

Understanding Complexity

by Verna Allee, 1994

Life is complex. Organizational life is complex. As we plunge headlong into a bewildering knowledge economy operating in cyberspace at warp speed, we struggle to understand the everyday complexities of our work. How can we understand – much less manage – complex exchanges of activity, knowledge and value between leadership teams, customers, suppliers, business units, production units, customer service groups, corporate services, marketing partners, research partners, community groups, government entities and trading partners? In an age of growing awareness of the impact of our actions on the environment and the global economy how can we make wiser decisions? Never in history has the need for systems thinking and tools been greater in every walk of life, at every level of work.

The performance of a complex system depends on how all the parts work together, not how each part performs when taken separately. This whole system perspective is difficult for us in organizations. We have traditionally managed by breaking things down into separate functions and processes. We try to manage complexity by focusing on only one small area at a time.

Breaking down business activities in this way does achieve efficiencies. However, our earnest hope that all our finely tuned processes and functions will add up to more efficient and profitable enterprises, is seldom realized. Appreciating and working with complex interdependencies is very new for us and quite challenging. Our culture has powerful values such as individual achievement, scientific specialization, and linear thinking that seem at odds with focusing on a complex system. Learning to work with complexity will require more than changing what we do; it will also require a shift of mind.

Organizations are a unique combination of mechanistic systems, which are "engineered" according to Newtonian physics, and human systems which are more organic and self-organizing. We must draw from both types of thinking to be effective in organizational life. Applying linear thinking, implementing control functions, specializing tasks and dissecting processes into parts, leads to great efficiencies in mechanistic processes such as manufacturing or logistical support. Whole systems thinking helps us understand dynamic relationships and appreciate how everything is working together. For example, the emergent properties of human systems or complex issues such as strategy development are only understandable from a systems thinking perspective. We have also gained much insight into the function of our mechanistic systems by appreciating how our thought world influences and shapes our creations.

In my work with company leadership teams and work groups I have found four keys to understanding complex issues and situations.

1. Employ **multiple lenses** for understanding both the external behaviors of the situation and the internal logic and assumptions that define structures and behaviors.
2. Focus on **dynamic relationships**.
3. Emphasize detecting the **patterns that connect**.
4. Engage people through **group learning processes**.

Multiple Lenses

Understanding complexity requires multiple lenses. We must look upward and outward to the external behaviors that we can observe. At the same time we must look downward and inward to understand the underlying assumptions, beliefs, and values that sustain the current situation, structures, and behaviors.

The inner world of a system is explored through open-ended, heuristic inquiry. Reflection and dialogue helps people explore the collective thought patterns sustaining a complex system or situation. For

example, one of my favorite questions to ask is, "What purpose does this situation serve?" It is important to remember that *every system works perfectly — it always fulfills its real purpose*. If we experience a system as dysfunctional, it is because we have a different purpose or desired outcome in mind. If purposes are in conflict things feel out of sync or complex. However, every system works perfectly by creating checks and balances to keep all those different purposes from destroying the system. Working with the question of what this situation really serves can offer powerful insights.

Equally important are external explorations using more visual and structured modeling, mapping and diagnostic techniques. We need to employ all our senses, asking ourselves not only how we can see a complex situation but also how can we feel it, taste it, and touch it. We need to bring our talents for metaphor, poetry and music to bear. Visual mapping approaches coupled with thoughtful reflection can be especially powerful in helping a group reach shared understanding of what is happening.

Dynamic Relationships

Visual techniques are especially helpful for understanding dynamic relationships. Eric Jantsch tells us that in life the real issue is not control, but dynamic connections. For example, we explore relationships between things all the time by comparing the way things are alike and grouping them into categories. In a complex situation, however, one would be trying to understand the dynamic relationships and interdependencies between the behavior of objects or people. Some of the most useful dynamic relationships to focus on in complex situation are influence or cause and effect, feedback loops, exchanges, cycles, strategic coupling (tight interdependencies), influence and cumulative impact.

Mapping techniques for systems understanding have what visual consultant Jennifer Landau refers to as a *synergraphic* quality. This means the technique helps to make explicit the tacit or unspoken mental models and images people hold as a *group*. Such techniques tap into collaborative intelligence by working with models, maps, metaphors and geometric shapes as ways of organizing group knowledge and insights.

I like to use mapping techniques that incorporate both linear flows and dynamic relationships, thus drawing from both Newtonian thinking and key principles that have emerged from the new sciences. Such systems maps capture:

- The boundaries of the system (what is included)
- Entities or actors (participants)
- Inputs and outputs (resources and products)
- Key transactions or processes
- Sequences of activity
- Dynamic relationships and interdependencies
- Feedback loops (or exchanges and response)

The Patterns that Connect

Unraveling complexity also involves trying to understand the patterns of thought, behavior or relationships that weave the fabric of the system. The ability to detect patterns in our organizations is vital for future success. The better these patterns are surfaced and articulated, the easier it is to communicate about the workings of the system and make appropriate responses. You might think of this as trying to unravel the DNA or genetic code of the system. Insights around patterns emerge through working with values, undertaking social network analysis, exploring explicit and implicit policies, rewards or decision criteria, exploring repetitive behaviors, and working with apparent paradoxes or polarities. For this work, it is important to let the patterns and insights arise from the group rather than imposing conceptual frameworks or models.

Working as a Group

Another requirement for understanding complexity is working as a group. Virtually every single analytical tool that is useful at the complex systems level must be used by a group to be successful. No one individual can understand a system or complex situation - it requires a group effort of all the critical stakeholders and players. System level learning is a collaborative learning process.

We all have inherent understanding of the complex situations that confront us. The challenge is to first tap our collaborative knowledge, then deepen knowledge into wisdom and respect for our powerful capacity to create systems that serve us. Without employing systems thinking tools and approaches we cannot make healthy choices for our future.