Journal of Evaluation in Clinical Practice
International Journal of Public Health Policy and Health Services Research

Journal of Evaluation in Clinical Practice ISSN 1365-2753

Outcomes from the workshop 'Putting Complexity to Work – Supporting the Practitioners': implications for health care

Patrick Beautement MSc[1] and Christine Broenner MSc[2]

[1]Research Director, [2]Principal Consultant, The *abaci* Partnership LLP, Tewkesbury, UK

Keywords
appropriateness, capabilities, communities of practice, complexity science, complexity-worthiness, landscape of change, practitioner, reflecting on practice, reflecting on realities, self-sustaining change, symptom sorting, trade-off space

Correspondence
Mr Patrick Beautement
10 Beauchamp Road
Tewkesbury, GL20 7TA
UK
E-mail: patrick@abacipartners.co.uk

Accepted for publication: 22 September 2011

doi:10.1111/j.1365-2753.2011.01790.x

Abstract

Rationale People working in the health sector have been looking to complexity science to help them deal with the complex phenomena they encounter in their everyday working practice. While complexity science has assisted many in the field to look at the complex issues from a different viewpoint and explained the emergence of complex phenomena, however, practicable, pragmatic approaches and techniques have not been provided.
Aims and objectives In this article, actual issues and challenges that these practitioners face and the needs they expressed during a workshop called 'Putting Complexity to Work – Supporting the Practitioners' are discussed.
Conclusion As the nature of complexity offers no one single ultimate solution, the paper concludes that, for operationalizing the insights received from complexity science into their day-to-day work, practitioners in health care and other domains need to address a range of challenges that are outlined in the paper.

Introduction

This article presents the insights and recommendations arising from a 1-day workshop called 'Putting Complexity to Work – Supporting the Practitioners' held on the 24 September 2009 at Warwick, UK as part of the European Conference on Complex Systems (ECCS '09).[1] The aim of the workshop was to improve understanding of how the insights coming out of complexity science could be harnessed to support practitioners – those who deal with complex realities in their day-to-day work such as in clinical, public policy and organizational challenges of health care. In this article, we cover practitioners' perceptions of complexity and the issues they raised when considering how to 'operationalize' insights from complexity science. Specifically, we examine practitioners' needs and how complexity science might meet them and conclude with a summary of what is needed to put complexity to work in health care practice.

The workshop was run as a part of a series of so-called satellite workshops, which focussed on particular aspects or phenomena in complexity science. All the other satellite workshops at the conference dealt with topics on theory and computational methods of complexity science. In contrast, this workshop specifically had the intention to bridge the gap between science and practice, as it was recognized that complexity science could give more support to practitioners – but only if their needs and working context were better understood. People *do* manage complex situations every day – yet insights from complexity science are not routinely employed as part of the language, approaches and techniques used by practitioners in their tasks. This workshop 'Putting Complexity to Work – Supporting the Practitioners' wanted to investigate why not, and what was needed by practitioners from complexity science. To this end it brought practitioners and researchers together to discuss how the 'complexity community' can better tailor their insights to provide practical, relevant support in these situations.

Definitions

The workshop's focus was on *practitioners* – defined as 'people who have to engage with the complex realities of day-to-day life in their work' as for example those involved in policy making, health care and community matters or in fields such as humanitarian aid; law, social and cultural engagement; local and regional planning; sustainable development and so on.

These practitioners deal with routine situations, but also with the unpredictable and novel events in dynamic environments that we call complex realities – defined as 'real-world situations that

[1] A White Paper describing in full the conduct of the workshop and of the material arising is available from: http://www.abaci.net/library/eccs09_pctw_white-paper_v1-1.pdf. The workshop was sponsored by The *abaci* Partnership LLP and ASSYST.

