

A Board's Journey into Complexity Science: Lessons from (and for) Staff and Board Members

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Abstract

Complexity science has been used as a lens to interpret organizations (Goldstein 1994; Morgan 1993, 1997; Stacey 1992, 1996a; Wheatley 1992; Wheatley and Kellner-Rogers 1996; Zimmerman 1993a, 1993b). These interpretations have shone a light on aspects of organizations that were idiosyncratic or at least difficult to reconcile with dominant organizational theories. In this paper, we go beyond interpreting results through a complexity lens to demonstrating how board members and staff of an organization deliberately applied insights from complexity science to improve their work. Using an action learning approach, we worked with the board and staff for a year. One of the lessons from this journey was the need to differentiate between "fake" complexity and real complexity. Using "fake" complexity, simple issues were complexified and complex issues were avoided. Another key lesson was the role of relationships for complex issues. This paper presents a "STAR" relationship model to help organizations discern the generative potential of current and future relationships. Each point, or letter, of the STAR represents one dimension of a potentially generative relationship. Through the action research process, both the researchers and the members of the organization extended our understanding of how complexity science can enhance the capacity to evolve in a rapidly changing environment.

1. Introduction

Complexity science is not a single theory. Complexity science is the study of complex adaptive systems (CAS). There is no single agreed upon definition of CAS among complexity scientists. However, the definitions all have certain characteristics in common. CAS are seen as evolving networks of independent but inter-dependent agents. CAS have the capacity to self-organize into higher or greater levels of complexity using simple "rules" or patterns of interaction. Complexity scientists are interested in the patterns of interaction within CAS, how they are sustained, how they self-organize and how outcomes emerge. Complexity science is highly interdisciplinary including biologists, anthropologists, economists, sociologists, management theorists and many others in a quest to answer some fundamental questions about living, adaptable, changeable systems.

Many books and articles have been written about complexity science in the past decade demonstrating how, in spite of recent research, we have much yet to learn about how living systems are sustained and evolve (Holland 1995; Kauffman 1995; Kelly 1994; Lewin 1992; Waldrop 1992). Complexity science is a

complement to Newtonian science and the machine metaphor. The Newtonian perspective focuses on explanations of the "parts" of systems. By detailed analysis of the parts, we can gain better insights into the whole, or the sum of the parts. However, it fails to explain emergence. Complexity science challenges the universality of Newtonian assumptions by demonstrating that in living systems, the whole is not explainable by the parts alone. Emergent outcomes can only be explained by the pattern of interdependencies and patterns of interaction. These emergent outcomes can be unpredictable and yet are created by simple, replicable processes. Emergence requires distributed capacity (Goodwin 1994). In nature, complex adaptive systems have distributed capacity. Capacity or control for "decisions", choices, or actions is not centralized. This decentralization of capacity or control also means non-sequential problem solving. The solutions emerge from a variety of simultaneous processes.

Most of the literature that applies complexity science to organizations does so in one of two ways: (1) in hypothetical or conceptual terms (Morgan 1997; Wheatley 1992) or (2) by explaining past events with a complexity science interpretation (Goldstein 1994; Morgan 1993; Stacey 1992, 1996a; Wheatley and Kellner-Rogers 1996; Zimmerman 1993a, 1993b). Recently, researchers have been trying to capture stories and implications for organizations that are deliberately applying complexity science to their work (Zimmerman and Lindberg 1999; Zimmerman, Lindberg and Plsek 1998). In this paper, we took this process one step further by showing how an action learning research mode can be used to understand and expand the application of complexity science to an organization.

The research project began after a wave of exposure of local non-profit organizations to the basic principles of chaos theory and complexity science in the management of human services.¹ Using an action learning approach, we worked with a nonprofit social service organization (NSSO).² The president of the Board of NSSO had approached us "to help make the board more like a complex adaptive system". We turned down the consulting assignment and asked instead to study with them to discern what it meant for a board to be "more like a complex adaptive system."

The research project had three objectives:

- to discover whether deliberately using a complex adaptive system (CAS) perspective can improve an organization's effectiveness;
- to find new ways of communicating CAS insights for organizations, and;
- to demonstrate how action learning is consistent with CAS concepts.

The primary purpose of this research study was to learn whether board members of a nonprofit organization could become more effective by deliberately using a complexity science lens. Effectiveness is defined as being able to achieve outcomes that support the mission or objectives of the organization.

Our conclusions about the increased effectiveness of the board and staff drawn from a CAS perspective are very tentative but promising. We do not claim to have "proven" that the CAS perspective caused an increase in effectiveness. However, senior members of the organization are convinced that learning about and applying complexity concepts has played an important and positive role in the organization. Eight months after the end of the research project, the executive director made the following observations in a follow-up interview.

"The CAS perspective has had a big impact on us.... The staff uses the ideas and the language of CAS in their work and discussions. We really recognize the need to evolve... For the first time in 15 years, we are very clear that services do not need to look the same to support the mission. From CAS, we have learned not to be obsessed with consistency and now see diversity as necessary."

The president of the Board also commented in a follow-up interview that the CAS perspective had helped the Board focus on the relationships that were "rich with potential", to "open" the meetings to staff and also open the meetings to "inquiry." She argued that the Board "recognizes the need to keep asking questions, the need for healthy reflecting and to be able to live with the discomfort that this uncertainty brings."

1.1. Outline of the paper

The paper begins with a brief description of the methodology and some of the principles underlying action learning. Several aspects of action learning are consistent with CAS principles including: self-organization, positive feedback loops, self-reference, distributed knowledge, and inter-connectedness. Following the methodology section, are two sections which first describe the organizational context and then report and analyze some of the findings from the research. The final sections of the paper provide implications for managers and researchers.

