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Philosophy of Science
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What is this thing called interdisciplinarity?

- The answer to the challenge of sustainable development research or just another buzzword?

Today one does not find many research projects on sustainable development not proclaiming a devotion to 'interdisciplinarity'. It has become a buzzword heard in research presentations, on research conferences, and a keyword in applications on research funding. Surely the research field on sustainable development is connected to many disciplines. When for example studying the socio-ecological interactions of a given society (region), a typical example from my own field of research *human ecology*, one will soon discover the need for many sources of scientific knowledge. Analyzing the socio-ecological metabolism by for example studying the material input-output and the quantities and qualities of energy flowing through a certain area, one will not only come across fundamentals in the natural sciences such as systems ecology and thermodynamics, but will also need contributions from the social sciences and humanities, i.e. economics, political science, sociology, history, and archaeology. This is due to the fact that research on sustainable development typically deals with complex qualities of open and continuously developing socio-ecological systems. When focussing on energy flows, for example, one will conclude that the amount of energy and the specific energy forms used is a result of the economic-political history of the society studied, its position in the world trade system, as well as the natural geography and climate of the place, and the life styles of the inhabitants. Further, when confronting socio-ecological problems such as the climate threat, the overuse of fresh water systems, or the health dangers from polluted urban air, then one will certainly make progress only by acknowledging some degree of interdisciplinarity. Dealing with heavily polluted air quality in city urban environments, for example, requires studies from a wide range of areas: city planning and design of management control measures; investigations on behaviour, values and attitudes; research on communication and social change, etc.

Still there seems to be much confusion as to what 'interdisciplinarity' really is. Often it is added without any clear definition of its use in the context. Is it just any kind of cooperation between the traditionally specialized disciplines – or is it something more than that? What then, are the main qualities of these attempts? Are they the answer to the challenge of sustainable development research or just another fancy word? This paper highlights these questions by suggesting some distinctions between different kinds of activities that may be categorized as 'interdisciplinary', using the concepts of *multidisciplinarity*, *interdisciplinarity*, and *transdisciplinarity*.[1] By this I do not aim to state definitions of the concepts in question. Googling 'interdisciplinary' yielding over 13 million hits makes a clear case for some humility. Rather, my intention is to point at possible advantages and shortcomings of different kinds of 'interdisciplinary' approaches in the context of sustainable development research. As so often is the case, not one single version is always the best one in all circumstances. In my discussion I will use some basic models outlined in figure 1-4. These sketches are only meant to support the discussion on possible qualities of 'interdisciplinary' attempts, not in any way to set clear borders and exact definitions.

[1] The prefixes multi-, inter- and trans- standing for many, between or among, and across or beyond (In Swedish ung. 'många', 'mellan', 'över/bortom'). From search on Wikipedia 080430.

To start with, one may ask what interdisciplinarity is not by looking at the concept of *disciplinarity*. To organize scientific knowledge into separate disciplines is not self-evident.[2] One could for example imagine science seen as one body of knowledge, the researcher's task being to increase his or her understanding of the whole. This was indeed also the ambition of for example the early Ionian natural philosophers in the pre-Socrates area around 500 BC. Even renaissance men like Leonardo da Vinci mastered a great part of the knowledge and skills of their times. Following the development of modern society, however, is a growing tendency to divide knowledge concerning different areas of reality, and to compartmentalize the academic activities at the universities.[3] Of course one may easily see that modern society itself has become increasingly complex due to processes such as industrialization, urbanization, bureaucratization and institutionalization, thereby no surprise that science has adapted. It is today impossible to imagine one scientist, or even group of scientists, mastering all areas of scientific knowledge. A specialization seems unquestionable. When it comes to the division between the natural sciences and the social sciences, and especially the humanities, it may be considered appropriate due to their very different objects of study (social vs. physical reality) [4], and their methods (quantitative vs. qualitative approaches). The focus on either technical or theoretical knowledge interest is another factor that may explain why for example engineering and ethnology are seen as distant neighbours. But the compartmentalizing of science may also be, as Kuhn's work highlighted, a mechanism set in action due to internal sociological processes and the organization of academia. Initial tendencies to divide areas of knowledge may be self feeding as separate scientific paradigms manifest themselves, guarding their distinction by activities strengthening rather than challenging the border lines to other areas. Normal science thus proceeds by internal and autonomous puzzle solving inside bubbles of paradigms (Kuhn 1996).

