Mapping interdisciplinarity in the human sciences

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presentation for «Academic Demarcations»
University of Oslo, 13 September 2012
Agenda

Key messages

1. The drift towards multidisciplinary science
2. Policy- vs. science-driven multidisciplinarity
3. “Interactional” vs. “contributory” expertise
4. NEW project: Mapping the humanities
Pressures for multidisciplinary knowledge

Innovation agenda & knowledge economy demand multidisciplinarity

«Contributing effectively to the objectives of Europe 2020 and Innovation Union will require solutions to be developed which are interdisciplinary in nature and therefore cut across multiple specific objectives» (Proposal for Horizon 2020, EC 2011 23).


Cognitive: case-based learning, issue-driven, problem-oriented complex problems demand different disciplines

Normative: Who define ‘problems’, aims, ‘projects’, ‘relevance’ research questions defined by stakeholders, not peers

How might these be reconciled in studies of interdisciplinarity?
Disciplinarity and interdisciplinarity

- **Disciplines** are institutionalised research fields that cohere around a set of shared descriptions of causal, structural or intentional mechanisms, regularities, laws, idealtypes, etc.

  The cognitive aims are e.g. explanation, understanding, generalisation, theory-building, models, taxonomies, etc. Mapping the familiar onto the familiar

- **Interdisciplinarity** departs from “problems” and “topics” (objects, cases) that arise in the scientific process and that demand several disciplines to investigate.

  This includes *internal* as well as *external* problem definitions.
Disciplines and disciplinary knowledge have been studied throughout the science studies literature as:

- Fields (Bourdieu 1984/2004)
- Communication systems (Luhmann, Stichweh)
- Tribes (Geertz, Becher & Trowler 2000)
- Fractal patterns (Abbott 2001)
- Epistemic cultures (Knorr-Cetina 1992)
- Boundary organisations (Gieryn 1983)
- Trading zones (Galison 1997)
- Paradigms (Kuhn 1962)
Two approaches to inter- and multidisciplinarity

Evolutionary (science-driven): ... New problems arise on the border between fields of research which cannot be addressed by a single discipline.

Rationale: frontier research moves across scientific fields: new “objects” and “problems” call for new disciplines (e.g. basic research) (biochemistry etc).

Mandated transdisciplinary (policy-driven) ... Problems and “challenges” arise in society that call for strategic research and solutions (Mode-2 knowledge production, Triple Helix, post-academic).

Rationale: society decides which disciplines should be contributing to the solution of complex interdisciplinary challenges (strategic research).

Production of knowledge is only necessary and relevant given the needs to address specific challenges (e.g. applied interdisciplinarity).
Interdisciplining science

Science driven

New research topics triggers new collaboration and integration

Interdisciplining science

Sedimentation of new (inter)disciplinary and epistemic communities (models, textbooks)

De-institutionalisation, project organisation, adhocracies etc.

Policy-driven

Flexibility, open-ended, rapidly changing user-needs and funding

‘Grand Challenges’
Bioeconomy
Smart materials
Food security
Demographics
Healthy ageing
Bio, Nano, ICT

EU uni reforms
Horizon 2020

TWO TENDENCIES

Cognitive science
Biochemistry
Nanoscience
Political economy
Cultural studies
Semiotics

Science driven

New research topics triggers new collaboration and integration

De-institutionalisation, project organisation, adhocracies etc.

Policy-driven

Flexibility, open-ended, rapidly changing user-needs and funding

(Budtz Pedersen & Collin 2012)
In order to understand the processes and dynamics of interdisciplinary research, consider the following two tendencies:

**Peer-to-peer driven**
- New research topics triggers new collaboration and integration.
- Sedimentation of new (inter)disciplinary and epistemic communities (models, textbooks).
- New departments, academic associations, journals, conferences.

**Policy-driven**
- Short-term project structure: Externally funded, contract-based.
- De-institutionalisation, project organisation, adhocracies etc.
- Research teams / networks (adaptive to environment): Flexibility, open-ended, rapidly changing user-needs and funding.

**TWO TENDENCIES**

1. **Interdisciplining science**
   - Cognitive science
   - Semiotics
   - Political economy
   - Literary criticism
   - Cultural studies
   - Feminism

2. **New research topics**
   - Triggers new collaboration and integration.
   - Long-term institutionalisation:
     - Periodic assessment of epistemic strategy.

- AU reform
- Grand Challenges
- H2020

**Long-term institutionalisation**
- New departments, academic associations, journals, conferences.

**Project groups continuously reconfiguring**
- Policy-driven
- Short-term project structure: Externally funded, contract-based.
Mutual dependence

- Interdisciplinarity
- Problem complexity
- Project organisation
- Basic tool-kit
- Common framework
- Sedimentation of interdisciplines
- New hybrid disciplines
- Technologies
- Industries
- Applied expertise
- Applied science
- Transdisciplinarity

(Bunge 2002; Krohn 2010)

- Epistemic convergence
- Models, theories
- Shared definitions
- Real-world cases
- Adhocracies
- Socio-technical setting
- Pre-commercial
- Demand-driver
Dilemmas of interdisciplinarity

Preconditions for establishing multidisciplinary collaboration and large-scale projects e.g.

i) Establish a common problem and frame of reference (what is the research question?).

ii) Establish a cognitive division of labour among participants (who is contributing with what?).

