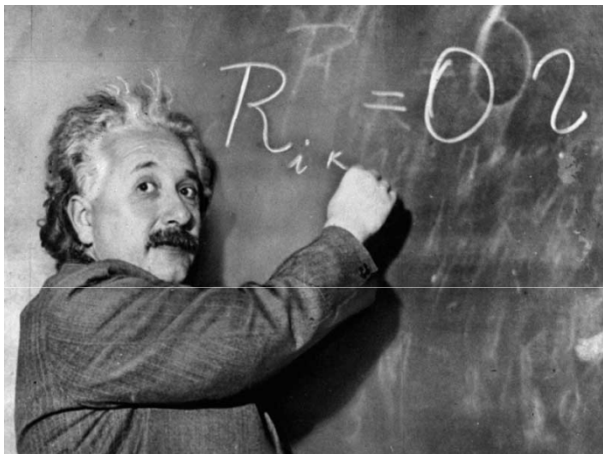




**LEUPHANA**  
UNIVERSITÄT LÜNEBURG



## ***Tilling the fields of knowledge in sustainability-oriented science***

**Challenges of transdisciplinary knowledge integration against the backdrop of common scientific practice and prevailing scholarly skills of post graduate researchers**

*CONVERGE Conference in Prague, 23 May 2013*

***Maik Adomßent***



## Modes of knowledge production in transdisciplinary sustainability research

<b>Science type:</b>	traditional ideal of science	formative and evaluation research	problem and solution oriented research
<b>Position of observant:</b>	non-participating observant	participating observant	observing participant
<b>Construction of reality:</b>	independent from observant	varies according to understanding of science -	observable world is dependent on observant

Source: Jahn (2001)



## Confrontation of characteristics

---

- In **disciplinary basic research**, problems are perceived through the perspective of a certain discipline.
  - *“Problems” and their “solution”* refer to explanation and empirical registration of processes, which are structured by the conceptual instruments of that discipline.
- In the realm of **applied mission oriented research**, problems are structured by the perspective of relevant actors.
  - *“Problems” and their “solution”* refer to the effective and efficient advancement of procedures of these (selected) actors, with recourse to situation-specific adjustments of knowledge from different disciplines.
- In contrast, the initial point of **transdisciplinary research** can be described as a certain problem, which – if it could – would be the ‘client’. The question which actors and which disciplines should be included, cannot be answered before a thorough analysis of the problem. Of course, the problem does not speak for itself, but always can be related to the perspectives of certain actors and disciplines.
  - From this point of view, *“problems” and their “solution”* are primarily related to the demand for the enhancement of problems for grounds of common welfare.



## Core elements of knowledge production within research for sustainability

---

- **Problem orientation:** Translation of existing societal problems into ensembles of scientific problems.
  - **Actor orientation:** consideration of actors' constellations and their possible ways of action // proactive design of problem horizons instead of repairing of damages
  - **Problems of integration** form the focus of interest.
  - **Self-reflexivity:** Making substantial normative premises and interests transparent // Reflexion of knowledge boundaries / limits.
- ➔ **transdisciplinary, participative model / understanding of science**

*Source: Jahn (2001)*

Everyday Knowledge	Science Knowledge
is used for orientation in the world	is used to understand and explain the world
knowledge is not derived systematically or test-based	is systematically derived and verified through research and experimentation
immediacy of everyday practice	systematic distance to every day practice
avoidance of doubt	systematization of doubt
assurance of what is known	doubt in the known
avoidance of alternatives	detection and search for alternatives
experience-near language	language distant from experience
findings revealed in the subjective and/or collective consciousness and especially communicated verbally	findings predominantly communicated in writing

Source: Adomßent (2013: 19), adapted from Hierdeis/Hug (1997); Matthiesen (2005); Stehr (2006)



## Quality criteria in science

---

### Necessary, ...

- **Objectivity:** the extent to which a test result cannot be influenced by the principal investigator with regard to implementation, evaluation and interpretation; or if several/many researchers are producing matching results.
- **Reliability:** an investigation / a measurement method is described as reliable if a repetition of the measurement under the same conditions and at the same objects comes to the same conclusion.
- **Validity:** quality criterion that indicates the degree of accuracy with which a test records what it's supposed to record (e.g., personality traits or behaviors).