Figure 1 A range of practitioners perspectives on complex realities.

co-evolve with humans in an environment and in a dynamic manner which cannot be stopped and which can only be changed through engagement and influence'. In the health care domain the variety of such complex realities are described for example by Matlow *et al*. [1] who point out that the coordination of multidisciplinary care is a key ingredient of quality patient care. Leykum *et al*. [2] pick up on the fact that the identification of effective ways to improve care of patients with chronic disease has been difficult because the non-linear nature of practice has not been recognized and systematically addressed. Griffiths [3] recognizes that the dynamic interaction of patients with their social and environmental context influences patient health, but this is poorly documented in available health care data. Finally, Singhal [4] reviews the complex factors, which affect the provision of high-quality care of nursing homes and points out the importance of the quality of the relationships between nursing home staff members.

In the workshop, complex realities were viewed from the perspectives of the participants stemming from the various (practitioner and academic) communities as shown in Fig. 1.

Practitioners' perceptions of complexity

Using the World Café approach [5], participants were invited to share and explore their experiences of working in situations that they perceived as complex and to discover the experiences of others. In small groups, they considered the question: 'what are the challenges you have faced and which insights have you gained from dealing with complex realities in your day-to-day work?' The aim here was to gain better understanding of each others' perceptions and challenges, and to identify and share common themes and issues.

It became apparent that the practitioners 'perceptions of complexity' issues that had been raised fell into the following thematic groupings.

What is complexity, how do we recognize it?

How do we perceive, recognize, understand, reason about and visualize complex situations?

The way in which people perceived, recognized and understood complex situations was diverse and thought to depend largely on their mindset, background, assumptions about the world and the context of the task on which they were engaged. Observations were made about the way people dealt with 'complexity science' and that there was a tendency to feel that they have to relate things to it – regardless of relevance – as this seemed to give views 'authority'.

The workshop facilitators noted that, among the practitioners, there seemed to be a drive to 'translate' the complex realties that they perceived into complexity theory. This was unnecessary as they understood these issues very well in their own context and on their own terms.

It was felt that people largely introduced – what they called – 'their own complexity', complicatedness owing to the various organizations, languages and abstractions and contrivances created – yet one did not know how to 'make sense' of it. Also, participants expressed that they lacked pragmatic large-scale 'whole-system' understanding – including how to engage with it at macro level in the real world.

Moving from linear to non-linear thinking was a challenge. There was a 'fallacy of linearity' in that, in the hierarchy of intellectual leadership, one is perceived as more robust if one thinks linearly. Yet, humans naturally think in complex organic ways, do their 'best' to work in that context, and in fact, this is more robust as the world is not linear.

What are the limits on analysis, modelling and verification of complexity?

Is complexity computable? If not, which techniques and tools are appropriate? How do we quantify and validate models and tools – how do we work out which are appropriate to employ in which circumstances?

Participants discussed whether complexity was 'computable', and if not, which techniques and tools would be appropriate. Computability was complicated by the variety of boundaries, levels/nestings, scales (e.g. in time and space) that had to be embraced.

Discussion also took place concerning the quantification and validation of models and tools. It was felt that part of the problem here was the mindset/language used. It was usual to talk about 'optimum', 'validate', 'prove', 'targets', etc., but it was deemed necessary that the language of 'success and failure' had to change to one that recognized the nature of complex environments. Also, the drive to 'quantify at all costs' created distorted perceptions – it caused people to look for inappropriate indicators and give 'wrong' significance to events.

What is involved in enabling effective communication and collaboration in complex, open-ended and unpredictable situations?

What needs to be different, if anything, about communication, language and negotiation in complex contexts?

In discussing communication, language and negotiation in complex contexts, participants felt that developing common ground among 'communities of interest' involved in collaborations in specific contexts was important. Metaphors could be helpful in this respect, though they could become 'tired' if overused.

It was also recognized that there were many 'domains of discourse' to be accommodated (e.g. directing, ordering, agreeing, influencing).

How do we accommodate the (necessarily) diverse views and perspectives which are inevitable in human endeavours?

What are effective ways of working with a wide range of 'behaviours' across stakeholders and actors?

It was recognized that dealing with complex realities required that a diversity of perspectives, views and behaviours across stakeholders and actors be accepted and employed. In addition, trust, emotion and ethics were important factors in the work of practitioners and must be factored in to any analysis.

