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Swiss National Centre of Competence in Research North-South

transdisciplinarity-net
Schwarztorstrasse 9 | 3007 Bern | Schweiz
Fon +41 31 310 40 94 | Fax 41 31 312 16 78
tdnet@scnat.de | www.transdisciplinarity.ch

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Christian Pohl, Gertrude Hirsch Hadorn
Translated by Anne B. Zimmermann

Principles for Designing Transdisciplinary Research

Proposed by the Swiss Academies of Arts and Sciences

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The Principles in Brief

Transdisciplinary Research (TR)

There is a need for TR when knowledge about a societally relevant problem field is uncertain, when the concrete nature of problems is disputed, and when there is a great deal at stake for those concerned by problems and involved in dealing with them. TR deals with problem fields in such a way that it can:

a) grasp the complexity of problems,
b) take into account the diversity of life-world and scientific perceptions of problems,
c) link abstract and case-specific knowledge, and
d) develop knowledge and practices that promote what is perceived to be the common good.

The transdisciplinary research process

The transdisciplinary research process consists of three phases:

1. Problem identification and structuring
2. Problem analysis
3. Bringing results to fruition

The importance of each of the three phases must be taken into account when allocating time, finances and personnel. TR does not necessarily progress through the phases in the order mentioned above. For example, identifying and structuring problems can lead to the insight that no further research is necessary because enough knowledge is available to develop suggestions for feasible solutions. In other cases, problem analysis and bringing results to fruition may lead to the conclusion that problem identification or structuring needs to be revised and adapted.

At the stage of analysing a problem field, trying to meet all of the four requirements of TR – which are: (a) to come to terms with complexity, (b) to take into account diversity, (c) to develop case-specific and practice-oriented knowledge that can be transferred and (d) oriented towards what is perceived to be the common good – is risky, as this might overload the project with prerequisites, as if it were supposed to become the proverbial "all things to all people". To avoid such overburdening of projects, it is important to take into account the following four principles when shaping the research process.

1st principle: Reduce complexity by specifying the need for knowledge and identifying those involved

When trying to come to terms with the complexity of problems, it is crucial to consider only those relations relevant to practice-oriented problem-solving. TR

deals with empirical questions (systems knowledge); it also aims to ascertain and explain better practices (target knowledge) and reflect on the practicability of goals and feasibility of proposed solutions to problems (transformation knowledge) (see Table 1, p. 36). With this in mind, two means of adequately reducing complexity are to specify the particular need for knowledge and identify the people involved. Specifying the need for knowledge implies discerning what research questions need to be addressed by a project and determining the corresponding conditions. To this end, it is necessary to find out what kind of systems perception underlies a project, what normative targets it has set itself, and what potential societal transformations it aims at (see Tool 2, p. 40). Identifying the people involved implies coordinating the tasks of societal actors and disciplines in relation to the four requirements that need to be fulfilled (a–d, see above), e.g. by determining which actors and disciplines need to be involved and in what manner, with a view to taking into account the diversity of relevant perspectives (see Tool 1, p. 30).

The principle of specification is important in all three phases of TR, but it is particularly significant when identifying and structuring problem fields.

2nd principle: Achieve effectiveness through contextualisation

TR aims to develop knowledge that helps solve "life-world" (or everyday-life) problems concretely. Knowledge in this context comprises empirical knowledge, as well as knowledge that enables people to shape practice-oriented opinions and creative skills that open up possibilities for action in specific life-worlds. Research must therefore pay particular attention to the impact-related contextualisation of a project. One way of achieving this is to elaborate an impact model at the stage of problem identification and structuring that shows the social impacts projects may have when bringing results to fruition. Projects must therefore assess the state of knowledge not only in relation to the research questions identified, but also with regard to concrete societal practices and issues in the life-world (existing technologies, regulations, practices, power relations and potential for change). In order to make research results accessible to those concerned, it is essential to reformulate them: Scientific insights must be summarised and assessed for specific target groups; they must be translated creatively into products useful to these groups; and it is necessary to reflect on how these products will fit target groups' current practices and agendas (see Tool 4, p. 65).

But the effectiveness of TR relies just as much on its being embedded in the scientific context. This can be achieved by linking current efforts to the state of the art in the relevant disciplines, by learning from transdisciplinary work on similar problems (even in other thematic realms), and by systematising and publishing experiences garnered in a project (see Tool 5, p. 67).

While the principle of contextualisation is relevant to all three phases of TR, it is particularly significant when problems are identified and structured, and when results are brought to fruition.

3rd principle: Achieve integration through open encounters

The most important principle for successful collaboration between disciplines and with various social groups is to be open to encounters. This implies perceiving one's own perspective as only one among several others, and accepting other views as potentially just as relevant as one's own. Only thus can constructive discussions about the potential of the various perspectives to contribute to the common undertaking take place and be further developed.

Collaboration can take various forms (common learning as a group, negotiations among experts, integration through the project leader), and be based on different modes of integration ("boundary objects", glossary, everyday language, models, transfer of concepts, mutual adaptation of concepts, developing bridge concepts) (see Tool 3, p. 59). Depending on the form of collaboration and mode of integration, the intensity of reflection about one's own and other actors' perspectives can vary. Moreover, every form of integration structures the relation between the perspectives involved in a specific way. This is why it is important to determine the mode and concrete process of integration in a common and open procedure, in order to ensure that it is adapted to problem structuring and questions that have been defined above.

The principle of open encounters is relevant to all three phases of TR.