2. Methodology

Our research approach has much in common with action research: a single research site and the roles of the insider participants defined by the organizational setting (e.g. Board members, executive director, program manager etc.). However, the approach we used is philosophically more aligned with action learning. Action learning is a "a self-directed, co-learning process carried out in real-time settings by long-term stakeholders and applied to ... persistent and complex problems" (Morley 1989, p. 178).

Action learning can be seen as both a subset and an offshoot of action research. Although both action research and action learning involve an education process, in action learning, the researcher plays much more of a role of a learner rather than a trainer. The researcher is trying to be a learning catalyst to create "continuing, adaptive learning processes that are self-organized by the participants" (Morley 1989, p. 181).

Action learning tends to "originate in specific local settings, but encourages the foliation of networks among similar settings as a conscious element of the wider field of action" (Morley 1989, p. 181). One of the persistent and complex problems faced by NSSO was that their mission required the collaboration with many community partners.

Action learning approaches were used to link theory and practice. We therefore assumed dual roles as (1) facilitators or learning catalysts to help the organization and as (2) researchers to learn and disseminate insights. The action component of this research was in keeping with the Buddhist belief that "if you know but you don't act, you don't know." We sought to enact a community of inquiry in a community of social practice (Argyris, Putnam, Smith 1985).

During the year we attended all of the monthly board meetings, the annual general meeting, interviewed members of the staff and board, and facilitated a retreat with the board and staff. In addition, one of the researchers facilitated the process of hiring a new executive director. As action learning researchers we followed in the Tavistock tradition of attempting to break down the barriers between the experimenter and the subjects (Emery and Trist 1973). We wanted to learn about creating the capacity for changeability, and evolution in a natural setting. The "actions" or interventions were self-reflections by the participants that we mirrored back to them in order to reveal their implicit assumptions and processes of interaction. Our interventions were designed to facilitate learning and reflection or, in the words of Emery and Trist, "to release processes of social and organizational learning which permit innovations to be accepted and adaptive changes to take place" (1973, p. 104).

At the beginning of each meeting, we asked the board members to pay attention to one or two particular aspects of their interaction. We layered the concepts from complexity theory by adding new dimensions every meeting or two to surface our understanding of the applications and limitations of the theory for the work of the board and the organization. At the end of each meeting we asked for their reflections. We often phrased our questions to them in terms of both the CAS principle that we had asked them to focus on for the meeting and also more generally asked, "what surprised you?" They reflected publicly about what happened during the meeting, why they thought it happened and what they would do differently (or the same) another time. This cycle of reflection was reiterated at the beginning of the next meeting to see if further insights had been gained between meetings.

In the early stages of the research, board members found it difficult to pay attention to both the content of the board meeting and step outside of the meeting and themselves to observe their patterns of acting, and thinking. However, even at the first meeting, five out of eight board members were able to make observations. By the end of the year, the board members were initiating their own reflections. We also made our reflections at these meetings. We were careful not to make too many observations at the beginning of the project so as to minimize the risk of "model monopoly" (Elden and Levin 1991). We did not want to assume (nor have the board members assume) that our models were superior to the extent that it would deny their own perceptions or reflections. The examples we chose to focus on were their own examples and asked questions to bring a different perspective on how or why something could have happened.

For the first three meetings, we played the role of "blotting paper" (Morgan 1989) more than interventionist. By the fourth meeting, we were more inclined to intervene during the process. At this point, their confidence was sufficient that they could use the intervention to further their work. In other words, they saw the deliberate reflections or questions "not as distractions from the work but as part of the work" as noted by one board member.

The meetings were audio recorded and transcribed. The transcripts were then analyzed to reveal the patterns. Argyris, Putnam and Smith (1985) argue for keeping data separated by the rungs on a ladder of inference. The key point is to separate the data into the following categories:

- (1) hard "facts" - quotes, indisputable data;
- (2) the insiders' interpretation - cultural meaning;
- (3) the outsiders' interpretation;
- (4) theory which was implicit or explicit in rungs 2 and 3.

During the meetings, data was collected in hand written notes by both the researchers and by some of the participants by separating the data into at least two of the four categories. As researchers, we collected data during the meetings in categories 1 and 3. We then fed some of the quotes and incidents back to the participants to reveal category 2 data. This in turn influenced our categories 3 and 4.

At designated times during the meetings and at the board and staff retreat, we challenged the board to reflect on their work. For example, in the second meeting with the board we taught them to keep their notes of the meetings with a split page and explained how we would do the same. One half of the page was for recording the critical incidents, quotes or other hard facts. The other half of the page was used to record their interpretation of this data. Consistent with action learning, we used feedback loops of both double and triple loop learning to challenge both their assumptions about what they knew and also to reveal "how" they knew. The process was not just an academic exercise. The discussion of the data we all collected was used to discuss how they needed to work to more effectively achieve the mission of the organization.

3. Description

3.1. Background about the organization

NSSO was entering its fifteenth year at the inception of our project. NSSO was initially seen as an upstart organization. They challenged the status quo of health and social services in the area by focusing on the linkages between developmental delay and mental health problems. Their mission was to address the vocational and residential living needs of young adults who were developmentally delayed and/or had chronic mental health problems. At the time, the concept of re-integrating people with these challenges to daily living into the community was antithetical to the previous half century of institutionalization followed by the development of smaller group home living conditions. The concept of citizen advocacy as a means of intervening in support of the quality of life of individuals such as those served by NSSO represented key elements of the original mission of the organization.