### ...but no longer sufficient conditions in order to guarantee validity of knowledge.

- **Accountability of research:** more than ever science has to take its own implications and limitations more into account.
- **Responsibilisation** of researches: social control through (self-) control and (self-) ascription of responsibility

*cf. Power (1997) and Jasanoff (2006)*



## Example: Co-producing a set of indicators on ESD ...

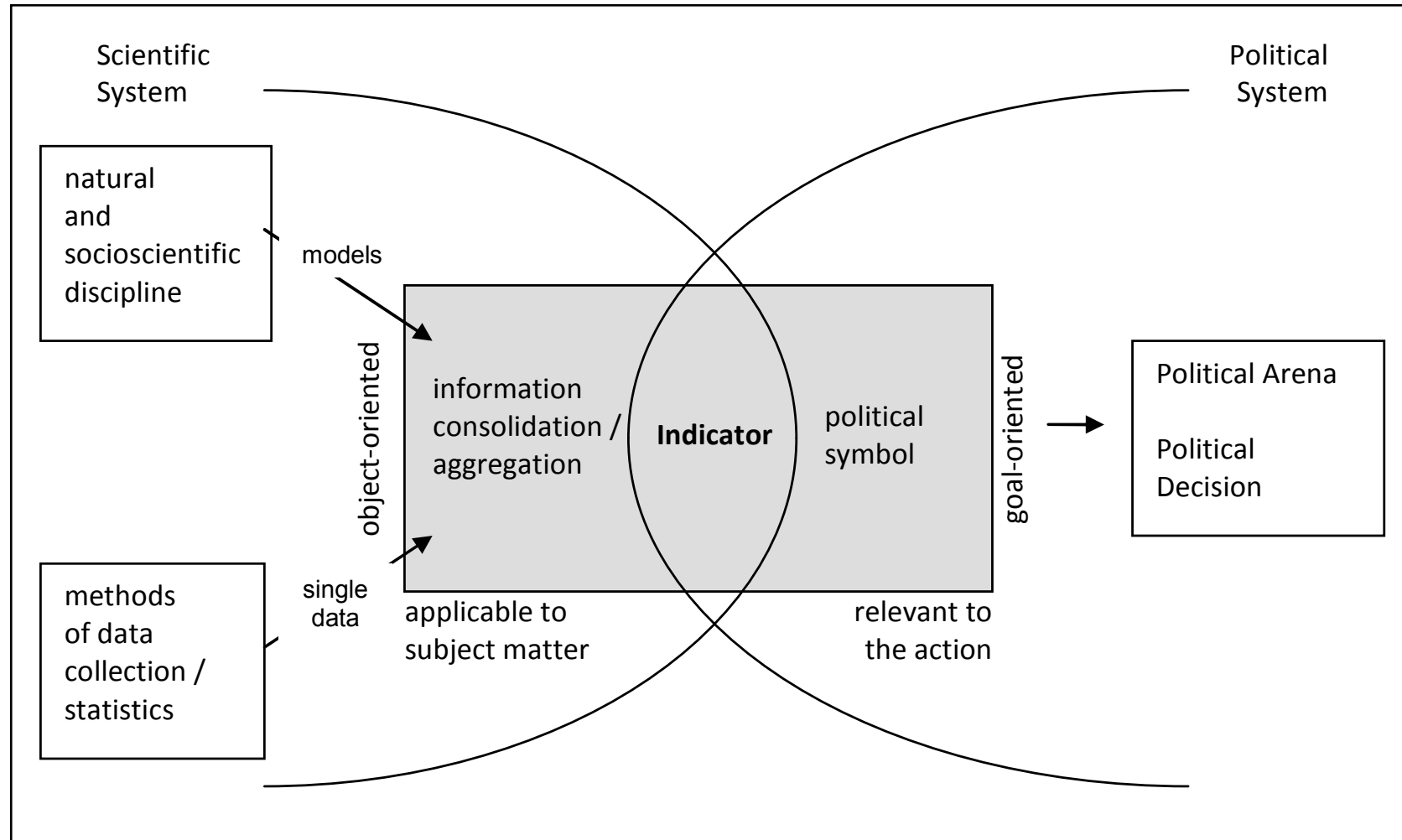
---

- ... that is potentially **suitable** for national educational reporting
  - Federal Report on ESD (since 2002, up to now not indicator-based)
  
- ... set of ESD indicator that is **acceptable**
  - indicator set aims to be *manageable* and *meaningful, relevant, functional* as well as *applicable*
  - Acceptance and credibility as prerequisites for implementation
  
- ...deepened understanding of **knowledge transfer** that is related to processes of development and application of indicators
  - What expectations do different groups of actors have with regard to development and application of indicators?
  - What resonance do indicators bring about in different groups of actors?
  - How is indicator-based information interpreted?

