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DIALOGUES AS A METHOD TO ENABLE REFLEXIVITY IN THE SCIENTIFIC CONTEXT

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Introduction

In this essay we aim to organize theoretical and methodological arguments to qualify scientific collaboration processes for transitions to sustainability.

The problematization of the essay starts with two points. The first, theoretical, was inferred from the readings and discussions from Alvesson; Sandberg (2011) and Susur; Karakaya (2021), which present the challenges of constructing the transition research agenda and the scientific work on it. This first issue connects with the discussions about the ontological and axiological bases we must mobilize in the New Climate Regime[1]. Based on the arguments of Bruno Latour (2017), this philosophical layer of logical coherence shows that the inter or transdisciplinary expedient is not trivial and demands much more effort and reflection on the basis on which we build knowledge.

The second point of questioning arises from our research experience as researchers trained in an interdisciplinary course whose materialization of interdisciplinary practice proves to be conflicting and sometimes restricting the normal production of science, in Khun's terms (1998). From empirical evidence, we argue that there is a need to improve methods of scientific collaboration to boost interdisciplinarity and, consequently, the research agenda on transition to sustainability.

We propose that the concept of reflexivity and the method of reflexive-collaborative dialogue cycles can compose a theoretical and methodological basis to contribute to scientific collaboration.

[1] Latour suggests the use of the term “New Climate Regime” instead of “Anthropocene”, since the latter is still being debated by the scientific community and carries a controversial political orientation regarding the agent of change (are all human beings responsible? Or those who fit into modern industrial life?)

The ontological and axiological challenge of the transition to sustainability

Meta-theoretical and meta-methodological coherence is a fundamental scientific expedient for constructing research, texts, arguments, and discourses. It involves understanding the foundations on which we develop thoughts and link ideas, the continuous philosophical expedient of synthesizing, articulating, and dialoguing. From the point of view of the evolution of science, in Kuhn's terms (1998), the construction of normal science involves not only engaging in this internal critical expedient but also producing knowledge from a base, from a sequence often linear, such as filling in a puzzle.

This puzzle metaphor presented in Kuhn's (1998) book “Structures of Scientific Revolutions” is adequate to articulate the first idea of this argument. Once we develop our work to solve a problem and fit one more piece to the puzzle, we automatically assume that this problem was previously framed in a predefined structure. Our piece must fit within some knowledge and adequate fittings; consequently, our method and conclusions will reinforce the importance of the crossword puzzle frame.

We recover this metaphor from Kuhn not as a superficial criticism of how normal science is reproduced but to place it in the context of the philosophy of science. The structure of scientific revolutions sometimes demands breaking certain linearities of the normal production of science when facing tensions created by the "anomalies." In essence, the idea of sustainability, the problem of climate change, and the transitional research agenda request, for its developments, new frames, and new paradigms to think about reality and the bases of science. These new frames invariably require different ways of thinking, methods, and approaches.

Assuming the necessity to think about another paradigm, Latour deepens the discussion by moving between the epistemological and ontological dimensions. The ontological dimension, addressed in the book Facing Gaia: Eight Lectures on the New Climatic Regime (LATOUR; PORTER, 2017), is treated as a

fundamental problem, revealed by Global Environmental Changes, or in Latour's words, the intrusion of Gaia.

The central idea is that any solution should primarily discuss and break with the duality between “Culture” and “Nature”, argued by Latour as a secular problem of modern Western society. To think about ways to move towards a sustainable society, we need other frameworks and other ways of visualizing our objects and premises.

The consequence of thinking and reproducing the world between the poles of nature and society (LATOUR, 1994), leads to the production of a modern science disconnected from the world, whose theories, methods, and solutions, framed in modern practice, only intensify the consequences. This effect was also captured by Ulrich Beck in Sociedade de Risco [Risk Society] (2011) and Anthony Giddens in Consequences of Modernity (GIDDENS, 1991), regarding the inability of modern science to deal with the reality of the New Climate Regime, this complex, probabilistic, non-linear, interconnected, often chaotic and, mainly, grounded[2] reality. In the symbolic figure of Gaia, the Earth has agency. It is an actant, just like the individual or the society.

