

## 52. Philosophy as a Theoretical Foundation for I2S

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Integrative applied research is a process of addressing consequential problems by: a) synthesising what is known about them by disciplinary experts and stakeholders, b) integrating that synthesis with a thoughtful response to what is unknown about them, and c) bringing the results to bear on both policy and practice aimed at ameliorating them. In the words of the US National Academies' Committee on Facilitating Interdisciplinary Research, work of this sort 'has delivered much already and promises more—a sustainable environment, healthier and more prosperous lives, new discoveries and technologies to inspire young minds, and a deeper understanding of our place in space and time'.<sup>2</sup> But integrative applied research is an exceedingly complex activity, involving a combination of players, contexts and challenges that is often *sui generis*. Those of us who engage in integrative applied research do our best to rely on experience as our guide when we launch a new project, but there is always a nagging concern that we could do better. How? One obvious method would be to check our plans against the best practices in the field. But there is simply no good, centralised 'storehouse' for expert opinion, relevant literature and 'best practices' related to the conduct of integrative applied research.

In her sweeping call to action in this book, Gabriele Bammer argues that we should address this problem by creating a new discipline: Integration and Implementation Sciences (I2S). In this book, she outlines what such a discipline might look like, beginning with broad, constituent domains (for example, knowledge synthesis and the integration and management of diverse unknowns) and moving through successively more focused framing questions, issues and examples. The vision put forward in this book reflects a mature, experienced appreciation for the shape and practice of integrative applied research, highlighting among many other things the importance of systems perspectives on this complex research mode, the centrality of communication issues to integrative applied research in all of its stages, and the existence and value of various nuanced responses to what is unknown about a research problem. In this commentary, I focus on theoretical aspects of this vision, arguing that philosophy could play a significant role in supplying a discipline like I2S with a secure conceptual foundation.

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<sup>1</sup> Michael O'Rourke was invited as a senior scholar 'who has been influential in stimulating interdisciplinary communication, including through the Toolbox Project'.

<sup>2</sup> National Academies (2005, p. 1).

## Disciplining Interdisciplinarity and the Role of Theory

I find the discussion highly stimulating, even while I remain uncertain about the prospects of a discipline emerging from the activities that surround and support integrative applied research. I take disciplines to be intrinsically constituted sets of methods, principles and practices sufficiently widespread and stable to receive institutional support. There will be those who resist *disciplining* interdisciplinarity because of a perceived threat to the flexibility and reach of interdisciplinary activity, but that is not my concern. That institutionalised communities of practice will form around interdisciplinary support activities is clear—it is already happening, as evinced by the Association for Integrative Studies and the work of the Science of Team Science network, among others—and these will quite likely lead to the development of the normed methods and confirmation regimens that mark *disciplinary* activity.

My concern is that I2S is too broad in scope to be anything more than a family of research activities. I suspect that I2S will be to disciplined interdisciplinarity what biological science is to microbiology and evolutionary biology—that is, an umbrella area covering a number of more or less loosely connected disciplines. The domains of knowledge synthesis, understanding and managing diverse unknowns, and policy and practice implementation are home to various integrative pursuits, but as Bammer herself points out, they are wide areas of intellectual endeavour that differ significantly in character. Will one community of practice emerge to bind them all or will there arise a number of more focused research communities?

Whether we see one discipline (such as I2S) or many emerge out of work that supports integrative applied research will depend in part on whether Bammer is correct in her assessment of the elements that constitute the Integration and Implementation Sciences. Little is said to motivate the selection of the three principle domains or the questions that subdivide them. What is missing—and here I second the commentary from Alison Ritter—is a theoretical foundation that can supply a disciplinary structure and justify these choices. A good disciplinary theory should satisfy two desiderata: a) supply a systematic conceptual foundation for the discipline that unifies its questions, methods and confirmation standards, and b) frame the disciplinary problem space in ways that are productive of new questions and insights. In the remainder of this commentary, I outline the prospects for philosophy as a source for such a theory, considering each of the desiderata in turn.

## Philosophy and Theoretical Foundations

We can begin by distinguishing between two questions that one might ask prior to initiating the development of a new theory for a prospective discipline such as I2S: 1) what concepts figure principally into the work of I2S that require analysis, and 2) how might those concepts be synthesised into a foundation for the whole of the discipline? This way of putting it suggests that analysis precedes synthesis, but the development process is typically more complex than that. Top-down, *a priori* intuitions about the conditions that make I2S possible will guide theorists in identifying which concepts are relevant, while bottom-up, *a posteriori* reflection on critical, paradigmatic concepts (for example, *integration, communication, complexity, uncertainty*) will influence intuitions about what the overall conceptual framework should be. In practice, these orientations would relate to one another in a feedback loop, mutually informing the theorist as she characterises the conceptual commitments of those who practise I2S. There is no single entry point into this loop, but adequate theoretical development will require sensitivity to both kinds of considerations and a considered effort to achieve reflective equilibrium.<sup>3</sup>