*Initial phase is time- and resource consuming*

iii) Theoretical and experimental coordination
Creation of peer community, culture etc.

iv) Interdisciplinarity takes time: configures around new topics, problems and models.

**Dilemma:** Constant re-configuration of interdisciplinary communities, lead to a vicious circle of time- and resource consumption – plus lack of optimising effects of institutionalised knowledge.
Interdisciplinarity and “trading zones”

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<td>Biochemistry</td>
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<td>”Grand Challenges” (bioeconomy, ageing, climate models etc.)</td>
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Interdisciplinaritet som “trading zones”
Collins, Evans & Gorman. Trading Zones and Interactional Expertise (2007)

“Contributory expertise”
“Indeliring”

“Interactional expertise”

*Research grant
*Application process

“Grand Challenges” (bioeconomics, ageing, climate models, etc.)

Incentives to cooperate
Collaboration without integration (ex. natural disasters, etc.)

EU uni reforms

Transdisciplinarity

Collaboration without integration (Ex natural disasters, etc.)

4. Subsumption
Monodisciplinarity

Two or more disciplines merge under one of the disciplines (Subversive interdisciplinarity)

3. Integration
(hybrid)

Interdisciplinarity

Biochemistry
Nanoscience
Cognitive science

HORIZON 2020

Heterogeneity
Interdisciplinarity
Multidisciplinarity

77x68: Interdisciplinaritet som “trading zones”
Collins, Evans & Gorman. Trading Zones and Interactional Expertise (2007)

3. Integration
(hybrid)

2. Fragmentation
Multidisciplinarity

1. Incitation

Autonomy

Authority

“Contributory expertise”
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“Grand Challenges” (bioeconomics, ageing, climate models, etc.)

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HORIZON 2020

Heterogeneity
Interdisciplinarity
Multidisciplinarity

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Humanomics: Mapping the humanities

New three-year project funded by the Velux Foundation (2012-2015)

i) Map megatrends in the humanities (methods, concepts, theories, etc.)

ii) Map the institutions of humanities (disciplines, academies, museums.)

iii) Map the “borderology” of humanities (relation to soc. and nat. sciences).

iv) Map centre and periphery (the core of humanities; the new hotspots)
Survey (3500 respondents) + network analysis

• **Purpose**: Collect quantitative and qualitative data about the epistemic content, institutional context and cognitive network of the humanities in Denmark

• **Cognitive map**: Ask the researchers:
  > subjects of study
  > which methodologies and theories they use;
  > with whom do they cooperate;
  > which disciplines do they collaborate with;
  > etc.
Network analysis

- Questionnaire for all tenured humanities scholars in Denmark (AU, AU-DPU-ASB, DTU, CBS, ITU, KU, RUC, SDU) and related institutions (ultimo 2012).

- Network
  1. Questions could involve, e.g., name the 5 living researchers in (a) Denmark and (b) internationally, that have influenced you the most, and with whom you have competed/conflicted the most.
  2. Which scientific fields have influenced you the most, and to which fields have you contributed?
  3. Is your current research mono- or transdisciplinary?
  4. In which discipline have you obtained academic training?
  5. Is your research theoretical or applied?
  6. To what extend do criteria and evaluation procedures used by universities and funding agencies influence your scholarly work (questions, methods)?
An empirically-based philosophy of science

Ideal outcomes

1. Develop a “thick” description of the main currents that dominate the field.
2. Test the hypothesis of “sequential ruling” theories.
3. Which theoretical frames and methodological tools do the humanities employ?
4. Are there common epistemic norms among fields, or radical pluralism?
5. Are institutional arrangements structuring the epistemic practice of the humanities (Goldman 1999).
6. Which types of research questions, methodologies, and theories get to be privileged, and which types are neglected (e.g., negative research, critical thinking, etc.)?
7. Do researchers only dress their epistemological claims in “transdisciplinary” clothing, or are new hybrid research communities evolving?
8. What is the scale of trans- and multidisciplinary collaboration in humanities in relation to the social and natural sciences.

Distribution of “foundational tensions”

1. Relativism-Universalism
2. National-International
3. Causal-Intentional
4. Idiographic-Nomothetic
5. Descriptive-Normative
6. Narrative-Comparative-Reflexive
7. Epistemic-Political-Aesthetic
8. Data-driven vs. Theory-driven
9. User-driven-Science-driven
10. Applied-Basic science
11. Teaching-Research
12. Specialist-Generalist

Distribution of methodologies

1. Empiricism
2. Structuralism
3. Marxism
4. Deconstruction
5. Comparative method
6. Experimental methods
7. Critical Theory
8. Phenomenology
9. Semiotics
10. Cognitive Science
11. Naturalism
12. Evolution/biologism
Thank you for the attention!

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