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University, traditional knowledge and possibilities of decolonial scientific production

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Abstract: The environmental imbalance revealed a crisis of civilization. Modern science produced great contributions to life in society, but was constructed in an Eurocentric and excluding way. Thus, diverse people, such as indigenous, quilombolas and riverine were removed from the academic-scientific environment. Based on Enrique Dussel, Boaventura Sousa Santos and Enrique Leff, this work aims to discuss how the experiences of university students from different origins can contribute to scientific enrichment and to a decolonial science. Information was obtained from observations and interviews with Amazonian university students. The results showed that the knowledge framework of these students is underutilized, which is reflected in their devaluation in the academic environment. Greater university-society integration, the knowledge dialogue and knowledge ecology are proposals to allow greater integration of these students and the construction of a decolonial scientific production.

Keywords: Modern science; coloniality of knowledge; ecology of knowledges; dialogue of knowledges; University

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Introduction

Modern science contributions to the societies are undeniable. Through science, deaths have been reduced, producing possibilities of improvement in life quality and the possibilities to understand structuring factors of societies, supporting the emergence of alternative proposals. On the other hand, due to its strong Eurocentric basis, the consolidation of modern science is based on the exclusion of people and the non-standardized knowledge, as it happens in the case of several indigenous populations. But some areas of studying, such as those that involve man-environment relationship, perceptions, experiences and empirical knowledge, can be as valuable as the knowledge developed by science.

At the university, since the Middle Ages, scientific education was restricted to the elite that could access libraries and laboratories, but could not understand the daily applications of their findings. Therefore, science and university distanced themselves from the population (SANTOS, 2005) and, in Brazil, by the end of the twentieth century, most students in public Universities were white people from upper class. At the beginning of the twenty-first century, affirmative political actions allowed another profile of students to join graduate and postgraduate courses. Indigenous, quilombolas, poor, black, women, riverine, farmer and students from other origins could have more access to the scientific universe. But an epistemological barrier remains in the university, where written communication is valued in detriment to the orality, as the technical language is valued in detriment of the usual. The student´s perceptions are little appreciated in scientific production.

The aim of this article is to discuss about how students' perceptions from different origin may contribute for a decolonial scientific production. A theoretical base was used from Santos (2005, 2010), Estermann (2006), Cunha (2007), Mignolo (2003), Leff (2009), Dussel (1977; 1993; 2015), Freire (2017) and Viveiros de Castro (2004). In addition, we analyze observations and information collected during two years from students of Biology course from *Universidade Federal Rural da Amazônia* (UFRA), in a countryside *campus* of Pará.

Modern science and contributions for a decolonial scientific thinking

What seemed to be a matter of difficult solution among the ancient Greeks, an *aporia*, as well demonstrates Plato (1973) in its inspiring *Teeteto*; and after that, with medieval Christian philosophers became part of the realm of divinity; among the modern, fundamentally, as from the seventeenth century with Descartes, it becomes object of meticulous, rigorous and scientific investigation study. Then, knowledge needs to be delimited to be better learned and taught, with the purpose of consolidating the new (modern) position of men in cosmos: master of nature.

There are some of those who associate this posture of modern man with the conquest process initiated in the end of fifteenth century. Dussel (2015), Argentinean philosopher, controversially bases the Cartesian "I think" in the "I conquer" characteristic of the colonizing European peoples. In the first pages of his work "Philosophy of Liberation", Dussel seeks to demonstrate the kind of imposition carried out by Europe (center)

on conquered peoples (periphery). What becomes clear in the text of the Argentinean is the expression of an "universal ontology", since the center seeks to absorb the periphery within its own borders, making it part of the set of things that can be manipulated and handled. The periphery is not understood from the point of view of sociability, of ethics, from which the relationship, in theory, must be of equality between human beings. By other way, the character of being from which periphery is considered refers to the domain of occupation, of the daily scope of things, from a merely ontological point of view. In this sense, the Others are absorbed as things that serve to the desire of those who manipulate. From this heideggerian inspiration, Dussel allows himself to interpret the *I conquer* as the practical fundament of *I think*. In this perspective, it is contemplated a very fruitful association from the academic-political point of view, for a whole generation of social critics, sociologists, anthropologists, historians, philosophers, educators, etc., which it will link the process of modernization of the world with the colonization.