I will consider the second question first in relation to I2S. In Bammer's view, I2S is 'the discipline that underpins integrative applied research' (Chapter 2), and so it acquires its character in relation to integrative applied research. Thus, in theorising the philosophical foundations of I2S, it is critical that one takes seriously the fact that integrative applied research is first and foremost a form of *research*. Research is an activity that aims to augment our knowledge, and so it is fundamentally *epistemological*. First philosophy for I2S will therefore be epistemology. This is not to say that metaphysical or axiological concerns will not figure importantly into the foundations of I2S, but they will be framed by a concern with knowledge production. The theoretical prominence of epistemology in this context is reflected in Bammer's three domains: the synthesis of knowledge, the management of unknowns, and efforts to influence policy and practice are all essentially connected with the development of a more comprehensive understanding of the problems at issue.

She also gives privilege of place to two concepts that will figure importantly into the epistemology of I2S: *synthesis* and *integration*. She distinguishes these, taking the former to be 'the bringing together of disciplinary and stakeholder knowledge'—a task made complex by the incommensurability of the different ways of knowing involved<sup>4</sup>—and the latter to involve 'the combination of the synthesised knowledge with a considered response to the remaining unknowns

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<sup>3</sup> Daniels (2011).

<sup>4</sup> Miller et al. (2008).

about the problem' (Chapter 2). While I agree that this distinction captures an important difference in epistemic orientation while emphasising the central role to be played by what we *don't* know, it isn't clear to me that this is the best way to draw this distinction relative to integrative applied research.

The problem is in taking synthesis to require involvement of stakeholder knowledge. Surely synthesis—understood as an epistemic process that involves working with what you have in integrative applied research—is manifest in a translational research process involving cross-disciplinary collaborators who may not yet have access to stakeholder perspectives. (Consider, for example, work in the translational health sciences at the interface of bench and clinical research.) Instead, it may be more theoretically fecund to associate synthesis with the systematic, negotiated development of collective knowledge in general, and integration with the negotiated, reflective combination of what is known with what has been identified as unknown. So drawn, this distinction could be crossed with another distinction that introduces stakeholder perspectives.

This second distinction focuses on three types of combination familiar to those working in integrative applied research, specifically, *disciplinary*, *translational* and *professional* combinations (Table 52.1). Disciplinary combination comprises either synthesis or integration involving multiple disciplines; translational combination includes the disciplines as well as non-research partners in other sectors, including managers, policy makers and stakeholders; professional combination focuses on the individual researcher, who is often asked to combine multiple scopes of work into one unified professional identity. As an example of the last sort of combination, consider the academic who may aim to combine research, teaching and outreach activities into a coherent identity as an integrative applied research professional.

Turning now to the first question, we find a number of concepts that figure importantly into integration and implementation that raise interesting philosophical issues. We can use the standard, three-part distinction of philosophy into epistemology, metaphysics and axiology to help classify these. Within epistemology, some concepts will concern more local aspects of integrative applied research practice, such as the relationship among the six identified ways of dealing with unknowns, while others will concern topics of exogenous interest to philosophers, such as the prospects for *reasonable* disagreement in integrative applied research.<sup>5</sup> Many issues of theoretical interest will fall under the banner of metaphysics, including those related to the disparate scales that figure into integration and implementation, the character of emergent phenomena in complex systems and the ontological status of various boundary objects used to effect synthesis and integration. With respect to axiology,

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5 O'Rourke and Crowley (forthcoming).

Bammer has emphasised the importance of ‘dealing with values’, and that will be an important topic for philosophical theory. Ethical considerations will come into play across the trajectory of integration and implementation, as will issues of advocacy, bias and cultural variation. Philosophical attention to these topics and many others will be an important part of theoretical development of an enterprise such as I2S.

**Table 52.1 A Framework for Epistemological Combination in Integrative Applied Research**

	<b>Disciplinary</b>	<b>Translational</b>	<b>Professional</b>
<b>Synthesis</b>	Combination of knowledge contributed by multiple disciplines to a cross-disciplinary research effort	Combination of knowledge about an applied research problem involving contributions from non-research sectors (for example, stakeholders)	Combination of what one knows about one’s own professional commitments into a coherent identity
<b>Integration</b>	Combination of the product of disciplinary synthesis with a considered assessment of relevant disciplinary unknowns	Combination of translational synthesis with a considered assessment of unknowns from the constituent sectors	Combination of professional synthesis with a reasonable and balanced assessment of what one does not know about one’s professional situation

## Philosophy and Theoretical Productivity

One important test of the developing theory will be how it engages with the practice of I2S. Does the theory support the practice, generating insights as it grounds the development of the discipline, or does it swing free of the day-to-day business of I2S, remaining the province of just those who happen to be theoretically inclined? The goal should be theory of the first sort—robust, engaged and embodied in the life of I2S and the professional lives of its practitioners. While notoriously abstract, philosophy has been applied to integrative applied research with positive effect. Philosophical reflection on the theoretical commitments of interdisciplinary activity has generated just this sort of engaged theorising, contributing, for example, to the emergence of ‘field’ philosophy,<sup>6</sup> interactional expertise<sup>7</sup> and, in the case of my research group, the Toolbox Project.<sup>8</sup>

The Toolbox Project, developed out of the frustration produced by the challenges associated with integrative applied research, is a good case in point.

