



## CONTRIBUTIONS OF DECOLONIAL THINKING TO CITIZEN SCIENCE

### CONTRIBUIÇÕES DO PENSAMENTO DECOLONIAL PARA CIÊNCIA CIDADÃ

### APORTES DEL PENSAMIENTO DECOLONIAL A LA CIENCIA CIUDADANA

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#### Mode: Expanded Abstract

**Abstract:** Faced with the challenges of scientific research in Brazil, this work aimed to discuss the contribution of decolonial thinking to citizen science through exploratory, qualitative, and bibliographic research, as well as to show the result of empirical and quantitative research in the *Conselho Nacional de Desenvolvimento Científico e Tecnológico do Brasil* to identify and compare the number of research groups and areas of knowledge that address the topic in 2020 and 2022. The result demonstrates that decoloniality, open science and citizen science are aligned and can help each other towards the production of democratic knowledge.

**Keywords:** Decoloniality. Open science. Citizen science.

**Resumo:** Diante dos desafios da pesquisa científica no Brasil, este trabalho teve como objetivo discutir a contribuição do pensamento decolonial para a ciência cidadã através de uma pesquisa exploratória, qualitativa e bibliográfica, assim como mostrar o resultado da pesquisa empírica e quantitativa na base de dados do Conselho Nacional de Desenvolvimento Científico e Tecnológico do Brasil com intuito de identificar e comparar o número de grupos de pesquisa e áreas de conhecimento que abordam o tema em 2020 e 2022. O resultado demonstra que a decolonialidade, a ciência aberta e a ciência cidadã estão alinhadas e podem ajudar mutuamente em prol da produção do conhecimento democrático.

**Palavras-Chave:** Decolonialidade. Ciência aberta. Ciência cidadã.

**Resumen:** Frente a los desafíos de la investigación científica en Brasil, este trabajo tuvo como objetivo discutir la contribución del pensamiento decolonial a la ciencia ciudadana a través de investigaciones exploratorias, cualitativas y bibliográficas, así como mostrar el resultado de investigaciones empíricas y cuantitativas en la base de datos del Conselho Nacional de Desenvolvimento Científico e Tecnológico do Brasil, con el fin de identificar y comparar el número de grupos de investigación y áreas de conocimiento que abordan el tema en 2020 y 2022. El resultado demuestra que la decolonialidad, la ciencia abierta y la ciencia ciudadana están alineadas y pueden ayudarse mutuamente hacia la producción de conocimiento democrático.

**Palabras clave:** Decolonialidad. Ciencia abierta. Ciencia ciudadana.

## 1 INTRODUCTION

Decolonial thought emerged as a counterpart to modernity and coloniality in the Americas, through indigenous and Afro-Caribbean thought, and continued in Asia and Africa as a counterweight to the reorganization of French and British colonialism. In parallel, after the end of the Cold War between the United States and the former Soviet Union (1947-1991), this thought begins to trace its own genealogy (MIGNOLO, 2007).

Quijano (1992) was the first to point out the importance of a critique of the European paradigm of universal rationality without denying the perspective of the totality of knowledge, highlighting the need to free the links between rationality, modernity and coloniality. The author proposed “in the first place, epistemological decolonization to make way for a new intercultural communication, an exchange of experiences and meanings, as the basis of another rationality that can legitimately claim some universality” (QUIJANO, 1992, p. 19).

Coloniality represents the continuity of power patterns resulting from historical colonialism characterized by foreign territorial occupation but covering bodies and minds as a mode of domination, within the scope of work, culture, intersubjective relationships, identities, and the production of knowledge (MALDONADO -TORRES, 2007; SANTOS, 2019).

In the unfolding of its characteristics, coloniality is reproduced in three dimensions: 1) coloniality of power equivalent to the interrelation between modern forms of exploitation and domination; 2) coloniality of knowledge that corresponds to the impact of colonization in the different areas of knowledge production; 3) coloniality of the being that deals with the experience of colonization and its effects on language, on the body, on subjectivity (MALDONADO-TORRES, 2007).

The coloniality of knowledge as well as that of power continues “to be a fundamental instrument for the expansion and reinforcement of oppressions generated by capitalism, colonialism and patriarchy” (SANTOS, 2019, p.27).