4th principle: Develop reflexivity through recursiveness

Fulfilment of the requirement that TR must, in the phase of problem analysis, (a) encompass the complexity of a problem field, (b) take into account diversity, (c) develop knowledge that is both relevant to specific cases as well as transferable, and (d) develop practice-oriented solutions for what is perceived to be the common good, often seems to be possible only to a limited degree. This can jeopardise the quality of results and stall TR. One means of preventing this is to shape the research process recursively (or iteratively). Recursiveness (or iteration) implies foreseeing that project steps may be repeated several times in case of

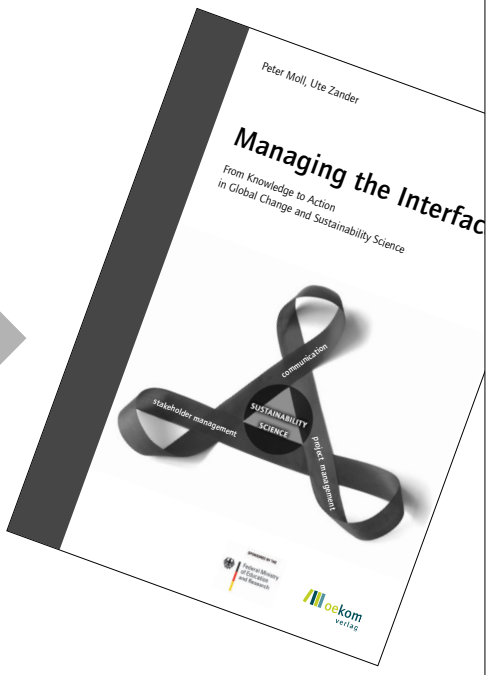
need. The possible limitation or uncertainty of a preliminary result thus becomes a means of targeted learning. Recursiveness is important in all three phases of the research process. With regard to bringing results to fruition, this implies introducing recursiveness not just at the end but already in the course of the research process, so that recursive adaptations are possible. Every effort in the phase of bringing results to fruition becomes a "real-world experiment" that must be observed and from which something may perhaps be learned for problem identification and structuring, for problem analysis, or for the next time results are brought to fruition. Reflexivity thus means to correct assumptions on which the production of knowledge is based, in case the real-world experiment reveals that these assumptions need to be corrected.

The principle of recursiveness is relevant to all three phases of TR.

When planning a project, it is necessary to decide how the four TR principles need to be implemented. Tools 1–5 are designed to help make this choice: they summarise the aspects that need to be taken into account and show very different ways of shaping TR.

Sustainability

A–Z



K for Knowledge and Action

In times of global change and a dramatic loss of sustainability from local to global scales, science has to shoulder ever greater responsibilities. So the question of how to move from knowledge to action becomes more and more crucial. Peter Moll and Ute Zander look at the design of the interface between theory and praxis.
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P. Moll, U. Zander
Managing the Interface
From Knowledge to Action in Global Change and Sustainability Science
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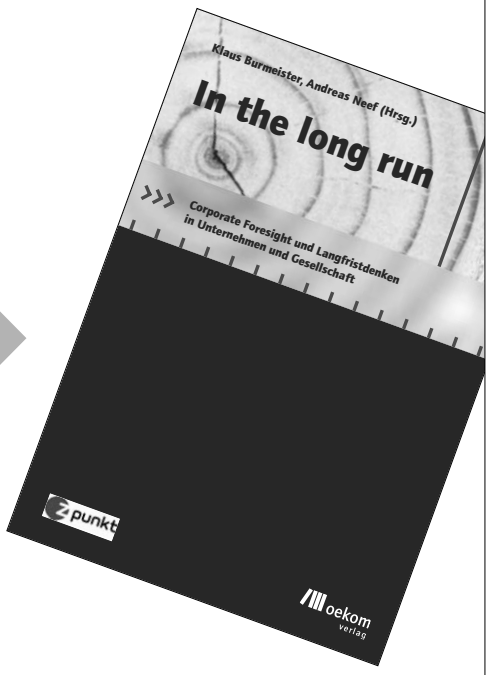

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Corporate Foresight and long-term Thinking in Business and Society
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Sustainability

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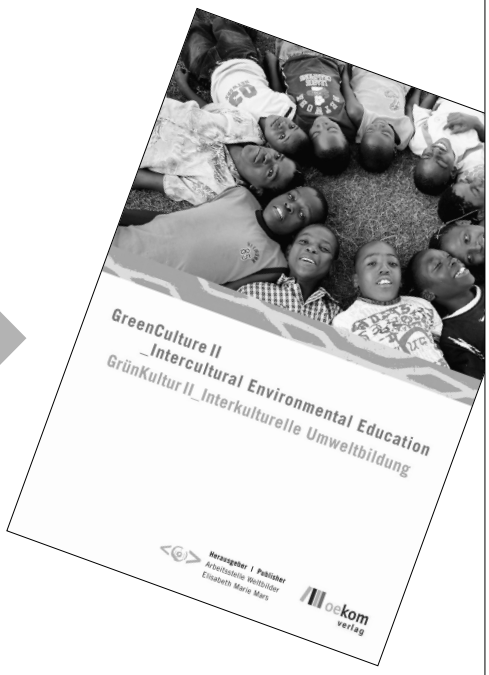

I as in Intercultural

Green Culture is an intercultural environmental education project with people from North Rhine-Westphalia and the province Mpumalanga in South Africa.

The recent book "GreenCulture_Intercultural Environmental Education" presents the experiences of Southafrican women and men involved in a project about environmental education and cultural learning. The people talk about the results of their common work, the gardening activities, artistic actions and discussions.

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