Indigenous Mathematical Knowledge and Practices: State of the Art of the Ethnomathematics Brazilian Congresses (2000–2016)

Maria Cecilia Fantinato and Kécio Gonçalves Leite

Abstract This chapter focus on the works addressing indigenous mathematical practices and knowledge throughout the five editions of the Brazilian Congress of Ethnomathematics (CBEm). By aiming to identify theoretical and methodological trends, main themes and the representativeness of indigenous authorship, this study reflects on possible and necessary relations between ethnomathematics and anthropology. A bibliographic research of the state-of-the-art type has been developed, the time frame adopted—2000 to 2016—covers the years of the first and last edition of CBEm. Having defined *indigenous* as the main criterion for the selection of contributions the works have been analyzed according to five subcategories for analysis of the selected works, namely: researched indigenous ethnicities, indigenous authorship, main themes, references from anthropology, and mention of ethnography as a methodological option. From the universe of 450 contributions presented in the five editions of CBEm, 69 were selected considering the indigenous theme. Results indicate proportional growth over the years, jumping from 4% in CBEm1 to 22% in CBEm5. 32 indigenous ethnic groups had some form of representation at the events, only 10% of the entire ethnic diversity of indigenous peoples in Brazil. From the third edition of CBEm, there is a growing presence of indigenous authors in the works presented at the event, related to the expansion of ethnomathematics in Brazil, initially concentrated in graduate programs and research groups, and spreading towards undergraduate programs and especially for initial teacher training programs. The increasing presence of indigenous authors in CBEm shows an inversion in the researcher's speech position in relation to the knowledge and practices researched with indigenous peoples in the country and has the potential to contribute to theoretical innovations of conceptions on ethnomathematics itself. From the reading and qualitative analysis of the selected sample four main themes were identified, indicated explicitly or implicitly by the authors in their productions: Indigenous (mathematical) knowledge, Teacher training, Curriculum, Culture and

M. C. Fantinato (✉)
Fluminense Federal University (UFF), Niterói, Brazil
e-mail: mcfantinato@gmail.com

K. G. Leite
Federal University of Rondônia (UNIR), Porto Velho, Brazil
e-mail: kecioleite@unir.br

E. Vandendriessche and R. Pinxten (eds.), *Indigenous Knowledge and Ethnomathematics*,
https://doi.org/10.1007/978-3-030-97482-4_5

cultural identity. Although 63% of the analyzed works have references from anthropology, having cited 59 anthropologists from different theoretical currents, there is a tendency to reduce these references along the last two editions of CBEm. This occurs simultaneously with the increase of indigenous researchers' presence at the events. These results allow us to suppose that, in the current phase of development of ethnomathematics in Brazil, the growing participation of indigenous researchers as authors of works that deal with their own peoples' knowledge, generates relative independence in the results of anthropological studies, indicating a distance tendency between ethnomathematics and anthropology in the country. Besides this, it has been noted that only 18% of all analyzed works call themselves ethnographic. Thus, it can be said that the dialogue between ethnomathematics and anthropology, although existing since its origins, needs to be deepened in Brazil, and constitutes an opportunity to give greater density to ethnomathematics research and better appropriation of ethnographic research.

Keywords Ethnomathematics · Indigenous knowledge and practices · Brazilian congresses · State-of-the-art · Ethnographic research

1 Introduction

In this chapter, we analyze the works addressing indigenous mathematical practices and knowledge throughout the five editions of the Brazilian Congress of Ethnomathematics (CBEm). Our aim is to identify theoretical and methodological trends, and main themes in the indigenous cultures. Starting from this section of the proceedings we reflect on possible and necessary relations between ethnomathematics and anthropology.

In general, ethnomathematics in Brazil is associated with a *line of research* in Mathematics Education, which investigates the cultural roots of mathematical ideas from the way they occur in different social groups. In this sense, ethnomathematics has interfaces with other areas, notably with anthropology and sociology, seeking to identify mathematical problems from the knowledge of the *other*, in its own rationality, terms and contexts.

This is a relatively new area of research. It is still under construction. However, as indicated by Vandendriessche and Petit (2017), although the first publications in ethnomathematics are from the 1970s and 1980s, it is possible to trace the emergence of a mathematical anthropology among ethnological, mathematical and philosophical studies from the nineteenth century. The contact of European anthropologists with colonized countries increased the interest in the study of the counting and measurement systems of *others*, as well as the geometric features in cultural artefacts—baskets, vases, body paintings, etc. However, an evolutionist perspective of society and knowledge, with a positivist orientation, still prevailed at that time. Hence, these first studies were seen as markedly ethnocentric and took Western mathematics as a frame of reference. Non-Western peoples' knowledge was seen as primitive.

After Malinowsky (1922), systematic ethnographic fieldwork with deep immersion in the life and universe of those studied became the norm (Strathern, 1987). This line of research produced an epistemological turn, which stimulated the development of research seeking to identify the mathematical knowledge of these populations, and to understand their own mathematical rationality (Vandendriessche & Petit, 2017).

As a consequence, early ethnomathematics were associated with the anthropology of mathematics. The field has developed significantly since then, worldwide. One of the first and main theorists of ethnomathematics is a Brazilian—Ubiratan D'Ambrosio (1985, 2001). He has played a significant role in the development of this line of research. Fiorentini and Lorenzato (2006) claim that this is the research area for mathematics education in which Brazil has stood out most internationally.

However, the first researchers in ethnomathematics had a mathematical background, and aimed at didactic improvements. This perspective "remains at the heart of most of the works that now claim to be ethnomathematics and whose main objective is to promote mathematical education based on indigenous knowledge" (Vandendriessche & Petit, 2017: 212) and is part of an activist approach aimed at the decolonization.

The ethnic, linguistic and cultural diversity of over 300 indigenous peoples in Brazil constitutes a broad field for research. This theme has been present in Brazilian studies in ethnomathematics since the 1980s. Eduardo Sebastiani Ferreira's (1990) pioneering works in the nineties, with indigenous communities in the Upper Xingu and Amazonas, are a benchmark for all academic production in the field (Knijnik, 2004). Since then, other researchers (Amancio, 1999; Bello, 1995; Scandiuzzi, 1997) and more recently Silva (2012) and Severino Filho (2012), among others, have dedicated themselves to indigenous education.

The congresses in ethnomathematics have contributed both to internal reflection in the field and to its consolidation. Such consolidation process involves the development of studies and research along different thematic axes. This chapter aims to present a brief overview. This is a state-of-the-art bibliographic research building on previous work (Fantinato, 2013; Fantinato & Leite, 2020; Leite, 2017).

