

A topological property study developed in the process of engraving into curved surfaces: a decolonial reading

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Abstract

The article presents a study carried out, based on assumptions from the ethnomathematics perspective and theoretical elements based on decoloniality and diversity. Its major aim is to discuss some topological properties, evidenced in techniques and processes during the production of iconographic representations, in the form of engraving, in handcrafted gourds. The methodological option occurred based on the assumptions of ethnographic research, during the period in which the researcher was living with artisans, living in the region of Aritapera, municipality of Santarém, State of Pará, based on a descriptor of experiences, techniques, and processes used in the configuration and elaboration of these crafts. The configuration of analysis and inference of results assumed that the cognitive substrate of production of these representations associated with certain properties, which we call topological, thus projecting a kind of holistic and transdisciplinary movement. In addition, we conclude that these systems of local representations, from a social and instrumental point of view, act as a catalyst for the production of diversified and expansive knowledge and knowledge, despite being constantly changing, because of the inevitable social and cultural change. This result projects consequences, from a decolonial point of view: the need to think of important solutions for the balance, sustainability, and permanence of sociocultural practices, in addition to preventing the destruction or disappearance of these practices, completely.

Key-words: Ethnomathematics; Sociocultural practices; Cognitive properties; Artisanal gourds.

Um estudo de propriedade topológicas desenvolvidas na elaboração de incisos em superfícies curvas: uma leitura decolonial

Resumo

O artigo apresenta um estudo realizado, com base em pressupostos da perspectiva etnomatemática e elementos teóricos pautados na decolonialidade. Tem como objetivo principal, discutir algumas propriedades topológicas, evidenciadas em técnicas e processos durante a produção de representações iconográficas, na forma de incisões, em cuias artesanais. A opção metodológica deu-se a partir de pressupostos da pesquisa etnográfica, durante o período em que o pesquisador esteve convivendo com artesãs, residentes na região do Aritapera, município de Santarém, estado do Pará e

Submetido em: 26/06/2021 **Aceito em:** 18/08/2021 **Publicado em:** 03/09/2021

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deu-se com base em um descritor de vivências, técnicas e processos utilizados na configuração e elaboração destas cuias artesanais. A configuração de análise e inferência de resultados assumiu que, o substrato cognitivo de produção destas representações, está relacionado com determinadas propriedades, as quais denominamos de topológicas, projetando assim, uma espécie de movimento holístico e transdisciplinar. Além disso, concluímos que estes sistemas de representações locais, do ponto de vista social e instrumental, atuam como um catalizador de produção de conhecimentos e de saberes diversificados e expansivos, apesar de estarem em permanente mutação, por conta da mudança social e cultural inevitável. Este resultado projeta consequências, do ponto de vista decolonial: a necessidade de pensarmos soluções importantes para o equilíbrio, sustentabilidade e permanência de práticas socioculturais, além de afastarmos a destruição ou desaparecimento destas práticas, por completo.

Palavras-chave: Etnomatemática. Práticas socioculturais. Propriedades cognitivas. Cuias artesanais.

Un estudio de propiedad topológica desarrollado en la preparación de incisiones sobre superficies curvas: una lectura descolonial

Resumen

El artículo presenta un estudio realizado, basado en supuestos desde la perspectiva etnomatemática y elementos teóricos basados en la descolonidad. Su principal objetivo es discutir algunas propiedades topológicas, evidenciadas en técnicas y procesos durante la producción de representaciones iconográficas, en forma de incisiones, en calabazas artesanales. La opción metodológica se basó en los supuestos de la investigación etnográfica, durante el período en que la investigadora convivía con artesanos, residentes en la región de Aritaperá, en el municipio de Santarém, estado de Pará y se basó en un descriptor de experiencias, técnicas y procesos utilizados en la configuración y elaboración de estas calabazas artesanales. La configuración de análisis e inferencia de resultados asumió que el sustrato cognitivo de producción de estas representaciones está relacionado con ciertas propiedades, que llamamos topológicas, proyectando así una especie de movimiento holístico y transdisciplinario. Además, concluimos que estos sistemas de representaciones locales, desde un punto de vista social e instrumental, actúan como catalizador para la producción de conocimientos y saberes diversificados y expansivos, a pesar de estar en constante cambio, debido al inevitable cambio social y cultural. Este resultado proyecta consecuencias, desde un punto de vista descolonial: la necesidad de pensar en soluciones importantes para el equilibrio, la sostenibilidad y la permanencia de las prácticas socioculturales, además de prevenir la destrucción o desaparición de estas prácticas, en conjunto.

