

INTERDISCIPLINARY PRACTICES. *WHAT, WHY, HOW ?*

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- *Short presentation*

- *What ?*

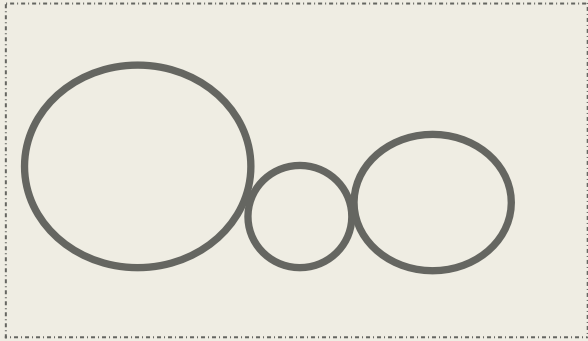
- *Why ? (However)*

- *How ?*

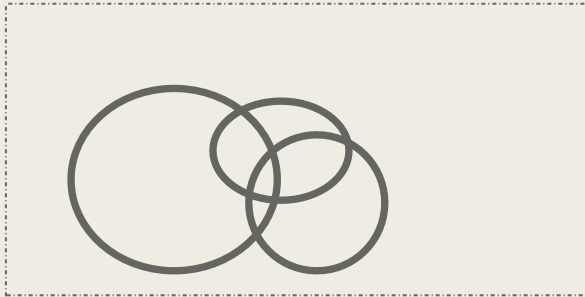
A short presentation

- Applied sciences (ingénieur) in physics (1978), Master in Philosophy (1989), PhD in Environmental science (PhD on political aspects of sustainable development)
- Worked in the private sector (3 years), in an environmental NGO (Inter-Environnement Wallonie, 4 years), and in research the remaining time. Large scope of environmental questions in relation with sociopolitical aspects
- Direction of Centre d'Etudes du Développement Durable (ULB) since 1997, Academic full time since 2002. Involved in the Master in Environmental Sciences and Management which is strongly interdisciplinary
- One specific trajectory in interdisciplinarity (and transdisciplinarity) among many others
- Here : limited elements, than can act as references and mirrors for your own practice

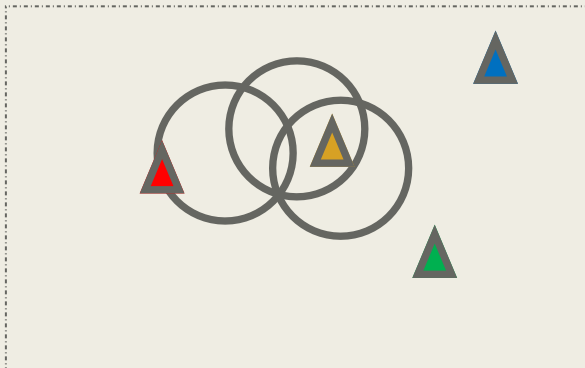
What ?



Multi or Pluri- disciplinarity



Interdisciplinarity



Transdisciplinarity

On Disciplines

- A discipline is not as homogenous as one could think
- There are instabilities within disciplines. External factors (diplomas, ...) make them appear more as stable
- Weber and Durkheim : “sociologists” mixed anthropology, history, economy, law
- Earth sciences use chemistry, physics, ...
- Many researchers here : geographers, ...
- Some might do it less (?): law, medicine, theoretical physics, mathematics, ... But these diplomas lead also to multidisciplinary works: medicine and informatics, mathematics and insurance
- **Teaching is more disciplinary than Research** : diploma, peers

Interdisciplinary works

- Works that combine several approaches, several kinds of knowledge, of data
- An image: disciplines would be several carefully worked pieces of an automobile. Who will put them together ?
- What knowledge is pursued ?
- Academic work: chooses its limits
- Expertise : the limits are negotiated with people outside the academic realm
- The role of the scientist, in interdisciplinary practice, is partly a role of translation
- Break-through (not common) : real import of concepts from one field of knowledge to another. Ex. Freud's Pulsional economy; Use of ants behavior to inspire softwares
- Interdisciplinarity is favored by demands for applied science (but not only)

Basic research	Applied research	Implementation- and target-oriented research
Classical sectoral disciplines	Engineering sciences	Sustainability science
Emphasis on expanding knowledge	Product orientation	Goal orientation
Problem definitions and discoveries	Technical concepts, products, processes	Holistic solutions and strategies
Mono-disciplinary research	Interdisciplinarity	Inter-, multi- and transdisciplinarity
Top-down methods theory – practice	Top-down and/or bottom-up	Bottom-up and top-down practical research
Teams internal to science organisations	Cooperation with industry	Stakeholder involvement
Education of next-generation scientists	Prototype development	Models and instruments to support decision-making processes

Combination of approaches. 1. Large scale

What and how ?