We start by reviewing the five Brazilian congresses on ethnomathematics, and we point to the trends that developed as a result of each congress influencing the next congress. Then, we provide some statistical surveys showing the numerical growth of the works, the proportion of works on the indigenous themes per event (congress), the central themes of the events and of the main lectures, and the elements that contribute to characterize the research movement in ethnomathematics in Brazil. In order to provide these survey results, we have followed up the slow but significant growth of indigenous authorship in this production and analyzed some factors that explain the changes over the years. We identified the anthropological references cited by the authors in order to determine the extent to which the researchers rely on these references, especially with regard to fieldwork of an ethnographic nature.

2 The Brazilian Ethnomathematics Congresses

Since the first studies in ethnomathematics, in the 1980s this field has been developing and consolidating itself in Brazil. Specific national congresses, which take place every four years, can serve as a portrait of the main research trends in this field, from a historical point of view. In this section, we present a summary of the characteristics of the five congresses held between 2000 and 2016, highlighting how the indigenous theme was present in each of these events. We also map the extent to which the relations between ethnomathematics and anthropology were addressed in their main lectures. The proceedings of these congresses form the literature analyzed in this current research study.

The *First Brazilian Congress of Ethnomathematics* (CBEm1) was held at the Faculty of Education of the University of São Paulo, in November 2000. This Congress was not organized around a general theme, but papers had to address at least one of the following themes: rural education, indigenous education, *caiçara*[1] education, urban education, artisanal practices, youth and adult education, environmental education, critical mathematical education, groups of professionals, and/or theoretical aspects. This thematic plurality was aiming to attract researchers from different ethnomathematics trends, as well as teachers from the education networks. In the proceedings, out of the 73 contributions only 3 treated indigenous themes. According to the general coordinator of the event, CBEm1 represented an attempt "to look at ethnomathematics in its multiple faces, as a social production of knowledge and an agent of inclusion" (Domite, 2000: 1). This concern with the multiplicity of perspectives was reflected in the organization of the lectures, addressing diverse themes, such as the theoretical aspects of ethnomathematics or the debate on concepts central to the theoretical-epistemological reflection of the field. The predominant ethnomathematics perspective in CBEm1 was that associated with the study of socio-cultural groups, seeking to give visibility to the *mathematics* practiced by these different groups (Duarte, 2009).

The dialogue with other fields of knowledge contributing to the theoretical-methodological delimitation of ethnomathematics—such as anthropology, history and philosophy—was one of the hallmarks of CBEm1. The theme of the Opening Lecture, *The notion of culture*, was debated by the ethnomathematician Eduardo Sebastiani Ferreira, the psychologist Marta Kohl de Oliveira, the philosopher Antonio Joaquim Severino, and the anthropologist Neusa Gusmão.

Relations with anthropology and ethnography were provided in the lecture of Marcio D'Olne Campos ("*To be here*" *and* "*to be there*": *Tensions and intersections with fieldwork*). The indigenous theme appeared in one of the discussion forums. The indigenous presence in this congress was still marginal, with representatives of some ethnic groups from the state of São Paulo selling their own handicrafts during breaks such as coffee breaks between the main activities.

[1] Traditional inhabitants of the coast of the Southeast and South regions of Brazil, formed from the miscegenation between Indians, whites and blacks.

All in all, CBEm1's pioneering spirit, as the first Brazilian Congress of Ethnomathematics, represented an important contribution to the field, stimulating the approach of the different Brazilian research groups that already existed and the formation of new ones.

The *Second Brazilian Congress of Ethnomathematics* (CBEm2) took place in April 2004, on the campus of the Federal University of Rio Grande do Norte, in Natal. The introductory text of the proceedings highlights its role as "one more step in the consolidation of Ethnomathematics as an area of knowledge" (Morey, 2004: 7). Unlike the previous event, the CBEm2 structure prioritized the meeting of all participants of the event in plenary sessions, instead of myriad lectures. Of the five round tables, four were dedicated to the dimensions of ethnomathematics, according to D'Ambrosio (2001): the political—*Ethnomathematics and political issues*—, the epistemological—*Ethnomathematics and Epistemology*—, the methodological—*Ethnomathematics and fieldwork*—and the educational dimension—*Ethnomathematics and teacher education.* The indigenous issue had a prominent place in the fifth round table, which was called *Indigenous Ethnomathematics.*

The CBEm2 opening lecture was given by Arthur Powell, from Rutgers University. The presence of this black researcher, critical of the Eurocentrism of mathematical education (Powell & Frankenstein, 1997), converged with the indication, during the closing plenary of this event, of the need to expand studies on ethnomathematics and Africanity.

CBEm2's proceedings register 56 papers, with 7 of them on indigenous themes. No main lecture addressed the relationship between ethnomathematics and anthropology specifically, but some guests at the round table on fieldwork did discuss ethnographic research (e.g., Sílvia Regina Ribeiro, in the lecture *Ethnomathematics: Methodological options for field research*). During this event, different theoretical and/or methodological perspectives on ethnomathematics emerged due to the plurality of conceptions of ethnomathematics, acknowledged by researchers in the field (Conrado, 2005).

Among the milestones of CBEm2, we can mention the launch of two books (Knijnik et al., 2004; Ribeiro et al., 2004), which became important references in the field. "From a political point of view, the decision of the final assembly of CBEm2, to create the Brazilian representation of the International Study Group on Ethnomathematics (ISGEm), deserves to be highlighted" (Fantinato, 2013: 151).

The *Third Brazilian Congress of Ethnomathematics* (CBEm3) took place in March 2008, at the Faculty of Education of the Fluminense Federal University, in Niterói. Its general theme was *Ethnomathematics: new theoretical and pedagogical challenges*. Seven thematic axes were defined for submission of contributions: mathematical education in different cultural contexts; ethnomathematics and teacher training; ethnomathematics and ethnosciences; ethnomathematics and its theoretical foundations; ethnomathematics research; ethnomathematics and the classroom; and/or ethnomathematics and history of mathematics. From the 97 papers presented, 12 addressed indigenous themes.

In its structure CBEm3 maintained the CBEm2 plenary round tables, each addressing one of the significant axes of research in the field. During the *discussion forums* participants were divided into subgroups, mediated by an experienced researcher. The relations between ethnomathematics and anthropology were addressed, in a way, in the opening lecture of the congress, *Ethnoscience, ethnography and local knowledge*, given by Marcio D'Olne Campos. At the roundtable on teacher training the indigenous issues were brought up both by Jackeline Rodrigues Mendes (2009), and by the indigenous school teacher João Lira Guarani.