Mignolo (2010) suggests the idea of epistemic disobedience through the distancing of Western-Eurocentric knowledge, but without rejecting its existence, thus allowing the involvement and rescue of suppressed, silenced, and marginalized knowledge and knowledge, thus expanding the geopolitics of State, people, languages, religions, identities, and subjectivities that were previously racialized and their humanity denied (MIGNOLO, 2010).

Santos (2019) contributes with the proposal of Epistemologies of the South that refer “to the production and validation of knowledge anchored in the experiences of resistance of all social groups that have been systematically victims of injustice, oppression and destruction caused by capitalism, by colonialism and patriarchy” (SANTOS, 2019, p.17). It is an epistemological, non-geographical, and anti-imperial South composed of a lot of knowledge originating from struggles, both on the geographic north and south.

The proposal of Epistemologies of the South, the idea of epistemic disobedience, and the approach of decolonial thinking are apparently aligned and can favor the practices of open science and citizen science, regarding a science of all, with all and for all.

This work aims to discuss the contribution of decolonial thinking to citizen science based on exploratory, qualitative, and bibliographic research, additionally to show the results of empirical and quantitative investigation which identified and compared the number of research groups and areas of knowledge focusing on decoloniality, in database of National Council for Scientific and Technological Development of Brazil (CNPq acronym in Portuguese), in 2021 and 2022.

## **2 DECOLONIALITY AS RESISTANCE AND EPISTEMIC EMANCIPATION**

The decolonial approach differs from historical theories of decolonization in which it does not assume that colonialism is over, instead theorists claim that contemporary forms of coloniality are perpetuated through imperialism and globalization (SCHULTZ, 2017). Decoloniality can be considered as a process of deconstruction and reconstruction, as was coloniality, as well as a long sociocultural process of transformation of the human imagination.

Epistemologies of the South reinforce and contribute to decolonial thinking through the valorization of the “peoples who suffered most violently from the epistemicide provoked by modern science and the genocide resulting from European colonialism”, allowing them to represent the world as their own and on their own terms. Instead of abstract universality, it means promoting decolonization that enhances pluralism and hybrid forms free from the colonizing impulse of the past, through intercultural translation (SANTOS, 2019, p.28).

Decoloniality and Epistemologies of the South emerge as epistemic resistance through the recognition of knowledge and respect for ethnic-racial and sociocultural diversity. It is about identifying, and valuing knowledge not recognized or even considered as knowledge by dominant epistemologies, through the resignification of the “cognitive dimension of

resistance struggles against oppression and against the knowledge that legitimizes this same oppression” (SANTOS, 2019, p.18).

Another approach to be considered is border thinking, which emerged from imperialism and colonial power in terms of the formation of subjectivities. The “geopolitics of knowledge ignores and discredits (delegitimizes) the colonial difference (epistemic and ontological) and affirms knowledge built in different historical places, re-indicates the undisciplined thinking by the disciplines of modernity” (MIGNOLO, 2010, p.45). Nonetheless, geopolitics and the body-politics of knowledge in the exercise of decolonization and depatriarchalizing start, on the contrary, from subjectivity and affections, since subjectivity is marked by the colonality of being and knowledge that rebels against the imperial principles of the knowledge (MIGNOLO, 2010).

Human imagination and creativity will flourish “when languages and subordinate categories begin to be activated by social actors who seek to decolonize knowledge and being, in addition to detach themselves from imperial modernity”, even if there is no place or safe language for them [social actors], in their work to surround the languages and categories of Western thought (MIGNOLO, 2010, p.124). This detachment requires an analysis of how to make and remake imperial and colonial differences, besides visions and strategies for the gestation and growth of border thinking.

The epistemic decolonization allows the passage to a true intercultural communication, through the exchange of experiences and meanings, as a foundation of another rationality. In this way, “frontier thinking becomes a necessarily critical and decolonial method in epistemic and political projects, to fill the gaps and reveal the imperial complicity that links the rhetoric of modernity to the logic of colonality” (MIGNOLO, 2010, p. 125).