In other words – to mention only the tradition that remotes to Philosophy of Liberation –, contrary to the republican ideals of equality, liberty and fraternity, that is, since the established ideals in Revolution of the Enlightment, the modernity also left an obscure legacy: the coloniality, a violent and bloodthirsty process that subjected the peoples of the "new world" to an alleged state of "civility", granted by Europeans (DUSSEL, 2015).

Therefore, it is possible to draw a picture that divides on the one hand the civilized, rational subjects who know and possess the true religion and, on the other hand, the "savages", "immature" (to use the expression of the illustrious German philosopher Immanuel Kant (1974), "people-objects" that must be guided in the safe path of reason.

From this hermeneutic scenario possible by the Philosophy of Liberation and, in a broader form, through Decolonial Critical Thinking, we may start to establish the centralizer character of cultivated knowledge by modern occident, in such way that tends to override others knowledge, in special, those linked to holistic world vision, based on principles of relationality, correspondence, complementarity and reciprocity. Beside this, it is also possible to highlight how modern human sciences emerged as epistemological paradigm, as a single and universal model of investigation, in opposition of epistemologies of occidental peripheries (OCAÑA; ARIAS; CONEDO, 2018).

In general, culture may be defined as human achievements. Just as work has been a cultural tradition of men, also has been the same the construction of residences to protect family, the prohibition of incest, the cultivation of foods and the creation of animals to maintain the community, etc. Knowledge is something that has at its root the activities of human beings, it means that production of wisdom or knowledge and its transmission from generation to generation belongs to the most varied human communities at different times, insofar as we presuppose its development in the course of their histories.[1]

From this principle, we could not only speak of *knowledge*, but, of *knowledges*, i.e., several approaches (methods) to execute, understand and transmit these cultural gains of

1 - Cf. Dussel (2006), where "culture" is understood as a mode or system of "work types". Both agricultural production, work with the land, as well as material and mythical production are culture, that is, a putting out, the subjective, or rather, the intersubjective, the community.

the peoples. These specific behaviors (execute, understand and transmit), inevitably, would have their values linked to the characteristic features of their civilizations or peoples.[2]

However, what draws attention in the history of the West is the fact of *one* specific cultural narrative appropriates a discourse with universal pretensions, that is, a population, in a specific stage of its history, believes and make believe in superiority of its cultural production to the other populations and civilizations. Uniquely, the European conquerors (Spanish and Portuguese, fundamentally) intend to make of their own visions of the world *the* vision of the world. Dussel notices that Europe was never the center of the world history until the end of eighteenth century, as effect of industrial revolution. What grants the *status* of centralization is nothing but an illusion, a self-vision that ends up transforming in a myth: the myth of modernity. Spain and Portugal were the regions of Europe that could have "the original experience of building the *Other* as dominated and under the control of the conquer, the dominance of the center over the periphery. Europe is constitute as *center* of the world" (DUSSEL, 1993).

These historical-philosophical contributions of Dussel allow to think in a well determined relation between the populations of the called "center" with those of the "peripheries", that is, between Europe and the conquered populations. We can think about the relationship of knowledge which the modern conqueror assumes the position of observer and considers himself a subject. Consequently, the observed (conquered) is considered as object of study and analysis. As subject, the modern man undertakes the position of owner of the suitable tools and correct principles in the self-knowledge process and comprehension of the *Other*. As a consequence of this, the modern conception of "knowledge" will only be able to conceive as "knowledge" the expressions of human thought that approach the Western model (method) or that are compatible with its principles.

Among the expressions of thought in which we can most observe the modern "pretense superiority" is the philosophical practice that, before the nineteenth century, it was not fragmented into the most varied ways of doing philosophy (philosophy of nature, moral philosophy, philosophy of law, philosophy of history, etc.). First of all, we need to make an analysis of the word "philosophy". Etymologically speaking, philosophy would be love devoted to wisdom. The first term, love, corresponds to domain of passion, in profound sense and existential commotion. Wisdom, the second one involves a necessary nexus with the living experience, personal maturity, experiential richness, and deep and unconditional meditation (ESTERMANN, 2006).