The growth in the number of contributions to CBEm3 seems to reflect the formation of new research centers in Brazil, as well as the growth in scientific output (Fantinato, 2013). This congress led to an important political landmark: the creation of the Brazilian Association of Ethnomathematics (ABEm), with Maria do Carmo Santos Domite as president.

The *Fourth Brazilian Congress of Ethnomathematics* (CBEm4) took place at the Federal University of Pará, in the city of Belém, in 2012. The theme of the congress—*Culture, Mathematical Education and School*—highlighted the relationships between mathematics, knowledge and practices of cultural groups and their role in the school context. The context was the backdrop of the diversity of the Brazilian socio-cultural wealth. In addition CBEm4 wanted to take the educational dimension of ethnomathematics as an important focus (D'Ambrosio, 2001): the teaching/learning process, teacher training, school formation, and new educational perspectives in different socio-cultural groups. This congress also highlighted the relationship between mathematical education and Amazonian culture. 114 papers were presented at the event, of which 23 reported research with indigenous peoples.

At CBEm4, presentations were organized along four thematic axes: Axis 1: Ethnomathematics and Education of the Peoples of the Forest; Axis 2: Ethnomathematics and Rural Education; Axis 3: Ethnomathematics and Relations between Trends in Mathematics Education; and Axis 4: Ethnomathematics and Education for Inclusion. The indigenous theme had a prominent place in CBEm4. The discussion on the anthropological concept of culture in ethnomathematics was prioritized in this event, with lectures by Maria da Conceição Xavier de Almeida (*Notes on the concept of culture: Contributions to ethnomathematics*), Jane Felipe Beltrão (*Culture, school education and ethnomathematics: Possibilities in/for Pan-Amazon*) and Alexandre Pais (*The limits of culture*).

The *Fifth Brazilian Congress of Ethnomathematics* (CBEm5) was held at the Federal University of Goiás, in the city of Goiânia, in 2016. This congress sought to bring a global vision of ethnomathematics. It gathered people "concerned not only with how to teach and learn mathematics, but with how to conceive it around different contexts, times, cultures and inter- and intra-articulations".[2] At CBEm5, presentations were held in four groups, namely: WG 1—Ethnomathematics, educational practices and teacher training; WG 2—Ethnomathematics theoretical and philosophical foundations; WG 3—Ethnomathematics in different sociocultural contexts; and WG

[2] https://cbem5.ime.ufg.br/p/12821-apresentacao. Accessed on October 13, 2020.

4—Ethnomathematics research methodology. A total of 110 papers were presented at the event, 24 of which reporting research on/with indigenous peoples.

One of the differentials of this congress was the participation of representatives of indigenous and *quilombola*[3] people movements, either as guests or as researchers in training. They presented research related to indigenous school education. The round table *Quilombola and indigenous knowledge in dialogue with Ethnomathematics and Ethnomusicology*, e.g. with the participation of indigenous researcher Gilson Ipaxi-aawyga Tapirapé, was one of the representative spaces of the indigenous presence at CBEm5. The participation of many students of Indigenous Intercultural Licentiate degrees from the Midwest region also distinguished the congress from the previous events, in terms of presence and indigenous authorship.

During CBEm5, the ethnomathematicians community voted for the Brazilian representative of the Brazilian sector of the Latin American Ethnomathematics Network (RELAET). Olenêva Sanches was elected. Researchers from several countries in Latin America started RELAET-Brazil, which replaced the Brazilian Association of Ethnomathematics.

The *Sixth Brazilian Congress of Ethnomathematics* (CBEm6) was scheduled for May 2020, but due to the COVID-19 pandemic, it was postponed with no date set as yet. CBEm6 will take place in the city of Palmas, State of Tocantins, in the northern region of Brazil. In this region there is a large proportion of traditional populations, whether indigenous or *quilombola.* Accordingly, the program of this congress already foresees in two round tables about the study subjects and demands of these peoples: *Ethnomathematics and the mathematical knowledge of indigenous peoples* and *Ethnomathematics and quilombola mathematical knowledge.* Submissions to CBEm6 must cover one of four thematic axes, the first of which is *Ethnomathematics and School Education of Native and Traditional Peoples.* Expectations are that research on indigenous ethnomathematics will be substantial.

3 Methodology

The present chapter is an instance of bibliographic research (Moreira & Caleffe, 2006) of the state-of-the-art type, focusing on Brazilian research in ethnomathematics with indigenous peoples. This is a complementary study to research of the same type conducted by the authors (Fantinato, 2013; Fantinato & Leite, 2020; Leite, 2017). Besides ours, we also refer to the existence of other surveys on Brazilian ethnomathematics, such as Conrado (2005), Costa (2012), Martins and Gonçalves (2015), Rosa and Orey (2018), Oliveira (2018), and Fantinato and Silva (2019).

State-of-the-art research provides an opportunity to map and systematically analyze academic production in a given field of knowledge, trying to identify theoretical, methodological and thematic trends that stand out in different times, spaces and institutions. To this end, they are based on "an inventive and descriptive methodology

[3] Descendants of runaway Afro-Brazilian slaved people.

of academic and scientific production on the theme that it seeks to investigate, in the light of categories and facets that are characterized as such in each individual work and the set of them, under which the phenomenon starts to be analyzed" (Ferreira, 2002).

We define *indigenous* as the main criterion for the selection of contributions. We also adopt five subcategories for analysis of the selected works, namely: researched indigenous ethnicities, indigenous authorship, main themes, references from anthropology, and mention of ethnography as a methodological option.

The time frame adopted (2000–2016) covers the years from the first to the last edition of CBEm. As a source of data, we use printed (CBEm1 and CBEm2) and digital (CBEm3, CBEm4 and CBEm5) Proceedings, as well as the institutional websites of the events. To identify the works with the indigenous category, we proceeded to read the printed proceedings and to scan the digital ones using the search tool developed by Adobe Systems for documents in Portable Document Format (PDF), in an open standard maintained by the International Organization for Standardization (ISO) and read by the free Acrobat Reader software. We identified 69 contributions in the *indigenous* category, out of a total of 450 presentations in all.

To map the subcategories in the contributions, we prepared a spreadsheet with the following data: type of work, names of the authors, ethnic identity of the authors (indigenous or non-indigenous), title of the work, CBEm edition, indigenous ethnicities cited in the work, main research theme, anthropology references cited in the work, and mention of ethnography in the method section. The data for each of these subcategories were obtained from the reading and filing of each of the selected works.

