How to Facilitate Interdisciplinary Research

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Who I Am

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Roles:
• Director, MSU Center for Interdisciplinarity
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Affiliation:
• Dept. of Philosophy, MSU
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Expertise:
• Science of team science
• Philosophy of language & communication

I am a philosopher who works on interdisciplinarity and an interdisciplinarian who engages with projects philosophically.
Where I Am

**Michigan State University**

**Research University:**
- $695M US in research expenditures
- Research is emphasized for faculty
- Emphasizes interdisciplinary research

**Land Grant University:**
- Established with the Morrill Act that provided land for colleges
- Committed to providing research-based responses to problems that arise for residents of the State of Michigan
- Engaged in transdisciplinary research with community partners
Center for Interdisciplinarity

Original Research on IDR:
• Committed to conducting research on interdisciplinary process
• Adopts a broadly philosophical perspective
• Influences research support

Research Support:
• Offers a variety of programs that support interdisciplinary research on campus
• Facilitates cross-disciplinary research internationally with dialogue-based ”Toolbox” workshops
• Uses data from facilitation efforts to inform research efforts
Facilitating interdisciplinary research

1. Setting the context
   • Why?
   • What?

2. Challenges and Responses
   • Institutional
   • Interpersonal
   • Individual

3. Case Study: The Toolbox Dialogue Initiative
Why do interdisciplinary research (IDR)?

- More people are engaged in IDR and more people are talking about it[1] – what accounts for this?
- IDR is difficult – you need to learn how to function effectively as a researcher outside the limits of your expertise – So why do it?
- A desire to save the world
Why Do IDR?

Save the world?

– The complex problems for which IDR is taken to be required include Grand Challenges and existential crises.

– IDR is understood to be a critical part of responses to these problems\(^{[2]}\), since they do not respect disciplinary boundaries.

– Researchers also increasingly recognize the limitations of disciplinary thinking, and some argue that we must move past disciplines.
Two Motivations

- **Scientific**: IDR allows us to meet complex problems with complex responses
- **Political**: IDR enables us to undermine the hegemony of the discipline in research endeavors
Beware the assumptions underneath

Scientific: complex reality can be “exfoliated” through an epistemic division of labor that assigns different parts of reality to different disciplines\(^3\)

- Disciplines supply knowledge of a facet or part that can be fitted together (or integrated) with facets or parts from other disciplines
- Related to positivist conceptions of knowledge\(^4\)
- Disciplines are socially constructed – they reflect the values, priorities, and experiences of those who contribute, which are biasing and partial\(^5\)
Disciplines as Windows

What you might think disciplines are: clear windows on the world
Disciplines as Windows

If disciplines are like windows, then they are more like this window:
The kind of complex whole that you might think interdisciplinary research produces:
What We Want From IDR
But what you really get is something like this -- a whole that combines the different perspectives in a way that enables you to think differently about the world.
Beware the assumptions underneath

- **Political**: Disciplines are guilds that protect their interests and their share of the academic market\(^6\)
  - There is truth to this, but it carries with it significant risks
  - **Individual**: it risks marginalizing early career researchers who wish to pursue this mode of research practice
  - **Society**: it deflects attention away from the Grand Challenges and wicked problems
  - It’s arguably not helpful in this context to reconceive ID as a side in an internecine battle within the academy
Disciplines

– Understand *disciplines* as an *epistemic technology*

– They are socio-historical constructions that:
  • Are associated with a circumscribed but dynamic range of “appropriate” questions
  • Leverage methods and prior knowledge
  • Are modes of mental training that induce ways of seeing and acting (e.g., *gen ed → major → graduate program*)
  • Are reflected in the organization of universities, libraries, and databases
Think of disciplines as

– Intrinsically constituted and maintained set of knowledge practices that are sufficiently widespread and stable to receive institutional support
– Given this, from different angles they are both:
  • Epistemic cultures\textsuperscript{[7]}
  • Research markets\textsuperscript{[6]}
What is interdisciplinarity?