But the moderns were able to transform, in some way, the "living" philosophy into something purely methodical and scientific. As well shows Estermann (2006) in its work *Andean Philosophy*, the modern western philosophy has acquired an anemic and despondent aspect, sometimes a strict science, sometimes a linguistic analysis or even mere history of philosophy, in short, an area of study made of bones, without the affection

2 - Cf. Estermann (2006). The notion of knowledge is immersed in that of culture, in the sense of being part of the universe of peoples. Both theoretical and mythical production, both the "world of logos" and the "world of myth" are part of a larger set that is knowledge.

of flesh and experiences.

> 'Philosophy' was then converted, starting with Plato, into 'logology' or 'noology', a distanced and theoretical study of *logos* and *nous*. The initial passionate love (*eros* and *philia*) gets cold, and with it the personal commitment with practical, political and existential problems. Slowly, philosophy ceased to be a passionate interpretation of living experience and became a "theory" about being (ontology), about knowing (epistemology) and even an interpretation of interpretation (ESTERMANN, 2006, p.21-22).

In this sense, it is not surprising when canonical histories of philosophy, written by professionals educated in the Western world, fail to find a history of non-Western philosophies, since these are considered inexistent exactly for having an unbreakable bond with existential issued, that is, for being linked to religiousness, to cosmos, to nature, in short, holistic worldviews.[3]

From an epistemological point of view, it may be noticed, following the image of Estermann referred above, the anemia of scientific knowledge, purely logical, without commitment to the intuitive domain.

Mignolo (2003) develops researches around of what could be called "coloniality of knowledge". In the preface to the work "*Historias locales/diseños globales*", he already sited in the sense that we would like to argue, by placing his thought in the domain of the generation and reproduction of human life on Earth, or, simply, life.

This methodological *a priori* (life) marks a huge distance from modern scientific practice, as it will become evident. This seeks to purify the carnal aspects, living experiences, practices of the production and reproduction of knowledge. For Descartes (2000), who sought to rebuild the edifice of scientific knowledge on secure and indubitable bases, knowledge should follow the example of the mathematical method, which refers to the idea of purity, insofar as its notions are increasingly distant from reality, from of *res extensa*. The subject is the ultimate foundation of the construction of the new science. And it can only be so insofar as it brings an essential distinction concerning the world of things: the subject is a thinking self (*ego cogitans*). In other words, only if, in the search for safe and indubitable knowledge, I move away from what has already deceived me, that is, from the ephemerality of experiences (literary, historical, experiential, mythological), it is possible to reach the main objective of rational investigation, that is, the truth.

Therefore, the apprehension of the world and our relations with it are seen from a dichotomous point of view. On the one hand, the knowing, pure, rational subject; on the other, the objects of the world. Here we have the distinction that underlies modern science: the subject-object, man-nature, man-world oppositions.

From the point of view of Mignolo's (2003) decolonial thinking, one cannot think

3 - Here, the notion of "holistic cosmovision" is thought from the work of Atawallpa Oviedo Freire, in "Sumak Kawsay: arte de vivir en armonia", specifically in the chapter "El paradigma reduccionista y el archetipo holístico" (FREIRE, 2017, p. 78-79).

of a behavior that involves knowledge without the requirement of locality in the world, that is, the place of enunciation needs to be seen as a conditional factor of the epistemological practices. It means that localized knowledge, local histories such as the struggles of indigenous movements for land rights, for example, are epistemic places where the "other paradigm" emerges, not to replacing the previous one – to use the nomenclature of Kuhn (2017) – but one that could easily prevail together with other worldviews, avoiding, for that very reason, being characterized as a universal paradigm.

Another important notion of decolonial thinking worked by Mignolo is the "border thinking". This notion intends to draw attention to the fact that the colonizing culture silences the colonized through processes of subjection, called "coloniality of power" (QUIJANO, 1992). The modernity was born with the conquest process, with colonialism, and it brings a side that does not intend to reveal about itself, that is, the violence that the imposition of its culture entails. It ends up silencing other life representations, thinking and acting. In this way, these other lives were not totally overcome. From their *places* of exclusion that cause pains and sufferings to them, forgotten, they begin to claim their rights in sharing a better and fairer, more equal, free world (MIGNOLO, 2003).