Palabras clave: Etnomatemáticas. Prácticas socioculturales. Propiedades cognitivas. Calabazas artesanales.

1. Introduction

We know that - from an anthropological perspective - the production and dissemination of knowledge associated with the various interactions between human beings and the nature of which they are part. Learning, therefore, manifests itself through an interweaving involving the flow of information, knowledge, and knowledge. The information we verify and abstract stimulates our

mental structures, moving our organism, body, dramatic and cognitive spheres. It is based on this interaction between information, knowledge, and know that we make up epistemic subjects.

Such considerations, attributed, in part, to the elaboration of a mathematical language associated with symbolic constructs, project their own rules, expressions, symbols, and words inherent to a certain spatiality and territoriality. Thus, the purposes of this article rest on our ability to develop a reflection on investigations of representations and symbolic properties, resulting from the engraving of patterns of incisions made in artisanal gourds, produced in the riverside regions of Santarém. For this study, we assume that the production of these representations' substrate rests on some topological properties which we have established as a referential analysis, social and instrumental standpoint.

Furthermore, the discussion also focuses on the ability to outline processes for the construction of written records, on these surfaces that make up such regional bowls, seeking to establish a connection between this study and assumptions arising from decolonialism, to provide elements for satisfactory discussions, in the practices established in the investigation's context, listing parameters of social dynamics reflected in different exchanges and social interactions.

2. Ethnomathematical studies and the decolonial perspective

The gradual insertion of propositions and discussions consistent with the challenges and dilemmas experienced in our society is very clear in the productions and reflections proposed in academic research. We know the strength and importance of mathematics for reading and critical interpretation of the world in which we operate. We know, moreover, the necessity and importance of this mathematical mastery of our students, so they can overcome the challenges facing them in the day-a-day. Thus, a satisfactory understanding of the world - and we do not refer only to mathematical knowledge - is relevant, as the meeting of cultures becomes inevitable, without overlapping or claiming supposed superiorities.

Legitimate knowledge, validated, practiced, and disseminated within the different institutions and communities that make up our society, can provide an important prerogative for the valorization of local knowledge, considered by many to be peripheral. Assuming the existence of differences provided by reading the cognitive processes involved building on this knowledge, we can think of answers to our different concerns. In the words of Silva (2004, p. 197), this is not just a simple valuation, but,

To view the cultures of the dominated groups anthropologically, as a manifestation and expression of ways of organizing social life that exist alongside others, equally valid. In this perspective, it is not a matter of 'departing from the dominated culture',

but of interrogating it, questioning it, historicizing it, in the same way as it should be done with the dominant culture. It is not a question of overcoming it, to enter another, but of asking questions that reveal its history, the history that produced the present social identities and placed them in a subordinate relationship in the existing social configuration.

Also, and in view, "The fact constitutes a faithful representation or at least as close as possible to reality there, irrespective of the form it assumes and processes through which produces the knowledge we have here." (SANTOS, 2004, p. 18). Thus, a configuration and a representation of reality model permeate distinct process cognitive can produce knowledge, for example, the knowledge mathematical, and that reflects an apart integral of this mosaic representations.

We can think of the understanding of the existing meanings that contribute to the production of knowledge based on configurations of anthropological and social origin. However, for us to actually validate our assumptions described above, a single study to be conducted in grassroots communities is not enough.

The causes for all this occur to find meaning in the history and formation processes of modern society, considering that society itself was (and is being) shaped by perverse power structures. However, it is considered that there is a multi-referentiality of knowledge and that there is no single convergence to the id and going of what is valid and true for learning concepts and techniques domains from a single reference. There are different manifestations of knowledge derived from different communities and which often border the periphery and marginality faced with institutionalized knowledge. According to the statements of Santos *et al.* (2005),

It is unsustainable that, for example, the social sciences continue to describe and interpret the world in terms of theories, categories and methodologies developed to deal with modern societies [...] when the majority of existing societies not only present different historical characteristics and dynamics, as it has generated its own forms of knowledge of its social and historical experiences and producing significant contributions to the social sciences, even if they are sent to the margins of these. (SANTOS *et al.*, 2005, p. 23).

