

Pulling it Together

On Interdisciplinary Research Design

This policy brief provides practice-based analysis of opportunities and obstacles relating to interdisciplinary research. It is based largely on the proceedings of the NET4SOCIETY conference "Learning by doing—making interdisciplinarity work" (Brussels, 15 January 2013), but is also informed by current literature. Reflecting a Social Sciences and Humanities perspective, its principal focus is society-driven, problem-oriented research. The issues addressed in this policy brief, however, are relevant for all interdisciplinary research. It offers recommendations on successful programme design and project-development for policy makers, programme owners and researchers.

What do we need interdisciplinarity for?

Societal challenges are at the heart of the EU's Horizon 2020 Framework Programme for Research and Innovation. These challenges – which range from demographic change to resource efficiency to security – are so complex and sweeping in scope that they can only be addressed by bundling research capacities. Notwithstanding the fact that disciplinary research remains a solid contributor to knowledge generation, a more integrative strategy is needed to address grand societal challenges. We must actively seek to combine knowledge from heterogeneous sources and nurture cross-fertilization between different approaches, methodologies and disciplines. This requires a conscious effort to move beyond research silos that isolate diverse sources of knowledge. It requires a collective effort that can pave the way for critical insights and approaches and foster innovation.

What kind of interdisciplinarity do we need?

Interdisciplinarity is almost as hard to practice as it is to pronounce. And, like most buzz words, it often lacks clear definition and usage. Traditionally, different scientific disciplines employ specific and explicit rules on doing research. Yet they themselves are social constructs and should be versatile.

New modes of knowledge production have been gaining ground in recent years. Notably, problem-oriented research

**No
discipline
knows
more
than
all
disciplines.**

- François Taddei

Director of the Centre for
Research and
Interdisciplinarity at Paris
Descartes University

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(developing applications, tackling societal challenges, etc.) has been transcending classical disciplinary moulds. Such research frequently employs techniques of co-production¹ with increasing attention to the users' benefit. In doing so, it stretches the traditional paradigm, encouraging researchers to take a mental leap and re-think the limitations of their profession².

Some of these novel approaches to scientific research have been described as "transdisciplinary". It is *interdisciplinarity*, however, that provides the foundation for transdisciplinary approaches. This policy brief, therefore, focuses on ways to improve interdisciplinary research design.

Multi-, inter-, or transdisciplinary: What's the difference?

Multidisciplinarity

Each discipline attempts to explain the same phenomena from its own viewpoint resulting in *independent stories*.

Interdisciplinarity

Interdisciplinarity looks at same phenomena from different viewpoints but tries to integrate the explanations thus producing *connected stories*.

Transdisciplinarity

Transdisciplinarity draws together theories and approaches to form a shared conceptual and analytical framework - a new discipline thus resolving in an *integrated story*.

Who wants to do interdisciplinary research?

While the merits of interdisciplinary research are broadly recognized, there is no consensus on how to foster it successfully. Interdisciplinarity runs counter to established career patterns and academic institutions. It requires researchers to re-think traditional paradigms and even the limitations of their profession³. Conversely, it is a risky endeavour, difficult to organise and time consuming, particularly in the early stages of team-building in a research undertaking. Practitioners of interdisciplinary research report significant

¹ Described in the 1994 book *The New Production of Knowledge – the dynamics of science and research in contemporary societies*, Helga Nowotny et al.

² Gibbons et al. (1994) in *A communication model for transdisciplinary consortium research*, Thomas Aenis, Humboldt-Universität zu Berlin.

³ Gibbons et al. (1994) in *A communication model for transdisciplinary consortium research*, Thomas Aenis, Humboldt-Universität zu Berlin.

intellectual, practical and personal rewards⁴. But additional time and resources are needed to reap those rewards. Interdisciplinary projects thus require particularly careful planning and management. A recent position statement by Science Europe expresses this conviction most eloquently: “Excellence needs interdisciplinarity: the key to future scientific breakthroughs lies in interdisciplinary research”.

What do Social Sciences and Humanities have to do with all of this? ...

The cluster of disciplines referred to as “Social Sciences and Humanities” (SSH)⁵ is strongly interdisciplinary and heterogeneous in its approaches and methodologies. While performing human, societal and cultural analysis they also reflect in general on the interconnectedness of knowledge in modern society. The social sciences and humanities are crucial for their ability to help us understand the “big-picture” and to define societal and human requirements for scientific advances.

In the past, SSH disciplines have often struggled to articulate their potential contributions to problem-oriented scientific research, particularly vis-à-vis policy-makers⁶. While some continue to struggle with that challenge, a 2011 NET4SOCIETY survey of SSH researchers with a European proclivity found that a majority of those polled welcome the opportunity to work on interdisciplinary projects. They are convinced that by thinking across disciplines Europe can better address some of the complex realities of today’s society.

