



Contents lists available at ScienceDirect

# Studies in History and Philosophy of Biological and Biomedical Sciences

journal homepage: [www.elsevier.com/locate/shpsc](http://www.elsevier.com/locate/shpsc)

## Disciplinary capture and epistemological obstacles to interdisciplinary research: Lessons from central African conservation disputes



Evelyn Brister

Department of Philosophy, Rochester Institute of Technology, 92 Lomb Memorial Dr., Rochester, NY 14623, United States

### ARTICLE INFO

#### Article history:

Available online 30 November 2015

#### Keywords:

Interdisciplinarity  
 Collaboration  
 Applied epistemology  
 Biodiversity  
 Conservation policy  
 Social epistemology

### ABSTRACT

Complex environmental problems require well-researched policies that integrate knowledge from both the natural and social sciences. Epistemic differences can impede interdisciplinary collaboration, as shown by debates between conservation biologists and anthropologists who are working to preserve biological diversity and support economic development in central Africa. Disciplinary differences with regard to 1) facts, 2) rigor, 3) causal explanation, and 4) research goals reinforce each other, such that early decisions about how to define concepts or which methods to adopt may tilt research design and data interpretation toward one discipline's epistemological framework. If one of the contributing fields imposes a solution to an epistemic problem, this sets the stage for what I call *disciplinary capture*. Avoiding disciplinary capture requires clear communication between collaborators, but beyond this it also requires that collaborators craft research questions and innovate research designs which are different from the inherited epistemological frameworks of contributing disciplines.

© 2015 Elsevier Ltd. All rights reserved.

When citing this paper, please use the full journal title *Studies in History and Philosophy of Biological and Biomedical Sciences*

### 1. Epistemological commitments and the success of interdisciplinary inquiry

More funding for policy-relevant science, plus greater awareness of how environmental, biomedical, and social problems require multidisciplinary solutions, have focused attention on developing methods for improving scientific collaboration and production. Interdisciplinary research is now considered essential to solving “wicked” problems, and American and European agencies which fund research directed at solving social problems (the “Grand Challenges”) prioritize research that integrates the contributions of researchers from different fields.<sup>1</sup> Policy-relevant

research involving the biological and biomedical sciences very frequently requires collaborative efforts from research teams that include members from different branches of science. For instance, engineers and biomedical researchers contribute expertise to the development of imaging technologies; epidemiologists and sociologists contribute expertise to disease prevention policies; hydrologists, marine ecologists, anthropologists, and historians contribute to policies to remediate pollution of Chesapeake Bay. Life scientists are particularly involved both in collaborations that cross fields and in collaborations that are policy relevant. These include the design of policies that affect human health and wellbeing; the economics of health care delivery systems; the integration of cognitive and psychological sciences; the development of novel organisms, whether by traditional breeding methods, genetic engineering, or synthetic biology; and the implementation of agricultural, conservation, and land and marine management policies.

Collaborative scientific work, especially for large research teams, has become increasingly common and well-rewarded in recent decades (Wray, 2002), but cross-field collaborative projects, such as those enrolling both social and natural scientists, are less common than interdisciplinary collaborations between researchers in

E-mail address: [elbgsi@rit.edu](mailto:elbgsi@rit.edu).

<sup>1</sup> The distinction between difficult but ordinary problems of social planning and “wicked” ones is due to Rittel & Webber, (1973). Wicked problems incorporate higher levels of complexity as well as incomplete knowledge, contradictory expectations for solutions among stakeholders, or interdependence with other policy problems. Examples of wicked problems include the alleviation of poverty, the global response to climate change, and the development of carbon-neutral economies.

related fields (Porter & Rafols, 2009). In order to craft solutions which address the specific problems faced by cross-field interdisciplinary research, it is important to understand the nature of the intellectual obstacles that interdisciplinary collaborators face.

My aim in this paper is to construct a general framework that catalogs the epistemological obstacles to creating reliable and trusted knowledge claims in contested areas of inquiry, paying specific attention to collaboration between social and life scientists. Interdisciplinary research has been plagued by what are often described as communication problems.<sup>2</sup> I show that in some cases, at least, these problems are not best described as misunderstandings, but rather as a result of differences in deeply held epistemological commitments. Interdisciplinary inquiry can be obstructed when researchers hold incompatible philosophical assumptions about the nature of the world and the nature of their work.

I develop a catalog of types of epistemological obstacles to interdisciplinary collaboration through the examination of a particularly vexed problem where interdisciplinary research between biologists and anthropologists is needed but has been difficult to foster: the problem of devising conservation solutions in central Africa. In order to address this environmental problem, interdisciplinary collaboration between experts in conservation biology and experts in economic and social development is crucial. Although the need for collaboration is well-recognized, successful interdisciplinary collaboration has been rare. Instead, researchers have candidly criticized each other in public venues. It is possible to give a political reading to the invective (Adams & Hutton, 2007; Dowie, 2009). However, I argue that there is ample textual evidence to demonstrate that the basis for dispute is overdetermined and that many of the criticisms voiced by researchers relate directly to mismatched epistemological commitments. Successful interdisciplinary collaboration in this case is impossible without explicit attention to disciplinary expectations regarding the nature and methods of appropriate scientific inquiry.