At that time of this research (1996-1997), NSSO had experienced over a decade of continued growth under the careful stewardship of its founding executive director. NSSO's case management, vocational, recreational and daily living supports had evolved such that a widespread network of staff covered the county. During the same period, the county had also experience rapid growth, adding the equivalent of a small city (40-50,000) to its population each year, bringing with this growth a significant influx of new cultures and great density in the southern part of the county, which at the time of our study had a population of about 500,000.

NSSO was entirely funded by the Ontario government. In late 1995 and throughout 1996, the newly elected provincial government announced drastic cuts to social service funding. Mental health programs were particularly vulnerable, as they were not mentioned in the government's documents that described their focus in health care and social service spending. A felt urgency permeated NSSO. They faced the prospect of significant funding and organizational changes as a result of changes in the policy direction of the provincial government.

NSSO's Board, when we first met them, was extremely used to being involved in a review of the minutiae of an organization's life. In fact, one telling story recounted the many lengthy debates that the Board had concerning a winter travel policy for staff. Under the terms of this policy, the presence of specific adverse weather conditions would determine whether or not staff, who provided most of their client services in community and household locations, would provide services or work out of their own homes because of adverse conditions. However, the nature of the county in which NSSO provided services was such that significant weather variations could be expected from one end of the county, the north, to the other, the south. The proximity of large but different bodies of water at either extremity, plus the juxtaposition of a huge metropolis at the southern border of the county, added to the contrasting weather systems experienced. Eventually, after several protracted discussions over this policy (which preceded the action research by several months), the Board and executive leadership of NSSO eventually decided to empower individual staff to decide if the weather conditions merited caution regarding local travel. The lengthy grappling of the Board of Directors with their attempt to generate a uniform, centrally controlled weather policy for the organization was a story recounted by several board members. They argued this was proof that they needed a new model of leadership and governance.

A further significant change in NSSO's history occurred within three months of the start of the research project. At that time, the founding executive director indicated an intention to leave the organization for family reasons. The Board was deeply divided regarding the directions it might take with the search for a successor. Two of the original senior managers with NSSO were at that time engaged in new, but temporary, roles as lead executives in other provincial and community assignments. Within the Board, the respective preferences for these two off-site leaders were relatively undiscussable, and the debate regarding a preferred succession policy

became shrouded in a proxy debate regarding due process and preferred recruitment methods. This discussion came to be facilitated by one of the members of the action research team, who offered the board an opportunity to focus on its preferred future for the organization, and to contrast this preferred future with an examination of the candidates most familiar with the organization. The Board reflected on what they had learned about themselves, where they needed to develop and about the future of the Board. Much of the public reflections were explained using CAS concepts such as diversity, information flow, distributed knowledge, self-reference or identity, and generative relationships (Lane and Maxfield 1996).

The chart below highlights a few key elements of the context of NSSO at the time of our research. Note the paradoxes in terms of complexity science. The degree of uncertainty, rate and intensity of change, the changing nature of the players in the sector, and the high degree of interdependence between independent agencies, all indicate a high degree of complexity. NSSO's mode of networking service providers and recognition of the links between disabilities and solutions Suggest appropriate responses to the complexity in the environment.

Table 1.

Aspect of context	NSSO in 1996
Funding	- single source of funding, funder announced major spending cuts in fields related to NSSO. Unclear what the actual impact would be on NSSO and its neighbouring agencies.
Innovation	- NSSO leader in linking developmental disabilities and mental illness issues. Also a leader in case management - networking with other service providers to create packages of services for clients in a "one-stop shopping" modality.
Competition	- competition for decreased funding dollars from other agencies and service providers. Decreased spaces available in institutions for clients.
Demand for services	- demand for services increasing (due to in part to increased population density in region served by NSSO)
Level of uncertainty	- high degree of uncertainty about funding sources, amount of available funding, about who will (or could) provide services in the region.
Board - staff interactions	- traditionally Board and staff relatively isolated. Board provided with information but not expected to challenge staff decisions. Board meetings not open to staff. No apparent animosity between Board and staff.
Distribution of decision making and authority	- "obsessed with consistency" even in details - centralized design and decision making although <i>lots</i> of input from staff and regions used in the process.
Predictability of outcomes	- senior staff wanted "no surprises". Predictability of Outcomes was a key success factor in past decade of growth.
Reputation	- NSSO well respected in the region. Some evidence that other organizations in the region

	were "jealous" of NSSO's success and funding.
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Very early in our research, we began to see differences in the Board and staff's stated intentions and their actions. The Board and staff were deeply committed to the mission. They talked about the need for adaptability, openness, connectedness and yet we quickly found evidence in actions that was the opposite of these dimensions. As shown in the chart, they had a history of being able to predict outcomes. They had centralized design and decision making for many aspects of their work. As noted by the executive director, "we don't like surprises" which reinforced the notion that their work and environment would be predictable. Although they talked about embracing complexity, many of their actions and programs belied their talk.

What brought NSSO into an exploration of complexity science? The Board president argued that:

"NSSO prides itself on being innovative. The staff have been terrific at linking services and service providers together. So when I started hearing about complexity it just made sense. It seems to me that some of the complexity stuff is what we had been doing by gut. We already believed in rich relationships, abundant information and shared purpose. So now we want to find out how we can make sure we are really doing these things and see what other lessons we could learn from complex adaptive systems. Things are changing so quickly and there is so much uncertainty that I am not sure we can keep doing what we have been doing exactly the same way. We have outgrown some things. We want to be able to continue to provide leadership and need to know more about how to take risks."