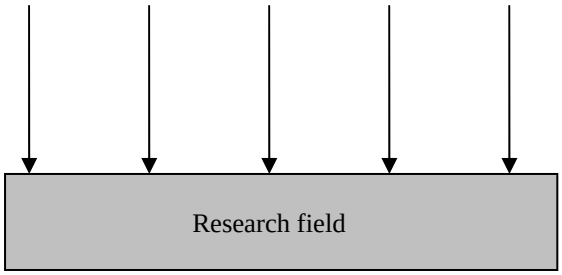

Figure 1.
Disiplinary research

Turning to figure 1, I have chosen to illustrate traditional disciplinarity as symmetrical arrows directed vertically downwards onto a research field. This symbolizes a scientific knowledge that aims at close and deep understanding of a limited aspect of reality, may it be molecules, taxes or the ancient Rome. Its ambition is the *spearhead:* to be in the front lead with new and unique knowledge. The scientist's ideal is here the free and rational agent carefully observing and conducting his study, contributing his little brick to the big monument of 'scientific knowledge'. Working in the tradition of strict academic hierarchies, order and stability is guaranteed. Distancing oneself from the objects of study is necessary, as is the detachment from 'disturbing' and irrational elements such as public opinion, popular media, and politics. The result is a science that guards its distinguished position and distances itself from other actors of society.

[2] To organize knowledge into 'science' is of course not self-evident either. As human history shows there are different kinds of knowledge of which science may be seen as one kind (see i.e. Hansson 1993: section 1-2). This broader topic is however beyond the scope of this paper.
[3] This statement may be discussed in its details as for example universities like Paris and Bologna were specialized very early after their establishment in the medieval times (Swedish National Encyclopaedia 1990). Here I am referring to a more general tendency of the development of scientific knowledge.
[4] Fundamental differences between the study of social vs physical 'reality' exist with a realist as well as a constructivist point of departure.

According to Foucault, the way science has developed is also a matter of exercise of power (SEP 2008). Presenting itself as a neutral and non normative source of knowledge, the fact is disguised that science is actually a result of contingent historical forces and expressions of specific ethical and political judgements. Knowledge and power are not independent but they are articulating each other, the modern science being a prime example of their fusion. The result is, as was the message from Feyerabend, that science articulates a dangerously dominant position and hegemonic control of knowledge, an indisputable status of legitimacy and trustworthiness (Chalmers 1999:155f).

Confronting the challenge of sustainable development, this scientific society typically responds by different disciplines developing their own branches of 'sustainability research', all with their own theories, methods, and models. Then, when actors of society raises attention to problems of unsustainable development, they will confront a heterogenic and not seldom internally hostile scientific community, each of their disciplines claiming their own version of the 'truth' and what should be done. Even if there of course are uncertainties and different priorities, I would claim that this state of the art often is highly unsatisfactory when it comes to assist the stake holders in understanding and mitigating pressing socio-ecological dilemmas. Rather they will find themselves ending up confused with a swarm of heterogenic messages and, even worse, perhaps with a growing negative attitude to what science is and may be used for. Another problematic case is when urgent solutions are delayed due to internal scientific quarrels concerning sophisticated details and not the big picture.

Even if the traditional disciplines make important contributions to research on sustainable development, different kinds of cross disciplinary approaches seem needed. How then may these interdisciplinary attempts look like? Looking closer at many research projects today claiming to be 'interdisciplinary', I would argue that a proper description would rather be that they are *multidisciplinary*. In dictionaries these two concepts are often presented as synonyms but it may be fruitful to make a distinction. My suggestion is that 'multidisciplinarity' stands for the close cooperation between – but not the attempt of merging or transforming – different scientific disciplines. It is the collaboration of scholars traditionally specialized in their own disciplines. Recalling our research example, the analysis of the 'metabolism' of a society including its ecological as well as social consequences, may for example involve specialists in physical resource theory, geography, economic history, and sociology. These scholars may apply for research funding presenting themselves as a 'research group' and then organize their work by splitting the research problems in line with their own disciplines. Even if the presented results may include a compilation and a summary of the various perspectives, this type of research I would claim is still essentially 'disciplinary'. Figure 2 illustrates this multidisciplinary approach as differing from the disciplinary one by its ambition on cooperation (the horizontal line connecting the vertical arrows). Depending on the degree of internal communication and willingness (and ability) to learn from each other, it will to a higher or lesser degree approach what I will in the next section define as 'interdisciplinarity'. This reminds us, referring to my way of classification, that there are no sharp boundaries between the categories suggested.

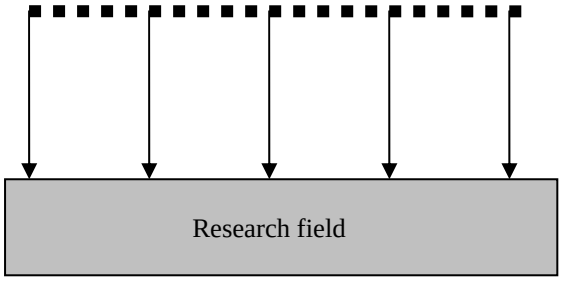

Figure 2.
Multidisiplinary research

What then defines 'interdisciplinarity' in contrast to multidisciplinarity? As sketched in figure 3 I would claim that *interdisciplinarity* is the building of something new in comparison to the work of the traditional disciplines. This I have illustrated as an emerging horizontal area symbolizing a new field of knowledge connected to, but not directly derived from, the traditional disciplines. By this I imply that even if the majority of the involved researchers have their background in specialized disciplines, they have here begun the process of mastering a fertile communication and cross learning between their original disciplines, the result of which is the creation of a new and independent body of knowledge.