Man-nature relationship and its importance for knowledge production

We would like to show the implications of worldviews for the production and reproduction of knowledge, that is, how the understanding of the relationships between subjects and objects, between the domain of culture and nature, of transcendence and immanence, of contingency and of necessity, and so on, condition the epistemological practices of the most varied peoples.

Therefore, we will expose how the relationship between the subjects involved in the production of knowledge takes place, in view of the relationality between these same subjects, human and non-human. It will be necessary to consider how modern science arrives at its current logical-mathematical appearance, explicitly, what conceptions of the world support this way of producing, apprehending and passing on knowledge, as well as the cosmovisions involved in their production and reproduction in the perspectives of Cunha (2007), Viveiros de Castro (2004), Estermann (2006) and Freire (2017), fundamentally.

Firstly, it is important to emphasize a linguistic understanding regarding the discourses about scientific and traditional knowledge concerning how we refer to this knowledge. As Estermnann suggests (2006), when one intends to distinguish between "knowledge" and "wisdom", it is possible to be inside a Eurocentric approach to the question. On the one hand, we would have "modern scientific knowledge", on the other, the "knowledge of other peoples", which would demarcate a territory of objectivity and another of subjectivity, mystical and superstitious. In addition, Cunha (2007) draws the attention for the comprehension of homogeneity of scientific knowledge when we state it as *the* scientific knowledge, demarcating it when we allude to traditional knowledge in the plural form: as if these brought a complete disagreement in their practices, as a distinctive mark in relation to the first.

However, "there are no different logics" [...], and yet "different assumptions about what is in the world" (CUNHA, 2007). For modern science, the notion of "world" involves the totality of things that make up the universe as a whole. However, this is only understood as something at the disposal of men's calculation and interests. It could be called the technicization of the world. Here, the distinction between two domains is evident: on the one hand we have the subject who knows, who manipulates, who transforms; on the other hand, we have the object of knowledge, manipulating and that can be transformed according to human designs. The worldview that sustains this state of affairs refers to the subject-object dichotomy, markedly distinguishable (FREIRE, 2017).

In this epistemological perspective, also known for its mechanistic character, the conception of subject and object and the proof of knowledge through laboratory tests condition the method used in the production and reproduction of knowledge itself. This method intends to invalidate any fact or phenomenon that cannot be subsumed under its requirements. However, the fact that certain men cannot explain some phenomena does not mean that they do not exist or that other views are wrong, but that the method of interpretation or analysis cannot explain certain phenomena due to its limitations. Before such situations that modern science cannot explain, it is common to hear expressions such as "superstition", "legend", "imagination". Thus, the modern scientific method carries out analyzes or studies of other societies based on their own paradigms and social codes, declared as universal and mandatory for all.

From the Andean "abyayalense"[4] perspective, the deepest world view refers to the notion of "alternation". Freire (2017) shows us that the "method of alternation" (observer-observed, observed-observer) is the key for the cosmos-knowledge and for wisdom, which presents as remarkable characteristic the fact of removing the observer from any investigative-interpretative position to insert him in the real world, in a kind of thinking-feeling. This method allows to be observer and observed at the same time. In kichwa, for example, we may notice the word "kawak", which means to observe, and which can be read from left to right and from right to left, which reflects that deep and conscious observation is only possible in a double sense. Otherwise, it reflects an interpretive, predisposed and distorted observation, which would denounce the researcher's personal point of view. (FREIRE, 2017).

Unlike modern science, which debates the question of method, "Andean science" has perception and conscious observation as a parameter or paradigm, through a clear and precise understanding of human and extra-human nature. If the modern scientist needs to unfold himself in the universe of rational thought (in the sense of logical thinking, pure) and, therefore, without the interference of feelings or emotions, the Andean observer needs to get out of his mental condition (none-rational, because, this would have other connotations for traditional populations of Abya Ayala and Amerindian, involving, for example, the non-human plan) to enter in an observational, emotional, spiritual and

4 - The term "abyaylense" arises from "Abya Yala", that means "flowering earth". Abya Yala it the notion that Kuna population, of Panama, used to refer to original indigenous populations that occupied the territory we now know as America (OCAÑA; ARIAS; CONEDO, 2018, p. 13).

material mode *since* the other, such as expressed in the word kawak. This implies the ability to be the other, to enter the body of the other or to live with the other, to arrive from the feeling and real coexistence, and not only from the thought to the reality that is being studied. (FREIRE, 2017).