A board member said "we are using lessons from complexity to make us more effective, not only our decision making but in terms of evolving as an organization.... We want to learn more about how we can be an agent of change in the community. This is my hope." Another board member said the real issue was "are we as good as we think we are and are we as effective as we think we are.... Is there a better way to serve our community and clients?" The Board and staff showed great courage and a leap of faith to bring us in to examine the organization and learn with them. In the analysis section, we identify some themes in our data which indicate potential benefits and stumbling blocks on their journey into complexity science.

4. Analysis

We have organized our analysis into some of the key patterns from the research:

- "empty headed" complexity (where language and ideas precede changes in behaviour);
- moving from consistency to coherence by embracing diversity;
- being in control by letting go (or the power of distributing control);
- acknowledging discomfort to create safety for innovation and questions;
- increasing the capacity to be surprised (and knowing when we want surprises);
- and shifting from "what we know" to "how we know" (through inquiry).

In this section, each of these themes in the data are briefly described and explained in relation to complexity science. The first theme is described in greater detail using data from the transcripts to demonstrate the theme.

4.1. "Empty headed" complexity

After a few board meetings, my co-researcher and I became increasingly concerned about the board's approach to issues. They seemed to complexity some very simple issues and drop some of the more challenging and fundamental issues facing the agency. During each meeting we recorded the amount of time spent on each agenda item. We found that some of the simplest issues on the agenda were vigorously debated at length. We nicknamed these the "menus and venues" issues because they related to items such as where to hold meetings and what food to serve at the annual general meeting. There were other relatively straightforward operational issues that also seemed to get a great deal of attention from board members.

At meetings where a "menus and venues" item consumed about a third of the available meeting time, a strategic item on the crisis response initiative was discussed in a few minutes. One of the insights from complexity science that the board talked about was the concept of generative relationships. When asked hypothetically about what this meant, they talked about the need for heterogeneity or differences between the parties in order to generate new ideas or programs from the relationships. When the crisis response initiative was discussed at the board meeting, the president and ED reiterated the need to do this initiative in relationship with others in the community. The staff then reported on several relationships that were being developed. A new board member asked, "what does NSSO do that (the other agency) does not already do?" The response was "they are an important player." Later in the discussion when another agency was mentioned, the new board member again reiterated his question "do we do anything better or different than they do?" The question was not answered at all and the discussion moved on to specific meetings.

Meanwhile the staff were getting increasingly frustrated with the board and began to over-simplify issues and seemed to want to avoid any creative suggestions from the board. Staff written and verbal reports were increasingly put in the form of "information only" rather than for discussion or decision. Several times board members asked the staff what role the board could play with issues and the staff response was usually to avoid the question and instead provide more data. When pushed on what role the board could play, the ED and staff member said that there really wasn't any role for the board members but that the staff would make sure to get more information to them for the next meeting to reduce confusion. The topic in question was potentially a major strategic shift for the organization.

An example of this type of exchange is shown below as excerpts from the transcript. The discussion revolved around the staff making a decision to take on a very large piece of work that was quite different from the work of the past. They were asked to do this by the funder and agreed to it without bringing it to the board.

Staff member: "Since the Ministry does fund us 100% they are going to start taking a very hard line as far as what they see our role as."

Board member 1: "We have been used to making decisions based on what we saw as the needs in the community ... I have a concern that the [Ministry] is now going to be yanking the chain and we will have to heel - we will have to do what they want us to do."

Staff member: "We have some real problems to deal with on this and we are also taking hits from other organizations in the region who don't want to see us take on this larger role... I know at least one organization who is taking this issue to their board and so they may contact you as board to board."

Board member 2: "I am still not clear, so I'll ask the question again, why did we say yes?"

Staff member: "We are not being victimized here, we are being handed an opportunity..."

Board member 1: "I think we are very frustrated in this discussion simply because we are trying to catch up on information and rationalize the decisions that are made... What is our role here?"

Staff member: "I apologize for not having more written information in the package which would have helped."

Board member 3: "What are we being asked to do as a board here? Do you want ideas about this from us? ... Do you want some guidance for when you should say "no" and when to say "yes"? ... Are there things we could be doing vis a vis our relationship with other boards of the organizations who are unhappy with us? What is it you are asking us to do here?"

Board member 4: "The important thing to remember here, and we learn this from complex adaptive systems, is that abundant information is critical."

NSSO struggled with the allure of CAS for some board members. This led to some board members using the language of CAS to "complexifying" some simple tasks and issues the menus and venues issues. They talked about "information", "diversity" and "relationships." They used the menus and venues issues as times to challenge each other and expose a variety of options. This is "fake" complexity. They faked disagreements and differences by staying at the surface level when at a core level, there was very little disagreement on the "menus and venues" issues. When complex issues arose in which there was no obvious agreement or course of action, they backed away from challenging their assumptions and looking at issues from multiple perspectives. The complexification of simple issues and an avoidance of complex issues, led to a deepening of the split between board and staff. Staff, perhaps in response to the board's style, simplified complex issues when presenting data to the board.

We labelled this pattern of "faking complexity" for simple issues and avoidance behaviour of complex issues "empty headed complexity". It is empty because it does not use the insights of CAS in the right context. They found they could create information by surfacing disagreements on issues which when probed revealed deep agreements. They therefore fell into the trap of believing they were being innovative when they were actually being inefficient. It was "headed" because it was an intellectual concept rather than an "actionable" concept. This was seen when the board faced some truly complex issues that required a deep examination of the fundamental nature of the organization. Frequently these issues were discussed only briefly at board meetings. The lessons from CAS would have been most helpful for these issues but were missed or avoided for the most part in the early days of NSSO's journey into complexity science.