I also argue – symbolized by adding wider arrows to the thin 'specialized' ones, that in the case of interdisciplinary research both specialists and what could be called 'generalists' are needed. That is, scholars trained in more than one single discipline are now valuable. Researchers from my own field, *human ecology*, may in some cases be an example of this generalist competence. Integrating perspectives from i.e. geography, economic history, physical resource theory, world systems theory, and anthropology, the human ecologist have gained a systems oriented view on the complexity of socio-ecological systems, though perhaps lacking insights in the very front lines of parts of their research fields. On the other hand, the generalist may master the ability to 'translate' across scientific borders, so that communication and cross learning is facilitated. Of course every research group must balance between the extremes of specialists and generalists: knowing a lot about a little – or knowing a little about a lot? In the first case – the specialists approach – the research group in question may have difficulties in developing beyond the multidisciplinary approach. In the second, research conducted only by generalists runs the risk of being too superficial and trivial.

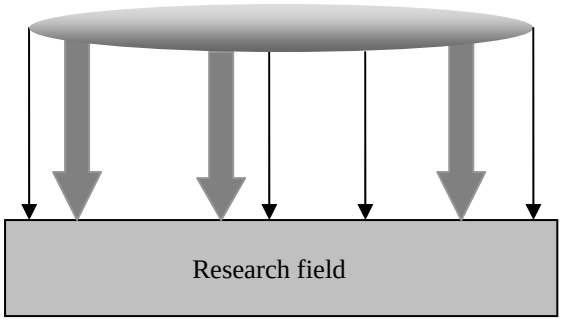

Figure 3.
Interdisiplinary research

Our research example on socio-ecological metabolism is a good one at highlighting why interdisciplinarity of the kind outlined may be fruitful. Building on scientific achievements in areas such as systems theory, thermodynamics, and ecology, a cross fertilization with perspectives from the human sciences on for example human nature, market behaviour and social change seems promising. What are the socio-cultural driving forces that cause the ecological problems observed and – the other way around – to what extent does the ecological context influence social norms and institutions?

However, acknowledging that the multidisciplinary as well as the interdisciplinary approach are valuable supplements to the traditional disciplinarity, one may still feel that something is missing. Although this new and cross communicating knowledge is a fresh breeze in the scientific society, I claim that at least in the context of sustainable development research there is still often a problematic gap between the researchers and that was is researched. In the light of pressing ecological and social problems at a global scale, stake holders from many sectors of society struggle for a change (in some parts of the world with their lives at risk). But science is often remarkably quiet. My view is that it is here unsatisfactory developing however grand interdisciplinary research approaches, if not paying attention to – and articulating a position in relation to – the actual social context surrounding the problem.

By that I do not mean that researchers should transform into activists, but that we should be aware of – and active in relation to – the always existing dimensions of power, vested interests, social conflicts and the struggle between different discourses, factors that are not trivial but influence the very research problem. Following our research example, if investigations show clear connections to urgent global problems such as climate change, depletion of fresh water supply, or the diffusion of hazardous chemicals into the ecosystems, I say it's an obligation to actively communicate this and take part in the societal processes of mitigation of the problem. And it should not be seen as an obligation on moral grounds only, but a quality of the research itself. Awareness of and openness to ongoing societal processes are indeed present in many cases of sustainable development research, but what to me is lacking is the appreciation of these qualities as legitimate parts of 'good' scientific work.

In this context, I would therefore like to suggest a fourth research model, which I call the *transdisciplinary* model. This attempt is the most difficult to picture, as it does not yet exist in any matured sense, and I hesitate to stick the reader (and myself) to some rigid structure clarifying what the state of affairs should be. Thus figure 4 is only a brief sketch of an imagined 'transdisciplinarity' being something that goes beyond science as it looks like today. While 'normal science' typically consists of vertically directed 'research programs' aimed at 'researching' a specific area of interest, I have here chosen the circle as a contrasting starting point. Instead of the hierarchically placed 'science' on top of the 'research field', I have pictured science as <u>one</u> of many relevant actors 'researching' a problem. Further, scientists as well as other actors are all <u>included</u> in the research field, not distanced or outside of it. They are part of the research problem. The circles symbolize a kind of cooperation that aims at being non hierarchical, thus breaking the monopoly of top-bottom procedures. Bottom-up communication is not a trivial question about 'listening better to the informants' or 'inviting stake holders to open workshops'. It is at its core decisions about what is being researched, the definition of the research problem, and its possible applications in different contexts. It is about science as a power-containing institution capable of influencing social change.

