Embedding Critical Systems Thinking And Other Integration And Implementation Sciences In The Academy

Stream 13: OR/Systems Thinking for Social Improvement

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Introduction

Critical systems thinking is an important tool for addressing problems characterised by:
- complexity
- large scale
- uncertainty
- impermanence, and
- imperfection.

Many of the problems the world faces are complex with multi-party interests, a politically-charged history, diverse cultural contexts, and a range of relevant factors, with inter-relationships that are far from straight-forward. The problems are also often large in geographical, temporal, hierarchical and population scales. There tend to be many unknowns, substantively, in terms of relationships and in terms of successful interventions. The unknowns are compounded by constant change; change occurring on many fronts including biological evolution (eg the development of antibiotic resistance in bacteria and of new communicable diseases), scientific and technological developments, in economic drivers, in international relations and in manifold intended and unintended consequences of local, national and international policies and programs. Perfect knowledge and solutions are impossible. Even in terms of research knowledge, there can never be enough research effort to investigate all the unknowns or to keep abreast of change. But more broadly, social issues are deeply contextualised, so that one person's excellent solution is anathema to another.

The value of critical systems thinking is that it combines systems thinking and participatory methods, and by its nature involves a range of disciplines and sectors.

Systems thinking provides tools for dealing with some important aspects of complexity, particularly non-linear relationships, feedback loops, hierarchies and emergent properties. One of the important contributions of critical systems thinking has been to problematise the issue of boundaries and their consequences for inclusion, exclusion and marginalisation of both issues and stakeholders (see eg Midgley, 2000). It also has a focus on "emancipation", which provides a participatory action orientation.

Participatory methods are predicated on the belief that relevant stakeholders must be involved in decision making in order to ameliorate uncertainty, impermanence and imperfection. In other words, those affected by decisions should have both the opportunity and the right to influence them, given that they have to live with the problems as well as the benefits that will inevitably arise. Participatory methods also provide a way for the knowledge of stakeholders to be valued and taken into account.

Crossing disciplinary and sectoral boundaries is inherent in both systems thinking and participatory methods, but there is also an independent growing body of theory and methods focusing on interdisciplinarity, transdisciplinarity and integration.

Critical Systems Thinking allows for theoretical and methodological plurality in its practice-based approach to a range of complex problems characterised by uncertainty, change and imperfection. To the best of my knowledge it has not tackled problems at a very large scale, for example, at national or global levels.
There are also other approaches that combine systems thinking and participatory methods, including integrated assessment (eg ICIS 1999; Aron et al. 2001), systems dynamics (eg Senge 1990), concept mapping (eg Trochim 1989), participatory action research (eg Reason and Bradbury 2001), principled negotiation, (eg Fisher et al. 1991) consensus building (eg Susskind et al. 1999), search conferences ( eg Emery 1999), and Executive Sessions (eg Hough 2002). There are also a range of unnamed approaches that have been developed by researchers and practitioners (eg Brown et al. 2003).

It is not my aim here to catalogue these approaches, although that would be a valuable activity. Instead my aim is to discuss the marginalised status within universities of the bulk of these approaches and to propose strategies for more firmly embedding them in the academy. This paper aims to stimulate a broader discussion, rather than making any pretence at comprehensiveness. The focus is limited by my own research, experience and interests. I have been heartened by the responses I have had to date when I have raised the issues covered here. It seems that many of us are keen to have a firm base in the academy that will provide a supportive yet critical home in which our ideas can flourish and through which solid education and training for the next generations can be provided.

There is no agreed overarching term to refer to these approaches, which makes discussing them difficult and which also contributes to their marginalisation. For the purposes of this paper, I will use “Integration and Implementation Sciences”.

The Marginalisation of Integration and Implementation Sciences

Overall it would seem that the field is characterised by:

- relatively small research groups operating in limited networks, many outside formal academic institutions. Those operating inside Universities tend to be independent centres or an uncomfortable fit within a larger department, often in a business school.

