INTEGRATION INSIGHTS

Number 5

KEY CONCEPTS UNDERPINNING RESEARCH INTEGRATION

Gabriele Bammer

DPMP
Drug Policy Modelling Program

ANU COLLEGE OF MEDICINE & HEALTH SCIENCES

INTEGRATION INSIGHTS

Number 5, May 2007

KEY CONCEPTS UNDERPINNING RESEARCH INTEGRATION

Gabriele Bammer

There are five core concepts which are fundamental to research integration tasks: (1) a systems approach, (2) attention to problem framing and boundary setting, (3) attention to values, (4) a sophisticated understanding of ignorance and uncertainty and (5) understanding collaborations.

Integration Insights is a series of digests of concepts, techniques or real-world examples of integration in research.

INTRODUCTION

An essential element for research integration is a set of core concepts. These highlight considerations which are fundamental to research integration tasks. This *Integration Insights* proposes that there are five core concepts and describes each of them briefly. They are:

1. A systems approach;

2. Attention to problem framing and boundary setting;

3. Attention to values;

4. A sophisticated understanding of ignorance and uncertainty, and

5. Understanding collaborations.

The core concepts are one of three pillars of effective research integration. The other pillars are a framework for explaining research integration and a common set of methods.

Integration Insights #1 outlined a framework for explaining research integration. This filled an important gap, providing a systematic way to communicate and think about integration across disciplines and between research and practice. Clear descriptions will help those involved in research integration learn from each other and improve their approaches, as well as overcoming the major omissions and variations in accounts of research integration that exist now.

In terms of a common set of methods, five strategies for approaching integration were proposed in *Integration Insights #1*, namely dialogue-based, model-based, product-based, vision-based and common metric-based. *Integration Insights #4* provided an overview of a compilation of dialogue-based methods and other methods will be the subject of future *Integration Insights*.

FIVE CORE CONCEPTS FOR RESEARCH INTEGRATION

The first core concept is that research integration starts with **a systems approach**, in other words a view of the world which orients us to looking at the whole and its relationship to the parts of an issue. Everything is interconnected, so that, for example, changes made in one area often have repercussions elsewhere. These influences can occur in ways that are not expected.

Nevertheless, no research project or program can cover everything, so the way any particular problem is tackled has to be delimited, which leads to the second core concept – **attention to problem framing and boundary setting**. Each of these will determine what is included, excluded and marginalised in the research.

Problem structuring is closely aligned with the values underpinning the research, so that **attention to values** is the third core concept. Furthermore, research which brings together the perspectives of different disciplines and of practice groups – such as industry, government, community and professional groups – often has to find ways of managing different values.

Fourth, a systems approach also helps us realise that there are vast areas which may be relevant to the problem of interest where nothing is known or where available knowledge is uncertain. Such appreciation orients research integration to give more emphasis to **a sophisticated understanding of ignorance and uncertainty** and to more refined ways of dealing with them.

Finally, all research integration involves collaboration at some level, so that **understanding collaborations** is the fifth core concept. The critical element of collaboration is to recognise that differences between research partners fall into two categories. One involves the differences that are key to and underpin the partnership, which must be effectively harnessed. The second is the differences that are incidental to the collaboration and that may undermine the achievement of its goals. These differences must be effectively managed.

This brief overview shows how the core concepts are linked. A longer description of each concept is provided next. In order to do more justice to the concepts the intention is to make each one the subject of an Integration Insight in future.

A SYSTEMS APPROACH

A systems view orients us to looking at an issue in a broad way, particularly the relationship between the components of the issue, as well as how the issue is embedded in larger social, cultural, environmental and technical understandings. Effective research integration requires an appreciation of the essentials of systems thinking. This includes what is now known as complexity science.

Checkland (1984) proposed the following fundamentals:

- emergence and hierarchy, and
- communication and control.

In terms of research integration, hierarchy is valuable for providing a structured way of thinking across different scales; providing a big picture view, including interactions between local and global; and showing linkages, including between sectors and stakeholders. Hierarchy also sets the context for emergent properties, in other words properties that exist at one scale, but not at others. For example, wetness is an emergent property of water, a property that cannot be predicted from its component gaseous elements, hydrogen and oxygen. Emergent properties appear when a system is examined as a whole instead of as separate parts, or when separate parts of a system are coupled for examination.

Communication and control are important in terms of understanding interactions, which can lead to vicious (reinforcing) and virtuous (balancing) cycles. These, in turn, may show the sources of unintended effects of particular actions, as well as effective points of intervention.

Higginbotham and colleagues (2001) described additional ideas which are useful for understanding and dealing with complex systems:

- *Emergent order*, namely that spontaneous order and organization can arise from flux and disorder in natural systems;
- *Adaptive, evolutionary, self-organization*, namely that systems can change actively and evolve over time;
- *Non-linear dynamics*, namely that the whole is much more than the sum of the parts, and that properties of the whole can be unexpected, complicated, and mathematically intractable;

- *Dissipative structures*, namely that life spontaneously evolves from simple to complex; and

- With regard to factors that influence the evolution of complex adaptive systems: *disturbance or perturbation* (namely the edge of chaos where forces of order and disorder compete) and *attractors* (namely the tendency of an evolving system to move towards a particular state).