> The highest degree of knowledge is always attained when the knower, the human subject, completely identifies and becomes one with the other, to such an extent that the difference between the two disappears. For differentiation or distinction means distance and, in cognitive relationships, distance means ignorance. (FREIRE, 2017, p. 132-133).

On the other hand, Amerindian thought, supported by a perspectives view, does not allow the differentiation between a "world of the subject" and a "world of objects", since nature and culture are part of the same cosmic field, in which capacities of conscious intentionality and 'agency' that enable the occupation of the enunciative position of subject can be attributed to humans and non-humans.

> Seeing us as non-humans, it is themselves that animals and spirits see as humans. They apprehend themselves as, or become, anthropomorphism when they are in their own homes or villages, and they experience their own habits and characteristics under the species of culture. (VIVEIROS DE CASTRO, 2004, p. 227).

Unlike the conceptual logic of modern science, which establishes its representation through the imaginative operation of a transcendental subject, that is, from a self that it is abstracted from the world of matter, Amerindian knowledge must always consider the "see how", e.g., the primacy of percepts in relation to concepts. We would be facing a logic dedicated to communicating and managing the crossed perspectives. For Viveiros de Castro, the "ability to occupy a point of view" can reveal the ability of a being, hitherto insignificant from the human perspective, to directly affect the lives of men. "For the rest, it is always possible that what appeared to be just an animal, when we came across it in nature, turns out to be the disguise of a completely different spirit of nature." (VIVEIROS DE CASTRO, 2004, p. 229).

The Amerindian human being, immersed in his world, cultivating his relationships with the various human and extra-human rational domains, talking to stones and mountains, as well expresses Krenak (2019), has been developing, as an expression of coexistence with its natural world, a determined way of living, acting and conceiving. Words and concepts used in a modern scientific record such as "rationality", "world", "dialogue", etc. have a distinct applicability to express the notions of non-Western peoples. As would say Viveiros de Castro (2004), it is necessary to recombine and then desubstantiate, which means that the scientific concepts crystallized by modern logic do not have the same status as their non-Western analogues. (nature and culture, for example). In other words, the Amerindian categorial does not indicate regions of being, but rather relational configurations, mobile perspectives, that is, points of view.

The epistemological diversity in the context of a university in the northeast of Pará

Between 2017 and 2019, some observation about the thematic of this work were made in a *campus* of Amazon Rural Federal University (UFRA), located in the northeast region of Pará. This is one of the most ancient colonization areas of Amazons. The territorialisation of this region occurred, fundamentally, through two processes. The first, at the times of Portuguese colonization, which Porto-Gonçalves (2001) denominates as river-marsh-forest pattern, characterized by organization to the river banks. The second occurred according to the standard road-solid ground-underground (PORTO-GONÇALVES, 2001), due to opening of highways such as BR 010 (Belém-Brasília), to BR 316 (Pará-Maranhão) and to BR 222 (that connects BR 010 to Marabá) in 60 and 70 decades. This second occupation standard of the region was marked by economic exploitation activities of solid land (agriculture and cattle) (TAVARES, 2011).

With the implementation of national development plans of military government, as from the seventies, the private appropriation of lands in the Amazon region and the control of lands by the federal government intensified, in addition to the migration induced by the government. This migratory process aimed to promote urbanization and occupation of the region, together with the organization of the labor market and the establishment of social control (TAVARES, 2011). Among the results of the implementation of several projects that are part of the national development plan, there are the consolidation of land concentration, the emergence of conflicts between old and new actors, the emergence of conflicts over land tenure and the environmental devastation. (TAVARES, 2011), all quite evident nowadays in the northeast region of Pará.

Historically, the university, the academic and scientific location built in Europe is elitist and, consequently, excluding (SANTOS, 2005). Since the first University arose (with this designation), in thirteenth century, poor, women, indigenous people and blacks did not have access to it. In the last decades of the twentieth century and in the first decades of the twenty-first century, this scenario began to change in Brazil due to international pressure to combat inequalities, as well as the implementation of government policies. Difference and diversity began to gain notoriety as issues, also reflected in educational policies (RODRIGUES; ABRAMOWICZ, 2013). The construction of mechanisms to guarantee the entrance to the University of historically excluded populations began, in addition to laws aimed at the inclusion of traditional and Afro-Brazilian knowledge in the curricula of basic and university education.