– Applying *inter*- to *discipline* suggests that there is mutuality or reciprocity between or among disciplines (cf. *interaction*)

  – This entails *combination* or *exchange* – the disciplines in an interdisciplinary activity function together in a way that can be described as *mutual dependence*

  – This *mutual dependence* can be conceived *ecologically* – elements systematically related to one another[8]

  – Mutual dependence is typically conceived in terms of *integration*
A preference for “cross-disciplinary”

– Going forward, I’ll speak of ”CDR”[^9][^10]

What is cross-disciplinary research?

Research involving multiple disciplines

- MD
- ID
- TD

[^9]: [^10]:
What is integration?

– Klein calls it the “primary methodology of interdisciplinarity”[11]
  – To call it a “methodology” is to suggest that it is an abstract account of the success of IDR methods
  – Emphasizes combining things into a “whole”
– Although many take it to be thick, I prefer a thin notion in terms of mutual dependence
  • Take mutual dependence to be a category of integrate relations, which can be more or less deflationary
  • Understand integration in terms of an IPO model[12]
Ontology of CDR

A relational, IPO model of integration

**INPUTS**
- Quality: abstract elements (e.g., cognitive – Repko 2012; social – Klein 2012); concrete elements (e.g., fields – Grantham 2004; data – O’Malley & Soyer 2012)
- Quantity: number + degree of difference

**PROCESS**
- Quality:
  - Nature of integrative relation: fuse, knit, mix, etc.
  - Purposive: Yes/No
  - Algorithmic? Heuristic?
- Quantity: number of changes + degree of change

**OUTPUT**
- Quality: abstract elements (e.g., understanding – Repko 2012, policy response – Bergmann et al. 2012, Bammer 2013); concrete elements (e.g., explanations – Brigandt 2010)
- Quantity: number + difference from inputs

Commensurability: High/Low Conflict

Scale: Global/Local

Comprehensiveness: High/Low

[12]
What are we after when we evaluate CDR?

– This is tricky, especially given the multidimensional variety of CDR\(^{[11][13]}\)

– Huutoniemi offers three sets of values that could guide us:\(^{[13]}\)
  • Mastering multiple disciplines – a disciplinary approach
  • Emphasizing integration and synergy
  • Critiquing disciplinarity
**Evaluation of CDR**

**CDR = disciplinary research?**

– Do we evaluate it as we do disciplinary research?
  • If so, then we can use standard metrics
  • But this is neither sufficient nor necessary for CDR

– One complaint: a CDR project is “productive but not interdisciplinary” – what is missing?
  • *Proposal*: integration
  • No standard way to evaluate this: we can specify multiple inputs\[^{14}\] or require integrative processes\[^{15}\] but no standard, integrative assessment of outputs
  • One idea: look at arguments made in the products\[^{16}\]
CDR is complex and highly variable

- Doing CDR well – what does that require?
- There are many challenges that should be articulated and addressed\[17\] – these can be classified in many ways
  - I’ll use the institutional/interpersonal/individual classification of challenges
  - This lines up with the macro/meso/micro “levels” classification found in the literature\[18\]
The ‘R’ in ‘CDR’ is research

– Since we’re talking about research, we’re talking about knowledge, so I will use an epistemological lens to focus on the challenges
  • To be successful, CDR should generate new knowledge and understanding
  • Thus, obstacles to knowledge production qualify as challenges to be met

– I’ll sketch a few challenges along with responses that I’ve found to be effective
Bias against CDR

- In many institutions, disciplinary knowledge production is the ideal, and CDR is a departure from the ideal – e.g., less rigorous, more applied
  - This can function *formally*, via performance evaluation standards, tenure and promotion standards, funding criteria
  - It can also function *informally*, via lack of support or even understanding from colleagues about what you’re up to
  - This affects early career professionals most especially
Institutional Responses

Build community

- It’s the rare institution that doesn’t harbor some animosity toward or misunderstanding about CDR

- **Suggestion**: Seek out a community that values your work
  
  • There are also professional communities that are congenial to this type of scholarship, e.g., AIS\[19\], INSciTS\[20\], Intereach\[21\]
  
  • You can also create a subcommunity within your institution to support your work

- Example – CDR projects can publish in disciplinary venues if need be
Expert confusion

– You’re an expert, but that doesn’t mean you can’t be deeply confused about things that matter to you

