29. Outcome?

Considering question five—'*What is the result of the integrative applied research?*'—re-emphasises that one advantage of the structured approach is that it provides a framework for evaluation. Evaluation is essential for improving how the I2S discipline operates. Although this chapter is framed around assessing completed integrative applied research, evaluation is also important at the beginning—for instance, in deciding whether a proposal to undertake such research will be funded. In either case, the methodology has to be adequately described to allow the research to be fairly appraised, as well as to make it clear when something new is planned, such as application of an innovative I2S concept or method, development of an improved guide to relevant knowledge from outside I2S or documentation of a case study that demonstrates a different slant on process. In this chapter four topics are considered

1. peer review

2. necessary conditions for integrative applied research

3. the challenge of imperfection

4. a summary of questions to guide evaluation.

Peer Review

As discussed in Chapters 8 and 22, developing I2S as a discipline makes peer review feasible as a mechanism for evaluating integrative applied research, just as is the case in traditional disciplines. Those who have been involved in knowledge synthesis, understanding and managing diverse unknowns and providing integrated research support are in the best position to act as reviewers, with I2S providing the elements for reviewers to assess, as described in the summary of questions that concludes this chapter.

Although peer review is relatively straightforward for knowledge synthesis and unknowns, applying it to the third domain of I2S is more problematic, as discussed in Chapter 22. This is because impact on policy or practice processes can be difficult to appraise without also getting input from the policy or practice sides. The first two domains are substantially within the researchers' purview, but this is not the case for supporting policy or practice change. Further, the success or failure of the research support may have little to do with the quality of the research or the methods employed to provide research support. Instead, research can be influential because it is available at the right time or backs a particular political outcome, sometimes irrespective of its quality. On the other

hand, excellent research that is well communicated can be ignored for a whole range of reasons, including changed political conditions that take the issue off the agenda or if the findings are opposed by powerful interests.

Tasks for the I2S Development Drive
Compile case examples about, and assess the effectiveness of, peer-review processes in integrative applied research.

Necessary Conditions for Integrative Applied Research

A different dimension of evaluation involves consideration of the conditions necessary for integrative applied research to succeed. These are analogous to good laboratory conditions for empirical scientific endeavours. Not only are laboratories required, but they must also meet best practice standards. Although these will vary depending on the research area,[1] it can generally be said that, for example, the environment must be uncontaminated, the equipment must be in good working order, measuring instruments accurate and staff appropriately trained. In addition, the laboratory needs to be furnished with up-to-date equipment that is appropriate for the investigations being undertaken. This requires adequate funding, and indeed the costs associated with running a laboratory are taken as a given.[2] These conditions are separate from the research conducted in the laboratory, although they are a prerequisite for it. They are also different from the organisational structure and culture, which determine, for instance, how much laboratory space different researchers are allocated and whether the laboratory is well run or if corners tend to be cut.

The point of the analogy with good laboratory practice is that the conditions for integrative applied research require the same matter-of-fact consideration and suitable allocation of resources. These conditions also need to be differentiated from the research itself, as well as organisational barriers and facilitators. What, then, are these necessary conditions, in other words, these aspects of integrative applied research that do not produce results by themselves, but that are requirements for success?

Let us begin with the integrative applied research analogy with up-to-date laboratory equipment. This is the compilation of concepts, methods, case examples and guides to relevant knowledge from outside I2S, such as the best

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1   For example, a laboratory for experiments on stem cells will require different standards from one for psychology experiments using rats.
2   This does not necessarily mean the funding is easy to get, but the point here is that the necessity for such funding is well accepted.

available concepts for problem framing or dialogue methods. A central argument of this book is that this 'equipment' is not currently available and that its rapid and effective establishment requires an I2S Development Drive.

Let us now imagine that the I2S Development Drive is completed, so that the up-to-date 'equipment' is available. What additional conditions for undertaking integrative applied research are required? I propose five conditions here, but at this stage they are tentative and require further investigation. They are

1. adequate resources for project development

2. suitable communication mechanisms among and between the researchers, stakeholders, and policy makers and practitioners

3. the ability to bring in specialist facilitation as required—for example, to 'translate' between different perspectives or to resolve disputes

4. 'database' development to allow the diverse research evidence to be gathered in a suitable format for integration

5. untied contingency funding to allow responsiveness to unforeseen problems, new ideas and opportunities.

The further elaboration of these conditions must test whether they are specific to integrative applied research and can be used to differentiate it from other kinds of research. In addition, a general understanding needs to be built up of the resources required to undertake different kinds of integrative applied research, in the same way that there are rules of thumb about levels of funding and other requirements for running different kinds of laboratories.