The rich concepts which have been developed in systems thinking and complexity science cannot be adequately explained in a few paragraphs. The intention here is to alert those interested in research integration to these key considerations.

ATTENTION TO PROBLEM FRAMING AND BOUNDARY SETTING

Given that it is impossible to research everything, let alone everything at once, the focus of any particular study has to be restricted. This is done both through the way the problem is defined or framed and through the way the boundaries are drawn up. While these two tasks are closely related, it is worth considering them separately, as they help the research integrator focus on the problem in different ways.

In terms of problem framing, the way we see problems and the language we use to describe them can play a powerful role in setting the basis for research integration. For example, referring to people who inject illicit drugs as 'junkies', 'cool nonconformists', or 'sons and daughters who have lost their way' all have different connotations leading to different ways in which they would be researched. Similarly, research on drug prevention could be defined or framed as 'an examination of individual factors involved in initiating illicit drug use' or alternatively as 'an examination of popular culture and its influence on illicit drug use'. Both are about understanding why young people use illicit drugs as a first step towards more effective prevention – but one approach frames it as a problem of individuals, whereas the other treats it as a societal problem, especially how social norms are communicated through television, music, the internet and so on.

The way a problem is framed already implicitly sets some boundaries around the problem. The boundaries specify what will be included, excluded and marginalised (Midgley, 2000). An important aspect of this for research integration is determining which disciplines and which non-academic or practice perspectives will be included in the project. For example, until relatively recently, research on natural resource management, such as determining how water supplies will be allocated, only involved science-based disciplines, such as hydrology and ecology. Now, it is common for such research to also include not only social science disciplines, but also those affected by the decisions, such as farmers, and those involved in making them, such as policy makers. Thus the boundaries of the research have been greatly expanded. However, all aspects may not be given equal treatment; some may be more peripheral and therefore marginalised.

Problem framing and boundary setting are inevitable and from an integration perspective it is essential that they are well thought through and managed. Furthermore, integration research requires systematic approaches to framing problems and setting boundaries, allowing researchers to be more aware of the processes and their consequences for the research.

ATTENTION TO VALUES

All research is located within a values framework, although this is often implicit and researchers may be unaware of how their values shape their work. Integrative research must often manage diverse values both amongst the researchers from different disciplines, as well as amongst the practitioners included in the research.

One way in which differences in values are highlighted is through epistemology. For example, positivism sees research as value free, with values having no place except when choosing a topic; interpretive social science considers values to be an integral part of social life, with no group's values being seen as wrong, only

different; and critical social science maintains that all research has a value position and that some positions are right while others are wrong (Neuman, 2003).

Another way in which values manifest is in the orientation of research to having an impact on real world problems. For example, there are different ways of considering the harms which might arise from new actions based on the research findings. One way is to judge the harms caused by the new actions in light of what would have happened if no actions were taken. Even though the new actions may lead to harms, if these are less than the harms that occurred originally, the actions can be justified. This is consistent with a utilitarian approach. Another way to judge harms is to, as far as possible, avoid causing harm, without being concerned about allowing harm to happen. In this case if the new actions were to cause significant harm, even if this was less than the harms which would occur without the actions, the actions would be hard to justify. This is consistent with a deontological approach (Ostini et al., 1993).

A third aspect of values is particularly important when researchers interact with politicians and other policy makers. Here ideology often comes into play and there can be significant challenges when research integration has to manage ideological differences.

The task for research integration is to make the values explicit and to find ways to accommodate or at least manage differences in values. Rather than avoiding these differences, research integration recognises that they are critical to a rich understanding of complex problems and to effectively dealing with them.

A SOPHISTICATED UNDERSTANDING OF IGNORANCE AND UNCERTAINTY

In dealing with any complex issue or problem, there will always be many unknowns, including about facts, causal and associative relationships, and effective interventions. Some unknowns result from resource limitations on research; some result from methodological limitations; and some things are simply unknowable. There are epistemological, ethical, organizational and functional aspects to dealing with ignorance and uncertainty. A more sophisticated understanding of and approach to ignorance and uncertainty involves better appreciation of the nature of ignorance and uncertainty, underpinning motivations and moral orientations to ignorance and uncertainty, as well as strategies for coping and managing under ignorance and uncertainty (Bammer and Smithson, forthcoming; Smithson, 1989).

Various disciplines and practice areas deal with ignorance and uncertainty differently and as yet there is no way to synthesise these alternatives. For example, the discipline of statistics is useful for problems where a probability-based approach can yield insights, whereas the practice area of intelligence deals with problems where there is either too little or too much information and where the key is to figure out possible distortions in the information.

In order to understand how and why people construct and respond to ignorance and uncertainty as they do, we need accounts of underpinning motivations and moral orientations. While it may seem odd initially to consider the notion of "good" and "bad" ignorance and uncertainty, it turns out that many disciplines and, especially professions, harbour views of exactly this kind.