A key challenge here was how to capture these views and balance perspectives.

In which ways can the effects of feedback, failure and learning be useful?

How do they relate to the social phenomena that underpin collaboration and purposeful activity?

An aspect that was extensively discussed in various contexts was how feedback, failure and learning in organizations came about – and, as a result, how one would set out create 'nurturing organizations'.

This topic related to most of the others previously summarized, covering issues such as fostering trust (as this provided a space for negotiation), leaving space for 'error' (i.e. active learning), engendering and recognizing the value and utility of 'informal' (human-scale) interactions and adopting appropriate mindset and language (e.g. of respect, recognition, power, punishment and reward).

What are the dynamics of structures in societies and organizations?

How do we go about creating nurturing organizations? It is perceived that governmental (institutional) structures are inhibiting – what are the consequences?

Another item of extensive discussion related to the way that governmental (institutional) structures are inhibiting the human-scale activities of concern to practitioners. Being able to demonstrate clearly the (potentially damaging) consequences of these structures to policy makers and managers was seen as being important. The participants also discussed different types of institutional, organizational and social forms, how they related and how to morph them/transition between them and what their life cycles were.

Many of the key factors were identified at the workshop (institutional structures too rigid, views of the world too mechanical, etc.), but it was felt that defendable alternatives to these inflexible forms needed to be offered. The most important aspect was how these formal structures related to the 'informal' social forms – which were often (wrongly) dismissed as insignificant.

Practice – how to effect self-sustaining change in ways of-working?

How should we deal with (perceived) complexity and change as a route to achieving desired outcomes? What is involved in putting things into practice – what are the issues to address, tools and techniques required, etc.? How can they be matched appropriately to practitioners' tasks?

At the heart of 'putting complexity to work' was how to deal with (perceived) complexity and change. This includes achieving better understanding of how change came about, how to understand, engage with and influence it. The metaphor of going in a kayak on a fast-flowing river was found helpful as it expressed clearly the need to be able to influence on-the-fly – where there may not be time for extensive 'planning'. A related issue was the question of who was in the best position to achieve change – that it may not necessarily be the person formally responsible – and so enabling initiative was important.

The participants, at various times and places in the workshop, discussed 'putting things into practice' – including issues to address, tools required, etc. However, it became apparent that there was no systematic framework around which to assemble these suggested approaches and capabilities. In addition, it was hard to make hard-and-fast recommendations as many of the needs change depending on the context – what is 'right' in one situation may be inappropriate in another. Participants recognized that developments such as the Internet offered new ways for people to organize (i.e. that simultaneously recognized commonality and difference) and that developing and fostering transdisciplinarity as described by Nicolescu [6] was a key capability goal.

'Operationalizing' complexity

A session in the workshop examined the issues involved in 'operationalizing complexity' – in particular identifying which mindsets, approaches, tools and techniques might be useful to the various communities shown in Fig. 1. Some of the suitable approaches, changes and transformation challenges to address them were identified by participants, as well as: things which are common across the various practitioner communities, those factors that are crucial, controversial; bottlenecks (inhibitors), or on the contrary, offer novel opportunities (enablers) for working in complex real-world situations in practice.

A visualization technique labelled as a 'trade-off space' (see Fig. 2) was used to represent the factors surrounding each thematic issue. These diagrams, to be used iteratively in the context of operationalizing complexity, that is putting complexity to work in practice, capture some of the necessary tensions, dynamics and influences surrounding the challenges practitioners had identified previously as relevant for bringing about change in their working context.

From the discussions on the trade-off between tensions and its practical implications, the interdependencies of factors raised became obvious. Participants noted that to bring about change in complex situations to address the, often intertwined, issues required facing up to the realities; adopting 'complexity-aware' mindsets; comprehending the enablers, pitfalls, myths and inhibitors arising in a situation. It was also noted that, currently, on the one hand, no cohesive integrative approach, techniques and tools were available, and on the other that no practical support, which would be appropriate for putting complexity to work, was forthcoming from complexity scientists either.