However, entering the academic-scientific milieu does not mean permanence, nor appreciation and integration of these people. The language used in this location is often an obstacle to those who enter the University. The language used in this environment is often an obstacle to those who enter the University (FREIRE, 2016), according to which the teacher is the holder of knowledge and the students only listen. The process of exclusion occurs not only in relation to a social group, but also because of cultural issues related to subjects who feel excluded and misplaced because they are "different", such as the family farmer, the riverside, the quilombola population, members of Afro-Brazilian

religions and others (NEDAM, 2018).

A view to the Bachelor Degree course in Biology- UFRA Capitão Poço

UFRA started as the Amazon Agronomy School (EAA) and as the North Agronomy Institute (IAN), created on 1939. In 1972, EAA became Agrarian Science School of Pará (FCAP) and in 2002, it was the Federal Rural University of Amazon (UFRA). Up to 2007, UFRA offered, fundamentally, agrarian Science courses, as Agronomy, Veterinarian Medicine, Forest Engineering, Animal Husbandry and Fishing Engineering in capital of Pará, Belém. As from 2007, with the Federal University Restructuring and Expansion Plan of Federal Universities (REUNI), created by Decree 6.096 of April 14, 2007, it was possible to start the implementation process of other *campi* inland (UFRA, 2017), with courses in diversified areas, such as accounting, administration, Pedagogy and Biology.

UFRA- *campus* Capitão Poço receives students, basically from the north-east region of Pará and a few from metropolitan region of Belém, state capital. Therefore, its public is formed by young amazon people, most of them come from small farming families. In *campus* there are also young people from indigenous families, quilombola population and artesian fisherman. Students from biology course corresponds to this profile. Most students have some degree of intimacy with working on the land, growing plants, raising animals, habits related to fishing, hunting and extraction of natural resources. In 2017, students demonstrated frustration with the academic environment, because they did not feel integrated into this environment, presenting difficulty in dedicating themselves to the course.

To understand this scenario it was used experience and observations obtained between 2017 and 2019 by the first author while she was student in the course. Furthermore, semi-structured interviews were made with 61 students of two bachelor degree course classes in Biology of *campus* Capitão Poço of UFRA. The participants were one with concluding students (ending the eighth semester, registered in the morning classes) and the other with recently admitted students (ending the second semester of the course, registered in the afternoon classes). At the time, the course had around 200 students in total.

Of the 61 students interviewed, only seven are recognized as arising from a traditional group (riverine, farmer and indigenous). Between those, two students considered that their experiences were useful in the University for having abilities that made their performance easier in practice classes and knowledges that made the comprehension of contents easier. Four students asserted that they were not helpful and one affirmed that it was helpful in parts, as he knows examples of animals and plants. Four students considered that their experiences were valued during the course.

Regarding the students' perception of the importance of using empirical/traditional knowledge at the University, the answers contained in Table 1 emerged.

Table 1. Answers to the question "What is the importance of using empirical/traditional knowledge at the University?"

	Response
1	"Not possible to use in all disciplines, as some require strictly scientific knowledge".
2	"Allows you to go beyond scientific knowledge, helping to maintain ancestral customs and ideologies".
3	"If applied, they would help make lessons easier to understand".
4	"Through empirical knowledge, one can put into practice various cultures".
5	"Show the diversity of knowledge

Source: authors

The first answer demonstrates that, in the perception of that student, there is strictly scientific knowledge that, not necessarily, dialogues with reality. This understanding contradicts the course's own objectives. That is, it is necessary to make methodological adjustments so that the academic contents are better understood in relation to the social context. The third answer goes in the same direction. The other answers indicate an understanding on the part of the students that scientific and empirical/traditional knowledge can dialogue and that this union would favor the maintenance of different cultures, valuing diversity.