Source: Di Gulio et al. (2012)



## (Sustainability) indicators: boundary objects between science and politics

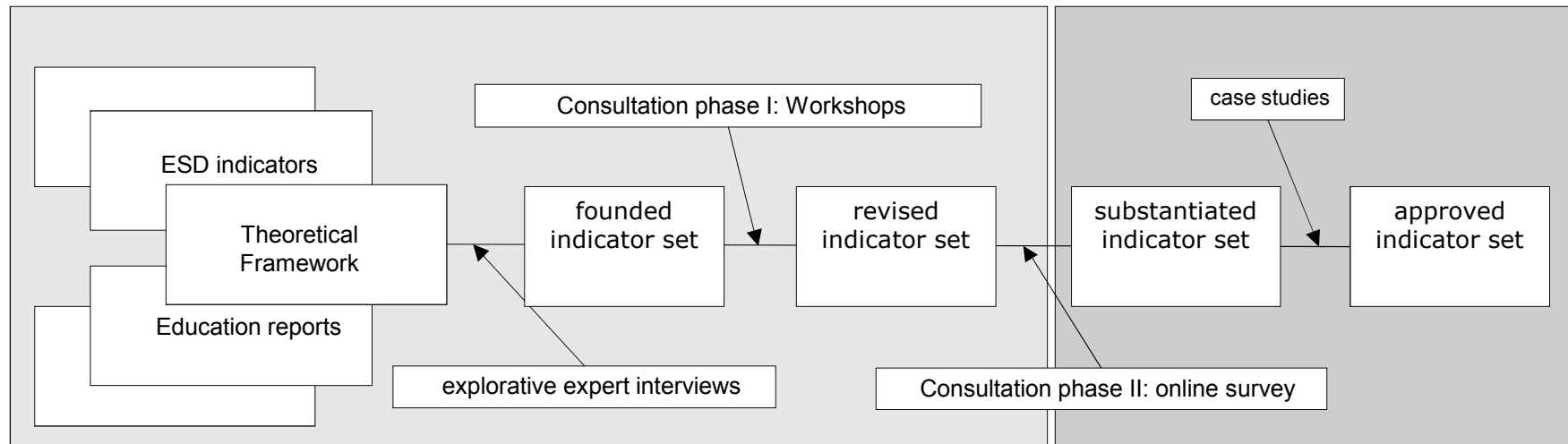


Adomßent (2013: 19), adapted from Zieschank (2003)





## Project schedule



Identification of transfer-worthy results, their processing & preparation for further dissemination

Perception and embedding in reception field

Implementation & anchoring

During project:

➔ overlap of subject matters and concerns in different phases of transfer

## Consolidation process during the project

Personnel and resources for: environmental research, social-ecological research, peace and conflict research, cooperation with developing and emerging countries			
Inter-ministerial cooperation		Inter-ministerial cooperation	
Federal state action plans	Strategy at federal state level	Strategy and action plans at national level	Political will to implement education for sustainable development
		Presence of ESD in political discourse	

## Consolidation process during the project

Funding volume from foundations			
Training and development in ministries			
Number of research institutions involved with ESD	Research and education cooperation		
Funding volume in the funding catalogue of German federal ministries for ESD research	Research funding with federal funds; federal state funds; foundations (DBU/DFG/W)	State-funded research and development in ESD at federal level	Research and development in education for sustainable development



## Research levels ...

---

- On the **analytical level**, interrelated fields of problems are reconstructed, their embeddedness in society and nature is analysed, and influencing factors and development dynamics are examined and the impacts of different options for action are estimated.
- On the **normative level**, the point is to clarify the goals of sustainable development, to reconstruct the societal sustainability discourse and to contribute to its advancement.
- On the **operational level**, research for sustainability deals with the examination of practical terms and conditions for operational activities, the elaboration of strategies for sustainable development according to the analysed conditions and their societal implementation.