Key Questions in the Millennium Ecosystem Assessment	25
1. How have ecosystems changed?	26
2. How have ecosystem services and their uses changed?	39
3. How have ecosystem changes affected human well-being and poverty alleviation?	49
4. What are the most critical factors causing ecosystem changes?	64
5. How might ecosystems and their services change in the future under various plausible scenarios?	71
6. What can be learned about the consequences of ecosystem change for human well-being at sub-global scales?	84
7. What is known about time scales, inertia, and the risk of nonlinear changes in ecosystems?	88
8. What options exist to manage ecosystems sustainably?	92
9. What are the most important uncertainties hindering decision-making concerning ecosystems?	101

The structure of knowledge is influenced by the questions

The question is not “how does biology studies this ecosystem ?”

See also IPCC, and other international reports on social or environmental challenges (FAO, WHO, ...)



Combination of approaches. 2. Limited scale

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What and how ?

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- [The Shared Socioeconomic Pathways and their energy, land use, and greenhouse gas emissions implications: An overview](#)
- [Global evaluation of shark sanctuaries](#)
- [Changes in the global value of ecosystem services](#)
- [Resilience: The emergence of a perspective for social-ecological systems analyses](#)
- [A place-based model for understanding community resilience to natural disasters](#)
- [The story of phosphorus: Global food security and food for thought](#)
- [What are the limits to oil palm expansion?](#)

1 paper 1 author, 2 / 2 authors, 7 / from 5 to 55 authors

WHY ?

- "Mode 2" (Gibbons et al. 1994) for the diffusion of knowledge tends to be more frequent than "Mode 1" (2= interrelations between several spheres of knowledge; 1= within academic disciplines)
- Many funding agencies ask for interdisciplinary research (Report 2016 of the Global Research Council - the heads of science and engineering funding agencies from around the world)
- The university is less a hegemonic center for producing (high quality) knowledge
 - Google hires as much PhDs than Stanford University (Robert Frodeman)
 - Many sources of information compete with academic knowledge
- To communicate the importance of academic work outside the alma mater often requires a distance with a pure disciplinary approach (cf. Translators)

- Some problems are difficult to understand within the limits of one discipline

Example: Climate “controversies” : the understanding of their importance in the society needs social sciences, political sciences, communication, ...and not only climate science (<http://climatecontroversies.ulb.ac.be/>)

- A certain kind of curiosity: It might be the case that some individuals are more prone to learn outside of their “comfort zone” (it needs time) (life long learning)
- Self-questioning the use of the knowledge produced, and the conditions by which it will be used, misused, or... forgotten.

However

- Disciplines favor careful controls by peers, fine tuning, mastering of references and authors
- The rigor is (normally) led by existent modalities of knowledge making
- Their role in the development of knowledge remain central

- Interdisciplinarity
 - peers are difficult to find (many "trajectories", always incomplete interdisciplinarity)
 - the same GRC (2016) reports warns of difficulties in evaluation of interdisciplinary research

HOW ?

6 profiles (Sedooka et al. 2015)

- *Disciplinary identity* : hyper specialization
- *Thematic identity*: ex. on Development
- *Hybrid identity*: ex. Double or triple diploma
- *Interdisciplinary migrant*: from one approach to another (often within the same theme)
- *Interdisciplinary native*: started from the beginning of his/her career
- *A-disciplinarity*: no discipline defined or "un-disciplined" (I. Stengers): "amateur" vs "experts"

(104 respondents from Belgium, France and elsewhere, 10% response)



- In many cases applied research is a driver
- Careful agreement on the definition of concepts and questions is needed. Ex. Adaptation or resilience does not have the same meaning in biology or in sociology
- Time is needed. The method can be more erratic, less planned from the beginning, and this is not necessary easy to combine with a pressure for publishing
- No fixed procedure to articulate disciplines. The research question is important to drive such an articulation. Avoid systematic stack of disciplines, with no internal link or necessity
- May be difficult for young researchers, especially if they are in disciplinary teams
- The evolution of academic learning and institutions will be key to promote (or not) interdisciplinarity
- However 97% of our respondents report a success (47%) or half a success (50%). There are certainly biases in the respondents and non respondents due to the theme, but still...

Thank you for your attention !