In this sense, the advent or implementation of a single perspective of representative construction of the world, based on the assumptions supported by the theories that describe modern societies, ends up further stressing the distances between the recognition of knowledge and ways of legitimizing knowledge, thus limiting the relative ability to know and understand the world in which we live.

Thus, the plurality of existing exchanges and conceptual elements, techniques, and representation models based on unique knowledge proves crucial for a clearer understanding of dynamics are involved in the meeting, or disappearance of fusion cultures, peripheral considered. In the words of Nunes (2004),

It is not yet clear to what extent the propensity to distinguish 'ethnos- know' from 'others' and 'our' scientific knowledge can be permanently contradicted by the symmetrical consideration of the various knowledge as being, without exception, partial and therefore worthy of equal consideration and respect. (NUNES, 2004, p. 68).

In research and collective participation among those involved in research, these relationships are not yet clearly perceptible at first. To show how much the current power structures - whether existing in a microscopic or macroscopic dimension - conspire to hide different perceptions of knowledge and which - erroneously permeates the assumption of which knowledge is the most "ideal" or "right", in relation to others. Such structures maintain their status of diligence and management of powers, however, that talking about diversity of knowledge implies delegitimizing a knowledge or knowledge, considered unique, thus ordering a movement towards an ecology of knowledge, according to the words of Santos *et al.* (2005):

The transition from the monoculture of scientific knowledge to the ecology of knowledge will be difficult because, as happened in consolidating the paradigm of modern science, it involves not only epistemological issues but also economic, social and political issues (SANTOS et al., 2005, p. 101).

It is not enough to just develop and show several bifurcations, in terms of knowledge development. The point is that, if in fact, "The challenge of knowledge is, rather, to seek the relationship, appropriate to each situation, between expectation and experience." (WAGNER, 2004, p. 119), it means to say that we need a very broad sociological (re)configuration, capable of moving and developing meanings and articulations, based on an ecology of knowledge, capable of transforming the world, or better, the people who lead the world.

The expansion of the dimension of more general problems about situations and problems that converge on the destiny of our local environment needs to be considered as a factor of the permanent discussion by those involved, thus delegating a sharing of necessary responsibilities. Therefore, or existing inferential - the inflection point between the recognition and legitimacy of the various traditions, techniques and processes generated, from the perspective ethnomathematics and, ultimately, the complete disappearance or "death" (perhaps, hopefully not more) of traditional knowledge - will determine the remaining epistemology capable of leading the world to the communion of values, peace, and diversity or to confirm modern or scientific knowledge as the model of development (or destruction) of the planet.

3. The research context and methodological elements used

The data that permeate this research we have obtained the results with artisans living in the region Aritapera (MAFRA and FANTINATO, 2016), located on the banks of the Amazon River, in the city of Santarém, state of Pará, in northern Brazil. The Aritapera region comprises a set of communities. These communities are: Enseada do Aritapera, Centro do Aritapera, Carapanatuba, Cabeça D'onça and Surubim-Açu, as shown in Figure 1.

Among the many handicrafts and rural activities developed in the region, the production of handcrafted gourds is a practice developed for a long time by the women of the region (MADURO, 2013). The gourd is a fruit originated from the cuieira ²(traditional tree of the Amazon region) and which presents different shapes and dimensions, being able to assume the dimension, from the point of view of a mathematical reading, of a sphere, oval or slightly flattened. It is mainly used to drink tacacá (broth of indigenous origin made with manioc gum, shrimps and tucupi and seasoned with garlic, salt and pepper, to which jambu is added, herb with the property of causing a tingling sensation in the mouth), but, over time, many other artifacts have been created, using the original raw material.

Figure 1 - Map of the Region of Aritapera, Santarém/PA, Brazil



Source: Carvalho (2011, p. 28)

The steps or phases of production of artisanal gourds include the collective nature of the microparticles, the cutting, and scraping of their curved surfaces, the dyeing, and final preparation

² Leafy tree (*Crescentia cujete*) of the family. Of the bignonians, with a tortuous trunk, several leaves, big, bellular flowers, with five lanceolate and crisped wolves, in a pale tone of yellow or green with purple striations, and ovoid berries, with over 30 cm; for the fruit, the gourd, of instruments, such as the aguê].

(drying) for scratching or engraving symbolic representations, through incisions at the surface of the gourd.

The production of these crafts has always been the object of curiosity and knowledge, by various segments of society, portrayed in different types of productions: studies and research carried out with the artisans, documentaries, and various publications. (MAFRA and FANTINATO, 2016; FANTINATO and MAFRA, 2017).