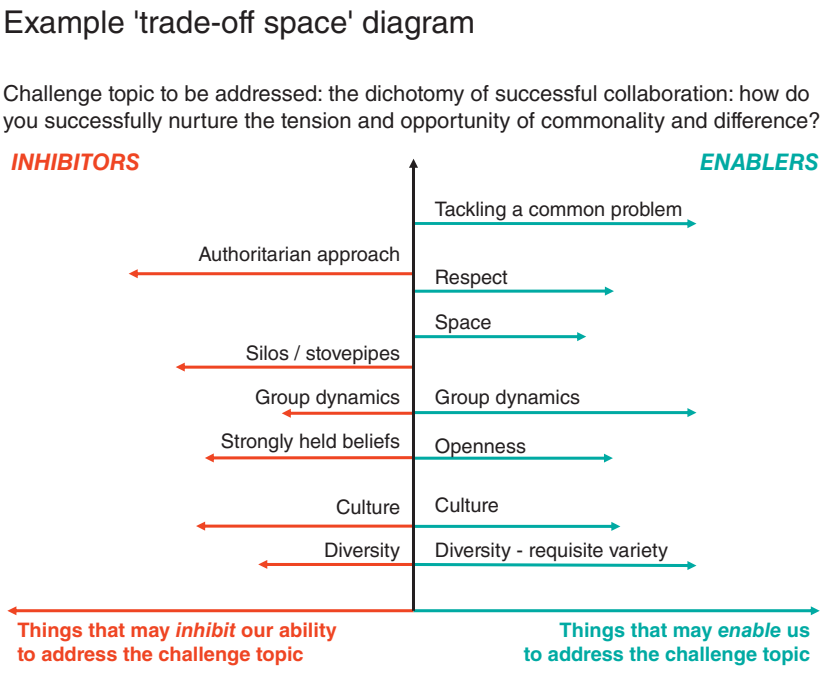

Figure 2 Example 'trade-off space' showing tensions/opportunities surrounding an issue.

What practitioners require from complexity science

The discussions and analyses identified both the gaps between what complexity science offers and what practitioners need, and the nature of support that they actively requested for their day-to-day work with complex realities. Practitioners formulated what was essential to address the 'perception of complexity' issues, across the working domains of participants that had become apparent during the workshop as follows.

Changing how it is perceived

Complexity science should both acknowledge the diversity in perception and consider how a systematic way of 'categorizing' *perceived complexity* could be developed so that practitioners can better match strategies and techniques to the changing situation.

Complexity science could assist practitioners by working with them in identifying appropriate ways of engaging with and influencing different types of complex phenomena in a working context – a 'symptom-sorter' approach might be helpful here.

Complexity science could assist practitioners by providing more rigorous justifications and practical 'case studies' demonstrating (in terms that institutions/managers, etc. would understand) the value added by adopting 'common-sense-inspired' complexity thinking and engagement techniques.

Complexity science should be aware that it may only be able to describe real-world situations at such an abstract level that this may not add value – indeed, making an inappropriate translation into 'complexity science' might impoverish understanding.

Limits on analysis, modelling and verification

Complexity science could assist practitioners by being clearer about the assumptions, constraints and limitations underlying models and by helping practitioners understand the consequences of these factors.

Complexity science could assist practitioners by helping them to develop sets of indicators and metrics, which were more appropriate for the various kinds of interventions they may employ/types of complex phenomena they may face.

Enabling effective communication and collaboration

Complexity science should recognize the diversity in ways of communication, forms of collaboration and related structures for engagement, and assist practitioners in developing alternatives to 'standardized taxonomies' – to ones that were extendable to make them relevant to the shared context.

Diversity of views and perspectives

Complexity science should examine ways in which these 'social intangibles' can be better reflected in their work such that more appropriate science can be made available to practitioners.

The effects of feedback, failure and learning

Complexity science could improve its support to practitioners if it can demonstrate its ability to synthesize its insights across these

transdisciplinary challenges – this means taking current 'single-issue' solutions and identifying necessary interdependencies with other relevant factors.