The idea of bringing ontological depth to discussions on scientific collaboration involves engaging in thought processes that help us recognize our way of seeing the world, our bases on which we feel the world, and, thus, to perceive our incoherences, limitations, and choices. It is not necessarily an eliminatory, brusque process. It does not mean that we suddenly need to replace our worldview, built with great difficulty throughout life. But first, it means adding the critical layer, allowing us to know the virtues and inconsistencies of our choices in scientific work.

Based on our scientific experience, it is possible to suggest the difficulty of building interdisciplinary science when the foundations on which knowledge is built are not minimally addressed. Sometimes we came across incoherent and

[2] The term “Grounded” used by Latour refers to one of the ideas mobilized in his book, basically, it is constituted as an image that humans must know how to locate themselves, understand themselves inside, mediated and involved by the nature as a feedback system. Latour suggests that we should enunciate ourselves as earthlings (beings that live inside the earth) and not just as humans (a term apart from the earth).

conflicting methodological and theoretical associations in projects or even thesis. That is, theories in one puzzle, methods in another, and questions and hypotheses in another. A real patchwork quilt that weakens the construction of the transition agenda.

Furthermore, during scientific collaborations, this problem becomes more critical in the discursive and dialogue dimension. When we build arguments orally during work meetings, the need to go deeper into the bases is evident. What are the assumptions of your method? What perspectives on reality are they anchored in? Can this perspective of reality lead to the desired sustainability? And more, what is the desired sustainability?

Commonly, at this point, a central expression of the problem of the culture/nature duality pointed out by Latour reveals when we, modern scientists, are bothered by the discussion about doing politics/doing science. “Separate things!” we would say. “Science is apolitical, immune to the biases of society”, "Our equations describe nature as it is." The disclosure of the ontology of the moderns is impressive because it shows how deeply rooted in our habits, tradition, and beliefs is the nature/society separation.

We do not make this argument a superficial proposal to indicate which truth should be followed. However, we put into perspective the need for an ontological disclosure of our ideas. If we ask what sustainability we want, we are being political when describing our worldview, what we want, and what underlies our choice. If we ask what are the assumptions that support our methods, we are only illuminating their virtues and inconsistencies to empower our choices. If we ask whether our methods and assumptions are adequate to achieve our desired objectives, in the light of their virtues and inconsistencies, we open, therefore, a more empowered and reflexive research roadmap to move towards a "sustainable" transition, in which politics complements science and vice-versa. Politics, as a declaration of our beliefs and objectives to be achieved (e.g. transition “to sustainability”, “decarbonization”). And science, as a rigorous method to achieve objectives.

To illustrate this argument, we highlight the discussions about the Global South (GHOSH et al., 2021; GHOSH; SCHOT, 2019), or about the problem of understanding capitalism as a landscape (FEOLA, 2020; FEOLA; VINCENT; MOORE, 2021), or about the multiple layers of policy agency in the research agenda on transition (STIRLING, 2019). How to think about a sustainable transition in the global south, with countries where people suffer from hunger and whose population, in a state of extreme poverty, earns less than 1 dollar a day? How to propose solutions based on market and innovation when the market assumptions themselves aim maximizing individual utility and not cooperation? How do we dialogue with an individual and his rationality in conditions of asymmetry of information and power? How to conduct interviews to collect data with people who perceive scientists as enemies? How to develop mathematical models about the earth system, the biosphere, or culture, when we understand these objects as empty spaces, without agency, or without the same ontological dignity? An infinite cascade of questions can be asked to put into perspective the necessity to understand our foundations and verify them in their virtues and inconsistencies compared to the objects we analyze.

At this point, reflexivity seems to be a central point for moving forward. Even as a polysemic concept, still in movement, its bases and interpretations can generate relevant theoretical elements to broaden our ontological perception of our scientific work.

About the concept of Reflexivity

We propose the interpretation that the concept of reflexivity has the potential to be the theoretical basis for an adequate idea of collaboration to foster interdisciplinarity. We highlight the self-confrontation process and the objective definition as the main elements of this concept.

