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A pragmatist approach to transdisciplinarity in sustainability research: From complex systems theory to reflexive science

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ABSTRACT

The importance of questioning the values, background assumptions, and normative orientations shaping sustainability research has been increasingly acknowledged, particularly in the context of transdisciplinary research, which aims to integrate knowledge from various scientific and societal bodies of knowledge. Nonetheless, the concept of reflexivity underlying transdisciplinary research is not sufficiently clarified and, as a result, is hardly able to support the development of social learning and social experimentation processes needed to support sustainability transitions. In particular, the concept of reflexivity is often restricted to building social legitimacy for the results of a new kind of ‘complex systems science’, with little consideration of the role of non-scientific expertise and social innovators in the design of the research practice itself.

The key hypothesis of the paper is that transdisciplinary research would benefit from adopting a pragmatist approach to reflexivity. Such an approach relates reflexivity to collective processes of problem framing and problem solving through joint experimentation and social learning that directly involve the scientific and extra-scientific expertise. To test this hypothesis, the paper proposes a framework for analysing the different types of reflexive processes that play role in transdisciplinary research. The main conclusion of the analysis is the need to combine conventional consensus-oriented deliberative approaches to reflexivity with more open-ended, action-oriented transformative approaches.

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1. Introduction

The last decades have witnessed a growing interest in sustainability research. Global environmental change (including climate change, loss of biodiversity or deforestation), population growth, rising inequalities and the financial crisis are requiring policy action backed up by reliable scientific data. However, the mainstream scientific methodologies are often poorly equipped to deal with complex sustainability problems [1]. In particular, solving sustainability problems involves decisions on values that require civic participation and the building of social legitimacy for proposed transition pathways to sustainable societies. Therefore, both scientists and policy makers have called for re-conceptualizing the role of experts, practitioners and citizens in the production and use of scientific knowledge [2,3].

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In this context, sustainability scientists have increasingly recognized the need to move from interdisciplinary approaches to transdisciplinary collaborations, which bring together scientific and extra-scientific expertise [4,5]. Some approaches within sustainability research, such as ecological economics [6–9] have already built an important body of transdisciplinary scholarship and are increasingly influential in academia and at a policy level. More recent approaches, such as models of transition management [10–14] or resilience thinking [15–17] are developing and gaining more visibility. Building on this research, Jahn et al. have defined transdisciplinarity as a “critical and self-reflexive research approach that relates societal with scientific problems; it produces new knowledge by integrating different scientific and extra-scientific insights; its aim is to contribute to both societal and scientific progress” [18].

However, even though transdisciplinarity has become increasingly visible as a general approach to address the shortcomings of prevalent methodologies and modes of organization of scientific research, the transdisciplinarity discourse has not managed to develop a clear, unambiguous approach [18]. In particular, the importance of a reflexive questioning of values, background assumptions and normative orientations of various approaches to sustainability in transdisciplinary research is not sufficiently acknowledged. Indeed, despite having challenged the influential conception of science as a value-neutral inquiry in the exclusive responsibility of highly trained and specialized experts, the prevalent sustainability discourse continues to construe scientific reliability and social legitimacy as distinct requirements that have to be pursued in parallel and traded off against each other. This is for instance the case in the complex systems approach to sustainability science [19]. As a result, reflexive processes are sometimes used to justify an ‘unstructured pluralism’ based on ambiguous theoretical and value commitments [20,21].

The goal of this paper is to highlight the problems related with such a restrictive understanding of reflexivity and to build a framework that allows a better analysis of the role of reflexivity in transdisciplinary research. The key hypothesis of the paper is that transdisciplinary processes would benefit from adopting a pragmatist approach to reflexivity, which argues for extending the actors’ reflexivity through their participation in concrete problem-solving and social experimentation and learning processes. To test the fruitfulness of this hypothesis, the paper proceeds in three steps. The first step briefly reviews the recent arguments for integrating reflexivity in transdisciplinary research processes (Section 2). The second step develops the pragmatist approach to transdisciplinarity and discusses four aspects of reflexivity that can facilitate the integration of transdisciplinarity into sustainability practice (Section 3). The third step starts from a typology of transdisciplinary approaches based on a double distinction proposed in the literature between descriptive-analytical and transformational approaches, and between epistemic and social levels of analysis, and assesses the basic types of transdisciplinary research according to the degree in which they manifest the four aspects of reflexivity (Section 4). The two final sections discuss these results (Section 5), outline the reasons for proposing reflexivity as a regulative ideal of transdisciplinary research, and draw some methodological and organizational conclusions.

2. The challenge of organizing transdisciplinary research for sustainability

Sustainability problems are usually characterized by a plurality of decision-makers, pervasive uncertainties, spatial and intertemporal externalities, interplay of human and natural components and an evolving understanding of policy objectives [22]. They challenge the assumption of a “stable and infinitely resilient environment where resource flows could be controlled and nature would self-repair into equilibrium when human stressors were removed” [23], moving the focus towards issues of building resilience, and analysing qualitative change and non-linear, far-from-equilibrium dynamics. At the same time, scientists, practitioners, policy makers and citizens often express different (and possibly incommensurable) values and perspectives on how sustainability problems should be framed and addressed. In short, at the core of different sustainability challenges lies the problem of managing complex social-ecological systems under conditions of uncertainty and plurality of values and perspectives.

The under-consideration of reflexivity on assumptions and values – as well the social norms and practices that sustain them – has been highlighted as a key problem in transdisciplinary sustainability research by an increasing number of scholars [24–26]. Several authors [19,27] have argued that phenomena do not become relevant to the sustainability scientist as value-neutral facts. On the one hand, normative commitments are embedded in the description of facts to the point that “evaluation and description are interwoven and interdependent” [28]. On the other hand, theoretical analysis is guided, explicitly or implicitly, by a normative agenda focused on intervention and change. It is not simply the *object* of inquiry (e.g. a particular ecosystem) that structures the research process around it; rather, it is a particular *problem* (e.g. biodiversity loss in a particular ecosystem) that requires theoretical and practical action (explanation, prediction, and intervention). As a consequence, issues of global climate change or biodiversity loss do not enter the scientific realm as neutral objects of inquiry; they are from the very beginning (that is, from the phase of problem definition) value-laden and guided by a transformational perspective (envisaged progression towards a more desirable state of affairs).

Transdisciplinarity has emerged as an explicit reaction to these challenges, and as an alternative to the dominant model of research organization and knowledge production. It has been proposed as a “reflexive, integrative, method-driven scientific principle aiming at the solution or transition of societal problems, and concurrently of related scientific problems, by differentiating and integrating knowledge from various scientific and societal bodies of knowledge” [18]. However, the reality of scientific practice is lagging behind this broadly-supported objective, and “while there is lip service paid to the need for civic science, the question of how it can be realized is largely unresolved” [2]. This situation can be explained by the lack of a common terminology and a shared research framework [29], diverging understandings of transdisciplinary requirements

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