

Feature Article

The Systems Consciousness of Senior Executives

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(Editor's Note: Updates on these research projects will be reported in the CHAOS conference on The Meta Network. Comments, questions, and suggestions are welcome! - Lisa Kimball, MetaSystems Design Group, lisa@tmn.com)

There is a manager in New York City with responsibility for keeping all the elevators in all city buildings operating - from the office towers downtown to the housing projects in the South Bronx. You don't want to know everything that happens in and to these elevators!

This manager accomplished an astounding feat of raising the percentage of elevators working on any given day from around 60% to 95% and higher. When I interviewed him to discover his management secrets he told me that 95% wasn't good enough. "You see," he explained, "My job is about reducing stress. The people using my elevators face all kinds of problems and the last thing they need is to be standing there waiting for an elevator that isn't working. It doesn't matter if there are only 5% not-working elevators in the city, if your elevator isn't working it's 100% not working and that can be the final straw."

He went on to describe various processes he'd put in place for preventative maintenance, work crew incentives, and cooperative relationships with building occupants. I realized that what enabled this manager to get on top of his impossible job was a dynamic systems perspective in which each piece of information and every activity was seen in relationship to the systems goal - people riding in working elevators.

This manager was one of a group I interviewed as part of a study of effective managers in New York City. Participants in the study had been selected for a "fast track" training program for candidates for promotion to executive level positions. These successful managers were from many different types of agencies and served in a wide range of functions. Although their jobs differed, our study found some striking similarities in how they conceptualized and solved problems. The one characteristic which appeared in every interview was one we called "having a systems view."

This finding matched that of an earlier study of high performing Federal executives (Klauss et al, 1981) which identified a cluster of competencies and indicators associated with effectiveness. We interviewed senior executives from six different Federal Departments and agencies using a technique based on analysis of critical incident interviews (Flanagan, 1954). Among the sets of characteristics we found were; systems view, strategic focus, proactive-anticipatory stance, networker, and sensitive to personal strengths and weaknesses. Effective executives tended to create broad problem definitions and see patterns of relationships among problems.

Management literature includes a group of studies of effective executives which have found a common element. Researchers have named it different things including systems thinking, having a systems perspective, recognizing

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systemic structures, and creating mental models of systems. This kind of "systems" thinking refers to thinking which tends to be holistic and relational rather than reductionist or analytical. They've called it a trait, factor, competency, characteristic, or strategy depending on their framework.

As a result of this research, a primary approach to helping executives learn about and cope with the thinking demands of their complex environments has been to focus on developing and supporting "strategic" thinking which is supposed to "take into account" all parts of the system. This has resulted in hundreds of different training designs, process models, and technological tools which have attempted to teach executives how to apply various strategic thinking skills to the problems at hand. Most of these have enjoyed a very limited success and many are outright failures. Executives master the various thinking strategies in the course but they don't tend to use them when faced with real problems in their day-to-day work. Many a book on strategic thinking skills for executives sits unopened on the executive suite coffee table.

Does this mean that "systems thinking" is something that can't be taught? Is it something you have or you don't? ... something you're born with? When I asked that question in the CHAOS conference on The Meta Network, people who thought of themselves as systems thinkers were able to give examples from early memories and spoke of experiences rather than courses (or books) which influenced their thinking. Most were reluctant to say that systems thinking can't ever be taught, but described it as more fundamental than a technique you can pick up in a book.

This question is at the heart of my current research interests. What if systems thinking is not just a powerful heuristic but is rather descriptive of the basic structure of expert knowledge? Perhaps expert executives actually store, organize, and retrieve their knowledge in terms of systemic relationships.

Cognitive psychologists have found attributes common to experts in a wide range of domains including chess, physics, computer programming, and international relations (Chi et al, 1988). Experts tend to organize their knowledge in large, meaningful patterns or "chunks." Experts attend to similarities in structure between problems rather than surface details. Expert knowledge is highly elaborated which creates connections to and from diverse concepts making it easy to access efficiently and with flexibility. Expert knowledge is also often implicit or unconscious. That sounds a lot like what we've been calling "systems thinking."