They organize the artisans of the region, collectively, through ASARISAN - whose formation dates back to 2003. This association congregates residents of the communities and has as one of its objectives the dissemination and diffusion of the artisanal knowledge reflected in the representations recorded in the gourds.

In the community of Aritapera, ASARISAN presented a perspective of experience and social organization, through essentially collective and participative work. Thus, it was possible to develop a follow - up next to them, between the years 2015 and 2017, through participant experiences that took elements and features of research ethnographic, similar to a detailed description and dense (Geertz, 2008), the form and their work activities.

The investigation took as a basic assumption, the immersion of the researcher in the research context (BOGDAN and BIKLEN, 1994), projecting the researcher-observer as the determining instrument in the collection and subsequent analysis of the data. Thus, it was possible to learn the procedures and instrumental techniques used in the development of their work activities. The data collection and organization of data, used in this study, were watching with notes in the field diary, the free interview, photo, and filming. The artisans duly allowed recordings, taking part in the research.

4. Regarding some topological properties evidenced in the incisions of artisanal gourds

Based on the research with ethnographic characteristics, developed, we sought an understanding of the historical and cultural roots, whose focus was the production of regional gourds, by the artisans of Aritapera. This production transforms and enhances the social life dynamics of the local population, as diverse artisanal knowledge and practices. We know that, for various reasons, the development of knowledge, although rooted in the inner d and a local population, suffers changes with time coming, ultimately, the disappears.

In Greenfield (2009, 2016), we found theoretical elements, to support discussions about different sociocultural environments, in a non-static way, but, from the point of view of the dynamics inherent to the flow of mobility and formal and knowledge exchanges informal. The

author refers to societies and cultures, and the way they interact with each other. This interaction, in theory, provides significant changes in social and cultural values, as the processes and dynamics of behaviors and socialization project the fusion or overlapping of cultural values, especially in learning environments, whether they are formal or informal environments, thus changing the epistemological paths of social development and cultural dynamics.

In the case of the Amazon region, more specifically the western region of Pará, where the Tapajós lived, whose population, of indigenous origin, lived in that region, it is to be expected that there are unknown and suppressed gaps in the timeline. In terms of cultural elements and substrates, belonging to Tapajonic culture.

We understand that the view "local" remains consciousness the memory of a people and, consequently, their culture, knowledge and associated representations, gain strength from the moment that design cultures maintenance strategies such as an active and necessary principle, against its complete disappearance.

Based on our investigations and observations, ethnographic witnessed the ability to highly diversified the range of models, illustrations, and patterns, the incisions made in the bowls produced. The possibility of a direct relationship between the traditional knowledge developed by the artisans' usual practices and the connections established between formal and institutionalized knowledge, in their social experiences, project an impregnation of elements of conceptual properties from different areas of knowledge, such as anthropology, sociology and the production of techniques or specific mathematical ideas.

Some of these properties, hereinafter referred to as topological properties, concern the assumed shape or configuration, when producing and elaborating strategies and techniques for marking the items in artisanal gourds. Given that these gourds have curved surfaces, the ability to organize and configure instrumental mechanisms for marking and choosing references is remarkable for the elaboration of the items. This aspect denotes an intrinsic property of point marking and dimensioning of measures similar to that of a flat surface, although we believe that it establishes its cognitive design properties in similar properties.

During the elaboration and production stages of gourds, we could observe the gathering of different manifestations of knowledge and not just those related to ethnomathematical aspects. It organizes different actions and interactions, connected to form at the time they occur labor activities processes, featuring dynamic and holistic behaviors and scenarios setting (topological spaces) creation. These scenarios or spaces, we understand they are born of properties, actions, and perceptions, organized according to the work developed by them (in this case the production of gourds). Thus, the topological properties - which we assume in this work - have to do with the

convergence and structuring of abstract thoughts of meaning and representation, under an anthropological perspective of knowledge.

Allow to observe and inquire about many situations and events of interaction between the artisans, to realize the level of configuration space strategy for the production of items and in what form, a stream or dynamic exchange information could be obtained. It was possible to identify flows knowledge, though often different between them, on account of their specificities, such as mathematical ideas used by them, in many actions involved in the production of gourds.