Both the Europe 2020 Growth Strategy and the Horizon 2020 Framework Programme for Research and Innovation call for more interdisciplinarity and new solutions to tackle Grand Societal Challenges⁷. Recent analyses have detailed the contributions SSH can make to rendering scientific research more responsive to societal needs, whether in their own domain or across all scientific fields⁸:

⁴ Standing Committee for the Social Sciences (SCSS), European Science Foundation, “The good, the Bad and the Ugly”: Understanding collaboration between the Social Sciences and the Life Sciences – strategic workshop report, 2012.

⁵ Science Europe Position Statement – Embedding Social Sciences and Humanities in the Horizon 2020 Societal Challenges, January 2013.

⁶ European Commission, Follow-up of recommendations on “The European Research Area and the Social Sciences and Humanities” of January 2004.

⁷ NET4SOCIETY, SSH experiences with FP7 - A commentary, March 2011; “Thinking across disciplines – Shaping our future welfare together”, Conference held in Brussels, October 2009.

⁸ Science Europe, Embedding Social Sciences and Humanities in the Horizon 2020 Societal Challenges, January 2013.

League of European Research Universities, Social Sciences and Humanities: essential fields for European Research and in Horizon 2020, June 2012.

It should be recognized that SSH research can contribute not only to successful policy development (on governance and sustainability, for example); it can also serve as an innovation driver⁹. Indeed, SSH research has spawned entire new arenas for investment and growth through social innovation¹⁰. Arguably, interdisciplinary programmes for policy-relevant research benefit from integrating SSH expertise at all stages - from problem formulation ("work programmes") to project evaluation and project implementation.

Barriers to Interdisciplinary Research

As past experience has proven, anyone seeking to promote interdisciplinary research is up against formidable obstacles. An interdisciplinary agenda still challenges vested interests and practices of the traditional academic establishment, which includes not only universities and research institutes but also scientific associations and powerful publishers. Interdisciplinary progress is often perceived as occurring at the fringes of traditional disciplines. In terms of promotions and reputation, it runs the risks of not counting as much as contributions to the core of a given traditional discipline.

Commonly cited obstacles:

For Researchers

- Interdisciplinary research challenges the 'silo' structure of academic institutions that have tended to reward scientific production and stimulate careers that adhere to disciplinary patterns.
- Interdisciplinary research is difficult to get published in high-ranked journals, as journals tend to be mono-disciplinary in focus.
- Interdisciplinary research risks being reduced to ancillary services making narrowly defined contributions to a project without impact on the core of a given discipline.
- Researchers have little (if any) knowledge of how to build interdisciplinarity into a proposal or how to translate it convincingly in work packages.
- Ideological divides (different schools of thought) prevent some researchers – especially within the social sciences – from cooperating effectively.

⁹ For an analysis conducted in Denmark, see: DEA, The Social Sciences and the Humanities – use it don't lose it, Danish Business Research Academy, 2012.

¹⁰ NET4SOCIETY conference Challenge Social Innovation, 19-21 September 2011 (<http://www.socialinnovation2011.eu/>)

For Institutions

- **Programme design:** The request for interdisciplinary approaches often is added as an afterthought, not as part of the problem formulation. This often leads to disciplines operating within a project in parallel rather than developing a shared research agenda.
- **Programme funding:** Unsustainable funding patterns (lack of pilot phase, lack of perspective after project cycle) by programme owners reinforce doubts of experienced researchers vis-à-vis interdisciplinary projects.
- **Project evaluation:** The merits of interdisciplinary research proposals are difficult to evaluate. Assessments typically benchmark against disciplinary criteria. Agreed indicators for evaluating interdisciplinary research proposals and for composing qualified interdisciplinary evaluation committees are lacking.

Best Practice Examples

RESEARCH ENVIRONMENT

Thinking outside the box – the FUTURAGE project

FUTURAGE is an FP7 project aimed at developing A Road Map for European Ageing Research. The project serves as a successful example of interdisciplinarity in practice.

Featuring “full engagement with key non-academic stakeholders in ageing research”, the project defined its priorities through an ‘iterative process of extensive consultations’. Over 300 persons representing no fewer than 26 separate disciplines were involved in the consultative process that led to the creation of 4 working groups. FUTURAGE sought to integrate interdisciplinarity into (and across) all work packages, carrying it all the way through to the writing and proofing process. The presence of young people in the project, was very helpful in “thinking outside of the box”. Also helpful was the fact that the project design was largely user driven. Cross involvement among work package leaders, was extremely useful in assuring that the interdisciplinary mode of operation carried through to the end of the project.