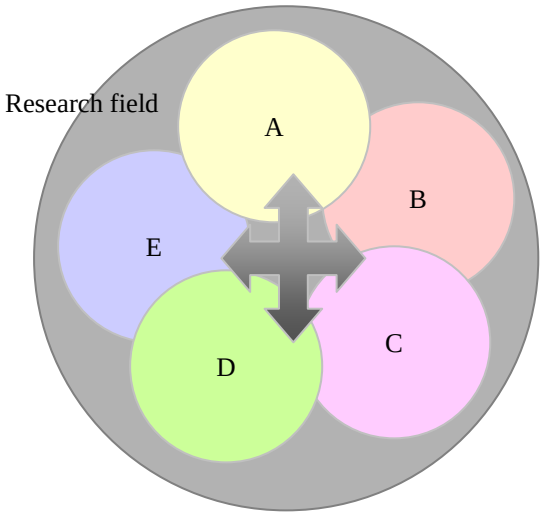

Figure 4.
Transdisiplinary research

A, B, C = different societal actors and stake holders

Further, transdisciplinarity is not only concentrating on the internal scientific building of new knowledge. Rather it takes as its point of departure the specific needs articulated by different actors of society (including science) paying attention to an emerging research problem.[5] This implies close cooperation and partnership with actors representing various relevant perspectives connected to the research area. The transdisciplinary researcher is not content only working with colleagues from academia, but may depending on the art of the project

[5] A notice: some seeds of this approach may perhaps be seen growing at the (Swedish) universities now emphasizing the so called "third task" (Swedish: 'den tredje uppgiften'), communication and interaction with the public and different sectors of society. See i.e. http://www.lu.se/om-lunds-universitet/samverkan.

collaborate with regional planners, local authorities, business representatives, NGO's, student organizations, etc. I have symbolized this by the circles interacting with each other, underlining that I do not mean the other actors roles to be only relatively passive reference groups, but the basis for an active and cross learning research process. But the circles' overlapping may also symbolize the fact that we are not only engaged as one-role-actors. Our roles in society are always multidimensional; we are researchers, but also citizens, consumers, residents, perhaps parents, NGO workers, etc.

To conclude, the monopoly of 'scientific' knowledge solely belonging to the prestigious halls of academia is here challenged. The definition of the research problem, the methods, and the outcome, is rather the complex result of researchers and other actors confronting each other. Is the researcher then not making him- or herself dispensable if transdisciplinarity is fully realized? What is the contribution needed from science itself? Would it not suffice that these other societal actors cooperate solving their specific problems, develop the knowledge needed – call it scientific or not? What is the role for the scientist in a transdisciplinary research context? My answer would be that scientists are certainly still needed, specialists as well as generalists. Scientific theories and methods are valuable as one of many bodies of knowledge and approaches in the context of sustainable development. Also needed though, is a brave and open minded self reflection in combination with a willingness (which is connected to ability, something that can be supported), to indulge in complex research contexts involving high stakes and no 'easy truths'. I imagine important 'scientific' skills would then be the ability of public communication and dialogue, the interacting with stake holders and on going societal processes, the mastering of participatory research methods, etc. A creative development of the traditional academic structures must also be taken into consideration if there is to be a true enhancement of horizontal processes in contrast to vertical ones.

Finally, I have now myself stated a typical example of a detached and non-communicating work. Without any channels of communication with different actors of society I have made these models up just by turning to myself and my own limited view of science and the area of sustainable development research. How do people representing other areas of society view interdisciplinarity? What does the man on the street answer when asked what kind of science is needed to build a sustainable development? (If he does not care at all we should perhaps be worried?). Without listening carefully to these persons I doubt my intention to contribute as a researcher to a sustainable development will have any true effects.

References:

Chalmers, A.F. 1999. *What is this thing called Science*? Third edition. Open University Press.

Hansson, B. 1993. *Vetenskapsteori.* Preliminär version. Department of Philosophy, Lund University.

Kuhn, T. 1996. *Structure of scientific revolutions.* The University of Chicago Press.

SEP. 2008. *Stanford Encyclopedia of Philosophy.* Article on Michel Foucault. Downloaded from http://plato.stanford.edu/. 2008-04-01

Other Sources:

Lund University website on 'the third task'. Downloaded from http://www.lu.se/om-lunds-universitet/samverkan. 2008 04 30

Swedish National Encyclopaedia (1990) on 'universitet'

Wikipedia on the prefixes multi-, inter- and trans-. http://en.wikipedia.org/wiki/Main_Page. 2008 04 30