

# Evaluating an interdisciplinary research project: Lessons learned for organisations, researchers and funders



Rosalind H. Bark <sup>a,\*</sup>, Marit E. Kragt <sup>b</sup>, Barbara J. Robson <sup>c</sup>

<sup>a</sup> Land and Water Flagship, CSIRO, 41 Boggo Rd, Dutton Park, QLD 4102, Australia

<sup>b</sup> School of Agricultural & Resource Economics, Centre for Environmental Economics & Policy, M089/35 Stirling Highway, Crawley, WA 6009, Australia

<sup>c</sup> CSIRO Land and Water, Clunies-Ross Street, Black Mountain, ACT 2601, Australia

Received 1 April 2016; received in revised form 25 July 2016; accepted 11 August 2016

---

## Abstract

Interdisciplinary research is often essential to develop the integrated systems understanding needed to manage complex environmental issues that are faced by decision-makers world-wide. The scientific, institutional and funding challenges to interdisciplinary research have been the subject of considerable discussion. Funders remain willing to support such research and to evaluate its impact. In this paper, we develop and apply a set of review concepts to systematically evaluate a large interdisciplinary research project. The project was conducted at a national research organisation that seeks to facilitate interdisciplinary integration. We categorise evaluation concepts as process- and outcome-related and propose five practical management interventions to bridge the concepts to improve interdisciplinary integration. These management interventions are: agree on a conceptual model, incorporate independent review, support synthesisers, foster intra-project communication, and build-in organisational learning. We end with reflections on lessons for the structure of research organisations and of the research team to develop effective interdisciplinary research as well as providing a set of recommendations for interdisciplinary research funders.

© 2016 Elsevier Ltd, APM and IPMA. All rights reserved.

*Keywords:* Interdisciplinary research; Interdisciplinary integration; Evaluation; Matrix organisation; Project review

---

## 1. Introduction

Leaders world-wide are facing complex, dynamic challenges in natural resource management, so-called “wicked” problems (Ritchey, 2004). Projects that aim to support policy making in such wicked situations will ideally employ an interdisciplinary approach that integrates biophysical, social, and economic sciences (NAS, 2005; Pohl, 2011; Bammer, 2008). The literature has used various classifications of interdisciplinary research. Fig. 1 shows that the types of integration between disciplines can vary significantly. In the current paper, we focus predominantly on *interdisciplinary* research, where scientists from different disci-

plines share methods and data to work towards a common project goal. Interdisciplinary research has the potential to develop new approaches to defining and analysing a research problem that more closely represents the reality in which such problems are situated (Rosenfield, 1992). Funding bodies increasingly call for interdisciplinary research projects to address the most challenging and significant research problems (for a review of interdisciplinary funding by global funding agencies see, Gleed and Marchant, 2016). With this increased focus on interdisciplinarity, there is a case to evaluate the process and outcomes of such research. The current paper contributes to the limited knowledge on interdisciplinary research evaluation by providing an assessment framework that can be used to improve the organisation of interdisciplinary research projects.

While interdisciplinary research offers great promise, it is inherently more complex to manage and facilitate and evaluate research that integrates disciplinary knowledge. Most existing

---

\* Corresponding author at: School of Earth and Environment, The University of Leeds, Leeds LS2 9JT, United Kingdom.

E-mail addresses: [R.H.Bark@leeds.ac.uk](mailto:R.H.Bark@leeds.ac.uk) (R.H. Bark), [marit.kragt@uwa.edu.au](mailto:marit.kragt@uwa.edu.au) (M.E. Kragt), [barbara.robson@csiro.au](mailto:barbara.robson@csiro.au) (B.J. Robson).

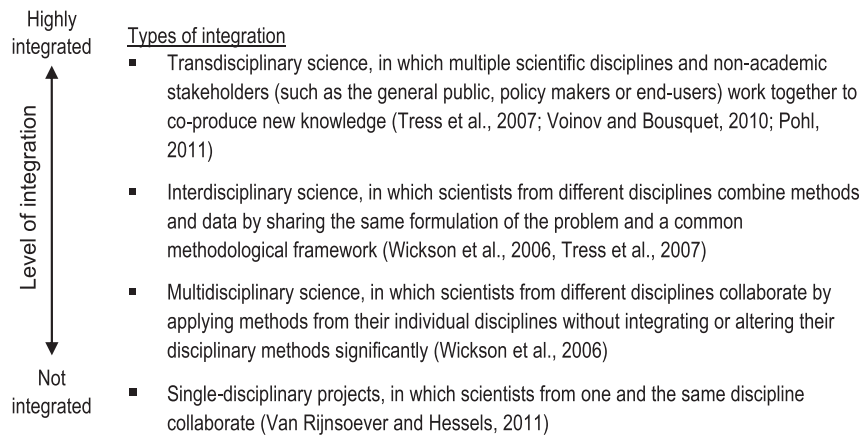


Fig. 1. Types of integration between disciplines.

