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Complexity – What's new?

Complexity is mentioned in professional discussions from astrophysics to zoology. There is a sense that previous generations led a simpler existence and did not have to deal with it. Understanding whether this is true or not can help to put into perspective present day efforts to handle complexity.

The challenge

A complete history of complexity and efforts to cope with it would be an enormous undertaking but useful insights can be gained from an interesting paper written almost sixty years ago. In language that would not seem out of place today, Charles E. Lindblom described two approaches to decision making in public administration in his 1959 paper *The Science of "Muddling Through"*[1], paraphrased here:

- One approach is to adopt whatever theoretical guidance is available, gather all relevant information and make an exhaustive search of all options to identify the one that the theory and data indicate will maximise a chosen measure of value, a measure that combines everything that matters to us and the trade-offs that show how much of an increase in one factor we would demand to accept a reduction in another
- The other approach is to consider a small number of alternatives, whatever comes to mind (Options A, B, C and D), and assess their impacts on a limited set of objectives, perhaps an operating cost reduction or an improved level of safety, weighing the options using previous experience in the field, relying on the fact that the proposed options represent small incremental changes from the current state so our experience is a reliable guide.

Lindblom points out that the first approach is practically impossible in real world situations exhibiting any degree of complexity. There are too many factors both directly and indirectly affected by most public policy decisions and too many possible options for us to be able to describe and evaluate them all. Consequently, almost all decisions in public administration adopt the second approach, considering a few options in terms of a few measures of value. However, he also points out that theory and practice are not aligned because:

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[1] Lindblom, C. 1959. The science of muddling through. Public Administration Review 19 (1): 79-88.

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"… the literatures of decision making, policy formulation, planning and public administration formalize the first approach rather than the second."

The first approach he calls the Rational Comprehensive or Root approach and the second the Successive Limited Comparisons or Branch approach. Lindblom goes on to describe how the second approach operates in practice (Figure 1).

Figure 1: Successive Limited Comparisons

Successive Limited Comparisons (Branch)

1b. Selection of value goals and empirical analysis of the needed action are not distinct from one another but are closely intertwined.

2b. Since means and ends are not distinct, means-end analysis is often inappropriate or limited.

3b. The test of a "good" policy is typically that various analysts find themselves directly agreeing on a policy (without their agreeing that it is the most appropriate means to an agreed objective).

4b. Analysis is drastically limited:
   i) Important possible outcomes are neglected.
   ii) Important alternative potential policies are neglected.
   iii) Important affected values are neglected.

5b. A succession of comparisons greatly reduces or eliminates reliance on theory.

Lindblom acknowledges deficiencies in the Branch approach while asserting that there is no practical alternative. In addition to the scale of the task, he notes several challenges that will seem familiar to those grappling with complexity today. They include:

- Multiple stakeholders with diverse views and values
- Difficulty engaging with the community on a large scale to allow their preferences to play a role
- Unclear trade-offs between conflicting objectives
- Context dependent values and preferences
- Absence of clear cause-effect relationships, which he refers to as means-end relationships
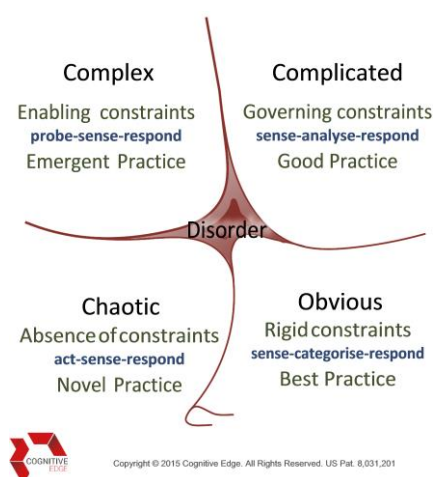
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- The absence of an objective basis for decisions, which most analytical processes assume exists and is required because decisions depend on agreement among stakeholders
- The fact that the systems being addressed are in a constant state of flux.

Twenty years later, in *Still muddling, not yet through*[2], Lindblom discussed some refinements of his ideas but concluded that his original observations still hold. Even today, we see that complexity is used as an excuse for unwanted surprises and as a rationale for using techniques based on order and stability in situations where neither exists. Complexity clearly is nothing new.

Fresh thinking

A valuable and comprehensive advance in the understanding of complex systems was encapsulated in the development of the Cynefin framework[3], illustrated in Figure 2, and the insights and methods that flow from it, see for instance *The Cynefin Mini-Book*[4]. Some treatments of complexity are based on inanimate systems, such as assemblies of software modules, or on the behaviour of groups of animals and insects, such as flocks of birds. While it has wider application, the treatment of complexity in the Cynefin framework is at its most useful when dealing with systems in which human beings are the dominant force.

Figure 2: Cynefin framework

2 Lindblom, C. 1979. Still muddling, not through yet. Public Administration Review 39: 517-526.
3 Snowden, David J.; Boone, Mary E. (November 2007). "A Leader's Framework for Decision Making". Harvard Business Review, 69–76.
4 Greg Brougham - https://www.infoq.com/minibooks/cynefin-mini-book

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Among other things, the Cynefin framework resolves one major problem that limited Lindblom and presumably others working in this field during the middle of the twentieth century. It allows us to understand complexity in relation to other sorts of systems that we encounter, those represented by the other domains in the framework. Complexity is no longer a nebulous influence indiscriminately making life difficult. It can be understood. We can tell whether it is present or not in all or part of our work and adopt methods to suit.

The framework also meets the need that Lindblom identified for something more than muddling through. Snowden and his colleagues have developed methods[5] for working in the Complex domain that complement the well-established systems analytic methods that are at home in the Obvious and Complicated domains, the domains where ordered cause-effect relationships exist. Rather than fight context dependence, deep entanglement with stakeholders and the absence of stable cause-effect relationships, these methods take the features of a complex system as their starting point.