The term reflexivity has evolved over the years and has become more complex regarding purpose, scope, and association with other concepts. If, on the one hand, this complexification can lead to the polysemy of the concept, on the other hand, it embraces several scientific areas, enabling an assembly of multidisciplinary scientific knowledge.

One of the original paths of the reflexivity concept is in the discussions about Risk Society, Consequences of Modernity and Reflexive Modernization (BECK, 2011; BECK; GIDDENS; LASH, 1997; GIDDENS, 1991). One of the ideas we highlight is focusing on the process and not necessarily on the result of the reflexivity.

The idea of reflexivity is rooted in the deepening of modern society's individualization and the new logic of risk distribution. While the first root detraditionalizes human relations, “freeing” people from traditional industrial relations, the second root causes the dissociation of nature and society boundaries, making the effects from universal industrialization reaches not only the “environment”, but the entire society and its contradictions (BECK, 2011).

This movement also reaches science to the extent that this social construction becomes a cause, a defining expedient and a source of solutions concerning risks and, therefore, scientific-technological development becomes contradictory. This movement of reflexivity in science brings an end to the monopoly of scientific pretensions of knowledge, where science becomes increasingly necessary but, at the same time, less sufficient for the socially binding definition of truth.

The fundamental idea of this passage is to highlight the scientific criticism of science itself. Internally, reflexive procedures in science are the natural course of methodological steps. However, externally, those same reflexive procedures may be interpreted as weaknesses of scientific explanations since there is no absolute true. This movement, in a public space reveals that science per se are not the source of absolute knowlgde and put the scientific production under the need for assessment, verification, and contextualization by other stakeholders. Therefore, reflexivity in science is a process of internal questioning that also expands the agents in the production of knowledge, with different points of view and different scopes for its validation.

Another interpretation that sheds light on this process could be described as the possibility of a creative (self) destruction for an entire era: that of industrial society. The “subject” of this creative destruction is not the revolution, it is not the crisis, but the victory of Western modernization (BECK; GIDDENS; LASH, 1997).

Moving forward, a variety of associations of concepts with reflexivity occurred over time. This includes governance agendas, energy transition, global climate governance, among others (BURCH et al., 2019). The illustrative example of “Reflexive Governance” reveals the need for an axiological association as an element to be included in reflexivity. That is: a focus not only on the process of self-confrontation but also on the objective to be achieved, that is, defined a priori, in this case, governance.

According to this research agenda, reflexivity refers to

> the ability of actors and institutions to critically reflect on their own performance (especially their impacts), and to reshape their goals, practices and values accordingly, in order to wisely navigate complex environmental, contested and changing human-environmental systems (BURCH et al., 2019, p. 12)

We also have reflexivity as the “capacity to turn or bend back on oneself. On the political stage, reflexivity as a mode of steering and coordination” (HENDRIKS; GRIN, 2007, p. 334).

What we want to extract from these few examples is that the process of deep self-confrontation of assumptions, theories, and methods, along with the set of objectives and values to be achieved, are central to reflexivity.

These two elements seem fundamental to us, demonstrating the methodological and political need to qualify scientific collaborations. Methodological because it sheds light on the need to consider the limits, inconsistencies, and virtues of our choices as scientists. It does not mean discarding our choices but qualifying them. Political because it sheds light on the need for political debate about the wills, objectives, and issues that a community (scientific or not) awaits. Therefore, reflexivity can be the fundamental engine for interdisciplinary and transdisciplinary collaborations.

Dialogue as a methodological proposal to stimulate reflexivity in scientific collaborations

While we place the idea of reflexivity in the theoretical domain to connect the dots between the need for ontological and axiological expansion of scientific collaborations, in the practical domain, we want to place the idea of dialogue as a method capable of boosting this movement.

We assume Monteiro; Toledo; Jacobi (2021) work as a central reference, whose proposition on dialogue combines reflexive and deliberative capacity in collaborative environments. The authors depart from the works of David Bohm (2005), Willian Isaacs (1999), and Paulo Freire (1981) to culminate in the methodological proposal of cycles of reflexive and deliberative dialogues.