It is important to emphasize here that most of the configuration of marking strategies, in the gourds, are performed by approximation, involving the location of points and location references, to provide the connection (risks) of these points, visually. During the coexistence with the artisans, we witness how they handle elements of qualitative aspects, such as estimates of approximate measures, through natural visualization. In some situations, the support of the fingers, such as production management, and at other times, from the location of references in the gourds themselves or using instruments, such as the compass.

The process of marking the gourds is organized according to the incisions and registration of the traces, originally of an indigenous nature. Thus, the configuration of two parallel circumferences at the widest base of the gourds projects a limit of references for the registration of the geometric patterns - based on the space delimited between the circumferences - thus ordering an important topological property, used in the making of the incisions in the curved surface, of handcrafted gourds.

In contrast, we have listed aspects that have been gradually incorporated into the artisans' know-how, in such a way that we could see how they are adapted or incorporated into local knowledge. In the work developed by Fantinato and Mafra (2016), we list a discussion about these aspects, besides and examples of these evidenced interactions. We showed here some of these: i) metal tools and industrial manufacturing, for scraping bowls and configuration of the incisions, the gourds; ii) use of a projected wooden base to scratch gourds; iii) incorporation of Tapajonic and floral patterns, over time, in the artisans' production.

In this way, traditional knowledge of essentially indigenous origin, developed in the craft of producing gourds, suffered a gradual interaction, with alternative knowledge and techniques, some of which learned through more formal education. An example of this consideration was a workshop given to artisans, through the Santarém gourds Project (CARVALHO, 2011, 2012), carried out since 2002, which sought, among other objectives, to recover memory and identity, reflected in the incisions that decorate the gourds. Also, it contributed to a greater imaginary and representative

range of the repertoire of iconographic records, produced by them, thus generating new knowledge, reflected in alternative and very varied patterns of illustrations.

The knowledge arising from these interactions proportion plowing a range of new knowledge regarding the strokes tapajonic, in such a way woman have incorporated that, the year of its practice. In Fantinato and Mafra (2016), we found elements of evidence, based on the testimony of artisan Léia, which corroborate our inferences:

Artisan Léia: Each one here at our point has a type of [...] (gourd making). Laís (referring to another artisan from another community) knows everything by the pint. She already knows it here when I do it, it's different. She hadn't seen me do that yet.

Researchers: The Mrs. specializes ...

Artisan Léia: Is it the same (the other gourd)?

Researchers: No way

Artisan Léia: With my mother, there was a cardholder, [...] (other types of pieces) so I had to use the compass to mark.

Researchers: The Mrs. using compass when? Or no longer use?

Artisan Léia: I still use it, always. I still do.

Artisan Léia: [...] I'm going to do this one ... (tracing with the compass)

Researchers: The Mrs. always uses (much) the compass?

Artisan Léia: I always use. So, they ask to make a tree fern, something else, I will always invent something.

(personal communication, August 5, 2015)

(FANTINATO E MAFRA, 2016, p. 192).

Still, in Fantinato and Mafra (2016), we found that the relationship between the choice of patterns - within and the repertoire produced and used by the artisans - established from a multiplicity of factors: inspiration, imagination, collective work, and mutual learning. From a topological point of view, it is an activity that involves the configuration of an artistic and spatial aspect, directly connected, whether on a large or small scale, to decision elements related to the shape and/or dimension of the gourds to be produced.

This complete process of cognitive movement, organized through the artisans' knowledge, provides distinct types of ornamentation:

i) the floral patterns, shown in Figure 2, produced through adornments and allegories reflected in figurative and flowery elements that refer to historical and family aspects and memories or the nature of the experience itself.

Figure 2 - Examples of standards flower of items in gourds



Source: record extracted from the repertoire of production ASARISAN

ii) the Tapajonic patterns, shown in Figure 3, which reflect elements directly connected with social and natural representations, originated from the inheritances of the Tapajonic indigenous culture.



Source: record extracted from the repertoire of production ASARISAN

In the research carried out with the artisans of Aritapera, it was possible to verify how the distinct elements related to unique knowledge are organized for the production and diffusion of knowledge disseminated in the community. The provided experience during the research allowed to abstract subsidies to understand how behaviors and movements relative to the knowledge to the artisans, established links symbolic the social agreements, expanding beyond the office just the craft, so ordering a social policy, which permeates the dynamics of life and community life.

And these cognitive and behavioral movements project an integrating element or holistic, as D' Ambrosio (1993) argues, to understand these dynamics, a closely connected with the nature, social relations established in the community and also with elements characteristics and of a relational order with other "sciences" or "areas of knowledge", which manifest themselves with different meanings.

