Transdisciplinary learning for institutional transformation: who to learn with, what to learn about and how to learn

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Abstract

A transdisciplinary approach to research provides a mechanism for addressing social-ecological complexity and fragmentation of knowledge, acknowledging local contexts and incorporating multi-stakeholder perspectives and values, and making science interactive by learning and co-producing knowledge with these stakeholders. In essence, transdisciplinary research in support of development and transformation is a process of social learning with concurrent grounding in practice and science. It represents a substantial departure from mono-, multi- and even inter-disciplinary modes of research because it asks something more from its participants, including researchers, managers and policy makers. Moreover, prospective researchers may not intuitively know how to prepare themselves to participate in, or facilitate, transdisciplinary learning. Acknowledging the likely complex nature of transdisciplinary learning, it would be futile to compile or follow an "implementation manual". An alternative would be to use a set of principles as heuristics for navigating through knowledge dynamics across a transdisciplinary landscape.

In this paper we present such a set of principles, drawing on our collective experiences from involvement in several real-life initiatives (previous and on-going) as well as a broad spectrum of literature. Practical grounding of the principles is provided by one of these programs; a freshwater conservation initiative that has matured from basic method development to having remarkable influence on relevant national policy and local management strategies alike. This initiative was inherently transdisciplinary in nature, partly by design and partly by accident.

Our principles are arranged along three questions, namely (a) who to learn with; (b) what to learn about; and (c) how to learn. The scope of who to learn with is determined by mapping out a scale-dependent transdisciplinary knowledge hierarchy covering empirical, pragmatic, normative and purposive levels. We should strive to achieve vertical and horizontal knowledge integration across identified domains (scientific disciplines, resource users and planners, policy makers and stakeholders) that make up the transdisciplinary knowledge hierarchy. Regarding what to learn about, we should firstly strive to engage each other’s prior knowledge. Accordingly it is important to learn about the respective vocabularies, cultures, realities and expectations that exist in the social-ecological system of interest. We should also strive to achieve some overlap in understanding of relevant histories, possible futures and key concepts.

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such as complexity, stewardship, ecosystem services and scale. Principles that guide us in how to learn with others include the need for face-to-face time, mutual respect and humility, purposefully converting knowledge between tacit and explicit forms, and committing to empathetic listening and selective unlearning.

In conclusion, transdisciplinary learning is not necessarily efficient learning and may require skilled facilitation and the use of knowledge intermediaries. Researchers may have to sacrifice certain outcomes in order to gain others, which may not align well with their rewards systems. While systems transformations may depend on how well we can design and maintain inclusive learning processes, the transdisciplinary mode of research may have far-reaching implications for scientists, both in terms of operating culture and career development trajectories.

**Keywords:** Adaptive governance, Conservation, Innovation, Shared learning, Transdisciplinary