Transdisciplinarity in the class room? Simulating the co-production of sustainability knowledge

Jörg Balsiger *

Department of Geography and Environment and Institute for Environmental Sciences, University of Geneva, Uni Mail, Boulevard du Pont-d'Arve, 1211 Geneva 4, Switzerland

A B S T R A C T

Despite its many advantages, teaching transdisciplinary is a costly enterprise. Transferring diverse theoretical, methodological, and practical skills may require several teaching staff; developing meaningful stakeholder interaction is time-intensive; and managing the research process demands significant efforts in logistics and coordination. This article seeks to make two distinct contributions. Conceptually, it introduces a framework for distinguishing between soft, inclusive, reflexive, and hard transdisciplinarity, based on the notion that there are diminishing returns to all features of the practice. Empirically, it examines a classroom simulation – the Sustainable Development Indicator Exercise (SDIE) – as an example of soft transdisciplinarity. In the SDIE interdisciplinary student groups play the role of policy advisers. Building on a concrete transdisciplinary research project, they explore their understanding of sustainability, develop a multi-criteria decision making method for assessing sustainability criteria and indicators, elaborate and present their results, and reflect on their experience. All aspects of the exercise follow the logic of role playing: organizing group interaction, distributing responsibilities, interacting with their political principal, presenting their findings, and evaluating their progress. Experience from the simulation reveals insights into ways students address and express concerns with objectivity, transparency, deliberation, and balancing sustainability; it also points to ways for moving beyond soft transdisciplinarity.

© 2014 Elsevier Ltd. All rights reserved.

1. Introduction

During recent decades transdisciplinarity has become an important paradigm of knowledge production to address complex problems under uncertainty in intercommunicative and action-oriented ways. Published work has focused on debating defining characteristics (Balsiger, 2004; Russell, Wickson, & Carew, 2008; Wickson, Carew, & Russel, 2006), exploring evaluation approaches (Bergmann et al., 2005; Guggenheim, 2006; Klein, 2008b; Pohl, 2011), defining research principles and guiding research practice (Hirsch Hadorn, Hoffmann-Riem, & Hoffmann-Riem; Lang et al., 2012; Pohl & Hirsch Hadorn, 2007), reviewing research practice (Brandt et al., 2013), and illustrating transdisciplinary research by means of case studies, often brought together in edited volumes or journal special issues (e.g. Hirsch Hadorn et al., 2008; Lawrence & Després, 2004; Maasen, Lengwiler, & Guggenheim, 2006). The proliferation of such work has significantly raised the profile of

* Tel.: +41 22 379 9453.
   E-mail address: joerg.balsiger@unige.ch

transdisciplinary research and generated more refined understandings among researchers, policy makers, and funding agencies.

In comparison to transdisciplinary research, teaching has received less attention, even though transdisciplinarity has long been understood to include the field of teaching (Centre for Educational Research and Innovation, 1972). At the outset, teaching-related concerns centred more broadly on the educational system, especially the linear structure of universities and their failure to serve the needs of society (Jantsch, 1972). According to Klein (2008a), transdisciplinarity soon appeared in numerous educational settings in the United States and Europe. Under the auspices of initiatives such as the International University Reforms Observatory, the Centre International de Recherches et Études Transdisciplinaires (CIRET) and <td-net>, a wealth of educational and teaching resources has become available (Klein, 2008b). Additionally, members of the transdisciplinary case study movement in countries such as Switzerland, Austria, and Sweden have produced numerous guides and scientific publications detailing their experiences (Hansmann, Crott, Mieg, & Scholz, 2009; Muhar, Vilsmaier, Glanzer, & Freyer, 2006; Scholz, Lang, Wiek, Walter, & Stauffacher, 2006; Stauffacher, Walter, Lang, Wiek, & Scholz, 2006).

