Seminar: Teaching and learning for critical thinking within interdisciplinary fields

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Introductory thoughts
As an introduction to the seminar, I want to present some ideas brought forward by Manfred Max-Neef (2005) in his text on transdisciplinarity, as well as some lessons learned from teaching sustainability science, as discussed by Jerneck et al. (2011). Regard these ideas as possible starting points for discussion rather than definite accounts of inter-/transdisciplinarity.

Max-Neef argues that the problematices of our times can only be addressed through a thinking that transcends disciplinary boundaries. Yet, universities are caught in traditional disciplinary thinking instead of addressing transversal problems.

He distinguishes between disciplines existing at different hierarchical levels (see graph below). The empirical level comprises disciplines concerned with the empirical investigation of the world, such as biology or sociology. Disciplines at the pragmatic level focus on the practical application of knowledge, such as engineering or agricultural sciences. At the level above that, disciplines such as planning or politics are concerned with strategic questions of what should be done. Max-Neef positions disciplines concerned with normative questions at the highest level: ethics, philosophy, and theology.

Interdisciplinarity spans different levels of this hierarchy, with the higher level defining the purpose of the lower level. Agriculture can, for instance, be seen as an interdisciplinary coordination of chemistry, biology, sociology, and geology.

Transdisciplinary entails, according to Max-Neef, the collaboration across all hierarchical levels. Each level can contribute different insights to a research problem, from answering empirical questions up to grappling with normative issues. This also means that science cannot be value-free.

Such a perspective opens up the debate of the structure of the university. Beyond that, it is necessary to address the question of epistemology: What kind of knowledge is knowledge that crosses disciplines? Max-Neef elaborates that, indeed, different levels of reality can operate following different logics. Therefore, one must question what knowledge actually is.

He suggests that knowledge does not exist as binary opposites, but rather may transcend these opposites to include a third “middle” option. This means that knowledge may evolve to develop alternatives beyond apparently exclusionary options (such as the binary between waves and particles in physics).

Max-Neef also argues that there is an understanding of the world that goes beyond rational, scientific knowledge – and that it is this understanding that might be helpful to transcend the boundaries of traditional knowledge construction. This might be an understanding based on intuition and experience rather than scientific rationality.

In a different take on inter- and transdisciplinarity, a group of scholars connected to LUCSUS, the Lund University Center for Sustainability Studies, present their vision of structuring sustainability problems (Jerneck et al., 2011).
To them, complex sustainability problems pose challenges to the structuring of academic knowledge. Sustainability problems, from climate change to deforestation, cut across traditionally debated social problem areas. They include aspects of other social problems, such as poverty or human rights. Knowledge is needed that cuts across these different problems.

The authors distinguish between problem-solving and critical research, with the former being the application of knowledge to solving real-world problems and the latter consisting in a critical interrogation of socio-ecological problems.

They also argue that knowledge has to progress from scientific understanding towards the setting of concrete sustainability goals and the implementation of this knowledge. Their notion of transdisciplinarity consists in reaching beyond the boundaries of academia. This differs from Max-Neef’s more philosophical notion of transdisciplinarity.

But just like Max-Neef, the authors approach this specific interdisciplinary problem as a question of knowledge construction and, thus, epistemology. They address this question by suggesting a specific way of structuring knowledge production, bringing together different modes of knowledge production from critical to problem-solving research.

They also suggest the application of social theories integrating social and ecological aspects to complex sustainability problems. While these theories indeed intent an integration of the social and the ecological, they remain grounded in the social sciences.

Finally, they suggest three necessary developments in sustainability science: The development of theories cutting across the social and the ecological; a transdisciplinary bridging of science and society; and the combination of critical and problem-solving research.
While both Jerneck et al and Max-Neef reach towards the issue of knowledge production in their accounts of inter-/transdisciplinarity, they do so quite differently. Max-Neef poses the question of the nature of knowledge, and Jerneck et al suggest a re-structuring of knowledge production geared towards real-world impacts.

Such questions require critical thinking in terms of attaining reflexivity about the modes of knowledge production in academia. The question is whether this is the only function of critical thinking in interdisciplinary research. Sometimes, critical thinking might start with questioning one’s own experiences of the world or one’s positionality in academia. It might also mean learning about critical social theories. But certainly, the fundamental questions remain related to the way we think about and produce academic knowledge. I am looking forward to discussing this further at the seminar (see suggestions for discussion questions below).

References

Jerneck, Anne; Olsson, Lennart; Ness, Barry; Anderberg, Stefan; Baier, Matthias; Clark, Eric; Hickler, Thomas; Hornborg, Alf; Kronsell, Annica; Lövbrand, Eva; Persson, Johannes (2011). Structuring sustainability science. *Sustainability Science* 6, 69-82

Discussion questions

- What role does critical thinking play in the above accounts of inter/transdisciplinarity?
- Which instances of critical thinking in learning and teaching have you experienced?
- What is it that made the thinking “critical” in these instances?
- Which teaching constellations, materials, methods etc helped for critical thinking to emerge?
- How does critical thinking relate to interdisciplinary learning and teaching? Are there differences between different interdisciplinary fields?