Finally, ignorance and uncertainty present us with adaptive challenges, especially:

- Dealing with unforeseen threats and solving problems;
- Benefiting from opportunities for exploration and discovery;
- Crafting good outcomes in a partially learnable world; and
- Dealing intelligently and sociably with other humans.

Finding ways to synthesise different approaches to ignorance and uncertainty and to apply a more sophisticated understanding of ignorance and uncertainty to complex problems is a significant challenge for research integration.

UNDERSTANDING COLLABORATIONS

Research integration involves bringing a range of perspectives and skills to bear on the issue of interest and therefore involves collaboration with the relevant people. Integration and collaboration is all about harnessing difference. However the differences between research partners cannot be limited to those which progress understanding of or effective action on the problem. Differences in ideas, interests and personality will also provide potential sources of unproductive conflict. Managing research integration and collaboration therefore involves dealing with two categories of differences – synthesising diverse relevant contributions and ameliorating problems arising from attributes which are incidental to the partnership (Bammer, 2007).

The framework provided in *Integration Insights #1* provides a useful approach for synthesising the diverse *relevant* contributions. Here the focus is on what the integration is aiming to achieve, being clear about what the different partners are contributing to the integration and what is being integrated, deciding on the most effective methods for integration and who will undertake the synthesis, taking into account institutional and other aspects of context which affect the integration, and considering how the success of the integration will be assessed.

In terms of dealing with differences in personality, interests, ideas, working style and other attributes which can lead to unproductive conflict, the task for research integration is not to eliminate disagreements and competition, which can provide a vital stimulus to creativity, but to minimise the tensions and disputes which prevent people from working together constructively.

There are two strategies which may be useful here. One is to foster reciprocity. This involves partners treating each other with trust and respect. The second is to build on a broad sweep of knowledge about personality differences, conflict resolution, building trust and so on, which has been gained in business, community development and other areas. Some simple techniques can be surprisingly effective. Personality assessments (such as the Myers Briggs typology, Myers and Myers, 1993), commonly used in team building, often result in conflict melting away, as participants realise that the annoying behaviours of others are not designed to be provocative but simply reflect different psychological make-up and orientation to the world. The main problem is that this knowledge is not compiled in any single place or tailored as a resource for those managing research collaboration and integration (Bammer, 2007).

The task for research integration is to help partners understand these two types of differences and to further develop techniques for harnessing relevant and managing incidental differences.

CONCLUSION

The aim of this *Integration Insights* is to present an overview of five concepts which are core to research integration. The overview presented here is necessarily brief, but is aimed at orienting those interested in research integration to these issues, as well as stimulating the development of these important areas.

REFERENCES

Bammer, G. (2007). 'Enhancing research collaboration: Three key management and policy challenges.' Under review.

Bammer, G., & Smithson, M. (Eds.) (2007). *Uncertainty and Risk: Multidisciplinary perspectives.* Earthscan, forthcoming.

Checkland, P. (1984). *Systems thinking, systems practice.* John Wiley, Chichester.

Higginbotham, N., Albrecht, G. and Connor, L. (2001). *Health social science. A transdisciplinary and complexity perspective.* Oxford University Press, Melbourne.

Midgley, G. (2000). *Systemic intervention: Philosophy, methodology, and practice*. Kluwer Academic/Plenum Publisher, New York.

Myers, I. B., with Myers P. B., (1993). *Gifts differing. Understanding personality type.* CPP Books, Palo Alto, CA.

Neuman, W. L. (2003). *Social research methods. Qualitative and quantitative approaches.* Fifth Edition. Allyn and Bacon, Boston, MA.

Ostini, R.; Bammer, G.; Dance, P.; Goodin, R. (1993). 'The ethics of experimental heroin maintenance'. *Journal of Medical Ethics, 19,* 175-182.

Smithson, M. (1989). *Ignorance and uncertainty: Emerging paradigms.* Springer Verlag, New York.

CONTACT

Professor Gabriele Bammer, National Centre for Epidemiology and Population Health, ANU College of Medicine and Health Sciences, The Australian National University, Canberra ACT 0200, Australia.

P: 61 2 6125 0716

E: Gabriele.Bammer@anu.edu.au

CITATION

COPYRIGHT

PUBLISHER

THANKS

PREVIOUS ISSUES

Bammer, G. (2006) A systematic approach to integration in research. *Integration Insights #1*, September. Available at www.anu.edu.au/iisn.

Bammer, G. (2006) Illustrating a systematic approach to explain integration in research – the case of the World Commission on Dams. *Integration Insights #2*, October. Available at www.anu.edu.au/iisn.

Bammer, G. (2006) Principled negotiation – a method for integrating interests. *Integration Insights #3,* November. Available at www.anu.edu.au/iisn.

Bammer, G., McDonald, D., Deane, P. (2007) Dialogue methods for research integration. *Integration Insights #4*, May. Available at www.anu.edu.au/iisn.