Even a cursory survey of accounts suggests that teaching interdisciplinarity and transdisciplinarity is a costly enterprise. In the very first issue of the journal *Issues in Integrative Studies*, Benson (1982) identified the relatively high cost of the typical integrative studies course as one of five overlooked, but serious criticisms of interdisciplinarity. Since teaching transdisciplinary research skills should add interactions beyond the academic world to the interdisciplinary curriculum, costs are even higher. Like interdisciplinarity, the sound teaching of transdisciplinary research may necessitate proficiency in a range of theoretical, methodological, and practical skills, which may require team-teaching. Furthermore, the development, implementation, monitoring, and evaluation of transdisciplinary research in concrete settings entails participation by a wide range of stakeholders. Extensive time is required to establish relations, convince external actors of the benefits of a transdisciplinary research project, and make themselves available at all stages of knowledge co-production. Finally, regardless of the research setting, efforts dedicated to research management tasks such as logistics and coordination are typically demanding.

While teaching transdisciplinary research raises tough questions about possible constraints, it also encourages the search for alternative approaches. To this end, the article makes two distinct contributions. First, it proposes a conceptual framework for distinguishing between different varieties of transdisciplinarity. The approach builds on widely used criteria for defining transdisciplinarity – integration, evolving methodologies, collaboration. Introducing the notion of "limits of transdisciplinarity," the resulting heuristic differentiates between four varieties of transdisciplinarity. Its purpose is not to designate what is transdisciplinary or not, but to facilitate the identification of means to make teaching – and research – more transdisciplinary with available resources, and/or to strengthen the case for devoting more resources to teaching.

The second, more practical contribution is an examination of a teaching exercise carried out in a graduate seminar on sustainable development, which serves as an illustration of what I will call 'soft transdisciplinarity.' The Sustainable Development Indicator Exercise (SDIE) contains numerous transdisciplinary elements, even though it was not conceived as such. The SDIE is a classroom simulation involving role plays of small student groups working on a task that mirrors a concrete transdisciplinary research project. Educational simulations are experiential exercises that transport students (and teachers) to another world, where they apply their knowledge, skills, and strategies in the performance of their assigned roles. Simulations cannot replace interactions in concrete settings with real stakeholders facing complex problems. However, they can offer students insights into the 'surface structure' (observable mechanisms, including the setting of the simulation) and the 'deep structure' (psychological mechanisms, including the nature of interactions between the learners and the task, and between students) of collaborative thinking and action (Gredler, 1992).

An analysis of the SDIE experience as a cost-effective approximation of a transdisciplinary setting thus permits a reflection of the limits of transdisciplinarity as well as the means to address them in a teaching context. Section 2 of this article is devoted to the conceptual argument. Section 3 provides an overview of the SDIE. Section 4 discusses key aspects of the SDIE, especially its implications for objectivity, transparency, deliberation, and understandings of sustainability. Section 5 concludes the article by reconsidering the SDIE from the perspective of moving beyond soft transdisciplinarity.

2. Varieties and limits of transdisciplinarity

Transdisciplinarity has obtained a prominent place among responses to widespread demands for transforming knowledge production, especially in the context of complex problems related to human–environment relations (Lawrence & Després, 2004). As Maasen et al. (2006) noted in their introduction to a recent special issue, previous research on transdisciplinarity has frequently focused on programmatic, epistemological and conceptual questions. Although much work has since produced insights into the practice of transdisciplinary research, defining transdisciplinarity in relation to other forms of knowledge production remains a prominent subject.

Several reasons account for the continued interest in differentiating forms of knowledge production. If traditional, disciplinary-based research is no longer considered adequate to grapple with problems such as climate change, health, or poverty, it is necessary to define and outline cross-disciplinary or supradisciplinary alternatives for bridging the "applicability gap" (Lawrence & Després, 2004, p. 398). A second reason relates to the promotion of such alternatives, including by various types of funding agencies needing criteria for identifying and evaluating proposals (e.g. Mobjörk, 2010). A third reason concerns the pedagogical consequences, as new forms of knowledge production require new sets of skills (Klein, 2008a).