– CDR creates conditions for expert confusion
  • This includes incommensurabilities among disciplines\textsuperscript{[22][9]}
  • Confusion within collaborations – how do we understand what we’re doing? How do we evaluate it as we’re doing it? If integration is important, how do we know when we are integrating?
  • This is one place where it may matter which labels you use to describe what you do, pace [2]
Engage in perspective-taking

– Actively seek out the perspectives of your collaborators\(^{[23]}\)

– Try to “understand, in a non-judgmental way, the thoughts, motives, and/or feelings of a target, as well as why they think and/or feel the way they do”\(^{[24]}\)

  • This is critically important in a CDR project
  • There are tools to aid you in doing this – e.g., concept mapping\(^{[25]}\) and the Toolbox approach
Epistemic arrogance

– This is reflected in disciplinary chauvinism[26]
– It is reflected in an unwillingness to defer, or a belief that one’s explanation tells the whole story
– This is potentially explained by the formation of expertise – we are encouraged to think that we are correct, that our perspective is the one that represents understanding
– CDR, though, demands listening, learning, and a willingness to defer
Cultivate a culture of dialogue

– Dialogue as a practice encourages a different relationship with one’s interlocutors
  • It emphasizes deep listening\(^{27}\) and a commitment to collaborative meaning construction and understanding\(^{28}\)
  • It shifts a group from a collection of “I”s to a “we”\(^{29}\)
– This can be emphasized in projects and other communities as part of a communication culture\(^{30}\)
– Here again, something like the Toolbox approach can help
What is the problem we seek to address?

– Unacknowledged differences compromise interdisciplinary research and practice
  • Language differences among disciplines and affiliations
  • Differences in values, priorities, and cultures
– These differences can generate challenges at all levels:
  • Support institutional bias
  • Create confusion among well-meaning collaborators
  • Strengthen the conviction of arrogant collaborators
What is our response?

- If *unacknowledged* differences are a problem, then it should help to *acknowledge* those differences
  
  • Acknowledging differences can enhance mutual understanding among collaborators, thereby improving communication and, eventually, project integration
  
  • This can help meet challenges at all three levels
  
  • We enhance mutual understanding through dialogue-based workshops and related co-creation activities
The toolbox is intended to facilitate movement of CDR teams from unreasonable collective states to reasonable ones.
The main idea

**Enhanced understanding → Enhanced communication**

– Operationalize this idea *philosophically* in dialogue[^31]

– Dialogue encourages integrative practices:
  - Reflexivity
  - Perspective-taking
The Toolbox Dialogue Method

The Toolbox instrument

– A set of philosophical prompts that aim to get at issues related to the concerns of our partner

• Several modules with core questions and probing statements
• Topics are various: values, methodology, models, trust,
• Probing statements are Likert items
• They are meant to suggest topics for discussion that can reveal salient differences
Toolbox Dialogue Method

The Toolbox dialogue

– The Toolbox workshop focuses on dialogue about the instrument
  • Begin anywhere, follow interests around the instrument
  • The dialogue is typically lightly-facilitated
  • Participants represent the facet(s) most relevant to their work with this team in their responses
  • There are no right answers
Co-creation activity

– Allow participants to build on insights and create or define deliverables
– Can take the form of:
  • Lightly structured, e.g., open brainstorming next steps toward project goals
  • Heavily structured, e.g., brainstorming and dot polling, consensus building
Workshop Experience

300+ workshops around the world

21 U.S. states and territories, 14 countries

| Intro | The Context | Challenges & Responses | Case Study: Toolbox |
Toolbox Research

Study cross-disciplinary process

Study cross-disciplinary process

Evaluate workshop effectiveness

Determine Toolbox impact

<table>
<thead>
<tr>
<th>Intro</th>
<th>The Context</th>
<th>Challenges &amp; Responses</th>
<th>Case Study: Toolbox</th>
</tr>
</thead>
</table>
Conclusions

How can we facilitate CDR?

– A common thread in this talk has been the importance of communication
  • Making community
  • Encouraging perspective-taking
  • Building a culture of dialogue

– Focusing on communication won’t solve all your problems, but it can help improve chances for CDR success\cite{17}

– For other problems, we need more tools, and there is more work to be done!
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