- multiple small professional associations, which conduct relatively small-scale conferences and which have few links with each other. Unlike the annual conferences of many of the established disciplines and specialisations, which have 20,000 or so participants, attendance at these conferences is likely to be of the order of 500 people. The point I am making is not that large conferences are necessarily better, but that the “college” represented is substantially larger in the established academic areas.

Professional associations which could be said to cover significant approaches in Integration and Implementation Sciences include the Association for Integrative Studies; the International Society for the Systems Sciences; the Society for Human Ecology; the International Society for Ecosystem Health; Action Learning, Action Research and Process Management; the Society for Values in Higher Education; Council on Health Research for Development; and the International Association for Conflict Management.

- a growing number of journals, many that are newly established and some that are only being published sporadically. These include Issues in Integrative
Studies, Systems Research and Behavioural Science, Ecosystem Health, Public Administration, Global Change and Human Health, and Integrated Assessment. There are no well-established high-impact journals.

- an orientation to consultancy work, which is in high demand from government agencies, business, community activists and other practitioners.

- an enthusiastic undergraduate and postgraduate student body, which faces very limited career opportunities within the academy.

- no clearly defined curriculum and no clearly defined relationship with established disciplines and specialisations. There is teaching in both undergraduate and graduate areas, but the development of curriculum is somewhat idiosyncratic, with no agreement on core curriculum elements or on standards or accreditation. There are no standard text books. There are also different views about whether students should be required to have a solid education in a discipline before being educated in Integration and Implementation Sciences.

- as outlined above, no unifying name or mission. As far as I am aware, there have been no attempts to develop the kind of overarching framework that I am proposing here. Certainly the International Society for the Systems Sciences aims to provide an overarching society in that area and Action Learning, Action Research and Process Management aims to provide a wide-reaching association covering participatory approaches. But these two areas are largely developing separately, even though there are many important synergies. Further, they do not cover all the areas that are important in Integration and Implementation Sciences.

Not everyone will agree that an overarching framework is worth developing and there will certainly be debate and dispute about its boundaries. Vague diffuse networks have the benefit of inclusivity, but, as I argue here, the cost of on-going marginalisation. As I discuss below, the process of developing a better defined mission with an appropriate name will not be easy, but the debates will help sharpen thinking and would ideally also help develop a greater sense of collegiality among endeavours which may now be only dimly aware of each other.

The consequences of marginalisation

Marginalisation has many consequences for the field. The preponderance of small groups that are not well networked leads to considerable duplication and reinventing of the wheel. Productive cross-fertilisation of ideas is limited, which in turn means that the field does not reach its potential in terms of progress. The practical demand for the approaches encompassed under Integration and Implementation Sciences by policy makers, business, community activists and other practitioners and the associated emphasis on consulting, often leaves little time for reflection, let alone for theory and methodology building.
Multiple groups of small size have costs associated with lack of economies of scale. For example, such groups often have no administrative support, with a disproportionate extra load on research and teaching staff. A disproportionate amount of effort may also have to go into fund raising, especially for self-funded groups either inside or outside the academy. In time the enthusiasm and energy of staff is ground down, limiting opportunities for networking, let alone innovation.

All this can also contribute to low standing within the academy and a perception that the field lacks rigour and attracts only low quality staff and students. This perception is exacerbated by the lack of high impact journals and the other accoutrements of established disciplines and specialisations.

**Embedding Integration and Implementation Sciences in the Academy**

In terms of how Integration and Implementation Sciences could develop, the discipline of statistics provides a useful analogy. Statistics is embedded in the academy at three levels. First there are home-base departments where theory and methods of statistics are developed and advanced. Second, other significant academic departments incorporate statistical training into their core curriculum and have at least some staff with a strong statistical bent. For example, disciplines like biology, psychology, sociology and geography provide core training in statistics, particularly as relevant to the discipline, and have staff and research programs with a strong quantitative orientation. In addition, multidisciplinary departments such as public health often employ statisticians who are willing to work on public health problems. Third, there is an expectation that a large proportion of staff and students throughout the academy will have a basic level of statistical competence.