In this sense, the knowledge, emerging from these practices, presents a spectrum of scope much more relational and immaterial than the formal knowledge of techniques and processes only

mathematical. Thus, informal processes (FANTINATO and MAFRA, 2016), are part of this scope and configure an interweaving of instrumental practices, cognitive processes of transformation in space - whose representations and properties are intrinsic to the group of artisans - in such a way that the disseminated knowledge and knowledge listed are in constant mutation. This assumption resonates with what Greenfield (1999) ponders, stating that different cultures, including their ways and ways of learning and spreading knowledge, change over time, assuming or incorporating different cultural patterns, based on several factors, whether through local or more global changes.

It is important to state and considers that these strategies and techniques, could be recorded after stipulating a kind of one contract research between researchers and searched: it was our goal to understand the knowledge and the doing of artisans, or as it was produced its various knowledge interconnected: techniques, strategies, language and communication employed in the processes. Thus, participation and coexistence with the artisans, after their proper authorization, was fundamental for the achievement of academic purposes, of the researchers involved.

In contrast, perform an order of many bowls and other artifacts, aiming at sales and profit by them, the generating a benefit for them from the economic point of view, and that it was possible to design perspectives and stock split sites future. These referrals ended up benefiting all those involved in the research. The collective experience between the researchers and the artisans generated several questions and reflections, such as: a) the limited number of artisans carrying out the work of elaborating the artisanal gourds; b) the little interest of minors in continuing what is done, artisanal way; c) the migration of young people to urban centers in search of study and work, mainly; d) materials and supplies used in the daily work of artisans, are increasingly difficult and far away to get; e) the possibility of incorporating in the local school curriculum, the knowledge related to the production of gourds, through an educational proposal. These questions proved to pertinent, in the sense of thinking about solutions and proposals for actions, aiming at the reduction of problems and limitations, imposed by several factors.

In general, this contract was good for everyone. The artisans were satisfied with the compensation (sales made, prestige, and appreciation) because of the work done, besides feeling recognized and respected for the craft they develop. And we, as researchers, contemplated in our academic purposes.

5. What do these properties allow us to affirm, from a decolonial point of view?

When reflecting on the testimonies of the artisans, we try to project a discussion, based on the issues inherent to their knowledge and how they are intertwined based on their cognitive

movements and elaborate systems of social representations. Also, the relationship between the established properties, in their know-how, projects elements of understanding about the spatial configurations assumed and reflected in distinct movements related to their technical and instrumental activities.

Thus, from a holistic point of view, transdisciplinary perception is essential for us to be able to understand and perceive the multiple relationships associated with their work and coexistence context. These aspects are related to social, cultural, economic, geographic and historical factors.

These articulation movements project some pertinent considerations: we are not talking about comparison and/or superposition of knowledge, cultural, and formal knowledge. There are different ways and strategies to explain certain actions and events. How they operate and affect, through different cognitive systems and how they activate, based on informal movements, being loaded with cultural elements, worldviews, beliefs among others.

Such moves project possibilities for articulations with other knowledge (interdisciplinary initiatives or movements). In this sense, the operation and properties can help us in understanding the evidence cognitive of successful experiences, own local contexts without loss of global exploration.

However, the discussion above points to the indication that there may be a clear tension relationship between the power structures at play, especially because traditional knowledge is combined or changed as the approximation and encounter of cultures becomes clear.

The more the existing relationships between different practices and knowledge are liable to an understanding and an anthropological meaning of them, by the actors involved, the more are the chances of acceptability and co-existence of this knowledge.

This statement tends towards acceptance, assumption, and the gradual implementation of diverse knowledge and knowledge, in a natural, unconscious, or, most times, imposed way. Pointing then, the need for coexistence and support with the existing diversity, alerts the people involved, the need for an understanding of the political dimension and the social dimension in the inversion of assumed assumptions from a different posture. In the words of Santos *et al.* (2005),

The concept of 'local' knowledge thus underlies the notion that the people who own it only know a very restricted medium and that this knowledge has no application beyond it. It is a local, circumscribed knowledge. For its part, the concept of "traditional knowledge" refers to a homogeneous system of thought, covering the fact that social groups constantly renew their knowledge for new experiences and new challenges posed by new historical circumstances (SANTOS *et al.*, 2005, p. 32-33).