For those authors who did not explicitly mention their indigenous identity, we consulted the respective curricula of the Lattes Platform of the National Council for Scientific and Technological Development (CNPq) and the enrollment lists of indigenous students in intercultural licentiate degrees, available on the institutional websites of the universities offering such programs.

The research theme dealt with in some of the papers was identified immediately from reading the abstracts or in the body of the texts. However, some of the studies analyzed included more than one research theme or did not indicate the theme explicitly. In these cases, we looked for the kinship of the work with others and classified them accordingly. Thus, it was possible to identify four main research themes in the set of works that make up this section of CBEm's Proceedings: Indigenous mathematical knowledge, Teacher training, Curriculum, and Culture and cultural identity.

The results were mapped in tables, including a reflection on the relationship between ethnomathematics and anthropology.

4 Results

This section brings some statistical results of the bibliographic research carried out, referring to each of the analytical subcategories listed for the work. From the data organized in tables, it is possible to identify some relevant trends for ethnomathematics in Brazil, especially regarding research with indigenous peoples.

4.1 Works on Indigenous Themes

From the universe of 450 contributions presented in the five editions of CBEm, 69 were considering the indigenous theme. Table 1 shows the general number per event (Congress), the number on indigenous themes in each modality per event, and the percentage with an indigenous theme in each of the five CBEm editions.

From Table 1, we can see that researches on indigenous knowledge, or indigenous education, have occupied a significant place in the events, showing proportional growth (jumping from 4% in CBEm1 to 22% in CBEm5). This result corroborates Leite (2017), showing the growth in Brazil of research on Indigenous School Education, "caused by an increasing capillarization of Ethnomathematics in teacher training courses, in a movement that goes from graduate to undergraduate education" (Leite, 2017: 12).

Another factor that may have contributed to the expansion of academic production registered at CBEm from 2000 to 2016 is the consolidation of new research groups focusing on ethnomathematics as the main theme or line of research. The very locations of the CBEm editions may have contributed as well to this trend: the North and Midwest regions of Brazil hold the largest concentration and the greatest diversity of indigenous peoples in the country. Finally the creation of new intercultural licentiate degrees for training of indigenous teachers in Brazilian public universities, precisely in the period from 2000 to 2016, added to this trend.

Table 1 Works in CBEm's Proceedings from 2000 to 2016

Event	Works	Works on indigenous themes						
		Communication	Poster	Report	Table	Forum	Total	Percentage of all papers (%)
CBEm1	73	1	0	0	1	1	3	4
CBEm2	56	4	0	0	3	0	7	13
CBEm3	97	10	1	0	1	0	12	12
CBEm4	114	18	5	0	0	0	23	20
CBEm5	110	12	7	4	1	0	24	22
Total	450	45	13	4	6	1	69	15

4.2 Ethnicities Represented in the Works

We found that 32 indigenous ethnic groups had some form of representation at the events, with the number of works carried out with each ethnic group indicated in parentheses: Guarani Kaiowá (10), Guarani (6), Tapirapé (6), Kaingang (4), Krahô (4), Tupinikim (4), Apinayé (3), Xerente (3), Rikbaktsa (3), Ticuna (3), Guató (2), Javaé (2), Kadiwéu (2), Karajá (2), Xavante (2), Ashaninka (1), Bororo (1), Enawene Nawê (1), Kalapalo (1), Karajá-Xambioá (1), Karipuna (1), Wajana (1), Krahô Canela (1), Paiter (1), Paresi (1), Pataxó (1), Ramkókamekra (1), Tapuia (1), Tembé (1), Waimiri-Atroari (1), Wari (1) and Xacriabá (1).

In this count, the ethnic groups explicitly mentioned in the works were considered, and sometimes the presentations refer to more than one of them or generically mention the term *indigenous* in a general way. We think it is significant that ethnic groups are mentioned by name in research reports, since it is a way of legitimizing such groups, instead of using the term *indigenous* in general. An example of a text in which the various ethnic groups were well characterized and cited by name is Monteiro and Souza Filho (2012), a work of initial training of indigenous teachers in the state of Tocantins, encompassing the Apinayé, Javaé, Karajá-Xambioá, Karajá, Krahô, Krahô Kanela and Xerente ethnic groups. Some of the works that do not specify ethnicity consist of teacher training experiences with different ethnicities together (Menezes, 2016), or are educational proposals aimed at indigenous education in general (Gonçalves & Batista, 2016), or reports of educational experiences in which indigenous and Afro-Brazilian cultures were taken into account, in compliance with Law 11645.[4]

Although we identified 32 indigenous ethnic groups cited in the works, this number represents only 10% of the entire ethnic diversity of indigenous peoples in Brazil. Therefore, most of the cultures, languages and knowledge of the country's indigenous ethnic groups have not yet been included in works presented at CBEm. As the proceedings of the main national ethnomathematics event reflect, in a way, the production trends in the field itself, we can conclude that there is still a large universe of indigenous knowledge of a mathematical nature that are practically unknown in the country, which will require many new researches and studies with the respective peoples.

4.3 Indigenous Authorship

In our study, we tried to register the works of indigenous authorship, either individually or in partnership, and we obtained the results in Table 2.

[4] Established in March 10, 2008, law 11,645 "Changes Law No. 9.394, of December 20, 1996, amended by Law Source: http://www.planalto.gov.br/ccivil_03/_ato2007-2010/2008/lei/l11645.htm. Accessed on 30 July, 2018.

Table 2 Works with indigenous authorship or co-authorship in CBEm's proceedings from 2000 to 2016

Event	Communication	Poster	Report	Table	Forum	Total
CBEm1	0	0	0	0	0	0
CBEm2	0	0	0	0	0	0
CBEm3	1	0	0	0	0	1
CBEm4	2	0	0	0	0	2
CBEm5	3	7	1	1	0	12
Total	6	7	1	1	0	15

As shown in Table 2, from the third edition of CBEm, there is a growing presence of indigenous authors in the works presented at the event. From the third to the fifth edition, 15 works were identified with indigenous authors, 1 in CBEm3, 2 in CBEm4 and 12 in CBEm5. This trend of growth of indigenous authorship in ethnomathematics in Brazil is related to at least three relevant aspects.

