

# Sustainability Science: Transdisciplinarity, Transepistemology, and Action Research

## Introduction to the Special Issue

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## **1 Transdisciplinarity and Action Research**

Since 2001, the international „Global Change Research Community“ has propagated sustainability science as an inter- and transdisciplinary approach to the assignment of tasks related to sustainable development (Kates et al., 2001). It has afforded a new perspective on man-environment research and demands the inclusion of various branches of psychology, including environmental, health, community and architectural psychology besides many other applied research disciplines. It furthermore attempts to combine psychological knowledge with other knowledge fields (e.g. natural sciences, humanities, engineering and design research). In addition to the exchange between the disciplines, the cooperation with practitioners is essential to attain real-world social changes towards sustainable development.

With this special issue, we wanted to concentrate on central aspects of Sustainability Science: transdisciplinarity and action research. We assumed from the beginning that transdisciplinarity and action research be-

long together. During the production of our manuscripts and the reviewing process, it became apparent that varying understandings of transdisciplinarity exist among different research cultures. With this contribution, we offer a new concept we call “transepistemic” in order to overcome this confusion and hope that transdisciplinary and transepistemic action-oriented research can help to support sustainable development.

Our intention is to provide a forum for German-English exchange about theoretical concepts and methodological challenges of transdisciplinarity. We received many diverse manuscripts, but had limited space in this issue. Thus, we want to thank all contributing scientists, including those whose papers we were unable to accept for publication. It was a very fruitful exchange between German and English speaking scientists from different cultures and backgrounds: thank you all – including the reviewers – for your valuable insights and support!

## 2 Sustainable development

Sustainable development refers to the preservation or restoration of the ecosystem. The primary objective is the avoidance of the overexploitation and destruction of this system, so that the so-called ecological services remain available for future generations. It is also necessary to distribute existing services in an equitable manner, in order to avoid a too great use-disparity, which leads to social strain, conflict and unrest. The application of the principles of equity and justice, as well as socially oriented forms of use, allow for harmonious interaction between humans and nature, contributing to a systemic balance between resource use and the fulfilment of needs (WCED, 1987).

Sustainable development is about combining both the sustaining of human life and the development of a good life for all inhabitants of the planet. Sometimes it is only referred to as sustainability and, in this context, is often wrongly used to mean durable and, in the worst case, stable. Development implies the further development of living conditions and we are in a permanently changing process. Our efforts in sustainable development aim at making life better and, at the same time, upholding our ability to use the limited resources provided to us by our environment. Sustainable development is defined in various ways and the economic model even provides a “weak sustainability”, where ecology can be replaced by social and economic means (Martens & Schilder, 2011). Our approach is to concentrate on the value of “deep ecology”, which recognizes the inherent worth of all living beings, the interdependence of organisms within ecosystems and among ecosystems within the biosphere, and our responsibility to share sustainable ecosystems with members of the current and future generations.

## 3 Sustainability Science

Scholars of Sustainability Science feel themselves responsible to support sustainable development. They are prepared for cross-disciplinary efforts, knowing that no single discipline is specialised in solving the complex challenges we are facing in the globalised world: overuse and depletion of the planet's resource reserves and an obviously unfair and conflicting benefit distribution of use. Sustainability Science applies different methods and approaches for research, all fitting to the basic paradigm of systems theory. The target of all the research are societal changes towards a more sustainable global development. inter- and transdisciplinarity

is one basic agreement among sustainability scientists, although the terms seem not yet clearly defined or at least there lacks consensus on the definitions.

#### 4 Transdisciplinarity and Transepistemology

Transdisciplinarity can be seen in the tradition of cross-disciplinary research approaches, using methods and theories from more than one discipline and overcoming the artificially developed disciplinary borders.

Cross-disciplinary research can be seen, according to Rosenfield (1992), as a taxonomy ranging from multidisciplinary (the weakest form), interdisciplinary, and transdisciplinary (the strongest form), based on the extent to which *researchers* from different *scientific* disciplines work together on a shared conceptual framework (Christens & Perkins, 2008). Or as Després, Brais and Avellan (2004) argue, the difference between interdisciplinary and transdisciplinary contributions stems from the Latin prefix ‘trans’, which denotes transgressing the boundaries defined by traditional disciplinary modes of inquiry (Lawrence, in press).