To highlight this pattern, we presented them with a modified version of a matrix created by Ralph Stacey (1996b) at a board-staff retreat. Stacey created this matrix to indicate that management decisions differ in two dimensions: the degree of certainty about the issue and the level of agreement about the solution to the issue. He argued that most of the management literature deals with decisions in which there is both high degree of certainty and high levels of agreement or at least one of these dimensions. Stacey said for these decisions we have good knowledge of what works. He also argued there is an area where there is extreme uncertainty and disagreement which leads to disintegration or anarchy. The diagram depicts a middle zone where he argues the traditional approaches will not work. In his diagram, each area is not labelled per se but rather filled with examples of appropriate management approaches. In our modification, we labelled the areas to help explain to the Board and staff at NSSO what we saw happening (See Figure 1).

We labelled the areas as simple, complicated, complex and anarchy as depicted below. Simple, complicated and complex issues are all "manageable" to some extent and anarchy is to be avoided. We described to the participants at NSSO that this diagram was one way of sorting the issues they had faced. We divided the participants into five groups. We asked them to think through the issues and decisions of the past year and sort them into three categories - simple, complicated and complex. Each issue was written on a separate page. They were then asked to post them on a wall under the three headings - simple, complicated and complex.

Figure 1.

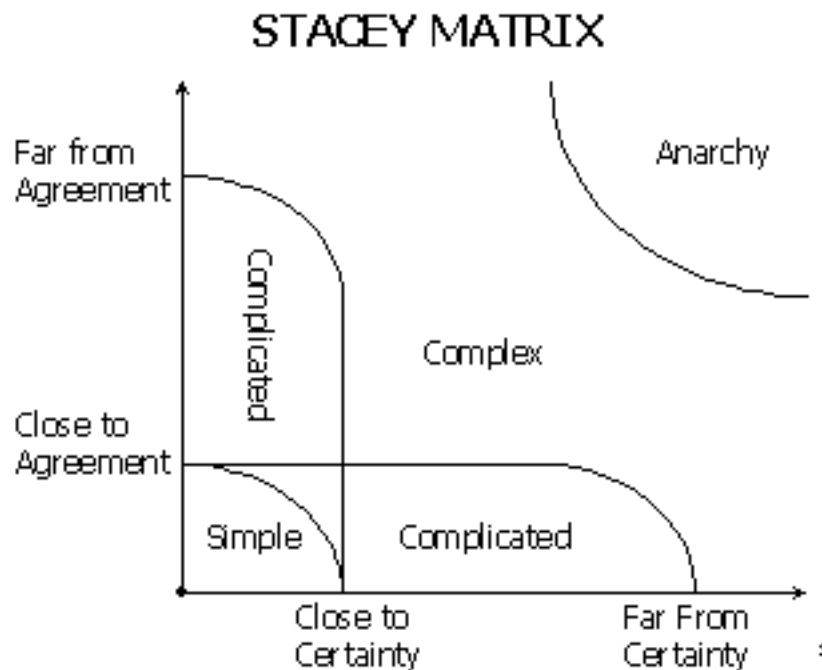


Table 2.

Simple	Complicated	Complex
- voice mail	- vacancy management (relates to the spaces available from institutions)	- crisis response system development
- Board and annual general meeting locations	- how does NSSO fit into mental health reform in the region	- integrated human system development
- board and staff training	- resource allocation	- complex service delivery models and expectations

What we discovered was there was almost no disagreement about the issues and how they should be sorted. All of the groups came to the same (or very similar) conclusions. We then asked them to think about the management techniques or approaches they had used for each issue. After a while we heard laughter from several of the groups. They became aware of how they had used simple approaches for complex problems and vice versa. We added to this by reading excerpts from the transcripts from some of the meetings we had attended.

Table 2 is an example of some of the issues they identified for each category. Board members reflected on how it was "fun" to be in the complex zone because it was creative, energizing and innovative." The staff reflected on how they were "going crazy" with a board that wanted everything to be "creative, energizing and

innovative." The staff began to volunteer their insights into the board's behaviour and their reaction to it. The staff commented that they could now see why the board was at times trying to push them into the zone of complexity. One member of the staff commented on how they had deliberately tried to create packages for the board that would not bring in new ideas. They were not looking for new ways to do "all" of their work. The board could see why the staff wanted to cut off discussion and generation of new ideas on some of the simpler issues.

They also commented on how the matrix did not represent a rigid landscape rather that issues moved from one zone to another in part due to external conditions and in part due to the participants' perspectives on an issue. The result was an honouring of a diversity of approaches. They could see the value the other group added to the array of issues facing the organization.

The next stage was to ask them to do the same exercise with the coming issues or issues that they were expecting to address in the coming year. Again the exercise showed remarkable overlap between the participants as to which category an issue belonged. But they also began to question their own quick consensus.

"Should this issue be as simple as we have suggested?"

"Could we be missing an opportunity by not pushing it, at least for a while, into the zone of complexity?"

This led to an animated discussion of how to use the matrix.

The matrix is now part of the orientation binder for new board and staff members. The language of issues being "simple, complicated or complex" is now widely understood in the organization and the board uses it to test whether they are putting the right amount of energy into an issue and to decide which approach would be more useful. They are now talking about the need for exposing differences and looking for relationships with generative potential for complex issues. They also use the concept of simple, complicated and complex for time allocation in board meetings.

4.2. Moving from consistency to coherence by embracing diversity

Seven months after the action research project, we interviewed the new CEO or Executive Director of NSSO. This CEO had been with the organization for most of its life. She was convinced that complexity science had made a difference in how they remained focused on the mission without predetermining how services should be provided.