Firstly, there is a change in the researcher's speech position in relation to the knowledge and practices researched with indigenous peoples in the country. If previously researchers external to the cultures and peoples surveyed were common, we now see researchers from indigenous societies doing the research. There are certainly theoretical and methodological implications that deserve to be better recognized and understood by these experiences of indigenous authorship. For example, indigenous researchers are less subject to the limitations of linguistic and cultural barriers commonly faced by non-indigenous researchers. There is an ethical ownership issue for non-Indigenous researchers since the research should be led and negotiated by the indigenous community. The sharing of worldviews and values is strengthened when presented by indigenous researchers to assist others, indigenous and non-indigenous, to understand epistemological aspects although anthropologists and educators might provide comparative notions for others to understand.

Secondly, the increasing presence of indigenous authors in CBEm is related to a phenomenon that we have called capillarization of ethnomathematics in Brazil (Fantinato & Leite, 2020; Leite, 2017). It is a movement for the expansion of ethnomathematics, initially concentrated in graduate programs and research groups, and spreading towards undergraduate programs and especially for initial teacher training programs. Thus, in the 1980s and 1990s the works in ethnomathematics predominantly described research carried out in masters and doctoral programs, but from the 2000s onwards there was a spread through undergraduate programs, especially in teaching degrees. Certainly this phenomenon is explained as well by the change in the profile of teacher educators who make up the teaching degrees. However, there is specificity in relation to indigenous intercultural degrees in public universities across the country, created from the 2000s onwards by inducing public policies of affirmative actions. Such programs focus on the presuppositions of interculturality and the right that the original peoples have to a specific and differentiated school education of the same quality as other programs. Based on these assumptions, the education

of indigenous teachers in these programs provided opportunities for both the presence of new researchers in academic spaces and the production of new research in various fields of knowledge, including ethnomathematics. This explains why the majority of the indigenous authors in the last editions of CBEm are students or graduates from indigenous intercultural licentiate programs. According to Fantinato and Leite (2020), indigenous intercultural degrees implemented in different regions of Brazil brought significant challenges to universities, as many teachers with indigenous licentiate degrees began to take an interest in indigenous issues and to seek training at the master and doctoral level. "On the other hand, indigenous licentiate undergraduates began to develop research projects in partnership with university professors. This entire movement increased the academic production on indigenous themes" (Fantinato & Leite, 2020: 116), and consequently provided the increasing presence of indigenous researchers in ethnomathematics in the country.

Thirdly, the presence of indigenous researchers in ethnomathematics research in Brazil has the potential to contribute to theoretical innovations on conceptions on ethnomathematics itself. In this sense, the position of indigenous researchers as internal members of their own cultures, associated with the perspective of appreciating and promoting traditional knowledge as a way of strengthening identity, has triggered an epistemological inversion. It is a phenomenon observed from the discursive practices of indigenous teachers who link ethnomathematics to ethnicity, so that, through their research on traditional knowledge and practices, they invert the meaning of the description of such knowledge and practices. Thus, when linking ethnomathematics to ethnicity, the set of knowledge that was previously predominantly attributed to indigenous peoples by researchers external to the cultures of such peoples, becomes a set of knowledge claimed by indigenous researchers for their respective peoples. This inversion is possible precisely because the discursive field of research is now also occupied by subjects who belong both to the theoretically represented indigenous universe and to the theorizing instance, i.e. the academy. The figure of the academic-indigenous-professor-researcher thus brings about a necessary revision of perspectives on ethnomathematics, which is no longer an exclusive category of the discourses of non-indigenous subjects. In this sense, based on the increasing presence of indigenous authors of research in ethnomathematics, "ethnomathematics as a construct goes beyond the epistemological dimension of the totalizing character of knowledge itself and acquires political contours of identity affirmation, and therefore is linked to ethnicity because it is assumed as claimed knowledge rather than as attributed knowledge" (Leite, 2014: 332).

4.4 Research Themes

From the reading and qualitative analysis of the works that make up the portion of the CBEm Proceedings that we are considering, we identified four main themes, indicated explicitly or implicitly by the authors in their productions.

Table 3 Main themes of work with indigenous ethnicities in CBEm's proceedings from 2000 to 2016

Theme	Works
Indigenous (mathematical) knowledge	26
Teacher training	19
Curriculum	12
Culture and cultural identity	10

As shown in Table 3, the most common theme referred to indigenous mathematical knowledge. This category includes research on topics such as quantifiers (Silva & Caldeira, 2012), time markers (Severino Filho, 2012), geometry (Silva, 2000), or measurement systems (Pedro & Oliveira, 2016).

In turn, the theme *Teacher training* ranks second in a number of works in the five editions of CBEm and, associated with the theme *Curriculum*, reflects the above-mentioned expansion of training programs for indigenous teachers in recent years. It also reflects the historically established close relationship of Brazilian ethnomathematics with researchers, research groups and institutions in education.

Fourthly, there are works with the theme *Culture and cultural identity*. The smaller number of works in this category reflects both the tendency to reduce the presence of anthropological references in the works presented at CBEm, as will be discussed in the next subsection, and the secondary place the *culture* category has occupied in ethnomathematics research projects with indigenous peoples in Brazil. This result, added to the others presented in this chapter, reinforces the argument that there is a need for a rapprochement between ethnomathematics and anthropology in the country, in view of the great demand for field research yet to be carried out with the majority of Brazilian indigenous ethnicities, to which the concepts of culture and cultural identity that have been discussed secondarily from a quantitative point of view in the works presented at CBEm are therefore central.

4.5 Anthropology and Ethnography in the Works

As shown in Table 4, although 63% of all the works analyzed have references from anthropology, there is a trend of reduction of these references in works on indigenous themes presented in the last two editions of CBEm. This phenomenon occurs

Table 4 Presence of references from anthropology in works on indigenous themes in CBEm's Proceedings from 2000 to 2016

Event	Works	Percentage (%)
CBEm1	3	100
CBEm2	3	43
CBEm3	11	92
CBEm4	17	74
CBEm5	9	39
Total	43	63

simultaneously with the tendency to increase the presence of works by indigenous researchers at the event, as shown in Table 2. Such results indicate that, in the current phase of development of ethnomathematics in Brazil, the increasing participation of indigenous researchers, such as authors of works that deal with the knowledge of their own peoples, generates relative independence from the results of anthropological studies carried out by non-indigenous researchers and, therefore, external to the cultures of the peoples to which the indigenous researchers belong. As internal members of their specific cultures, indigenous researchers share epistemological, cosmological and linguistic perspectives of the researched cultures, which favors the identification, description and interpretation of knowledge and activities of their respective peoples, regardless of research with the same peoples already carried out by non-indigenous researchers.