*cf. Nölting et al. (2004)*



## ... and related knowledge dimensions

---

The challenges arising from the need for fundamental societal transformations do not only concern knowledge; they also involve value conflicts.

- To solve such problems **system knowledge** of the processes which led to the problem and which could negatively affect future developments is necessary.
- At the same time, **target and orientation knowledge** is required which allows actors to decide which goals and purposes can be justified.
- Finally, **shaping or transformation knowledge** is needed in order to be able to change framework conditions in a way that leads to the goals desired.



cf. NN (2012)



## Questions for (self-)evaluation (1)

### Handling the demands of normativity

---

- Which values and objectives do the actors in the analysed field of action have? How are they analysed empirically?
- How does the project relate to sustainable development? To which goals and normative orientations is it connected?
- Which role does the project take within the societal discourse on the concept of sustainable development?

*cf. Nölting et al. (2004)*



## Questions for (self-)evaluation (2)

---

### Handling the demands of integration

- Which interrelations that are suppressed by disciplinary science does the project focus on? Which conceptions does it use?
- Which assets and forms of knowledge (like theories, analyses, experiences) does the project integrate? With which concepts?
- What social differences are bridged within the research process? By what methods?
- How are the subtasks coordinated and the results brought together? How does the project find a balance between focusing single aspects and keeping an eye on the project as a whole?

*cf. Nölting et al. (2004)*



## Questions for (self-)evaluation (3)

---

### Handling the demands of participation

- What functions do the actors of practice have for the research process? Which role do they play within the project?
- By which criteria are actors of practice selected? By which means are they integrated into the project procedures?
- How are the actors' perspectives included into the project results? Can they be linked to their daily routines?
- Which interrelationships of interests of power can be bound in the field of practice and how does the project deal with them?

*cf. Nölting et al. (2004)*



## Characteristics of a Community-of-Interest in contrast with those of a Community-of-Practice (after Fischer & Ostwald, 2005)

Characteristic	Community-of-Practice	Community-of-Interest
<b>Nature of problems</b>	Different tasks in the same domain	Common task across multiple domains
<b>Members</b>	From the same domain (novices and experts)	From different domains (stakeholders)
<b>Knowledge development</b>	Exchange of knowledge within the practice; refinement of domainspecific knowledge system	Exchange of knowledge between domains; integration of multiple knowledge systems
<b>Learning</b>	Growing from novice to expert	Reaching shared understanding
<b>Major objective</b>	Growth in domain-specific knowledge	Resolving a complex problem
<b>Threat</b>	group think	No real communication
<b>Opportunity</b>	Fast progress due to shared background	Creative and robust solutions by making all voices heard



PD Dr. phil. habil. Maik Adomßent  
email: [adomssent@uni.leuphana.de](mailto:adomssent@uni.leuphana.de)  
phone: +49.4131.677 2924

Leuphana University of Lüneburg  
Institute for Environmental and Sustainability Communication  
Scharnhorststrasse 1  
D - 21335 Lüneburg  
Germany



