16, jan./jun. 2008.

ESCOBAR, Arturo. Mundos y conocimientos de outro modo. *Tabula Rasa,* n. 1, p. 51-86, 2003. https://doi.org/10.25058/20112742.188

GIRALDO, Victor. Formação de Professores de Matemática: para uma abordagem problematizada. *Ciência e Cultura*, v. 70, n. 1, p. 37-42, 2018. http://dx.doi.org/10.21800/2317-66602018000100012

LÜDKE, Menga; BOING, Luiz Alberto. Caminhos da profissionalização e da profissionalidade docentes. *Educação & Sociedade*, v. 25, n. 89, p. 1159-1180, 2004. https://doi.org/10.1590/S0101-73302004000400005

MALDONADO-TORRES, Nelson. Analítica da colonialidade e da decolonialidade: algumas dimensões básicas. In: BERNARDINO-COSTA, Joaze; MALDONADO-TORRES, Nelson; GROSFOGUEL, Ramon. (Org.). *Decolonialidade e pensamento afrodiaspórico.* Belo Horizonte: Autêntica, 2019, p. 27-53.

MATOS, Diego. *Experiências com Matemática(s) na escola e na formação inicial de professores: desvelando tensões em relações de colonialidade.* 2019. 172f. Tese (Doutorado em Ensino e História da Matemática e da Física). Universidade Federal do Rio de Janeiro. Rio de Janeiro.

MATTOS, Sandra Maria Nascimento. *O sentido da Matemática e a Matemática do sentido: aproximações com Programa Etnomatemática*. São Paulo: Livraria da Física, 2020.

MOTA NETO, João Colares, LIMA, Adriane Raquel Santana. Desafios da pesquisa em educação em perspectiva decolonial. In: LIMA, Adriane Raquel Santana. (Org.). *Pedagogias decoloniais na Amazônia: fundamentos, pesquisas e práticas.* Curitiba: CRV, 2020, p. 55-84.

MOTA NETO, João Colares. *Educação popular e pensamento decolonial latino-americano em Paulo Freire e Orlando Fals Borda.* 2015. 368f. Tese (Doutorado em Educação). Universidade Federal do Pará.

OLIVEIRA, Andreici Marcela Araujo. Povos indígenas, desenvolvimento e colonialismo na Amazônia brasileira. In: CASTRO, Edna Maria Ramos; PINTO, Renan Freitas. (Org). *Decolonialidade e sociologia na América Latina.* Belém: UFPA, 2018, p. 355-386.

OLIVEIRA, Dalila Andrade. Os trabalhadores da Educação e a construção política da profissão docente no Brasil. *Educar em Revista*, n. esp., p. 17-35, 2010.

OLIVEIRA, Ivanilde Apoluceno; SOUZA, Sulivan Ferreira. Colonialidade pedagógica: outras epistemologias e insurgências pedagógicas. In: OLIVEIRA, Ivanilde Apoluceno; SOUZA, Sulivan Ferreira. (Org.). *Diferentes olhares epistemológicos sobre a educação.* Belém: UEPA, 2017, 83-99.

PEREIRA, Luciana de Lima. *Escola não é empresa: a pseudoqualidade da GIDE nas escolas de Manaus*. 2020. 238f. Tese (Doutorado em Educação). Universidade Federal do Amazonas. Manaus.

PINTO, Júlio Roberto de Souza; MIGNOLO, Walter. A mordernidade é de fato universal? Reemergência, desocidentalização e opção decolonial. *Civitas*, v. 15, n. 3, p. 381-402, jul./set. 2015. https://doi.org/10.15448/1984-7289.2015.3.20580

ROQUE, Tatiana. *História da Matemática: uma visão crítica, desfazendo mitos e lendas*. Rio de Janeiro: Zahar, 2012.

SAMPIERI, Roberto Hernández; COLLADO, Carlos Hernández; LUCIO, María del Pilar Baptista. *Metodologia da Pesquisa.* Traduzido por Daisy Vaz de Moraes. Porto Alegre: Penso, 2013.

SILVEIRA, Rosa Maria Hessel. A entrevista na pesquisa em Educação: uma arena de significados. In: COSTA, Marisa Vorraber. (Org.). *Caminhos investigativos II: outros modos de pensar e fazer pesquisa em Educação.* Rio de Janeiro: DP&A, 2002, p. 119-141.

TAMAYO, Carolina. A colonialidade do saber: um olhar desde a Educação Matemática. *Revista Latinoamericana de Etnomatemática*, v. 10, n. 3, p. 39-58, 2017.

TAMAYO, Carolina; MENDES, Jackeline Rodrigues. Opção decolonial e modos outros de conhecer na Educação (Matemática). *Revista de Educação Matemática*, v. 18, p. 1-14, 2021. https://doi.org/10.37001/remat25269062v18id599

TARDIF, Maurice. A profissionalização do ensino passados trinta anos: dois passos para a frente, três para trás. *Educação & Sociedade*, v. 34, n. 123, p. 551-571, 2013. https://doi.org/10.1590/S0101-73302013000200013

WALSH, Catherine. Interculturalidad, plurinacionalidad y decolonialidad: las insurgências político-epistémicas de refundar el Estado. *Tabula Rasa*, n. 9, p. 131-152, jul./dic. 2008. https://doi.org/10.25058/20112742.343