However, it is important to stress the permanent renewal of knowledge; they agglomerate a mutation with passing time. Not so much because of the demands made by local knowledge, but by the gradual fusion and exchange of knowledge and techniques known for both "local" and "traditional" knowledge.

The perspective shown in our work seeks to show a permanent dialogue in several directions, as far as possible the ways of knowing and the knowledge produced. This dialogue, however, points to considerations and obstacles to be analyzed, discussed, and resolved with the progress of the studies we assume.

In this sense, the artisans, in fact, establish a principle of sociological organization, more active and more solidary, reflected in ASARISAN, based on the acceptance of the diverse plurality of forms of knowledge and knowledge generated in the community of Aritapera. The artisans do not live in isolation, they permanently interact with people from large urban centers, researchers, and academics from different levels of education. Also, they adapt their production to the demands of these centers to adapt to the demands of the commercial and production market, to produce economic subsidies - with their craft as one prerogative of subsistence - aiming at economic gains. Nothing else together, in an essentially capitalist world.

However, it is important to think, speaking now in a decolonial perspective, of how this relationship with the forms of production and culture, projects implications and consequences for the unique knowledge manifested and recognized in their social and cultural environment. Different, because there are records of symbolic representation and configured thought structures, based on the different myths, beliefs, and legitimate languages, but identical to trace paths of solution, pursued objectives, and solidary communication. For Santos *et al.* (2005):

Over the centuries, the constellations of knowledge have developed ways of articulating with each other, and today, more than ever, it is important to build a truly dialogical mode of permanent engagement, articulating the structures of modern/scientific/western knowledge to native/local formations/traditional knowledge. [...] In conclusion, we can say that the world's epistemic diversity is potentially infinite since all knowledge is contextual. There is neither pure knowledge nor complete knowledge; there are constellations of knowledge. (SANTOS *et al.*, 2005, p. 54-55).

According to Santoswords, an opportunity to establish communications between these constellations of knowledge is the proposition of opportunities for the gradual dialogical process necessary to them.

A cultural plurality reflects a diversity of practices. This assumption points to the inability of accentuated generalizations with explaining the instrumental activities imbued with their diversity of techniques and ideological procedures existing in different manifestations of knowledge.

The implications for the understanding of the science of knowledge are obviously direct, regarding the intrinsic aspects of our reality, as we know that, according to Visvanathan (2005, p. 209), "Science has to turn to the question of diversity where life forms are disappearing, be it a variety of plants a day, or a language a week. ", or a technique a month, or an ethnomathematics a year, or a traditional culture every century. In these multiple paths taken, it is important to highlight the importance of a more intense discussion about the assumptions existing in the knowledge considered rivals located in different regions of the planet. As stated by Matias (2005):

It should also observe that since in í heat, were associated with the protest movement two kinds of knowledge are traditionally regarded as opposites: knowledge "local" and "global" knowledge. The differentiation between these two types of knowledge, seen as "rivals", is based on the assumption that there are ways of knowing that, because of the way they are built, they are independent of the contingencies and limitations associated with local forms of knowledge, thus being universal knowledge, globally imposed on other forms of knowledge. This separation, strongly associated with a modern conception of knowledge, established in the separation between science and common sense, allows the devaluation of local knowledge, disguising it as occasional manifestations, so, in contexts of confrontation of knowledge, these are considered non-legitimate ways of knowing. (MATIAS, 2005, p. 260-261).

Thus, taking as an example the work developed with the artisans, it is possible to affirm the existence of multiple legitimate ways of knowing and knowing, where the legitimation of these paths are validated, practiced, and disseminated in the broader global context. This aspect means, therefore, the valorization and legitimate recognition of local knowledge, in the sense that the investigation provided by the existing reading of the cognitive construction processes involved in this knowledge can provide answers to our different concerns.

The legitimization of the existing diversity of local knowledge, coupled with the need and importance of a critical understanding of the meaning of global or scientifically valid knowledge for teaching and learning purposes, has a relatively important significance in studies on diverse forms of knowledge, to be discussed and realized in educational environments. Investigations, in this perspective, conducted in different study contexts, may lead to convergent or adjacent results, with which we agree and believe what will demand a deep discussion about knowledge and our inability to deal with extremely dynamic and natural situations, from a disciplinary point of view.

These are challenges that are not new, they have been launched for some time, but which are not yet fully explored from the potential for greater discussion. The dissemination of future studies

and research on this perspective points to a wide field of investigation to be carried out and developed in the coming decades.

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