### **3 DECOLONIAL THOUGHT IN FAVOR OF CITIZEN SCIENCE**

Latour (2000) explains that “technoscience is done in relatively new, rare, expensive and fragile places that gather an enormous number of resources, these places can come to occupy strategic positions and have relationships with each other” (LATOUR, 2000, p. 294).

The author proposes to think of technoscience as a network, since “scientific activity always has a collective dimension”, since “a scientific fact only exists if it is supported by a network of actors” (FREIRE, 2013, p.9).

The open science movement emerged to question the *modus operandi* of science and its current epistemological and institutional perspectives. Open science must be thought of as a context of social movements as a networking agent (human and non-human) that permeates the “production and circulation of information, knowledge, and culture” (ALBAGLI, 2015, p.9).

For Albagli (2015) “open science approaches imply overcoming the perspective of thinking about science from its intrinsic productivity”, at the same time that they seek to expand the dialogue of science with other social segments and types of knowledge, enabling the emergence of new spaces for the production of knowledge (ALBAGLI, 2015, p.10).

Open science is considered an “umbrella term” because it encompasses a diversity of activities in favor of collaborative, interactive and shared production of information, knowledge, and culture, from free access to scientific publications, open data, collaborative tools, open, open hardware, open scientific notebooks, open education, and citizen science (ALBAGLI 2015, p.15).

In 2022 the Oswaldo Cruz Foundation in collaboration with the Brazilian Institute of Information in Science and Technology promoted activities in favor of Milestone 5 - Citizen Science Indicators, one of the 11 milestones of Commitment 8 on Transparency in Science; new evaluation mechanisms for the advancement of Open Science, which aims to build a proposal for an evaluation model that promotes Open Science (JORGE et al., 2022).

Citizen science involves public engagement in scientific research activities, through citizens who actively contribute to science with their local knowledge, tools, and resources. “Participants provide experimental data and facilities for researchers, formulate new questions and jointly create a new scientific culture” (PARRA, 2015, p.126).

Citizen science initiatives have multiplied through two strands: one strand aims at the voluntary contribution of non-scientists, from sharing computing resources to collecting information for research. Another aspect is oriented towards the cooperation of citizens in the production, uses, decisions and directions of scientific research (ALBAGLI, 2015).

Open science, citizen science and decolonial thinking are aligned towards the democratization of knowledge, participation, intervention, and promotion of capacities for local knowledge, communities, social groups, ethnic groups, and other groups, however, each one has its own perception of science and epistemology.

Although there are challenges to be overcome in the process of collaboration between scientists and nonscientists, regarding the intrinsic exchange of knowledge, requiring the development of new methods of citizen participation that enable scientific production in a democratic way (PARRA, 2015).

As for decolonial thinking and Epistemologies of the South, there are questions about how to decolonize the knowledge, theories, concepts, and methodologies which it was produced, because “as colonialism is a co-creation, decolonizing implies the decolonization of both knowledge (of) colonized as the knowledge (of) the colonizer” (SANTOS, 2019, p.36).

#### **4 METHODOLOGIES**

From exploratory, qualitative, and bibliographic research which was based on a narrative literature review (JESSON et al., 2011). This work aimed to discuss the contributions of decolonial to citizen science, as well as to show empirical research was carried out in the CNPq database in order to identify and compare the number of research groups and areas of knowledge which address decoloniality in Brazilian science during the years 2020 to 2022.