The key issue for Integration and Implementation Sciences is that there is no home base or shared understanding of what this area encompasses. Some elements of Integration and Implementation Sciences are already embedded in other significant academic areas. For example, many environmental science departments incorporate integrated assessment, other systems approaches and participatory approaches in their teaching and research. Public health departments often have a strong orientation to participation and implementation. However the incorporation of Integration and Implementation Sciences is largely idiosyncratic and there is generally little interaction between different departments of environmental science or public health about core or best methods. There is more standardisation in other areas. For example, most law schools now include principled negotiation (alternative dispute resolution) in their teaching, if not research. It can further be argued that many staff and students throughout the academy have some basic competencies in Integration and Implementation Sciences. Some are good at building trust, some at thinking laterally, some at seeing interconnections. However, staff and students tend to be left to their own devices to develop these competencies and they tend to be seen as personal attributes rather than academic skills.

Thus the building blocks for a solid home base exist and establishing home base departments would have positive spin-offs for established disciplines and specialisations and for individual staff and students.

Statistics provides two other useful analogies. First, statistical knowledge advances by tackling diverse practical problems. Second, some statisticians are trained
predominantly in statistics and work on a diverse range of problems, while others are trained in statistics and another discipline or specialisation and work predominantly in that area.

Integration and Implementation Sciences also advance by tackling diverse practical problems. The difference with statistics is that the advances in statistics are fed back into the discipline, through the standard discipline-based structures of peer-reviewed journals and conferences. In Integration and Implementation Sciences, on the other hand, knowledge about advances tends to be limited to much smaller groups, because of the marginalisation I discussed earlier.

The comfortable co-existence of diversity in statistics where some statisticians are trained predominantly in that discipline, while others have bi-disciplinary training may provide a useful approach for Integration and Implementation Sciences. It is easily conceivable that some of those trained in Integration and Implementation Sciences would work on a wide range of problems, while others would work in more depth in areas such as environmental sciences and public health. The relationship between Integration and Implementation Sciences and traditional disciplines might be somewhat different, however, than the relationship of statistics and other traditional disciplines. Those trained in Integration and Implementation Sciences plus a traditional discipline might be expected to focus particularly on bringing that disciplinary perspective to the understanding of a complex problem. I suggest that a key task of Integration and Implementation Sciences is to harness and build on disciplinary strengths. The disciplines have developed and continue to develop a wealth of theoretical, methodological and content knowledge. Further, the disciplines themselves recognise the importance of developing effective ways to draw together the strengths of a range of disciplines.

The development of home-base departments of Integration and Implementation Sciences is not only intellectually important, as outlined in the discussion to date, but also has political ramifications. It gives this area a greater ability to compete with the established disciplines in the control of resources. It also provides a structural way to break down silos and other barriers within universities.

A final useful analogy with statistics is in the provision of consulting services, through both university-based and outside agencies. Like those with skills in particular aspects of Integration and Implementation Sciences, statisticians are in hot demand. I don't know enough about how that plays out in terms of either on-going professional development or in feeding back into the discipline knowledge gained in consultancies, and both of these areas need further consideration.

The big differences between statistics and Integration and Implementation Sciences lie in the development and scope of the fields. Clearly statistics is a well-developed and defined academic area. There are a range of widely adopted standard techniques and an array of known challenges which stimulate on-going research. Integration and Implementation Sciences is poorly defined, with no widespread agreement about what the field does and does not encompass. As outlined above, some methods, such as principled negotiation, are relatively well-defined and accepted, while others are idiosyncratically developed and applied. Even without a clear framework, however, it seems like the scope of Integration and Implementation Sciences is considerably broader than that of statistics. Further, it seems unlikely that one core concept will lie at
the heart of Integration and Implementation Sciences, in the same way that probability forms the nucleus for statistics. This is where the real developmental challenges for Integration and Implementation Sciences lie.

Other important issues for embedding Integration and Implementation Sciences in the academy include the development of overarching and interlinked professional organisations that will both promote cross-fertilisation of ideas and raise the academic credibility of the field. High-quality and high-impact journals need to be established to focus on the theoretical and methodological development of Integration and Implementation Sciences, as well as the practical application of the field. Peer-review networks need to be linked, broadened and strengthened. Funding needs to be earmarked for the development of the field.