<http://www.futurage.group.shef.ac.uk/road-map.html>

Best practice examples (continued)

POLICY DESIGN

The Irish National Higher Education Strategy to 2030¹ highlights the multi-dimensional nature of many of the social, economic and civic challenges that require multi-disciplinary approaches. The Strategy asserts that higher education institutions, in partnership with others, are uniquely well placed to lead, develop and apply these. Research funding councils also stress the importance of building a critical mass of interdisciplinary researchers at universities. In **Finland, a strategy report by the Research and Innovation Council (RIC)**² identified a key aim of producing younger doctoral students who are more multidisciplinary and international, particularly as they play a key role in research networks. **In the UK, the Research Excellence Framework**³ (as did its predecessor, the Research Assessment Exercise) assesses academic departments on the level of their interdisciplinary research, thus creating a strong policy imperative for UK university departments to engage in the cross-fertilisation of research ideas and concepts.

1: http://www.hea.ie/files/files/DES_Higher_Ed_Main_Report.pdf

2: [http://www.minedu.fi/export/sites/default/OPM/Tiede/tutkimus-
_ja_innovaationeuvosto/julkaisut/liitteet/Review2011-2015.pdf](http://www.minedu.fi/export/sites/default/OPM/Tiede/tutkimus-ja_innovaationeuvosto/julkaisut/liitteet/Review2011-2015.pdf)

3: <http://www.ref.ac.uk/>

Best practice examples (continued)

RESEARCH PROGRAMME DESIGN

ESRC – UK's Economic and Social Research Council

Examples of research funding organizations fully embracing interdisciplinarity are rare. One of these exceptional entities is the UK's Economic and Social Research Council (ESRC). The ESRC has no disciplinary structure' and there are two reasons for this: first of all, 'disciplines are social constructs' and should not be regarded as fixed. But more importantly, the Council's experience has shown that 'impacts are greater with interdisciplinarity'. ESRC supports independent, high quality research that has an impact on business, the public sector and the third sector. Over 4,000 researchers and postgraduate students in academic institutions and independent research institutes have been supported. All ESRC research awards are made in open competition, subject to transparent peer assessment at the outset and evaluation on completion. Research involves multidisciplinary teams, collaboration with other councils, and frequently takes a long-term view.

Recommendations

I. For designing interdisciplinary research programmes

Institutional framework conditions of the research system

- **Teaching:** Teach methods that allow for the integration of knowledge from different disciplines into multi-, inter-, and transdisciplinary approaches; demonstrate impact on the core disciplines involved.
- **Funding:** Increase flexibility in funding framework: preparatory and pilot projects for overcoming disciplinary biases, sufficiently long timeframe (interdisciplinary projects typically need a longer timeframe to realize their potential), sustained support, especially when requesting impact measures; for multiannual, multiprogramming frameworks such as Horizon 2020 a substantial margin for new developments should be factored in. Work Programmes must support the interdisciplinary endeavour.
- **Knowledge transfer and co-production:** Create better conditions for data mobility and accessibility across disciplines, domains and sectors to support transition to transdisciplinary research.

Programme design

- **Topics:** Balance needs for policy-relevant research and the pursuit of true scientific novelty when designing new interdisciplinary programmes.
- **Governance:** Ensure interdisciplinarity (possibly also involving users of research) in the composition of planning, advisory, and evaluation committees of programmes; request similarly broad range of expertise in the internal governance of projects.
- **Call:** Ensure that the call spells out explicit interdisciplinarity requirements for project proposals in response to research topics.

Evaluation

- **Principles:** Evaluate novelty in the combination of disciplines and methods in response to the research theme; specifying criteria, without distinguishing between fundamental and applied research.
- **Panel:** Include interdisciplinary research experts on evaluation panels; evaluate and emphasise the quality of interdisciplinary integration in project design (including project management and the experience and skills of project coordinator).
- **Impact:** Reward use of new publishing practices (Open Access) and of proactively involving non-academic users of knowledge (e.g. civil society organizations, policy makers, business, etc.), if requested in call.

Recommendations

II. For researchers while building an interdisciplinary research project:

- Build interdisciplinarity into the project from the start at all governance and implementation levels (methodological pluralism at the core; avoid “add-on” of disciplinary contributions); involve all categories of relevant stakeholders (including, if relevant, partners with policy/practice orientation) along the entire process - in governance, advisory bodies and research.
- Clarify core shared terminology at the beginning of the project and agree on measures to assess appropriate level of interdisciplinary integration for successful deliverables.
- Select an experienced project manager/coordinator who can pro-actively help networking and community-building in the early stages (sufficient funding for this critical phase needs to be guaranteed).