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Transdisciplinary Working for Environmental Research: Case of an R&D Performing Organisation from Latvia

Inese Suija-Markova
Institute for Environmental Solutions, Latvia, inese.suija@videsinstituts.lv

Abstract

Current environmental problems are complex and require the fusion of expertise from a diversity of backgrounds and sectors. The aim of this research was to assess which of the principles of transdisciplinarity proposed by the researchers of the Canadian AGE-WELL Network of Centres of Excellence are practiced in environmental and natural resource related problem solving projects carried out by a Latvia-based R&D performing organisation.
Keywords: transdisciplinarity, innovation, R&D, environmental research

Introduction

Current environmental problems are too complex to be solved with routine or conventional efforts, and creating effective solutions requires many skills, integration of different disciplinary, experiential and professional perspectives, and collaboration among multiple stakeholders. The fusion of expertise from a diversity of backgrounds and sectors is required, not just to create new ideas, but to imagine innovative, non-existent solutions. Transdisciplinarity is often suggested as an appropriate form of collaboration for tackling complex real-world problems (Lang, et al. 2011). In 2016, the researchers of the Canadian AGE-WELL Network of Centres of Excellence published a paper in which they proposed a set of principles that facilitate transdisciplinary collaboration in the context of developing assistive technologies. According to the authors, the proposed principles are applicable across disciplines and sectors and are flexible to suit different design contexts (Boger, et.al., 2016). The aim of this study is to identify which of the principles of transdisciplinary collaboration given by the AGE-WELL researchers are practiced in environmental research by an R&D performing enterprise in Latvia.

Methodology of Research

This study is based on two in-depth interviews with the founder and the leading researchers of a small, Latvia-based environmental R&D performing organisation, carried out in February 2017. The organisation was established in 2008, and currently employs 22 young and well-established specialists of various backgrounds. The organisation carries out own initiated as well as commissioned research and development activities in the fields of lake water management, biodiversity assessment, forest management, wild animal ecology, habitat modelling, and others.

Findings/Results

In their seminal paper, Jahn, T. et al. define 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;

integration is the cognitive operation of establishing a novel, hitherto non-existent connection between the distinct epistemic, social–organizational, and communicative entities that make up the given problem context" (Jahn, T., et al., 2012). Boger, J. et al. (2016) have grouped the principles of transdisciplinary collaboration into four main domains: complexity and holism, relationships, communication and transformation which overlap with many of the elements listed in the definition of transdisciplinarity given above. These principles are presented and applied to the practise of the studied environmental R&D performing enterprise.

Table 1. The application of the principles of transdisciplinary collaboration by the studied R&D organisation

Domain proposed by Boger, J, et.al.	**Principles of transdisciplinary working proposed by Boger, J, et.al.**	**Principles used by the studied environmental R&D organisation**
Complexity and holism	- Address wicked, needs-driven, real world problems. - Have an attentiveness and appreciation of complexity. - Cross ideational borders. - Have a common understanding of problems. - Share goal creation.	- The environmental problems to be researched and solved are not invented; instead, identified through participatory process involving in-house as well as external field practitioners and researchers. - Environmental solutions proposed are customised taking into consideration specifics of the problem locality. - Biologists, remote sensing scientists and engineers jointly attend nature objects to raise understanding of the basic concept of each other's native areas of interest. - The problems are investigated and goals set as a team.
Relationships	- Engage in ongoing inter-sectoral and technology-user involvement. - Challenge accepted ways of researching and working. - Foster trust and respect. - Maintain high-levels of tolerance, commitment, and resilience.	- Continuous end user involvement is ensured in the development and testing of the proposed environmental solutions. - Co-creation and citizen science approach is used in some projects. - Strong focus is placed on face-to-face communication to strengthen mutual trust and foster openness and participation of young researchers is encouraged.
Communication	- Engage in clear, transparent and ongoing communication. - Agree on shared vocabulary. - Use frameworks and methodologies as appropriate.	- Information transparency ensured through online project management systems; - Team members are educating each other on acceptable terminologies, and, in some cases, create, new terms and phrases. - The developed prototypes and approaches are evaluated in real-world environments involving main stakeholders.
Transformation	- Critically identify and challenge assumptions, at both personal and project level. - Achieve outcomes that have a transformative, real-world impact. - Push beyond common grounds to establish a deeper level of understanding. - Practice accessible knowledge translation. - Maximize impact.	- The assumptions are challenged by involving end users, external experts and practitioners in the project design and implementation phases; before carrying out large-scale experiments, pilot-studies are used. - In some projects the taken nature conservation activities have led to substantially improved environmental conditions. - The application of advanced remote sensing technology for deeper understanding of environmental

		processes, thus revealing previously unknown areas of research. - Involvement of artists to challenge the perspectives of researchers. - The transdisciplinary nature of the project is conveyed through joint articles, presentations at various events. - Sharing of knowledge with public through websites, educational sessions, social networks. - The organisation is considered as advancer of use of modern technology (satellites, airborne remote sensing, drones, digital solutions etc.) in ecological studies and nature management.

Conclusions

Transdisciplinary approach is needed to solve complex environmental problems such as loss of biodiversity, habitat degradation, water and air pollution, etc. The case-study demonstrated that the principles of transdisciplinary collaboration for developing assistive technologies are also used in environmental research and development processes. However, more and deeper studies are needed to test, refine and validate the principles of transdisciplinary working.

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