In the next section, I examine current approaches to understanding factors that make a difference to collaborative success. Section 3 provides an overview of debates surrounding conservation policy in central Africa. In Section 4, I use the case of conservation disputes to draw out points of difference among epistemological commitments, and I examine how they are organized into stable disciplinary matrices. Finally, I evaluate strategies for addressing epistemological disputes. Although my hope is that a better understanding of the conditions that block or delay collaborative research will be a step towards developing solutions that can be generalized, I am not sanguine that these problems are easy to solve.

## 2. Disciplinarity, interdisciplinarity, and obstacles to knowledge production

Collaborative interdisciplinary scientific research promises to produce epistemic benefits directed toward addressing social, technological, and biomedical problems. Because interdisciplinary research is time-consuming, difficult, and risky (Ledford, 2008), it is important to investigate factors which make it more likely to succeed or fail.

K. Brad Wray (2002) identifies epistemic benefits which accrue to collaborative research. Two benefits are especially likely to apply to interdisciplinary collaborative research: “collaborative research has made possible types of inquiries that would not otherwise be feasible” (156) and collaborative research is of higher quality as

measured by citation rates. In the current research environment, there is an additional reason why specifically *interdisciplinary* collaboration is beneficial to researchers. Namely, the epistemic benefits, especially for work on complex problems of high social value, are actively pursued by public funding agencies by offering incentives to researchers willing to engage in interdisciplinary projects. Wray argues that competitive access to this funding drives the trend toward increased collaborative efforts (2002), and funding dedicated to support for interdisciplinary research has indeed increased in recent years.<sup>3</sup>

However, as many experienced researchers can attest, interdisciplinary collaboration is a risky undertaking—it promises high yields but introduces distinct difficulties as well.<sup>4</sup> Though many researchers are understandably reluctant to talk about failed projects, stories about difficult, tense, or failed interdisciplinary collaboration are common. Davies (2011) is a relevant account of the challenges which interdisciplinary researchers face. He participated in a broadly interdisciplinary project on the “Nature of Evidence,” with participants from jurisprudence, computer science, psychology, economics, statistics, and other fields, directed by Philip Dawid and William Twining, primarily at University College London. According to Davies, one of the difficulties of the project was that when there was a disagreement about how to proceed, the usual arguments, starting from shared disciplinary expectations, got no traction: “*Aporia* arose, then, when familiar disciplinary strategies were exhausted: a statement that was expected to command unproblematic assent failed to do so, further appeals to disciplinary norms merely complicated matters as they too were challenged, and so on until we reached a complete breakdown” (59). In the end, he writes, even the criteria by which to measure the success of the interdisciplinary project were ambiguous. Although the project did produce well-received presentations and publications, the group did not achieve their original aim. Davies, therefore, raises the question of whether a shift in the achievable outcome of the project should be judged negatively or if, instead, it should be judged positively, since their complex and imprecise accounts of evidence achieved a more accurate perspective on the subject matter than an oversimplified classification.

The high reward and high risk presented by interdisciplinary collaboration, together with the difficulty of identifying criteria for success suggests numerous problems calling for philosophical investigation. Sociologists and philosophers of science are examining how epistemic cultures are produced and maintained (e.g., Knorr-Cetina, 1999) and how facts and techniques are transferred from one context to another (e.g., Howlett & Morgan, 2011). Social epistemologists are examining the criteria for collective belief (e.g., Fagan, 2010; Rolin, 2010) and the dynamics of information exchange and aggregation (e.g., Andersen & Wagenknecht, 2013). These endeavors are complemented by projects which bring awareness of epistemological issues with interdisciplinary collaboration to the attention of policymakers (e.g., Miller, Minter, & Malan, 2011) and prospective scientific collaborators (e.g., O'Rourke et al., 2014). Additional work remains to be done in specifying the types of epistemological obstacles that tend to trip up interdisciplinary collaborations. To that end, this paper extracts

<sup>3</sup> For instance, in the United States funding for a program titled “INSPIRE: Integrated NSF Support Promoting Interdisciplinary Research and Education” increased from \$29M in 2012 to over \$42M in 2014 (Scott & Smith, 2014). This program's funding is targeted toward complex science issues such as space-weather monitoring and groundwater restoration. In the last section of this paper, I return to this idea that funding initiatives can direct the quality of interdisciplinary collaboration.

<sup>4</sup> For instance, the more complex a collaboration (e.g., the more institutions involved), the less likely it is to end with published articles (Cummings & Kiesler, 2007).

<sup>2</sup> See, for example, O'Rourke et al. (2014).

Download English Version:

<https://daneshyari.com/en/article/1161604>

Download Persian Version:

<https://daneshyari.com/article/1161604>

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