In my current research, I am using the expertise framework from cognitive psychology to explore executive thinking. Many studies of expertise use designs which compare experts to novices using think-aloud protocol analysis. There has been relatively little comparable research done with executives. However, Isenberg (1984,1986) used this method in a series of studies focussed on how expert managers encoded information, reasoned from encoded information, and planned action. He found that expert managers had an organized "mental map" of the issues related to any particular problem - a map which is continuously revised, tested, and corrected based on subsequent experience. This map includes associations among myriad tasks, people, issues, and goals.

I am interested in pushing this idea a little farther to see if the organization of relationships among elements in these knowledge webs can be described using concepts from systems theory e.g. feedback loops of various kinds, whole-part relationships, and cause and effect relationships shifted in time and space.

In a pilot study, ten executives from different fields participated in structured interviews and then were asked to draw how they "saw" a particular problem they were working on currently. The drawing task was suggested by work done by deBono (1985) based on the notion that people's concepts are often more complex than can be easily captured given the linearity of language. Even something as crude as a sketch on a napkin provides cues which trigger more elaboration and description of relationships among elements.

Although most of the executives in the study did not use the standard systems vocabulary (and most had no formal training in systems theory), they used functional descriptions of systems concepts to explain how they thought about complex problems. What was even more striking was the extent to which their drawings contained arrows, loops, and the other chutes and ladders needed to describe how changes in one part of the system might influence the other parts. Although the metaphors reflected by the drawings varied widely, they were all essentially dynamic and tended to provide larger contexts for problems rather than breaking the problems into smaller pieces.

Two studies are in-progress to explore additional implications of this idea. In one study, a randomly selected group of executives are ranked based on their performance on a standard in-box exercise used for assessment. They then "think-aloud" while solving a series of different management case problems given to them on different days over a period of about a week. The cases are set in the same organization and the executive is asked to take on the same role each time. The content of each case in the set is apparently autonomous - covering different functional areas e.g. personnel, planning, budget management, etc.

In the pilot for this study, the higher ranked executives referred to knowledge learned in the context of previous cases when dealing with later cases, spoke in terms of how possible actions in the present case might impact action plans in previous cases, and tended to integrate solutions to previous cases with subsequent ones thus ending up in the final case with a strategy incorporating aspects of all of them. In contrast, lower ranked executives tended to treat each case as a separate problem to be solved independently.

Evidence that this approach resulted in differences in how their knowledge of these cases was organized and stored was found in subsequent recall tasks (given 4 to 6 weeks later) in which the higher ranked executives remembered much more about all the cases and recalled material in terms of solution strategies. Lower ranked executives remembered less material overall, treated the cases separately when recalling material from them, and tended to focus on factual details rather than strategies or solutions.

In a second study, expert executives are asked about real problems they're working on using a combination of critical incident interview and idea sketching techniques. This process is repeated over a several month period to create a series of "maps" of how the executive is thinking about the problems. If the view that experts organize their knowledge systemically is correct, then we'd expect them to do so right from the beginning. Their systems "models" would not be something imposed at the end of an information gathering and analysis process but would instead be grown organically as new information is incorporated into ever more elaborated maps of relationships.

If this turns out to be what expert executive thinking is like, how can we help executives become systems thinkers? One possibility is suggested in a recent article by de Geus (1992) about a new approach to modeling which places the value in the experience of actually constructing the model rather than simply participating in a pre-canned exercise (no matter how complete or complex). Other promising strategies focus on supporting reflective practice and team processes which expose executives to multiple perspectives on every problem. The successful approaches will likely be experienced-based rather than based on training of techniques. However, it may be worth exploring whether explicit learning about the language and concepts of systems theory can support development of executive expertise.

There's no danger of running out of interesting questions about systems thinking. If you're a systems thinker do you think that way about everything or only about things where you're an "expert?" Are people with particular cognitive styles predisposed to be (or not be) systems thinkers?

Are the systems structures we use to understand the world the result of characteristics of human cognition or is our cognitive process simply adapting to the way the world is really organized? I'm looking forward to hearing from all you systems thinkers out there about that one.

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