## References

- Adomßent, M. (under review): Action research and its repercussions in transdisciplinary research for sustainable development – with particular emphasis on normativity and methodology. In: Action Research.
- Adomßent, M. (2013): Exploring universities' transformative potential for sustainability-bound learning in changing landscapes of knowledge communication. In: Journal of Cleaner Production 49: 11-24
- Adomßent, M. (2011): In search of the knowledge triangle for regional sustainable development: the role of universities. In: Barton, A. & Dlouhá, J. (Eds.): Multi-Actor Learning for Sustainable Regional Development in Europe: A Handbook of Best Practice. Guildford, S. 5-18
- Adomßent, M. (2008): Knowledge Production and Distribution of Higher Education Institutions in the Sway of Global Development Trends. In: Herwig, R. & Uhlig, J. & Küstner, J.. (Hrsg.): Wissen als Begleiter!? Das Individuum als Lebenslanger Lerner. Reihe 'diagonal denken' Bd. 4, Münster, 153-174.
- Adomßent, M., Godemann, J. (2011): Sustainability communication: an integrative approach, in: Godemann, J., Michelsen, G. (Eds.), Sustainability Communication: Interdisciplinary Perspectives and Theoretical Foundations. Dordrecht u.a., Springer, pp. 27-38.
- Adomßent, M. & Michelsen, G. (in press): Leuphana University Lüneburg and the sustainability challenge: a review and a preview. In: Franz-Balsen, A. & Kruse, L. (Eds.): Higher Education for Sustainable Development and Human Ecology. oekom.
- Beringer, A. & Adomßent, M. (2008): Sustainable university research and development: inspecting sustainability in higher education research. In: Environmental Education Research 14 (6), 607-623.
- Di Gulio, A. & Ruesch Schweizer, C. & Adomßent, M. & Blaser, M. & Bormann, I. & Burandt, S. & Fischbach, R. & Kaufmann-Hayoz, R. & Krikser, T. & Künzli David, C. & Michelsen, G. & Rammel, C. & Streissler, A. (2012): Education on the Path to Sustainability. Proposal of an indicator set to evaluate education for sustainable development. Publication Series of the Interdisciplinary Center for General Ecology (IKAÖ), Nr. 13, Berne. [http://www.ikaoe.unibe.ch/publikationen/PDF-Schriftenreihen/Schriftenreihe%2013%20%282012%29/Education\\_on\\_the\\_Path\\_to\\_Sustainability.pdf](http://www.ikaoe.unibe.ch/publikationen/PDF-Schriftenreihen/Schriftenreihe%2013%20%282012%29/Education_on_the_Path_to_Sustainability.pdf)
- Fischer, G. & Ostwald, J. (2005). Knowledge Communication In Design Communities. In R. Bromme, F. Hesse, & H. Spada (Eds.), Barriers and Biases in Computer-Mediated Knowledge Communication, Kluwer Academic, Dordrecht, Netherlands, pp 1-32
- Gibbons, M. (1999). Science's new social contract with society. Nature, 402, Supplement: C 81-84.
- Power, M. (1997). The Audit Society: Rituals of Verification. Oxford: Clarendon Press.
- Jasanoff, S., (Ed.) (2006): States of Knowledge. The co-production of science and social order. Milton Keynes.
- Jahn, Thomas (2008): Transdisciplinarity in the Practice of Research. In: Matthias Bergmann/Engelbert Schramm (Hg.) (2008): Transdisziplinäre Forschung. Integrative Forschungsprozesse verstehen und bewerten. Frankfurt/New York: Campus Verlag, 21–37 (English translation) <http://www.isoe.de/fileadmin/redaktion/Downloads/Transdisziplinaritaet/jahn-transdisciplinarity-2008.pdf>
- Matthiesen, U. (2005): KnowledgeScapes, Pleading for a knowledge turn in socio-spatial research. Working Paper, Erkner, Leibniz-Institute for Regional Development and Structural Planning. [www.irs-net.de/download/KnowledgeScapes.pdf](http://www.irs-net.de/download/KnowledgeScapes.pdf)
- Nölting, Benjamin / Voß, Jan-Peter / Hayn, Doris (2004): Sustainability Research – Beyond Discipline and Anything Goes. GAIA 13 (4): 254-261.
- Stehr, N. (2005): Knowledge Politics: Governing the Consequences of Science and Technology. Paradigm Publishers.
- NN (2012): Understanding – Evaluating – Shaping. Transdisciplinary Knowledge for a Sustainable Society Memorandum on the Development of Social-Ecological Research in Germany. [http://www.isoe.de/fileadmin/redaktion/Downloads/Soziale\\_Oekologie/soef-memorandum-2012-en.pdf](http://www.isoe.de/fileadmin/redaktion/Downloads/Soziale_Oekologie/soef-memorandum-2012-en.pdf)
- Zimmermann, F.M. & Mader, C. & Michelsen, G. & Adomßent, M. (2011). The European Higher Education for Sustainable Development Network – COPERNICUS Alliance – back on stage with Charta 2.0. In: Global University Network for Innovation (Ed.): Higher Education in the World 4. Higher Education's Commitment to Sustainability: from Understanding to Action. Madrid: Palgrave Macmillan.



## **Sustainability science** will need to do the following:

---

1. span the range of spatial scales between such diverse phenomena as economic globalization and local farming practices,
2. account for both the temporal inertia and urgency of processes like ozone depletion,
3. deal with functional complexity such as is evident in recent analyses of environmental degradation resulting from multiple stresses; and
4. recognize the wide range of outlooks regarding what makes knowledge usable within both science and society.” (*Kates et al. 2001*)