

Improving Interdisciplinarity needs Three Break-throughs

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Overview

1. Recognise multiple kinds of interdisciplinarity
2. Differentiate the various kinds of interdisciplinarity on four core elements
3. Interdisciplinarians need to organize (and funders have a key role)

Recognise multiple kinds of interdisciplinarity... 1

For different outcomes eg

- Enhanced disciplinary or field perspectives
- New productive ways to understand problems
- Commercialisation opportunities
- Ways forward on ‘wicked’ societal problems

Multiple kinds of interdisciplinarity... 2



Historian who 'borrows' from sociology, anthropology, applied ethics

Enhanced disciplinary/field perspective



Collaboration between psychologist and economist (behavioural economics)

New productive way to understand problems



Team from physics, chemistry & engineering developing a new technology

Commercialisation opportunities



Team from life sciences, physical sciences, medicine & engineering developing breakthrough ideas

Commercialisation opportunities



Team from the natural and social sciences researching sustainability

Ways forward on 'wicked' societal problems

BUT confusing array of terminology & approaches

Eg

Inter-, multi-, trans-, ...

Use-inspired res...

Systems thi...

Action ...

Pr...ence

Sus...y science

Convergence research...

**Fragmentation of effort,
resources, understanding**

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Four elements of differentiation

1. Knowledge
2. Unknowns
3. Integration
4. Implementation

Key issues: 1. Knowledge

- disciplines +/- stakeholders (end-users)
- application of existing knowledge to new problem
- development of new knowledge
- deal with elements of complexity ('wickedness')
eg systems, values, context

Key issues: 2a. Unknowns

1. **Disciplinary** unknowns
2. Unknowns of concern to **stakeholders**
3. Unknowns **marginalised** by power imbalances
4. Unknowns in the **overlap** between disciplines
5. New **problem-based** unknowns
6. **Intractable** unknowns

Key issues: 2b. Unknowns

1. Disciplinary
 2. Concern stakeholders
 3. Marginalised by power imbalances
 4. Overlap of disciplines
 5. Problem-based
 6. Intractable
- i. Reduce
 - ii. Banish
 - iii. Accept
 - iv. Exploit
 - v. Surrender to
 - vi. Deny

Key issues: 3. Integration

- of/for what
- how complex (**number** & **diversity** of disciplines/stakeholders; **value conflict**)
- **how** (dialogue, model, product...)
- **when** (beginning, end, continuous)
- **by whom** (individual, whole team, sub-group)

Key issues: 4a. Implementation

Yes/No.

Key issues: 4b. Implementation

Yes/No. If yes:

- Policy &/or practice change or product
- Government, business, civil society

How?

- Inform, catalyse, engage, drive

To understand different types of interdisciplinary research need to define...

- What aiming to achieve?
- Which knowledge is relevant?
- Which unknowns are important?
- How will integration occur?
- Is implementation an aim? If so, how?

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Organise! 1. Leadership

No authoritative leadership group = critical vacuum

Professional organisations are small and lack power and intellectual heft

Few leaders are effectively advising about (and lobbying for) interdisciplinarity

Global meeting of leaders of interdisciplinary organisations, March 2018



See Palmer, 2018 (Nature Sustainability <https://rdcu.be/234H>)

Outcomes	Interdisciplinary Research Community		Funders
	Leaders	Bulk of researchers	
Authoritative leadership group	***		*






Note to funders:

- Stop using consultants who don't know anything about interdisciplinarity
- Support/Provoke leadership efforts

Organise! 2. College of peers

- Review by disciplines alone is not enough
- Extra dimensions – knowledge, unknowns, integration, implementation
- Critical that ‘like reviews like’

Multiple kinds of interdisciplinarity

	Historian who ‘borrows’ from sociology, anthropology, applied ethics
	Collaboration between psychologist and economist (<u>behavioural economics</u>)
	Team from physics, chemistry & engineering developing a new technology
	Team from life sciences, physical sciences, medicine & engineering developing breakthrough ideas
	Team from the natural and social sciences researching sustainability

Outcomes	Interdisciplinary Research Community		Funders
	Leaders	Bulk of researchers	
Authoritative leadership group	***		*
College of peers	***	***	***

Note to funders:

- You have a key role
- Needs investment, long-term view, persistence

Organise! 3. Protocols

No agreed way to write an interdisciplinary methods section for a paper or grant application

- Important for peer review
- May need more space in applications

Needs an agreed framework

Outcomes	Interdisciplinary Research Community		Funders
	Leaders	Bulk of researchers	
Authoritative leadership group	***		*
College of peers	***	***	***
Application & report protocols	***	*	***

Note to funders:


Grants may need more time or two stages

Laboratory analogy for good collaborative processes
(eg travel/meetings, project co-ordinator etc)

Organise! 4. Education






What are we educating for?

- Generalists
- ‘T-shaped’ researchers (Discipline plus)
- Expertise in intersections between 2+ disciplines
- Integration and Implementation specialists (Statistics analogy)
- All of the above



Australian
National
University

Multiple kinds of interdisciplinarity

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15

Organise! 4. Education cont.