"For the first time in 15 years, we are very clear that services do not need to look the same to support the mission. From CAS, we have learned not to be obsessed with consistency and now see diversity as necessary. One of the things we have learned from CAS is that things don't need to be identical. We can be consistent in our overall objectives but not in how the services are delivered or how the offices/regions are structured. Now we are moving to more differentiation. Some of this is a difference in emphasis of the services provided. The regions we serve have very different demographics. In the southern areas, there is more complexity because of multi-culturalism, differences in socio-economic status and other factors. So we are moving to an approach where the service delivery can look different in the different areas. We are asking the people who work in those areas to design the structure and service delivery approach that suits their region. This is quite different from before where we always designed structure centrally, even if we used input from the local offices, we still made a central decision about how all offices would be structured, deliver services and communicate to external stakeholders."

This shift was seen as a move away from consistency. They no longer specified the details centrally nor did they work towards achieving consensus on them. Both of these modes of action are appropriate in the region

close to certainty and agreement on the Stacey diagram. As NSSO's context had become more unpredictable, there was also less agreement on how the services would be best delivered. NSSO created a context for experimentation and differentiation across the organization and the geographic region. Paradoxically, the decrease in consistency increased coherence. How did this happen? As details were left to the local decision makers, their reference points or decision criteria increasingly related to the mission rather than established procedures. Therefore, services designed at the local level created procedures or approaches that which both suited the mission and were adapted to fit with the local context. Focus on the mission was necessary when the old reference points of "what does head office say we have to do" increasingly disappeared. Diversity in approaches also created opportunities for experimentation and sharing of ideas across the system. Innovations were not created only from the centre but distributed throughout the system.

This changed the nature of who needed to know the "big picture" as well. Traditionally, it had been assumed that this was the job of the head office, leaving the local service providers to concentrate on their skill set. However, as decision-making and control was more distributed, the local staff also needed a "big picture" perspective. The ED commented on this issue.

"We have been working for eight months on how to deliver service in our different programs. This is happening in a very different manner than we did it before. It is all bottom up rather than top down. They are learning how to ask the questions that show where the structure has cracks. There are a lot of nervous but excited people out there now.... We have cranked up the ability to ask questions.... We have been exposing more people to the wider implications of decisions. When exposed, they pick it up more and more quickly.... People in the past have always "just done their work" and now we are asking them to put it in a broader context.... Some people don't like this. They don't like it. But some are really excited about being required to think beyond the narrow confines on their programs. Staff are becoming bigger picture thinkers."

The Board president and ED argued that this process brought with it some fear but they also said it paradoxically alleviated some fear when more people became aware that there wasn't a "master plan" or "hidden agenda."

Embracing diversity as a means to increase coherence is paradoxical. One of the lessons from complexity science is that diversity in outcomes is created by compliance with a few rules. Too many rules, limits diversity and hence adaptability. Too few rules, prevents coherence. At NSSO, they reduced the number of rules by focusing primarily on mission and values. They provided information and lots of opportunities for interaction to create a safe context for local decision makers to interpret the rules in a wide variety of ways. Rather than reducing coherence, the diversity created a context for more robust strategies to support the mission.

Coherence for NSSO was reconnecting with their vision. They spent time reflecting on it, asking questions about it, probing it and ensuring they were indeed acting to support it. As one board member said, "it was amazingly energizing to go back to our vision." The ED said that "the energy prickled when we spent time reflecting on our vision, the mission and the relationships." The mission was the original "attractor" for most of the professional and support staff of NSSO. Complicated procedures and processes had obscured the mission for some staff and reconnecting with their original purpose released energy and optimism. Given the severe funding cuts, dominant pessimism in the sector and the media, NSSO's ability to access optimism was seen by the Board as significant.

4.3 Being in control by letting go (or the power of distributing control)

As mentioned in the previous theme, NSSO learned about nourishing diversity. They also discovered that diversity flourishes best when the power to innovate is distributed throughout the organization. They looked for methods to distribute control and information in the organization. One of their initiatives was to push for the use of technology to create connections and share information (data, ideas, innovations and meanings) quickly and broadly in the organization. Here was an area where staff were not given an option. Some professional staff resisted the idea. The ED said this was not a choice for staff. They pushed the use of e-mail and using computers to share information. The ED said she believed that once staff tried the technology, they would be attracted to how it helped with their work. They deliberately used the technology to create new and different points of interaction in the system. She argued that these new points of interaction were necessary first steps to creating a more adaptable innovative organization.

Distributing information and creating more connectedness at NSSO also reduced the direct control that the ED and the Board had on the organization. The ED argued that this loss of control was not the complete story. By distributing control, the whole organization was in better control. There was a "sense of excitement among staff about having a voice." NSSO had tapped into the discretionary energy of many staff and therefore had access to more skills without hiring more staff. "We hadn't asked people to look at the whole system before. It was new for people to lift their heads and look around." Expanding the staff members' field of vision required the centre of the organization to give up "ownership of the vision, and big picture." Doing so, created an increased capacity for the whole organization to "see" what was happening. Letting go of control by the centre, therefore increased control by the whole.

One of the ways they distributed information and control inadvertently happened when a senior staff member became ill. She was away from work for almost a year but they did not realize it would be that long when she first became ill. Therefore, in an ad hoc fashion they distributed her tasks and decision making to a number of other staff members. She was very competent and skilled at working with other organizations and linking pieces of the work. However, she was the "hub" of a hub and spoke system internally in the organization. A staff member who had worked directly for her and had to perform some of her tasks during the illness remarked, "I had no idea you folks thought about this stuff ... you think about everything in the broad context." The ED said although this was not a planned distribution of control, it worked as a method to have some staff exposed to the wider implications. "Once exposed," she argued, "they pick it up more and more quickly."