Some additional comments about these five putative conditions are warranted, starting with adequate resources for project development. It will be clear from the earlier discussions on scoping and boundary setting that project development for integrative applied research requires significantly more time and funding than other kinds of research.[3] Regarding suitable communication mechanisms, it is useful to differentiate between communication as a prerequisite for the research and communication as part of the research, as it is the first that is of interest here.[4] In other words, the relevant communication is that which is required for the research to 'work'. At a minimum, it is what is needed for the team members to be in touch with what others are doing. More commonly

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[3] Christian Pohl and Gertrude Hirsch Hadorn (Personal communication, March 2007) have argued that this stage is so important in transdisciplinary research that it should be recognised and separately funded and that successful completion should seamlessly lead to continued project funding. This is also briefly alluded to in Pohl and Hirsch Hadorn (2007a, p. 189).

[4] Dialogue methods for knowledge synthesis, as well as advocacy or engagement for the provision of research support for policy or practice change, are part of the research itself, not a condition for it—and do not form part of the considerations here.

this is the level of communication that is necessary for establishing trust and building the team. The diversity of integrative applied research teams when it comes to the involvement of different disciplines, stakeholders, policy makers and practitioners means that making this communication effective is likely to require more resources than is the case for other types of research. This multiplicity of perspectives, epistemologies, interests and so on means that bringing in appropriately skilled facilitators at appropriate times can make 'translation' more efficient and effective, as well as aiding conflict resolution.[5]

On a different note, it is remarkable that at this stage relatively little attention has been paid to how diverse knowledge and perspectives are 'captured' as a prelude to integration. If we just consider the synthesis of knowledge from different disciplines and stakeholders, standard ways of bringing knowledge together include annotated bibliographies, literature reviews and databases, but there has been little attention to how this is done in integrative applied research with its multiplicity of different kinds of knowledge, let alone how this can be expanded to include diverse unknowns. Finally, although all research needs some contingency funding, the complicated nature of integrative applied research means that this needs to be considered explicitly, rather than being accommodated through internal mechanisms, as is usually the case.[6]

From an evaluation perspective, assessment of both completed and proposed integrative applied research projects needs to include examination of the adequacy of the conditions, which in turn means that the conditions must be described. More importantly, yardsticks are required to allow adequacy to be determined.

Task for the I2S Development Drive
Compile case examples illustrating whether the integrative applied research required prerequisite conditions, especially resources for project development, communication mechanisms, translation and conflict-resolution processes, 'database' development and funding mechanisms, from which exemplars can be highlighted and general rules proposed.

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5   Efficient translation involves providing a mediator to aid mutual understanding that would not otherwise occur when people have significant differences such as divergent world views or epistemologies. Developing such facilitation skills is one task for I2S specialists, although not all I2S specialists will necessarily be expert in this.

6   For example, projects are often able to reallocate funding from one area (where there have been savings) to another.

Challenge of Imperfection

The inevitability of imperfection provides a challenge for evaluating the outcomes of integrative applied research. As I have outlined in this and other chapters, imperfection arises because it is impossible to investigate everything that is relevant to a complex problem; there will never be enough time, money or other resources. This is most evident when examining unknowns and contextual factors. The real-world connections of integrative applied research in both studying actual complex problems and seeking to provide integrated research support for policy and practice change add another dimension of imperfection—namely unpredictability. It is not possible to predetermine which aspects of the problem will have the most currency for action, nor to foresee in which ways provision of integrated research support is likely to be most effective.

The inevitability of imperfection raises two particular challenges for evaluation of integrative applied research. One is that it will be easy to identify the unavoidable deficiencies, but this provides neither a fair nor a productive assessment of the work. On the other hand, imperfection should not become an excuse for an 'anything goes' approach. In other words, it can be tempting to suspend any critical review because imperfection is inevitable, but this is also not appropriate.

These are not issues that can be resolved in a dogmatic manner. Reviewers will always be called upon to exercise judgment. One advantage of using peer reviewers, as discussed earlier, is that their judgment is tempered by relevant experience. Of course, peer review itself is far from perfect. But like Winston Churchill's assessment of democracy, '[n]o one pretends that peer-review is perfect or all-wise. Indeed…peer-review is the worst form of assessment except all those other forms that have been tried from time to time.'[7] The questions for evaluation, which are presented next, aim to provide a template that can guide a measured assessment by peers.

