A SHORT GUIDE TO THE REPORT

The character of interdisciplinary research

EXAMINED THROUGH A SAMPLE OF SOCIO-ENVIRONMENTAL RESEARCH PROJECTS

AUSTRALIAN ACADEMY OF THE HUMANITIES

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Making interdisciplinary research work

There are considerable benefits in encouraging interdisciplinary research, particularly where the objective of the research is to achieve useful economic, social, environmental or cultural outcomes. The real world does not always present its problems and opportunities conveniently aligned with traditional academic disciplines so mechanisms are needed to facilitate interactions and collaborations between researchers working in widely different fields.

Supported by the ARC Linkage Learned Academies Special Projects Funding this project addresses two outstanding problems: the application of interdisciplinary research to the broad, problem-based research and how to use this understanding to find effective ways of approaching the array of challenges confronting Australia.

The project comprises four components with the first report, *Strengthening Interdisciplinary Research – what it is, what it does, how it does it and how it is supported* (published in February 2012) making a series of recommendations that were built on for this report, *The Character of Interdisciplinary Research* (components two and three).

Strengthening Interdisciplinary Research – what it is, what it does, how it does it and how it is supported

Authored by Professor Gabriele Bammer, *Strengthening Interdisciplinary Research – what it is, what it does, how it does it and how it is supported* examined the status quo in the field of interdisciplinary research in Australia, made a number of key findings and presented a set of six recommendations:

- The establishment of an agreed parsimonious classification which distinguishes the major kinds of interdisciplinary research.
- The establishment of standard reporting systems to fully describe different kinds of interdisciplinary research, allowing them to be understood, assessed and learnt from.
- The compilation of useful strategies into "toolkits", providing a range of options for conducting different aspect of interdisciplinary research, such as synthesising knowledge, building trust and engaging with end-users.
- The development of an effective system to collect data about the amount of interdisciplinary research of various kinds which is being undertaken.
- The development of an effective system to collect data about the quality of different kinds of interdisciplinary research. The assessment of the best ways of educating the next generation, including the value of starting with a base in a discipline and determining which skills are relevant.
- The convening of an ACOLA workshop with key individuals from government, industry, philanthropy and research organisations to develop action plans for strengthening interdisciplinary research.

The report is available at www.acola.org.au

Aims

This component of the program, *The character of interdisciplinary research – examined through a sample of socio-environmental research projects,* builds on the foundation established in *Strengthening Interdisciplinary Research,* examining in detail interdisciplinary research related to environmental sustainability. Drawing upon information about a sample of research projects and programs in the field of environmental sustainability at Australian universities to this report sought to:

- identify the breadth of interdisciplinary research programs and projects in Australian universities and other research organisations
- assess the extent to which ineffective policies and other barriers affect those research programs and projects
- observe good and bad practices and assess strategies for overcoming the hurdles to doing interdisciplinary research
- identify useful methods that researchers have employed to overcome some of the difficulties and barriers to interdisciplinary research
- document current achievements and the future opportunities for high quality interdisciplinary research into issues of sustainability.

Interdisciplinary research about sustainability in Australia

Research about sustainability means research concerned with the ability of our society to continue to exist in the long run in something similar to its present form, insofar as that depends on the biophysical quality of our environment. The report found that its sample projects investigated four principal groups of topics: climate change and its impacts; the secure, sustainable supply of water, food and energy; landscape management, biodiversity and conservation; and urban areas as human habitats.

Key Findings

Barriers and Challenges

General challenges include:

- Little training exists in the practice of interdisciplinary research
- Additional time is required within interdisciplinary projects to overcome multiple languages and methodologies, develop trust between researchers and relations with stakeholders
- A body of knowledge as to how to practice interdisciplinary research (within the field of sustainability) is still lacking
- It is not clear that large projects or centres are the most effective at delivering interdisciplinary research

Institutional challenges include:

- A disjunct (for younger researchers) between interdisciplinarity and career progress
- A lack of high-impact, prestigious interdisciplinary journals
- University structures (departments, faculties) that mitigate against broader inquiry
- Interdisciplinarity may inhibit career progress; the academic job market is organised into disciplines
- There is a lack of agreement about what constitutes quality in interdisciplinary research
- Competitive research funding is usually reviewed within disciplines

Broader, extrinsic challenges include:

- A peer review and research funding environment that is often not welcoming to interdisciplinary projects
- The multiple roles that interdisciplinary researchers are forced to play, as intermediaries, facilitators and scientists

Characteristics of successful interdisciplinary research

The report identifies 13 key considerations for successful interdisciplinary research projects.