4.4. Acknowledging discomfort to create safety for adaptation and questions

One of the challenges faced by the Board and senior staff of NSSO was how to address the emotional impact of the fear and uncertainty in the environment. For the first time in a decade, the staff and Board of NSSO were unclear how NSSO would survive and what it would look like if it did. They were certain that the work and the mission they had created were still very much needed but they were not sure how that work was going to happen and what their role would be in it.

The Board president argued that one of the appeals of complexity science was the acknowledgment that "it was uncomfortable to be uncertain and that we need to accept that it is healthy to be uncertain and to be uncomfortable." Rather than hiding from the negative emotions of fear and frustration caused by uncertainty and ambiguity she argued the need to acknowledge them. At Board meetings she talked about this and in effect gave "permission" to the board members to feel uneasy. Rather than being paralyzed by fear, board members talked about how it felt and then moved into discussing action steps. They didn't stay "stuck" in their fear in part because of explicitly acknowledging it and naming it.

One of the lessons from complexity science is that CAS need boundaries within which they evolve. The acknowledgement of the negative emotions seemed to create the boundary conditions or "container" in which people then could safely ask questions, challenge assumptions and propose ideas. We facilitated this by giving them a time during each meeting where they consciously reflected on what had happened. During the year, the reflections had more explicit emotional content. They moved from using words like "discomfort" in the reflections at the first meeting, to being "terrified that we are kidding ourselves" during one of the last meetings. They also used this time of reflection to acknowledge each others' contribution. Increasingly during the year, they thanked each other when they were challenged. Twice during the reflections, board members commented on how it was safe to be open and disagree with each other. At the beginning of the year, reflections were made by board members when prompted by us. By the end of the year, reflections were made throughout the meetings by many board members. In effect, the boundary conditions shifted and became broader during the year.

4.5. Increasing the capacity to be surprised (and knowing when we want surprises)

At the first Board meeting, we met briefly with the outgoing ED of NSSO. She told us about a very difficult meeting she had been at that day with some of the other service agencies in the region. She had had a bad experience because she had been taken by surprise with a piece of information that she did not have. One of her remarks to us was "I tell all my staff I don't want any surprises." At one level, her remark was very rational and sound management practice. Be prepared. However, at another level we were uncomfortable about the organization's capacity to embrace complexity science that has as one of its central tenets, surprise and unpredictability. The principle of emergence suggests that interactions will create surprising outcomes at times. "Be prepared" in a complex context requires having the capacity to adapt to the unpredicted outcomes.

During the year, we pushed the board to look for surprises. We asked them to reflect on what surprised them about the meetings, the reports or the decisions. Our purpose in these reflections, in which we also participated, was to increase their capacity to be surprised. We asked them to look for the subtle, or not so subtle, differences in the normal patterns. In effect, we were focusing on their capacity to recognize patterns rather than only to maintain patterns. Pattern maintenance is an excellent skill in predictable environments. However, in highly complex, uncertain contexts, the number of interdependencies requires heightened pattern recognition skills.

One of the methods we used mid-year for increasing the capacity to be surprised was to ask them to note what surprised them. We did this for most meetings. When they commented on what they were surprised by, we asked them why that was surprising. During these discussions, board members were able to articulate some of the assumptions they had about their work, the environment of the agency, and how they operated as a board.

After the research project, we interviewed the new ED and asked her what had surprised her recently in the organization. One of the things she mentioned was how in a recent staff meeting, they had used a process to access the different values held by people in the organization. She collected all of the words and phrases and later sorted them into four categories of values: task-oriented, relationship-oriented, change-related and status quo. The categories were her own sorting based on a framework suggested by McDonald and Gandz (1992). What surprised her was how many change related values were on the list and how few status quo values were expressed. She said,

"I don't believe this could have happened without our learning about complex adaptive systems. A year ago we would have been heavily into status quo values. There was a lot of expressed desire to turn the clock back and go back to what we knew and was comfortable. Now we see the value in change, growth, and diversity.... The CAS perspective has been

important in this shift. The staff have been exposed to these ideas and now talk about the need to evolve, the positive aspects of uncertainty and are moving away from wanting to be what we used to be."

4.6. Shifting from "what we know to "how we know" (through inquiry)

We began our research with them by first exploring with them what was really meant by "abundant information". We asked them to focus on what information was really available to them, what information they needed to do their work and how they enhanced or inhibited the flow of information. We asked them to look at information as points of data and also interpretations, or sense making. After the first meeting we asked them to reflect on these aspects with each other. The reflections became part of the minutes of the meetings from that point forward.

By the third meeting we had asked them to look for both confirming and disconfirming evidence for the "facts" they knew about the environment, the organization and the board. The use of confirming and disconfirming evidence was to access not only what they knew but how they knew it. The board found this a challenging exercise to do but within two meetings, over half of the board members began questioning their own assumptions explicitly. They asked themselves questions "how do we know that we are as good as we say we are" on a wide variety of issues. They saw their key role as asking questions. The board's function was redefined as one of inquiry rather than decision maker. They embraced scenario planning as a method for strategic planning because they saw that it had the capacity to help them analyze not just what they knew but how they knew it and what other explanations could also be made from the same information. The board president said scenario planning was consistent with the key lessons from complexity.