Task for the I2S Development Drive
Compile case examples about how imperfection was managed in the assessment process.

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7   Hansard, Speech to the House of Commons, 11 November 1947, <http://hansard.millbanksystems.com/commons/1947/nov/11/parliament-bill#column_206> (accessed 28 November 2011 via Wikiquotes).

Summary of Questions to Guide Evaluation

Significant questions for evaluating each domain were introduced in earlier chapters and these are re-presented here with some modifications, along with questions covering examination of

- interactions and congruence
- the necessary conditions for integrative applied research
- imperfection.

Box 29.1, therefore, presents questions that peers could use to systematically evaluate integrative applied research.

Box 29.1 Questions for Evaluating I2S as a Whole

How well did the integrative applied research meet its aims and reach the beneficiaries? Did the knowledge synthesis achieve its purpose and include leading discipline and stakeholder perspectives? Were unknowns considered expansively, including wide-ranging insights and approaches? Were appropriate aspects of policy or practice identified? Were identified aspects of policy or practice successfully targeted and well supported?

Were suitable systems views used for both the problem and the policy or practice arenas? Would different systems views have been more useful?

Was there recognition and assessment of the full range of: a) pertinent systems views, b) applicable disciplines and stakeholders, c) relevant unknowns, d) options for providing support to the policy and practice arenas?

Within the necessary limitations of the research, was there inclusion of worthwhile: a) systems views, b) disciplines and stakeholders, c) aspects of unknowns, and d) policy or practice actors and processes? Was the balance fitting? Did any of those excluded turn out to be crucial?

Was the problem framing accurate for knowledge synthesis and consideration of diverse unknowns? Were the problem framing and the framing of the integrated results accurate and meaningful for providing research support for policy and practice change?

Were values considered adequately? Were defensible decisions made about whether and when values were made explicit, which and whose values were considered and how values were examined?

Was there effective harnessing of productive differences: a) in the research team, b) between stakeholders and researchers, and c) between policy makers and practitioners, on one hand, and researchers, on the other? Was there good management of potentially destructive differences: a) in the research team, b) between stakeholders and researchers, and c) between policy makers and practitioners, on one hand, and researchers, on the other?

Were sufficient flexibility and iteration built into the processes of deciding on a systems view, scoping, boundary setting, framing, considering values, and harnessing and managing differences?

Were appropriate methods used for knowledge synthesis, understanding and managing diverse unknowns and providing integrated research support? Would other methods have made better contributions? Were justifiable decisions made in choosing who would undertake, and when, the knowledge synthesis, understanding and managing diverse unknowns and providing integrated research support?

Was adequate consideration given to the overall context for the knowledge synthesis, comprehensively addressing diverse unknowns, and the provision of integrated research support? Were crucial contextual factors missed?

Was the authorisation apposite for the knowledge synthesis, consideration of diverse unknowns and provision of integrated research support? Did the authorisation lead to restrictions or other significant influences?

Did the host organisational structure or culture provide barriers to the knowledge synthesis, consideration of diverse unknowns or provision of integrated research support? Did the target organisation structure or culture provide barriers to the provision of integrated research support? If so, were these effectually recognised and managed? Were facilitators beneficially mobilised?

For each aspect of the framework (aims and beneficiaries, the systems views taken, scoping, boundary setting, framing, values, harnessing and managing differences, flexibility and iteration built into the processes, the methods used, considerations of context, authorisation and how it was managed, and identifying and managing organisational facilitators and barriers): a) were relevant interactions identified and dealt with effectively, b) were issues that were incompatible recognised and resultant problems helpfully managed, and c) was there appropriate balance in emphasis between the three domains of knowledge synthesis, consideration of diverse unknowns and providing integrated research support for policy and practice change?

Were the conditions suitable for undertaking integrative applied research? Did the integrative applied research team make good use of available compilations of concepts, methods, case examples and guides to relevant knowledge from outside I2S? Were there: a) sufficient resources for project development and b) fitting communication mechanisms among and between the researchers, and with stakeholders, and policy makers and practitioners? Was there: a) ability to bring in specialist facilitation as required—for example, to 'translate' between different perspectives or to resolve disputes, b) 'database' development to allow the diverse research evidence to be gathered in a suitable format for integration, and c) untied contingency funding to allow responsiveness to unforeseen problems, new ideas and opportunities?

Was the inevitability of imperfection adequately described and recognised? Were defensible decisions made? Were problematic responses avoided, particularly overconfidence, hopelessness and nihilism, hindsight bias and opportunities for incompetence and corruption?