
Column

Complexity Science and Collaborative Decision Making

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Welcome to the Age of Complexity

In a recent book entitled *Planning with Complexity*, Judith Innes and David Booher (2010) make the case for a new way of knowing and deciding that they call collaborative rationality, an approach to problem solving that puts a premium on face-to-face dialogue and multiparty negotiation. Collaborative rationality involves interactions among a great many people with different perspectives, drawing on multiple sources of information, who manage to reach agreement. To explain how such broad-based collaboration is possible, Innes and Booher draw on insights from the field of complexity science.

That field's experimental and disciplinary underpinnings are summarized in another recent book, *Complexity: A Guided Tour*, by Melanie Mitchell (2009). She explains the most recent advances in thinking about natural and social networks, and the ways they function. For me, the most important point she makes is that many complex systems are self-organizing — that is, they do not require a strong hand (i.e., an expert or a leader) to steer them toward a predefined destination in the way that most conventional thinking (usually dubbed instrumental rationality) presumes.

Complexity science, instead, tries to account for systems in which large numbers of individual agents interact dynamically: they exchange information and work their way, in adaptive fashion, toward a mutually satisfying outcome. Even if some agents only interact with a few others, the effects of these interconnections ripple through the whole system. As a result, complex systems have a memory that is not located at a specific point but,

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rather, is distributed. There are many direct and indirect feedback loops in complex systems, and usually they are open, not bounded.

The behavior of these complex systems is determined by the sum of these interactions, not the actions of individual nodes. Furthermore, the behavior of such a system cannot be predicted by looking at its individual components. Surprisingly, if random nodes are deleted from a large network, the network's basic properties still remain intact. Complex adaptive systems display a capacity to maintain their viability and to evolve. Some of the examples that Mitchell marshals include immune systems, the World Wide Web, and national economies. But from my standpoint, she could just as well be talking about large numbers of actors involved in collaborative problem solving. Innes and Booher's book demonstrates how dispute resolution theory and practice could and should incorporate complexity science.

I believe that traditional ways of thinking about decision making — based mostly on the idea of instrumental rationality — are giving way to collaborative approaches to generating decisions based on *collective* rationality. Innes and Booher have nicknamed their take on this “DIAD” because it builds on notions of diversity, interdependence, and authentic dialogue.

Diversity

As far as diversity is concerned, Innes and Booher suggest that diverse stakeholders can be self-organizing, handle a wide range of interactions among participants with very different interests and needs, and operate in nonlinear ways. That is, they need time to circle back, bring in more participants, consider additional information, and continue to modify whatever provisional decisions they make. Diverse agents must be involved for coherent and novel patterns of action to emerge. They also point out that a collaboratively rational process needs to include not only agents who have power because they are “deal makers” or “deal breakers” but also those who have needed information or could be affected by the outcomes of the process.

Interdependence

The condition of interdependence holds that agents must depend, to a significant degree, on other agents. That is, as is true in all successful negotiations, each agent (or stakeholder) has something that others want. At the very least, they can learn something from each other. This condition ensures that participants maintain a sufficient level of interest and energy to keep working toward agreement. Negotiation theory tells us that interdependence among interests is the key to moving beyond zero-sum games to mutual gains agreements. Such interdependence means that players cannot achieve their interests on their own and that, given their diversity, some participants will value certain results more than others. As a group,

however, they can pull together a “package” that allows every participant to get more of what he or she values without reducing the benefits to others.

Authentic Dialogue

Authentic dialogue requires that agents engage with each other in deliberations that adhere to Jürgen Habermas’ ideal speech conditions. That is, deliberations must be characterized by direct engagement so that parties can convince themselves that claims are accurate, comprehensible, and sincere. Deliberations cannot be dominated by those with power outside the process, and everyone involved must have equal access to relevant information and be given an opportunity to speak and be listened to.

In authentic dialogue, all participants can challenge the assumptions or assertions put forward by others. Nothing is off the table, and the reasons that people give for why they are taking a particular stance matter. Authentic dialogue relies on participants expressing what they know from their everyday lives and not just on specialized, scientific expertise and constructing knowledge jointly through interaction and shared inquiry. Many processes that are dubbed “collaboration” fail to meet these conditions and, thus, do not involve authentic dialogue.

Complexity Science Explains Why Collaborative Rationality Works

Innes and Booher write:

The complexity and rapid change in contemporary society have created an increasing awareness among policy leaders of the limits to hierarchical control by government agencies and to formal expertise in solving problems. This awareness leads to growing uncertainty about policy and a new focus on the need to manage uncertainty, rather than create programs and regulatory regimes that deny its existence. As society has become more culturally diverse and democratic leaders have sought to represent wider arrays of groups, decision makers have to deal with an array of publics with different values, perspectives, cognitive styles and worldviews. Complexity is also reflected in growing interdependence among government players, as agencies find they cannot be successful, even on their own limited agendas, if they continue to work unilaterally (p. 197).

Collaborative rationality sees the world as inherently uncertain and assumes that all decisions are necessarily contingent. In this view, Innes and Booher suggest that planning and policy are “not about finding the best solution — indeed there is no one best solution, though there may be many better ways of proceeding than the status quo” (p. 200). Collaboratively rational processes are about engaging with other members of a community to jointly learn and work out how to generate improvements in the face of

conflict, changing conditions, and conflicting sources of information. Such processes are not only about finding new ways to move forward, but they are also about helping communities and groups to be resilient in the face of new challenges.

A resilient system is one that can withstand shocks, absorb extreme stress, and maintain its core functions. Resilience refers to the amount of change a system can undergo while still retaining control over its function and structure, the degree to which a system is capable of self-organizing, and its ability to learn and adapt.

Mitchell characterizes the “balancing act” between unfocused exploration and focused exploitation (of information) as a general property of adaptive and intelligent systems. She provides numerous examples of the continual interplay between unfocused random exploration and focused action driven by the perceived needs of all kinds of systems, including the immune system, ant colonies, and cellular metabolism. Maintaining the correct balance between these two operations is essential because the optimal balance needs to shift over time. As information is obtained and acted on, exploration gradually becomes more deterministic and focused in response to what has been perceived by the system. When she writes that “the system both explores to obtain information and exploit that information to successfully adapt,” I cannot help but think of the role that mediators play when they help groups engage in joint problem solving — encouraging them to brainstorm in a relatively unstructured way at the outset and then prodding them to become increasingly focused as they try to generate agreements that everyone can support.

Now, every time someone suggests a collaborative (bipartisan?) approach to problem solving or dispute resolution, you can consider their approach in light of the DIAD model. Are they really committed to collaborative rationality, or are they just instrumental rationalists hiding behind a mask of collaboration?

Even when only two parties are involved, if they approach negotiation as a joint problem-solving process, accept the fact that there are probably multiple outcomes that can meet both their interests, and work forward in an adaptive fashion (rather than backward from what they assume to be the “best” outcome), they are likely to be pleasantly surprised.

REFERENCES

- Innes, J. and D. Booher. 2010. *Planning with complexity: An introduction to collaborative rationality for public policy*. New York: Routledge.
- Mitchell, M. 2009. *Complexity: A guided tour*. New York: Oxford University Press.