literature addresses issues related to the process of integration, such as communication challenges between disciplines, epistemological differences, lack of clarity around project objectives, and how best to promote ownership of doing science in an integrative way (e.g. Naiman, 1999; Tress et al., 2007; Wickson et al., 2006; Kragt et al., 2016). Another challenge to working in interdisciplinary teams relates to the team itself (Armstrong and Jackson-Smith, 2013) and the structure of research institutions, which are often organised around disciplinary divisions, especially when procedures for promotion and tenure are based on excellence in a single discipline (NAS, 2005; Ravetz, 2006) or when funding for interdisciplinary research is limited (Fischer et al., 2012; Bromham et al., 2016). In addition, though interdisciplinary research papers typically have a higher citation impact in the long-term than single-discipline papers, they take longer to achieve this impact (van Noorden, 2015). Combined, this can mean that interdisciplinary research is less appealing for early-career scientist intent on building reputation and establishing an academic career (Rhoten and Parker, 2004; Schmidt and Moyer, 2008; Pfirman and Martin, 2010). Although it has been shown that interdisciplinary research could lead to a greater number of publications (Millar, 2013) and that integrated research can enhance, rather than detract from, the integrity and success of single-disciplinary research (Fox et al., 2006), there is still limited recognition for publications in interdisciplinary journals (Schmidt and Moyer, 2008).

Frameworks exist to guide integrated research, typically focussing on project management or contributions of individual researchers (see, for example, Fischer et al., 2012; Kragt et al., 2011; Pfirman et al., 2007; Van Rijnsoever and Hessel, 2011). While these guidelines are extremely valuable in helping individuals in their interdisciplinary ventures, researchers work in organisations that need to accommodate interdisciplinary projects. Kragt et al. (2013) argue that there are few institutional arrangements that “actively enable collaboration”. Some authors suggest that institutional reform is necessary to progress integrated research (Rosenfield, 1992; Frame and Brown, 2008; Schmidt and Moyer, 2008), for instance, by creating new interdisciplinary research positions or providing dedicated administrative support

(Pfirman and Martin, 2010). In a university setting, cross-faculty institutes can constitute a new model for integrated research (Rosenfield, 1992; Fischer et al., 2012). Other models to manage complex projects include ‘matrix organisations’ (Hobday, 2000; Kuprenas, 2003; Arvidsson, 2009). A matrix organisational structure is typically defined as one where there are multiple reporting lines; for example functional ‘vertical’ departments as well as cross-functional or cross-geographic ‘horizontal’ structures (Galbraith, 2008). Matrix structures are a means to manage across departments and functions in order to break down vertical silos and improve integration and coordination. Such new institutions have few guidelines regarding how to best facilitate and enable interdisciplinary research.

Evaluating interdisciplinary science projects can provide insights to improve future research collaborations (Bammer, 2008). However, interdisciplinary research projects cannot be evaluated against the standards of one discipline (Szostak, 2015). There are few clear indicators for end-of-award evaluation of interdisciplinary projects (Gleed and Marchant, 2016) and research on how to evaluate interdisciplinary projects has been sparse thus far (Huutoniemi, 2010). Funding bodies, research agencies and others still struggle to find practical ways to evaluate the quality of interdisciplinary projects and outputs (Strang and McLeish, 2015; Lyall et al., 2011). The present paper contributes to filling this research gap by providing a systematic set of evaluation principles for interdisciplinary and transdisciplinary research, and applies this to a large interdisciplinary research project and in so doing identifies a set of guidelines and recommendations.

In the following section, we introduce our case study project undertaken by a large, matrix-managed government research organisation (Australia’s Commonwealth Scientific and Industrial Research Organisation, CSIRO), followed by our evaluation methodology in Section 3. We apply Klein’s (2008) evaluative principles to draw considerations for research design, process and organisation in Section 4. In Section 5, we discuss five management interventions that research institutions could adopt to aid interdisciplinary integration and identify a set of recommendations for funders. A final section concludes the paper.

Download English Version:

<https://daneshyari.com/en/article/4922252>

Download Persian Version:

<https://daneshyari.com/article/4922252>

[Daneshyari.com](https://daneshyari.com)