Notwithstanding these trends (reduction in anthropological references and increase in indigenous authorship), 59 anthropologists were cited in the works that make up the present portion of the proceedings of the five editions of CBEm, among which is the indigenous Gersem José dos Santos Luciano Baniwa (currently at UFAM). Table 5 presents the most cited anthropologists.

The variety of theoretical references of anthropology present in the texts, which includes the structuralism of Lévi-Strauss, the perspectivism of Viveiros de Castro, the functionalism of Malinowski and the interpretativism of Clifford Geertz, suggests the absence of a theoretical or methodological unity of anthropological orientation in ethnomathematics research with indigenous peoples presented in the five editions of

Table 5 Anthropologists most cited in works on indigenous themes in CBEm's proceedings from 2000 to 2016

Anthropologists cited	Works
Mariana Kawal Ferreira	12
Clifford Geertz	9
Luís Donisete Benzi Grupioni	5
Claude Lévi-Strauss	5
Aracy Lopes da Silva	5
Julio César Melatti	4
Marcio Ferreira da Silva	3
Bartomeu Melià	3
Marta Maria Azevedo	2
Marshall Sahlins	2
Manuela Carneiro da Cunha	2
Helbert Baldus	2
Gersem José dos Santos Luciano Baniwa	2
Eduardo Viveiros de Castro	2
David Maybury-Lewis	2
Bronisław Kasper Malinowski	2

CBEm. Therefore, there is no theoretical tendency to support on anthropology in the works, but rather different perspectives that are present in the field of anthropology itself.

This theoretical variety is a common claim in texts that deal with the foundations of ethnomathematics, as a necessary condition to avoid making it a discipline or as an alert to the possibility of making it an "epistemological cage" (D'Ambrosio, 2018). The references cited in the works share the idea that the centrality of culture is a primary factor in research in ethnomathematics, considering the polysemy inherent to the term *culture*. In this sense, Meira's research (2021) has sought to investigate the conceptions of this term in Brazilian ethnomathematical production. Such a fact would justify a necessary original rapprochement with anthropology, especially in research with indigenous peoples, in view of the trend identified in Table 4, regarding the reduction of anthropological references in the works presented at CBEm.

Such a tendency towards distancing ethnomathematics from anthropology in Brazil becomes even more obvious when we focus on the methodological procedures described in the studies analyzed. In this regard, we identified that in CBEm1 and CBEm2, none of the 69 studies analyzed mention ethnography, with such mention appearing in 8% of the works in CBEm3, 35% in CBEm4 and 13% in CBEm5. We found, therefore, that only 18% of all works on indigenous themes presented at CBEm call themselves ethnographic. Thus ethnographic methods were being associated with ethnomathematics per se. Some other texts present data resulting from fieldwork, but without mentioning the term ethnography. For instance, Guimarães et al. (2004), in a study about the Ramkókamekra's numerical representation, describe the methodological procedures adopted in visits to the villages, but do not refer to ethnography. On the other hand, Silva's text (2000), despite presenting elements about the construction process of the *Takãra*—the house for men among the Tapirapé, does not describe how the author has obtained data but the elements are immediately associated with Western geometry.

Thus, when we consider that ethnomathematics, in its origins in Brazil, was significantly based on fieldwork of an ethnographic type, especially in research with indigenous peoples, the results reported here reinforce the need for reflection on the development and future of the field in Brazil, resuming, if possible, the important relationship with anthropological theories and methods for the development of new studies.

5 Indigenous Ethnomathematics and Anthropology

The data exposed here, as a representative sample of research trends in ethnomathematics with indigenous peoples in Brazil, provide a necessary reflection on some important aspects for the national development of this field of knowledge. Considering that Brazil is a multi-ethnic country, composed of more than 300 indigenous ethnicities who speak 274 different languages (IBGE, 2012) and are distributed in 723 territories (ISA, 2020), the main national event in the field (CBEm) shows that

there is a relatively small number of groups with whom field research has been carried out in the 16 years of the first five congresses. This data points to the need to expand fieldwork in ethnomathematics with other indigenous peoples, with a view to understanding and appreciating the multiple knowledges and their respective local epistemologies not yet researched. To that end, ethnographic techniques and anthropological theories are fundamental to researchers external to the cultures of such peoples. However, they should be free of prejudice vis-à-vis the researched indigenous cultures.

In this sense, it is necessary to resume the original dialogue between ethnomathematics and anthropology, reversing the historical trend of distancing between the two areas identified in the present study. The inclusion of anthropology topics in graduate programs and undergraduate courses that produce research in ethnomathematics in the country could contribute to this movement. However, for this research to have an impact on education, research should be carried out under the request and negotiation and with co-researchers from the indigenous group.

Another aspect that is no less important for the development of ethnomathematics in Brazil is related to the trend identified in the last congress of CBEm: an increase in the number of indigenous researchers, mainly from intercultural licentiate programs. If this trend is sustained for a long period, which depends directly on public education policies induced from the 2000s, but under constant threat of discontinuity in the current national political scenario, there will certainly be a different qualitative increase in ethnomathematics research with indigenous peoples in the country. Such an increase includes theoretical, methodological and political aspects.

From a theoretical point of view, indigenous authorship reverses the discourse position on the researched knowledge, which is no longer attributed to others other than researchers and begin to be claimed as inherent in their own internal cultures. As a consequence, a direct link between ethnomathematics and ethnicity becomes possible, when indigenous researchers claim for their respective peoples the production and mastery of their own mathematical knowledge. This movement would strengthen their identity as well.

From the methodological point of view, the internal position of the indigenous researcher can provide a review or reformulation of field research procedures in ethnomathematics in Brazil, especially those of an ethnographic type, in contribution to anthropology itself, following the concepts of "endoethnography, anthropology at home, native anthropology, domestic anthropology, autoethnography, [local and] insider anthropology"[5] (Ribeiro, 2018). Such methodological innovations would thus result from the historical processes of social transformations that the country went through during the last two decades of the twentieth century, which was the time of the first national research studies in ethnomathematics. These transformations involved strengthening the indigenous movement, the democratization of access to higher education, the implementation of public policies aimed at specific and intercultural

[5] Research methodologies in which the researcher investigates his/her own culture, "usually by conducting fieldwork in one's own country" (Jackson, 1987).

educational projects, and culminated in the training of indigenous researchers who start to take over and promote studies in ethnomathematics with their own peoples.