Dialogue and the ecology of knowledge for a decolonial knowledge-producing university

The abyss created between the technical-scientific knowledge and other forms of wisdom is considered by authors such as Leff (2009; 2012) and Santos (2010b) one of the causers of current environmental unbalance, evidencing, therefore, a knowledge crisis (PORTO-GONÇALVES, 2002). This crisis arises from the fact that modern rationality question the reality perceived by the senses, in the name of a knowledge generated from models and representations of life that do not show the complexity of nature. (PORTO-GONÇALVES, 2002; LEFF, 2009; 2012). According to Santos (2005; 2010a), university knowledge produced during the twentieth century was predominantly disciplinary and relatively decontextualized in relation to the needs of society, since the researchers themselves – coming from the same scientific culture based on well-defined organizational hierarchies – define the problems to be investigated and the relevance of these problems and establish their methodologies and research rhythms. In this way, different paradigms and knowledge are disciplined and subjugated (LEFF, 2009, 2017), promoting a hierarchy of knowledge that leads different sectors of society – academy, political and economic actors – to a belief in science and technology as an inexhaustible and apolitical source of

solutions to environmental problems. In addition, the hierarchy of knowledge manifests the power relations in knowledge (LEFF, 2009, 2017), that determine the modes of access, intervention, appropriation and degradation of nature (LEFF, 2017), which roots are found together with other relations of inequality in society, such as the economic and social. That is, inequality in the field of knowledge is closely linked to the maintenance of other forms of inequality, or, in the words of Santos (2010b): "global social injustice is thus closely linked to global cognitive injustice".

To move towards the construction of a decolonial science, it is necessary to change the academic posture. It must to start from the need to make visible other paradigms, epistemologies and ways of living. There is an urgent necessity for a committed consideration of different worldviews, from which we can look critically at the myth of the universality of modern scientific knowledge. The University must open itself to the themes and challenges posed by communities, use its methods, techniques and knowledge and adapt them according to the reality of different subjects – and together with them – when necessary, without placing itself as specialized and hierarchical knowledge. The path indicated by Leff (2009) and by Santos (2005) for the reformulation of science is the need for a "dialogue of knowledge" for the production of an "environmental knowledge", as the first one names, and the "ecology of knowledge" that would allow a "multi-university knowledge", pointed out by the second.

The "environmental knowledge" it is born from objectivity and subjectivity, from exteriority and interiority, from the valorization of subjugated knowledge and identities dispossessed by the homogenizing entirety. It is a complex object that is integrated by multiple identities that configure a new rationality. "The construction of environmental knowledge implies a deconstruction of disciplinary, simplifying, unitary knowledge" (LEFF, 2009). The "environmental knowledge" it is built from a network of relationships with others and with reality, confronting individual and collective subjectivities with objectivity, forming individual and shared knowledge. In this logic, "social knowledge emerges from a dialogue of knowledge, from the encounter of beings distinguished by cultural diversity, guiding knowledge towards the formation of shared sustainability" (LEFF, 2009). This dialogue is only possible in the encounter of identities when the being, immersed in his culture, reframes knowledge to inscribe understanding in collective identities. (LEFF, 2009; 2012).

The "ecology of knowledge" for the construction of a decolonial science in the university environment implies an epistemological revolution (SANTOS, 2005) for allowing a discussion between knowledges, valuing popular sages and their knowledge in a set of practices in which everyone wins, insofar as there is, necessarily, an expansion of worldviews. It is necessary to move from university knowledge to "multi-university knowledge" (SANTOS, 2005), a contextual knowledge, as it must be born from the extramural application that can be given. Therefore, the relevance of the study problems must be stipulated jointly between researchers and society, which, necessarily, requires an exchange of knowledge. Society is no longer questioned by science and starts also questioning it. In the teaching methodology form, this proposal corresponds to what

Paulo Freire denominates as "learning through generative themes", when you move from practice to theory and, from there, back to practice (FEIRE, 2016).

The Bachelor degree course in Biology of UFRA-*campus* Capitão Poço is a fertile ground for the application of the "dialogue of knowledge" and the "ecology of knowledge". Consists in a *campus* of a rural university, inland Amazonia, in which great part of the students are from traditional families and communities and that entered the University with great baggage of diverse knowledge (often being themselves, many times, the "popular sages"). Using the knowledge of these students in order to compose teaching plans, research and extension projects would contribute to a faster, less costly, more integrative execution and, probably, with more applicable results.