Don't expect students to do something that the professors cannot!

Teachers need to teach to their expertise, so skills development needs to start at the top.

Need an agreed curriculum.

Outcomes	Interdisciplinary Research Community		Funders
	Leaders	Bulk of researchers	
Authoritative leadership group	***		*
College of peers	***	***	***
Application & report protocols	***	*	***
Education	***	***	*

Note to funders:

Needs synergy with proof of expertise in grant applications

Organise! 5. Career progression and reward

Need to recognize relevant expertise (eg integration, implementation, stakeholder engagement, team co-ordination)

Assessment by 'real' peers is critical

Needs top-level organisation (college of peers, professional associations etc)

Outcomes	Interdisciplinary Research Community		Funders
	Leaders	Bulk of researchers	
Authoritative leadership group	***		*
College of peers	***	***	***
Application & report protocols	***	*	***
Education	***	***	*
Career progression	***		**

Note to funders:

Provide synergy eg by funding fellowships

Organise! 6. Resources

Fragmentation means resources (methods, concepts etc) are dispersed

Leads to

- Reinventing the wheel
- Use of substandard methods and processes
- Lack of continuous quality improvement

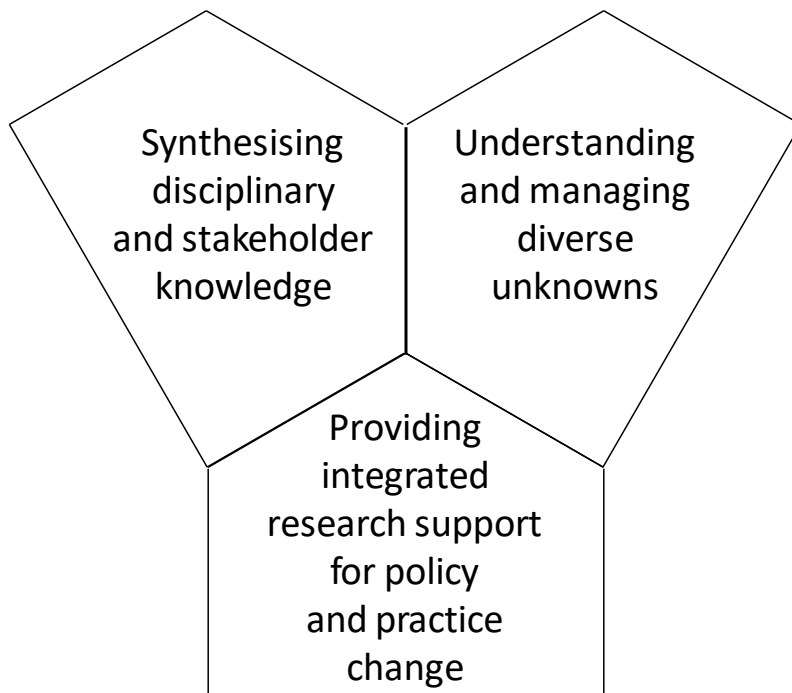
Need to build a shared repository

Need more high-quality publication outlets (very few good journals especially for methods)

Journals publishing ID methods

Subset of approaches or methods	Topic- related	General research policy and practice
<ul style="list-style-type: none"> • <i>Action Research</i> • <i>Implementation Science</i> • <i>Interdisciplinary Science Reviews</i> • <i>System Dynamics Review</i> • <i>Systems Research and Behavioral Science</i> 	<ul style="list-style-type: none"> • <i>Conservation Biology,</i> • <i>Ecology and Society</i> • <i>Global Environmental Change</i> • <i>Public Health Research and Practice</i> 	<ul style="list-style-type: none"> • <i>Research Policy</i> • <i>Journal of Research Practice</i> • <i>Science and Public Policy</i>
Mostly low IF	Mostly high IF, but few articles	Mixed IF, few articles

New discipline of Integration and Implementation Sciences (i2S)?



Q1 For what and for whom?

Q2 What is needed?

Q3 How?

Q4 Context?

Q5 Outcomes?

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Authoritative leadership group	***		*
College of peers	***	***	***
Application & report protocols	***	*	***
Education	***	***	*
Career progression	***		**
Resources	***	***	***

Note to funders:

Attention to methods quality (and reinvention) in peer-review
 Help build repositories and support their use

Organise! 7. Quality improvement

All of the above

Mechanisms to share learning

But there are also cautions

- Beware setting the bar too high, given the state of the field
- Allow for some 'clunkiness' as interdisciplinarity develops



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College of peers	***	***	***
Application & report protocols	***	*	***
Education	***	***	*
Career progression	***		**
Resources	***	***	***
Quality improvement	***	***	***

Note to funders:

You are the leaders in supporting
interdisciplinarity at the moment

Zero sum game

Be in it for the long haul!



Thank you.

Questions?
Comments?
Debate?