The political aspect inherent to indigenous authorship in ethnomathematics research with indigenous peoples in Brazil is directly related to the possibility of questioning historically dominant conceptions of knowledge in general. It also questions views on mathematics in particular, in so far as they are based on Eurocentric perspectives and characterize the process of cultural imposition inherent in colonialism. The figure of the autonomous indigenous researcher in ethnomathematics represents an empowerment and the possibility of breaking with the coloniality of knowledge (Lander, 2005), with a view to epistemic pluriversality (Mignolo, 2017), from the "epistemologies of the South"[6] (Santos & Meneses, 2010), thus breaking with the "epistemicide" (Santos, 2007) that resulted from colonialism. The latter historically denied the rational character to all forms of knowledge that do not rely on the epistemological principles of scientific rationality characteristic of modern thought (Santos, 2010). The presence of the indigenous researcher in ethnomathematics represents, therefore, the possibility of decolonizing the production of scientific knowledge in academic pursuits, moving away from the predominance of researchers external to the cultures of the indigenous peoples producing the knowledge described.

6 Final Considerations

The results of our research allow us to make some considerations about indigenous knowledge and practices in the production of Brazilian ethnomathematics congresses. The indigenous issue has been addressed with increasing representativeness, both in the form of research reports and reports of pedagogical experiences or teacher training. The initial trend, of ethnographic studies in indigenous communities, has been gradually replaced by the predominance of works focused on teacher training in intercultural licentiate degrees.

Over these years, research has followed social changes and the demands of social movements. Brazilian indigenous peoples have had some legal achievements for the consolidation of specific and differentiated school education, with emphasis on teacher training in intercultural degree programs at public universities. For the continuation of this struggle, "it becomes necessary, in addition to the articulation of political movements, in which the peoples themselves emerge as protagonists, the construction of theoretical support, resulting from studies and research focused on specific themes" (Leite, 2017, p. 2). We believe that such support may come from an articulation of results already achieved by research carried out, such as those of

[6] According to Santos (2007), Western domination has profoundly marginalized knowledge and wisdom that had been in existence in the global South. He contends that today it is imperative to recover and valorize the epistemological diversity of the world. Epistemologies of the South outlines a new kind of bottom-up cosmopolitanism, in which conviviality, solidarity and life triumph against the logic of market-ridden greed and individualism.

ethnomathematics, but they may also require further studies and research. The organization and historical systematization of academic production already carried out on a given theme enables advances in the production of related knowledge. Such was our proposal in this chapter.

Recently, the greater contact of indigenous populations with the culture of non-Indians brought the need to rethink indigenous education in the villages as a space to strengthen local cultures, as well as the schoolish content. The contributions in our analysis invite a constant reflection on the possible articulations and tensions between traditional and school knowledge.

Another emerging trend that is still evolving, but promising, is the indigenous role in academic spaces, both in teacher training courses and in graduate school. This trend, despite the fact that the most recent production of Brazilian ethnomathematics congresses already brings some representatives of it, needs to grow.

Despite the representativeness and development of research on indigenous issues, there is still a great need for more research on this topic. The dialogue between ethnomathematics and anthropology, although existing since its origins, needs to be further developed. This can be a fertile way for ethnomathematics, to give greater density to research in relation to cultural aspects and better appropriation of ethnographic research.

References

Amancio, C. N. (1999). *Os kanhgág da bacia do Tibagi: um estudo etnomatemático em comunidades indígenas.* UNESP, (Mestrado).

Bello, S. E. L. (1995). *Educação Matemática Indígena: um estudo etnomatemático com os índios Guarani-Kaiowá do Mato Grosso do Sul*. UFP, (Mestrado).

Conrado, A. L. (2005). *A pesquisa brasileira em Etnomatemática: desenvolvimento, perspectivas, desafios.* Dissertação (Mestrado em Educação)—Programa de Pós-Graduação em Educação, Universidade de São Paulo.

Costa, W. N. (2012). Imagens da Etnomatemática em periódicos brasileiros. *Union—Revista Iberoamericana de Educación Matemática*, (32), 165–180.

D'Ambrosio, U. (1985). Ethnomathematics and its place in the history and pedagogy of mathematics. *For the Learning of Mathematics, 5*, 44–48.

D'Ambrosio, U. (2001). *Etnomatemática: Elo Entre as Tradições e a Modernidade*. Ed. Autêntica.

D'Ambrosio, U. (2018). Etnomatemática, justiça social e sustentabilidade. *Estudos Avançados*, São Paulo, *32*(94), 189–204. Disponível em: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0103-40142018000300189&lng=en&nrm=iso. Acesso em 12 de out. 2020.

Domite, M. C. S. (2000). *Anais do Primeiro Congresso Brasileiro de Etnomatemática—CBEm1.*

Duarte, C. G. (2009). *A "realidade" nas tramas discursivas da educação matemática escolar*. Tese (Doutorado em Educação)—Programa de Pós-Graduação em Educação, Universidade do Vale do Rio dos Sinos.

Fantinato, M. C. (2013). Balanço da produção acadêmica dos congressos brasileiros de Etnomatemática. *Revista Iberoamericana de educación matemática—UNION, 33*, 147–161.

Fantinato, M. C., & Leite, K. G. (2020). Ethnomathematics research on indigenous peoples' knowledge and practices. In M. Rosa & C. Coppe (Eds.), *Ethnomathematics in Action* (pp. 111–137). Springer International Publishing.

Fantinato, M. C., & Silva, M. L. (2019). Tendências da produção em educação indígena dos congressos brasileiros de etnomatemática. Segundo Encuentro Latinoamericano de Etnomatemática. Retrieved Feb 23, 2020, from http://elem.etnomatematica.org/index.php/elem2/elem2/schedConf/presentations?searchInitial=F&track=

Ferreira, E. S. (1990). The teaching of mathematics in Brazilian native communities. *International Journal of Mathematics Education Science Technology*, *21*(4), 545–549.

Ferreira, N. S. A. (2002). As pesquisas denominadas "estado da arte." *Educação & Sociedade, Ano XXIII, N., 79*, 257–272.

Fiorentini, D., & Lorenzato, S. (2006). *Investigação em Educação Matemática: Percursos teóricos e metodológicos.* Autores Associados.

Gonçalves, E., & Batista, H. M. D. (2016). Reflexões sobre a Etnomatemática na Escola Indígena e suas considerações em sala de aula. *Anais do 5º Congresso Brasileiro de Etnomatemática.*

Guimarães, M. L. C., Guimarães Filho, O. S., & Oliveira, A. J. S. (2004). A representação numérica dos índios Ramkókamekra do Maranhão. *Anais do II Congresso Brasileiro de Etnomatemática—CBEm2.*

IBGE. (2012). *Estudos especiais: o Brasil indígena.* Disponível em: https://indigenas.ibge.gov.br/images/pdf/indigenas/folder_indigenas_web.pdf. Acesso em: 23 de fev. 2020.