Dynamics of structures and organizations

Complexity science could work with practitioners to develop these alternatives, including both explaining rigorously why certain organizational forms were inhibiting and being able to demonstrate why better strategies, approaches, tools and techniques would result in more effective outcomes in complex situations.

Practice – how to effect self-sustaining change

Complexity science could provide better understanding of the mechanisms underlying change and transition and help practitioners experiment with change through providing appropriate 'simulations' that help them understand what their options are. These should not attempt to be absolutely predictive/prescriptive models, but instead help inform practitioners' thinking.

Complexity science could assist practitioners by developing, with them, a more systematic approach to the selection of 'tools', which enabled things to be done differently to really 'put complexity to work'.

Complexity – putting it to work

The nature of complexity offers no one single ultimate solution. For the operationalizing of the insights received from complexity science for their day-to-day work, practitioners in health care and other domains are faced with the following challenges that the Workshop addressed:

1 Being able to deal with a range of real and perceived complex phenomena and having the capability to identify the opportunities and take advantage of them.

2 Accepting the dynamic, 'always-on' and ever-changing nature of the situation with which practitioners are 'co-evolving' with (i.e. one cannot make a change without affecting both the situation itself and ones place in the changing events).

3 Understanding that phenomena, events, actors and objects 'self-organize' – in other words, structures and patterns will form spontaneously (even in ways one cannot ever understand) – regardless of whether one intervenes or not.

4 Coping with the non-linearity of events and phenomena over time – that is that they do not always 'unfold' in a repeatable way. This means that practitioners have to accept that most of these patterns, phenomena and behaviours are unpredictable – they are beyond the so-called 'prediction horizon' and are, by definition, 'unknowable' with certainty.

5 Realizing that outcomes are best achieved by participation, that is that the people of the community are probably best placed both to understand the dynamics of their environment and to effect the changes required (see Chambers [7] for an in-depth discussion of experiences with participatory methods). This means accepting that 'externally imposed' interventions are not the only way to bring about the required change.

6 Understanding the differences between 'closed systems' (such as a machine) and open systems such as human communities. For practitioners, these 'systems' are totally different in the way they can be understood, engaged with and influenced.

7 Accepting that most conventional notions of boundaries are, at best, mere contrivances to aid understanding. In practice, most of the boundaries do not really exist and so the wider real-world influences result in so-called 'unintended consequences'.

8 Applying common sense with confidence is a virtue – just because something cannot be translated into 'complexity speak' does not mean it should be discarded.

9 Fostering constructive, 'cross-disciplinarity' collaboration – as this is really the only way to address the complex realities of the real world. This is because neither one person nor one group can assemble the understanding necessary to change the world.

References

1. Matlow, A. G., Wright, J. G., Zimmerman, B., Thomson, K. & Valente, M. (2006) How can the principles of complexity science be applied to improve the coordination of care for complex pediatric patients? *Quality and Safety in Health Care*, 15 (2), 85–88.
2. Leykum, L. K., Pugh, J., Lawrence, V., Parchman, M., Noel, P. H., Cornell, J. & McDaniel, R. R. Jr. (2007) Organizational interventions employing principles of complexity science have improved outcomes for patients with Type II diabetes. *Implementation Science*, 2, 28.
3. Griffiths, F. (2007) Complexity science and its relevance for primary health care research. *Annals of Family Medicine*, 5, 377–378.
4. Singhal, A. (2007) *Which nursing home would you put your mother*. In: Plexus Institute, Complexity Series. Available at: http://www.plexusinstitute.org/resource/resmgr/docs/which-nursing-home-mcdaniel.pdf (last accessed 31 March 2011).
5. Brown, J. & Isaacs, D. (2005) The World Café. Shaping Our Futures through Conversations that Matter. San Francisco: Berrett-Koehler Publishers.
6. Nicolescu, B. (2002) Manifesto of Transdisciplinarity. Albany, NY: State University of New York Press.
7. Chambers, R. (2008) Revolutions in Development Inquiry. London, Sterling, VA: Earthscan.