6 Frodeman (2008).

7 Gorman (2010).

8 Eigenbrode et al. (2007).

In 2001, the University of Idaho and CATIE (Turrialba, Costa Rica) received a US National Science Foundation Integrative Graduate Education and Traineeship (IGERT) grant to underwrite an interdisciplinary PhD program that focused on biodiversity conservation and sustainable agriculture in fragmented landscapes. Among the innovations in this project were the requirements that students work in teams of three to four from the start, identify a common, overarching research question, and write dissertations on aspects of this question. Students in each team were expected to produce publishable collaborative research and co-author a collective dissertation chapter. The work put the teams in contact with place-based stakeholder groups, adding implementation to integration as an additional dimension of their graduate education. Some of the teams struggled to find the key to integrative success and, as a result, students approached the principal investigator team and requested that the project seminar in the autumn of 2005 be devoted to philosophical issues in interdisciplinary research. Philosophy, they thought, might supply just the sort of abstract perspective that might facilitate the integration of the constituent disciplines in their teams.

Work in the seminar led to development of the Toolbox approach to cross-disciplinary communication. Philosophical thinking about the challenge of communicating across disciplinary boundaries led us to recognise the potential of philosophy to supply common ground for disciplinary synthesis. Participants in the seminar recognised that conceptual incommensurability was one important obstacle to effective cross-disciplinary work. It manifested itself in the form of terminological, methodological and ontological difference. Fundamentally different disciplinary epistemologies went unrecognised, generating the illusions of both disagreement and agreement, and leading to 'discourse' that was more an exercise in talking past one another. The group determined that collaborators could work out some of these differences in a dialogue structured to reveal conceptual differences systematically and efficiently. Cue philosophical theory. Drawing from both epistemology and the philosophy of science, the group developed a 'Toolbox' of prompts that limns the fundamental epistemological and metaphysical commitments of scientific researchers, exposing the elements that frame their research world views. By discussing these prompts in a workshop setting, collaborators acquire mutual appreciation of their conceptual assumptions, coming to see their research project through each other's eyes. The result is a type of dialogue method<sup>9</sup> that combines philosophy's ability to abstract away from disciplinary difference towards common ground with its

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9 McDonald et al. (2009).

theoretically systematic appreciation for the fundamental character of scientific research practice. The Toolbox approach was introduced by Eigenbrode and others<sup>10</sup> and subsequently funded by the US National Science Foundation.<sup>11</sup>

## Philosophy in Relation to I2S

Should I2S emerge as a discipline, there is no doubt that philosophers will turn their attention to it and examine its conceptual character; this is what philosophers do. The philosophy of I2S would certainly join the philosophy of music, the philosophy of sport and the philosophy of geography as a ‘philosophy of’ sub-discipline. But the relationship between philosophy and I2S could be much more vigorous and essential, yielding great value on both sides. In one direction, philosophy could take the lead in supplying a robust and coherent theoretical foundation that could support disciplinary development of I2S. While I agree with Michael Smithson’s commentary that philosophy is not a good ‘template’ for I2S as a discipline, it is worth emphasising that I2S is in its nascent stage and at present lacks a ‘philosophical consensus’ about its ‘ontology and epistemology’; in fact, it is precisely this consensus that *constitutes* a theoretical foundation, and what better discipline to supply this foundation than philosophy? In the other direction, I2S could serve as a type of ‘full-service’ platform for philosophical work, similar to science and the environment, supporting interesting work in the three main philosophical branches identified above: epistemology, metaphysics and axiology. Sadly, though, at this time few philosophers recognise the potential that integrative applied research holds for their discipline. While there are exceptions,<sup>12</sup> this is a reflection of philosophy’s staid, traditional nature, especially in its more hallowed halls.<sup>13</sup> Whether work that falls under Bammer’s term ‘Integration and Implementation Sciences’ will constitute a single discipline is unclear to me, but I am hopeful that as it continues to gain momentum and stature, it will take philosophy along with it (even if it goes kicking and screaming).

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<sup>10</sup> Eigenbrode et al. (2007).

<sup>11</sup> SES-0823058. For additional details, please visit <<http://www.cals.uidaho.edu/toolbox/>> (accessed 15 February 2012).

<sup>12</sup> For example, Frodeman (2008).

<sup>13</sup> For an expression of this nature, see Stanley (2010).

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## Brief Biography

Michael O'Rourke is Professor of Philosophy at Michigan State University. His research interests include the nature of epistemic integration and communication in collaborative, cross-disciplinary research and the nature of linguistic communication between intelligent agents. He is Director of the Toolbox Project, which conducts research into philosophical approaches to

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