ISA. (2020). *Terras indígenas nos Brasil: Situação atual das Terras Indígenas.* Disponível em: https://terrasindigenas.org.br/. Acesso em 23 de fev. 2020.

Jackson, A. (Ed.). (1987). *Anthropology at home. Issue 25 of A.S.A. monographs, Association of Social Anthropologists of the Commonwealth.* Tavistock Publications.

Knijnik, G. (2004). Itinerários da etnomatemática: questões e desafios sobre o cultural, o social e o político na educação matemática. In: G. Knijnik, F. Wanderer & C. J. Oliveira (orgs.). *Etnomatemática, currículo e formação de professores* (pp. 19–38). EDUNISC.

Knijnik, G., Wanderer, F., & Oliveira, C. J. (Orgs.). (2004). *Etnomatemática: currículo e formação de professores.* EDUNISC.

Lander, E. (Org.). (2005). *A colonialidade do saber: eurocentrismo e ciências sociais.* Perspectivas latinoamericanas. Colección Sur Sur. Ciudad Autônoma de Buenos Aires: CLACSO.

Leite, K. G. (2014). *Nós Mesmos e os Outros: etnomatemática e interculturalidade na escola indígena paiter*. 409 f. Tese (Doutorado em Educação em Ciências e Matemática)—Rede Amazônica de Educação em Ciências e Matemática. Universidade Federal de Mato Grosso.

Leite, K. G. (2017). Pesquisas brasileiras em Educação Matemática situadas na interface entre Etnomatemática e educação escolar indígena. *Anais do II Congresso Internacional de Ensino de Matemática* (pp. 1–14).

Malinowski, B. (1922). *Argonauts of the Western Pacific*. Routledge and Kegan Paul.

Martins, F. N., & Gonçalves, P. G. F. (2015). Pesquisas em Etnomatemática e suas contribuições para o contexto escolar: Um olhar para os anais dos CBEM. *Revista Latinoamericana de Etnomatemática, 8*(1), 108–123.

Meira, C. J. (2021). *As concepções de cultura nas teses brasileiras de etnomatemática: Uma presença ausente*. Universidade Federal Fluminense. (in press).

Mendes, J. R. (2009). Processos identitários que emergem das relações entre conhecimento e escrita: aspectos discursivos no contexto de formação de professores indígenas. In: M. C. C. B. Fantinato (org.) *Etnomatemática: novos desafios teóricos e pedagógicos* (pp. 167–179). Editora da UFF.

Menezes, J. E. (2016). Etnomatemática na transposição de algoritmos matemáticos usados pelos estudantes Indígenas de graduação, para os algoritmos acadêmicos e suas inserções no Ensino Formal e Informal. *Anais do 5º Congresso Brasileiro de Etnomatemática.*

Mignolo, W. D. (2017). Colonialidade: O lado mais escuro da modernidade. *Revista Brasileira De Ciências Sociais, São Paulo, 32*(94), 1–17.

Monteiro, H. S. R., & Souza Filho, E. B. (2012). Os professores indígenas do estado do Tocantins em formação inicial: A etnomatemática no contexto do Magistério indígena. *Anais do 4º Congresso Brasileiro de Etnomatemática.*

Moreira, H., & Caleffe, L. G. (2006). *Metodologia da pesquisa para o professor pesquisador*. DP&A.

Morey, B. B. (2004). *Anais do II Congresso Brasileiro de Etnomatemática—CBEm2*.
Oliveira, M. A. M. (2018). Aproximações da etnomatemática e interculturalidade nas produções acadêmicas com a temática indígena. *Anais do VII Seminário Internacional de Pesquisa em Educação Matemática.*
Pedro, I. S., & Oliveira, M. A. M. (2016). Práticas e saberes presentes na construção da casa de reza kaiowá: etnomatemática dos Kaiowá do Panambizinho. *Anais do 5º Congresso Brasileiro de Etnomatemática.*
Powell, A., & Frankenstein, M. (1997). *Ethnomathematics: Challenging eurocentrism in mathematics education*. SUNY Press.
Ribeiro, H. L. (2018). O Desafio da Endoetnografia. *Ilha Revista de Antropologia, Florianópolis, 20*(1), 177–205.
Ribeiro, J. P. M., Domite, M. C. S., & Ferreira, R. (Orgs.). (2004). *Etnomatemática: papel, valor e significado*. Zouk.
Rosa, M., & Orey, D. (2018). *Estado da arte* da produção científica dos congressos brasileiros em Etnomatemática. *Ensino Em Re-Vista, Uberlândia, MG, 25*(3), 543–564.
Santos, B. S. (2007). *Reinventar a teoria crítica e reinventar a emancipação social*. Boitempo.
Santos, B. S. (2010). *Um discurso sobre as ciências.* Cortez.
Santos, B. S., & Meneses, M. P. (Orgs.). (2010). *Epistemologias do Sul.* Cortez.
Scandiuzzi, P. P. (1997). *A dinâmica da contagem e Lahatua Otomo e suas implicações educacionais: uma pesquisa em etnomatemática.* UNICAMP, (Mestrado), Faculdade de Educação.
Severino Filho, J. (2012). Os marcadores de tempo indígenas e a solidariedade entre o ambiente e os povos que o habitam: um olhar etnomatemático. *Anais do 4º Congresso Brasileiro de Etnomatemática.*
Silva, A. (2000). A geometria na construção da Takãra. *Anais do Primeiro Congresso Brasileiro de Etnomatemática* (pp.162–169).
Silva, A. (2012). Alguns aspectos do sistema de contagem A´uwê/Xavante: outros saberes, outros conhecimentos, outras soluções. *Anais do 4º Congresso Brasileiro de Etnomatemática.*
Silva, S. F., & Caldeira, A. D. (2012). Sistema de numeração guarani: aspectos básicos. *Anais do 4º Congresso Brasileiro de Etnomatemática.*
Strathern, M. (1987). Out of context: The persuasive fictions of anthropology. *Current Anthropology, Chicago, 28*(3), 251–281.
Vandendriessche, E., & Petit, C. (2017). Des prémices d'une anthropologie des pratiques mathématiques à la constitution d'un nouveau champ disciplinaire: l'ethnomathématique. *Revue d'histoire des sciences humaines—RHSH, 31*, 189–219.