Complex systems methods rely on light touch framing and facilitation. They tap into the experience and observations of the people within a system to allow them to explore it and their place within it. Insights into the current state, disposition and possible future direction of a system emerge from the only thing we can really rely on, the system itself in the form of the people within it.

Methods – an example

Only a limited understanding of these methods can be gained by simply reading about them. To appreciate their value, it is necessary to experience them. Nevertheless, to offer some indication of what they entail, one of the simplest techniques, the Anecdote Circles method[6], is outlined here with reference to Figure 3, which represents people entering into the process with more or less distinct views of their current situation and leaving with an enriched understanding that they share as it has emerged from their interaction.

The outcome is more than the simple sum of the inputs brought to it by the participants. Fresh insights and concepts develop during the exercise, insights that would not be gained by simply combining the separate views of those who take part.

[5] http://cognitive-edge.com
[6] http://cognitive-edge.com

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Figure 3: Anecdote circles

Anecdote circles
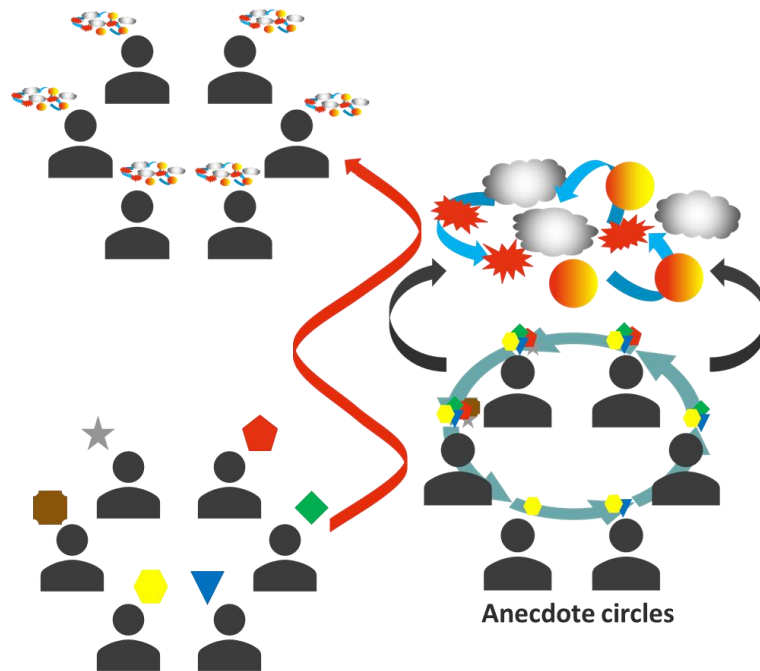
Loosely framed by a topic and stimulated by unbiased prompts, the method exploits the human propensity to recall and exchange experiences as narratives. Narratives are not to be confused with stories. They might be as brief as a single sentence describing something that occurred to or was observed by the contributor.

The facilitator of an anecdote circle intervenes only as much as is required to ensure participants remain receptive to emergent insights. Among other things, the facilitator must: avoid groups drifting into an exchange of opinions; prevent one member of a group taking over the process; disrupt any attempt by participants who are uncomfortable with the open nature of the exercise to introduce a structured form of interaction; invigorate the flow of contributions if it starts to flag, and; avoid influencing the participants.

The participants' contributions might be recorded to be used as a resource for further work. In a more extensive method, key features of contributions can be used to develop a representation of the factors at work and how they interact, all emerging from the experiences and insights of the participants alone.

This method has the capacity to bring to the surface information and insights that a questionnaire or structured one-on-one interview would never expose. Participants develop their thoughts in response to their own experiences and to the contributions of other participants. Their input is not steered by a

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facilitator's hints or guidelines. It is not channelled by a predefined framework as happens in SWOT analysis or when brainstorming solutions to a problem, for instance. The difference goes well beyond using open questions, ensuring everyone has a chance to contribute and respecting all their inputs. SWOT, brainstorming and related methods have their place but that place is not in exploring complex systems.

Any aspect of a complex human system can be explored using principles that accept complexity as the starting point rather than treating it as a problem to be overcome. Other common applications include:

- Exploring possible pathways to change and development
- Building a framework within which to understand an organisation's culture
- Probing a system to explore its behaviour
- Developing plans for trials or experiments to inform longer term change
- Exploring conflicts and possible resolutions
- Mapping an organisation's knowledge.

In each case, the desired end is pursued in a way that avoids conditioning or limiting the outcome with an external frame of reference or a preconceived sense of priorities.

The SenseMaker™ method is especially powerful and has a wide range of applications. It offers a means to tap into a large number of people in a complex setting using web-based tools. This allows the engagement of geographically distributed groups over extended periods of time on a large scale and, thanks to the internet, at moderate expense.

Conclusion

The existence of complexity in human systems is not new; we have simply become more conscious of it. We now know that we can distinguish complex systems from ordered systems and engage purposefully and productively with complexity.

Complexity need no longer be seen as a necessary evil that limits what we can do. It is a fact of life that we can allow for in the way we work, without compromising the quality or integrity of our efforts.

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Contacts

If you would like further information about this topic please contact us. We will endeavour to reply promptly.

Dr Stephen Grey
Grey@Broadleaf.com.au

Dr Dale F Cooper
Cooper@Broadleaf.com.au

Pauline Bosnich
Bosnich@Broadleaf.com.au

Grant Purdy
Purdy@Broadleaf.com.au

Geoff Raymond
Raymond@Broadleaf.com.au

Phil Walker
Walker@Broadleaf.com.au

Mike Wood
Wood@Broadleaf.co.nz

For further information, visit www.Broadleaf.com.au