Conclusion

Modern science was responsible for fundamental contributions for structuring a western urban industrial society. Through science, social and economic actors created conditions for the appropriation and transformation of nature, along with new problems and solutions. The authors of this work recognize the important scientific contributions, especially those that have provided improvements in social well-being, such as those related to the area of public health. The current environmental imbalance, however, has highlighted the prevailing (modern Eurocentric) conception that man is master of nature.[5] Before this imbalance (crisis), it is necessary to learn that there are worldviews that favor the production and reproduction of life, as well as harmful worldviews.

The university environment is fundamental to contribute to the construction of a decolonial science, contextualized and directed to the resolution of social/environmental problems; given that, currently, students from different origins can live in this space. However, it is necessary that, mainly, the teaching process in Universities is transformed in order to value diverse knowledge and to use it for the benefit of the construction of knowledge itself, making it more assertive and comprehensive. In Universities located in Amazonia, this opportunity is especially tempting. The "ecology of knowing" aimed at the construction of "multi-university" knowledge and the "dialogue of knowledge" aimed at the construction of "environmental knowledge" are fundamental paths for this reconfiguration of science.

As from these reflections, we propose that the production of knowledge practiced in university environments moves towards an improved science that, from the recognition of its origin and its history (Eurocentric), can reflect on its current constitution and promote the necessary changes in the sense of to build a decolonial science, even more connected to societies, integrative, multiple, responsive and problem-solving.

5 - The appropriation of nature by mankind takes place in different ways. The unequal distribution of power is a key factor in the ecological crisis, where some groups enjoy environmental goods and services without restrictions, while others are deprived of access to essential items. (MARTÍNEZ-ALIER, 2007).

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AMBIENTE & SOCIEDADE 25 anos 25 años 25 years

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Universidade, conhecimentos tradicionais e possibilidades de produção científica decolonial

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Resumo: O desequilíbrio ambiental global evidenciou uma crise civilizatória. Embora tenha produzido grandes contribuições à vida em sociedade, a ciência moderna se constituiu de forma eurocêntrica e excludente. Com isso, pessoas de saberes diversos, como indígenas, quilombolas e ribeirinhos, foram afastadas do ambiente acadêmico-científico. A partir de autores como Enrique Dussel, Boaventura Sousa Santos e Enrique Leff, este trabalho tem como objetivo discutir sobre como vivências de estudantes universitários de diferentes origens podem contribuir para o enriquecimento científico e para uma ciência decolonial. Informações foram levantadas a partir de observações e entrevistas com universitários amazônidas. Os resultados mostraram que o arcabouço de conhecimentos desses estudantes tem sido subutilizado, o que se reflete em sua desvalorização no ambiente acadêmico. Maior integração universidade-sociedade, o diálogo e a ecologia de saberes constituem propostas para permitir maior integração desses estudantes e a construção de uma produção científica decolonial.

Palavras-chave: Ciência moderna; colonialidade do saber; ecologia de saberes; diálogo de saberes; Universidade.

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Universidad, conocimiento tradicional y posibilidades de producción científica decolonial

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Resumen: El desequilibrio ambiental global ha revelado una crisis de civilización. Aunque la ciencia moderna ha producido grandes aportes a la vida en sociedad, ella se ha constituido de forma eurocéntrica y excluyente. El resultado de esto ha sido que personas de diversos conocimientos, como los pueblos indígenas, los quilombolas y los habitantes de las riberas, han sido apartadas del entorno académico-científico. Basado en autores como Enrique Dussel, Boaventura Sousa Santos y Enrique Leff, este trabajo tiene como objetivo hacer la discución de cómo las experiencias de estudiantes universitarios de diferentes orígenes pueden contribuir al enriquecimiento científico y a una ciencia descolonial. La información se obtuvo a partir de observaciones y entrevistas con estudiantes amazónicos. Los resultados mostraron que el conocimiento de estos estudiantes ha sido subutilizado. Una mayor integración universidad-sociedad, el diálogo y la ecología del conocimiento son propuestas para permitir una mayor integración de estos estudiantes y la construcción de una producción científica descolonial.

Palabras-clave: Ciencia moderna; colonialidad del conocimiento; ecología de saberes; dialogo de saberes; Universidad.

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