The idea is to bring together, in independent but complementary cycles, the capacity for reflexivity based on the reciprocal dialogue between people and, subsequently, the capacity for joint construction of resolving agendas in the face of a problem to be solved. This proposal for integrating complementary cycles transits between open, honest, and respectful interaction between people willing to engage in dialogue. This is the precondition of the learning process that could

open the doors to the re-signification of individual assumptions and beliefs and their possible collective reconstruction.

At first, the objective of the Reflexive Dialogue Cycle is

> to understand why the other thinks and acts in a certain way, leaving aside the moralizing condemnation. In this sense, the resolutive posture may quickly lead us to fail in this exercise, since the definition of resolutive paths implies the choice and hierarchization of ideas, therefore, the judgment between what is better and what is worse" (MONTEIRO; TOLEDO; JACOBI, 2021, p. 168).

Once the learning preconditions are achieved, the process follows its logical steps: listening, identifying emotions and feelings, speaking, and re-admiring.

When this reciprocal dialogue is established and reproduced continuously, in a respectful and honest environment of interaction, fundamental elements emerge for reflection, such as understanding and learning about the other, understanding and cognitive change about the dialogued object, and, finally, the co-creation of meaning. Therefore, here the connection is established with the theoretical basis of reflexivity, the capacity for self-confrontation of internal beliefs.

After the conclusion of the Reflexive Dialogue Cycle, the Deliberative Dialogue Cycle follows. This one correlates with the need for axiological direction, in the case of the transition to sustainability, to a more sustainable perspective than the previous one.

This cycle begins with the dialogic planning stage, where participants collectively pursue build agreements and assignments of responsibility based on diagnosis and mapping of the observed problem. By developing this collective practice, people may discover the need to engage again in a reflexive dialogue stage at a new level, based on a new contextual scenario emerging from the deliberative cycle.

Engaging in this long and continuous process takes much energy, but the authors support its practical viability and lasting long-term effects due to the construction of collective agreements.

The idea of reflexive and deliberative dialogue cycles can complement the operational dimension of reflexivity in the scientific context as proposed by Susur and Karakaia (2021) to pursue a transition agenda. We argue that the approaches are complementary, since the reflexive approach brings out the themes and issues that generate discussions to be worked on, while the dialogical approach brings out how these discussions can be conducted. One approach deals with form and the other with content.

One of the essential points of the dialogue method is the predisposition of those involved to engage in reciprocal dialogue, even in divergent disagreements or opposites ideas. These divergences seem to emerge as a response to the generating questions proposed by the authors' reflexive approach. Conflicts and distinct views of the world of dissimilar researchers will arise from the responses of the reflexive approach. Therefore, methods to manage this process collaborative and non-conflicting become a relevant element to enable the reflexive approach.

Likewise, Sandberg; Alvesson (2011) recognizes the importance of problematizing the assumptions and the research question as a logical problematization methodology. The authors themselves recognize that, on a collective level, this undertaking can lead to conflicts of views and interests. For this reason, the dialogical and reflexive method proposed in this essay complementthe authors' idea. Sandberg; Alvesson (2011) also suggest generating questions and themes to be carried out to improve our vision. We argue that this problematizing process may be linked to the Deliberative Dialogue Cycle, bringing a complementarity to the dialogue method.

We argue that this method, supported by the theoretical basis on reflexivity, is a possibility of a fruitful and coherent path for the construction of transitional research agendas. The planning and execution stages of scientific work may

constitute the ideal space for the methodological reproduction of reflexive and deliberative dialogue cycles.

Once the bases are built collectively and shared, from a reciprocal process of understanding the other, the emergence of interdisciplinary themes, questions and solutions will be much more viable than in a traditional, individual model and of competing worldviews.

Open conclusions

The forwarding conclusion, still open, of this essay, points to a theoretical and methodological path consistent with the ontological and axiological demand of the research agenda on the transition to sustainability. From a theoretical and methodological point of view, there is a potential win-win relationship to connect the reflexivity concept, the dialogue method, and the approaches suggested in the literature toward improving the transition for sustainability agenda. From the abstract and practical articulation of these ideas, we will be able to assess the results and unravel the inconsistencies and virtues of this essay.

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