Lawrence (in press) argues that since the 1970s, transdisciplinarity has not been restricted to scientific research, because it has been used in debates about teaching and professional practice (Sommerville & Rapport, 2000). In transdisciplinary research, the focus is on the organisation of knowledge around complex heterogeneous domains rather than around disciplines (Bruce, Lyall, Tait & Williams, 2004 in Lawrence, in press). Lawrence (2004) compares interdisciplinary approaches to a mixing of disciplines, whereas transdisciplinary ones would have more to do with a fusion of disciplinary

and other kinds or sources of knowledge. “This implies the giving up of sovereignty over knowledge” (Lawrence, in press), the willingness to share and understand concepts of other disciplines, theories, and methods, to allow the generation of new insights and knowledge types by this kind of collaboration between professionals and lay people. Therefore, transdisciplinary research transcends the disciplinary borders and also the borders of science and practice, of scientific and practical knowledge and of scientific findings and societal changes.

Stokols (2006) distinguishes between collaborative and non-collaborative transdisciplinary research, where the second allows individuals to transcend the borders of disciplines by integrating them in their own person. Manfred Max Neef (1996) sees it in the same way. There may be some very capable persons, but how could they include all disciplinary knowledge needed? Max-Neef further defines weak vs. strong transdisciplinarity analogously to the distinction, respectively, between interactional and transactional world views (Altman & Rogoff, 1987). „Strong transdisciplinarity,“ like the transactional world view, looks beyond the simple interaction of discrete organisms and environments and sees the wholeness and complexity of ecosystems that cannot be separated into isolated pieces for study, but must be understood as holistic entities and dynamic systems.

As “transdisciplinary” has thus been defined differently by different scholars and groups, we propose the new term and concept of “transepistemic” (adjective) or “transepistemology” (noun) to imply cooperation between different personal knowledge systems, also called co-production of knowledge, and views the entire society ultimately as a “producer” of our shared and socially

constructed understanding of the world. In this sense, cross-disciplinary collaboration cannot be seen as independent from society. Working with other disciplines on a real-world problem (which virtually all inter- and transdisciplinary work does) brings the need of cooperation with all relevant stakeholders as a central challenge of inter- and transdisciplinary work (see also M $\ddot{u}$ nger & Riemer, this issue).

## 5 Action Research

Action Research is combining research with actions, overcoming the separation between scientific knowledge production and societal actions for change (Reason & Bradbury, 2006). This research works via action-reflection-cycles to make research outcomes translated, to be used for societal changes and joint actions that produce knowledge for society and is valuable for scientists to further develop their theories and research methods that can be brought to the action-reflection-cycle again. Kurt Lewin is often named as the inventor of action research, building on a positivistic, so called “Northern Tradition” of action research and Paulo Friere is named as the main proponent of the so-called “Southern Tradition”, which focuses on the empowerment of involved parties (Wallerstein & Duran 2003). This separation no longer exists, as the action research of Kurt Lewin changed over time and overcame the earlier separation from other, softer methods of science (see also 4. Transdisciplinarity and Transepistemology, above). In Sustainability Science, to achieve desired transformations, it is important to integrate different action research methods and approaches (see e.g. Wiek, Ness, Schweizer-Ries, Brand & Farioli, 2012).

## 6 What can be found in this volume

Finally, the accepted contributions show a good mixture of psychological research and reflections on how psychology can contribute to this transdisciplinary and action-oriented process of social change in the field of sustainability science, where psychology, and especially environmental psychology, can provide important input.

There are three more “classical” contributions in demonstrating the psychological investigations of societal processes that are going on in the fields of ground water (Heinen & Hunneke), management of parking spaces (Harms & Bruppacher) and acceptance of dam constructions (Lima & Moreira). All of them give us an insight into how psychological concepts and work can be used to investigate reality and encourage a societal change process to more environmentally friendly and sustainable behaviour patterns on the individual and community levels. Three articles are concerned with the question of how psychological knowledge can be managed (Hunneke & Heinen), how collaboration processes can be supported for transdisciplinary or even transepistemic work (M $\ddot{u}$ nger & Riemer), and how psychology could be better integrated into sustainability science (Riemer & Schweizer-Ries), allowing for greater clarity and openness of dialogue among the different disciplines and other stakeholders.

Altogether, this volume is meant to demonstrate how psychological research is already contributing to environmental issues and sustainability science and how this can improve in the future. We think this provides a rich variety and basis for discussion and look forward to the dialogues that we hope will

# Schwerpunktthema

result and change  
our world from  
an unsustainable status quo to a more sus-  
tainable future.

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