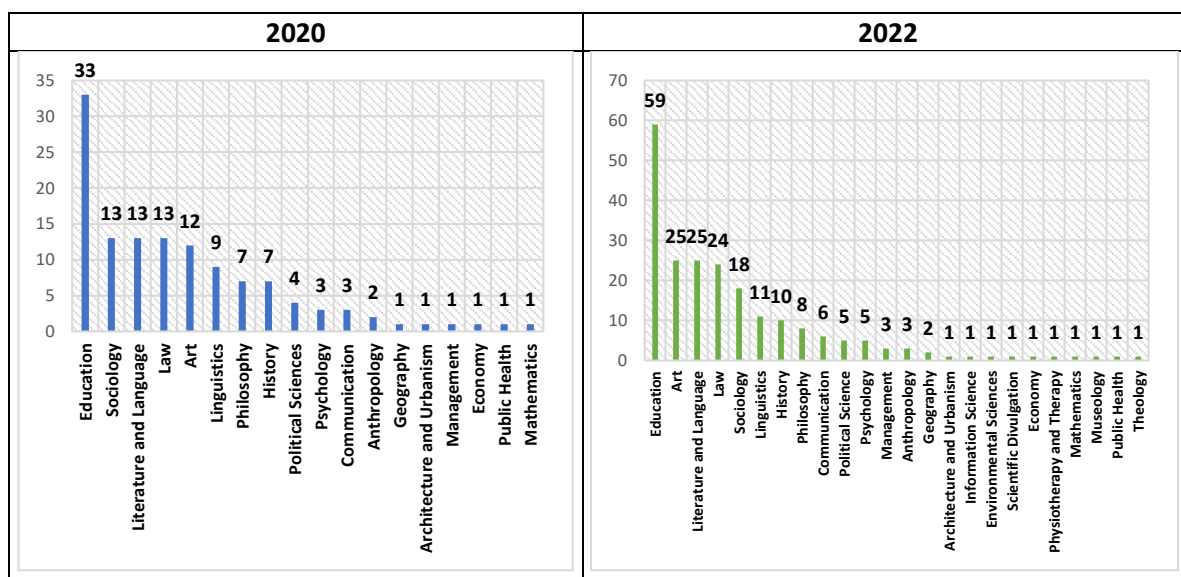
This research is a continuation of the study carried out in the CNPq database in 2020, which demonstrated the importance of investigations and discussions on the issue. However, the intention is to deepen the themes that permeate the issue of decoloniality, with regard to the areas of knowledge identified by the research groups. Furthermore, to broaden the discussion, such as the relation with open science and citizen science.

#### **5 RESULTS**

The term “decoloniality” in the CNPq database in 2020 identified 125 research groups divided into predominant areas: Human Sciences (70), Linguistics, Literature, and Arts (34), Social Sciences (19), Exact and Earth Sciences (1), as well as Health Sciences (1) (RAMOS, CARVALHO, 2020).

The result for information retrieved on September 7, 2022, was 214 separate research groups in the areas: Human Sciences (111), Linguistics, Literature, and Arts (61), Social Sciences (37), Health Sciences (2), Another (2), and Exact and Earth Sciences (1). The Another formed by Environmental Sciences and Scientific Divulcation. Graph 1 shows the comparison of specific areas in the years 2020 and 2022.

Graph 1 - Areas of Research Groups at CNPq related to Decoloniality.



Source: Ramos & Carvalho (2020) and CNPq (2022).

The areas with the highest number of research groups in 2020 were Education, Arts, Literature, Law, and Sociology. These areas continued to be representative in terms of quantity in 2022, with emphasis on growth in Arts (108%) and Literature (92%).

It is worth mentioning the growth of the areas such as Management (200%), Communication (100%), and Geography (100%) in 2022 compared to 2020. Other areas remained stable in the number of research groups: Architecture and Urbanism (1), Mathematics (1), Economics (1), and Public Health (1).

## 6 FINAL CONSIDERATIONS

The work reflected the theoretical framework on the contribution of decolonial thinking to citizen science, offering arguments in the sense of increasing the network of actors, adding local knowledge, previously suppressed. At the same time, it was possible to perceive that there are many challenges and questions, whether from the point of view of citizen science as well as decolonial thinking about the implementation of methodologies that provide the expansion and communion of both.

The subject does not end here, therefore, it is important to continue the research and the discussions on the connection between the free sharing of knowledge initiatives and the actions of visibility of subaltern knowledge, which are part of the collective diversity of common knowledge and that can contribute to the production of new knowledge and ways of doing, in order to provide a solidary and accessible science.

We believe it is important to question the hegemonic universal mercantile model of science along with appropriation and privatization of knowledge (patents, trademarks, and copyrights), through practices of open science, citizen science and decoloniality, as an action of political resistance, including in Brazil, where most scientific research is carried out with public resources. Therefore, it is essential to increase the discussion on decoloniality and citizen science topics in Brazilian science in all areas of knowledge.

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