What does an Integration and Implementation Scientist do?

The development of theory and methodology and their practical application in tackling complex problems are the core tasks of Integration and Implementation Scientists and these develop in tandem.

The areas of both practical application and theory and methodology building that Integration and Implementation Scientists specialise in are:

- Scoping the problem, ensuring multi-disciplinary and multi-sector involvement, and making clear where the boundaries around the problem have been set and the implications of those decisions for inclusion, exclusion and marginalisation of stakeholder groups (see Midgley, 2000).
- Integrative functions, ensuring that different conceptualisations of integration are made apparent and that those most appropriate for the project in hand are chosen.
- Collaborative functions, ensuring that appropriate researchers and sectoral representatives are included, that their interests are accommodated, that different strengths are harnessed, that communication (including ‘translation’) mechanisms are strong, that conflicts are appropriately mediated and so on.
- Practical application in terms of policy or action, ensuring that those who can implement the research are part of the research process or kept closely in touch with it and that the political aspects of the research are dealt with.

The role of Integration and Implementation Scientists may vary from project to project. In team projects addressing specific complex issues they could be the project leader or a team member or a project consultant. They might also undertake solo or team projects collecting empirical data through case studies, surveys or other methods on various issues to do with integration and implementation to strengthen the theoretical and methodological base.

Some challenges

In terms of embedding Integration and Implementation Sciences in the academy, I am essentially arguing for the development of a specialisation. This faces a number of challenges, not least of which is agreement on whether a specialisation is appropriate, likely to achieve the desired outcomes, and worth the down-sides.
A second challenge is constructing a coherent specialisation from ‘bits’ that are located all over the place, many of which now have their own traditions. Some ‘bits’, like participatory methods and principled negotiation techniques can potentially be fully encompassed within the new specialisation. Others, such as systems thinking, will have elements [such as the mathematical development of complexity theory, for example] that fit more comfortably within an existing discipline and would not sit well in the new specialisation. Redrawing boundaries, and possibly also reallocating resources, are important components of this challenge.

Third is to get this specialisation accepted and implemented, both by those inside and outside the specialisation. Within the specialisation, challenges include that some may not want to refocus their allegiances, as outlined above. Others may have identified a niche in which they are doing well and may either not see the need for or be too overcommitted to contribute to a larger enterprise. Those outside the specialisation may oppose it because they fear losing resources or because they see Integration and Implementation Sciences to be about personal skills rather than academic theory, method and application.

A fourth challenge is to develop appropriate intellectual interfaces with traditional disciplines and newer multidisciplinary specialisations (such as environment studies or peace studies).

Fifth, many of the components of Integration and Implementation Sciences are most developed in the environmental area, so that consideration needs to be given not only to further enhancing the skills that have been developed in the environmental area but also to diffusing them into other areas.

Sixth, the systems thinking and participatory methods aspects of Integration and Implementation Sciences require different skills and often attract different personalities, so that uniting them in one specialisation may be difficult. Participatory methods also tend to have much lower status.

Finally, Integration and Implementation Sciences need to find suitable locations within the academy, locations where there is a sense of fit and where the specialisation will prosper. This needs to be an exciting and rewarding area for research and teaching, to attract good people.

Where next?

This paper aims to be a discussion starter rather than a definitive exposition of the field or its issues. I am aware that its coverage is idiosyncratic and limited by my experience and interests. The next challenge is to provide appropriate fora in which to conduct discussions, to capture the outcomes and to begin to develop consensus. Most important is the facilitation of such processes that funding can bring. Each of us is limited in the resources we can devote to such an enterprise, so that we need not only to maximise efficiencies but also to be tolerant of our limitations.

I suggest that important next steps include:

- identifying and applying to potential sources of funding
• finding a journal – maybe EJROT - that will provide a forum for paper-based discussions, a place to publish records of verbal and other discussions and a noticeboard for funding and other developments
• establishing an exhaustive web-based catalogue of the elements of the field and a network of their practitioners
• encouraging alliances and perhaps even amalgamations of existing associations.

I look forward to your comments on this paper

References