1. Leadership

The leadership group must be carefully chosen, ensuring that at least one member of the leadership group has project management skills. Interdisciplinary projects that involve several sub projects and several participants (with diverse motives) working towards a common goal over are complex operations.

2. Skills mix

The mix of disciplines represented in the project team must be chosen based on appropriateness to the project. The right mix of non-discipline skills is also essential such as project management, communications, facilitation and stakeholder management and data analytics and statistics.

Develop skills for the future, allow for succession, including the training and mentoring of junior researchers.

3. Team work

A good inter-disciplinary researcher should be: curious about, and willing to learn from, other disciplines (not suffer from disciplinary arrogance); flexible and adaptable; be open to ideas coming from other disciplines and experiences; creative; a good communicator and listener; able to absorb information and its implications rapidly; and a good team worker.

4. External input

Stakeholders and the public have information and skills that need to be combined appropriately with the information and skills of the researchers.

5. Ask the right questions

Spend a lot of time at the beginning getting the questions right.

6. Integrated findings

Successful projects factor into their design, at the beginning, how the findings of the different streams of research will be integrated. Different kinds of research proceed at different paces; thus, critical paths need to be understood for successful integration.

7. Size and scale

While there are plenty of pressures to enlarge projects, maintain an appropriate size. Large projects do not necessarily cohere; more people means more time spent on managing them; and additional people may take the project into inappropriate directions.

8. Meetings and communications

Consider the time, cost and means of communication to enable the most productive outcomes.

9. Plan for staggered outcomes

While projects can be scoped by defining research questions, implement projects by planning to deliver tangible products.

10. Supply and demand

Early decisions should be made about the role of end users or practitioners, whether they are to be central to the project and involved at all stages, on the leadership team or consulted at appropriate times.

11. Who will own the results?

Understand the role of commercialisation in the research program, if necessary ensure that the team has members who can facilitate. Protocols for intellectual property ownership should be agreed before the project commences.

12. The paperwork

Maintain documentation. A university and a funding agency will require lots of documents; in addition to these, however, the informal agreements with team members and end users need to be documented, as do the progress of individual sub-projects and the interactions between team members (and between the team and end users). Allow for these costs.

13. Managing the work-flow

Recognise that the team members have other responsibilities outside the project. The timing of contributions needs therefore to be explicitly negotiated between the leadership group and each team member, and documented.

Achievements And Opportunities

Interdisciplinary research into environmental sustainability in Australia is still in the early stages. The Cooperative Research Centres and larger programs studied for this report are among the earliest large-scale research projects into socio-environments within Australia. Apart from specific technical expertise and research on the interface between agriculture and environmental management, this decade has really been one of learning how to do this kind of research, how to foster it and how to fund it. There has also been progress in developing tools for integration. That achievement is not inconsiderable. However, Australia would benefit from developing a long vision around interdisciplinary research needs.

The Next Steps – Road testing the findings

The final component of *Making interdisciplinary research work* will road test the model of interdisciplinary research developed in the first two reports using a 'live' scenario to address one of the key challenges confronting Australia today. *Assistive Health Technologies for Independent Living: A Pilot Study* will look at the need to enable elderly and disabled individuals to live longer within their own home through the application of smarter and more cost-effective approaches to assistive technologies. The project will explore the benefits of an interdisciplinary approach to the technological, social and ethical issues surrounding technology- based solutions for aged and disabled housing.

The practicality, usefulness and relative importance of including (or omitting) the key considerations identified to date by *Making interdisciplinary research work* will be monitored during the execution of the final project.

REPORT AUTHOR
Professor Michael Webber FASSA

An Australian Research Council Linkage Learned Academies Special Project 2010 – 2012 (extended)

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