5. Implications for practitioners

Complexity science is not another management fad. It is not a recipe for success. Rather it is a way of looking at organizations that resonates with how other evolving, adaptable systems change and learn. It is not a quick fix to help with crises. However, it does provide insights into how and where to intervene in systems to have the most effect.

The issue of generative relationships was particularly troubling in this organization. At one level, they were very aware of the need to look to other organizations and people given the increase in complexity in their context. At another level, they struggled with how to identify which relationships are truly generative. The language of complexity can be seductive but overwhelming. They spoke the language of generative relationships but were often confused about how to recognize and support the generative relationships they needed to fulfil their mission.

We created an acronym, STAR, to help discern the generative potential of current and future relationships. Although this is based in large part on the work of Lane and Maxfield (1996) it uses everyday language and a visual icon to make the idea memorable and useful. Each point of the STAR (see Figure 1) represents one key aspect of generative relationships.

S Separateness or differences.

This is Lane and Maxfield's call for heterogeneity. They argue that without heterogeneity or differences in the background, skills, perspectives, or training of the parties there is unlikely to be a fundamental challenge to the assumptions which maintain the status quo. Only incremental conceptual changes are likely.

T Talking and listening.

Heterogeneity is not enough. There also need to be real opportunities to talk and listen to each other with permission to challenge the status quo, sacred cows or implicit assumptions of the context. The conceptual changes in a complex context can be profound. Opportunities for reflection allow the parties to grow and learn.

A Action opportunities.

Talk is a necessary but insufficient condition to create new sources of value. The parties need to be able to act together to co-create something new.

R Reason to work together.

The parties need to have a reason to share resources, ideas or to act as allies even if only for a short period. There has to be some mutual benefit to being aligned in a project. If the parties do not see value in working together, if they see each other as adversaries only rather than as allies for this piece of work, it is highly unlikely that they will co-create something of substantial value. They may talk and learn from each other, but then do the work of creating something new alone.

S and T are necessary to enhance the capacity to generate unseen and unpredictable insights and sources of value. S and T operate primarily at the conceptual level. It is through redefining a "fact" or challenging an implicit assumption that new ideas can be created. A and R operate primarily at the structural level. It is through action that new players and products actually emerge.

At NSSO, we found that some of the relationships that were labelled as "generative" by the nonprofit social service agency failed to produce anything of value because they were lopsided stars - only a couple of points were well-represented in the relationship.

For example, an STAR (see Figure 2) relationship was one where representatives from the whole community came together to solve a social problem. However, the parties had no reason to work together. They saw themselves as competitors for a shrinking pool of funds and the trust was not there to see each other as allies. Therefore, there were no real action opportunities defined by the parties.

Figure 2.

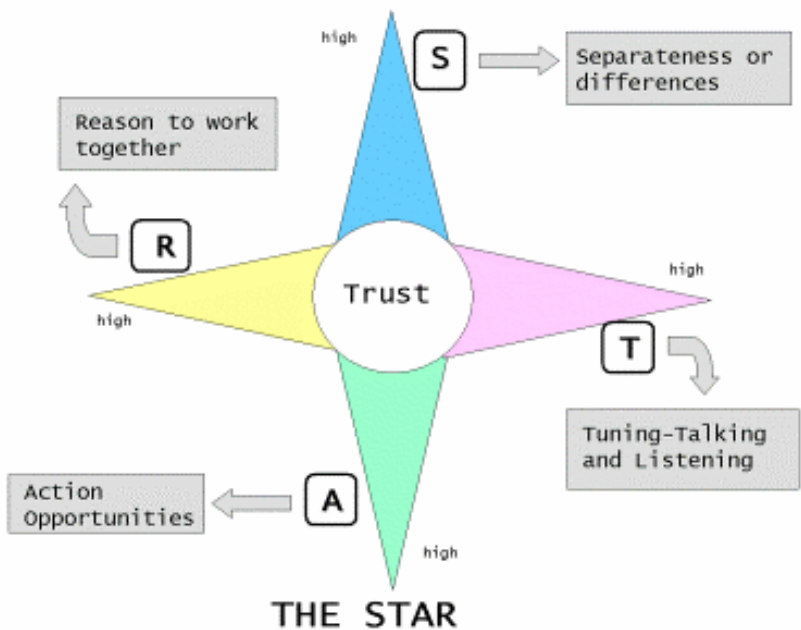


Figure 3. An "STAR" relationship.

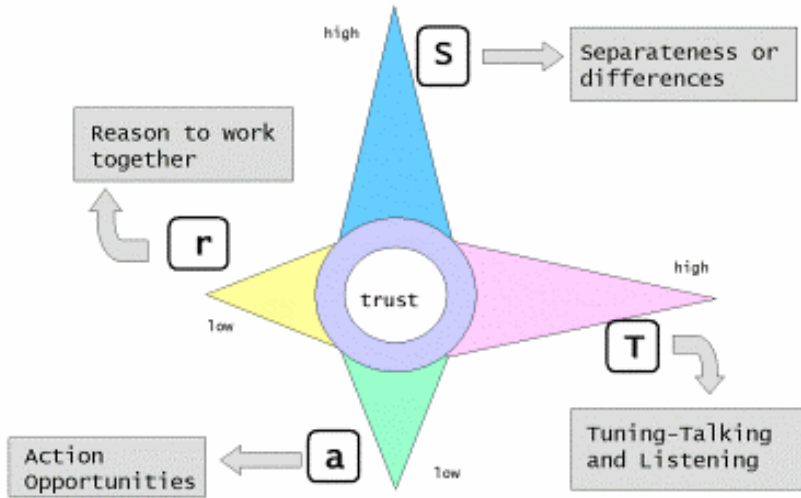
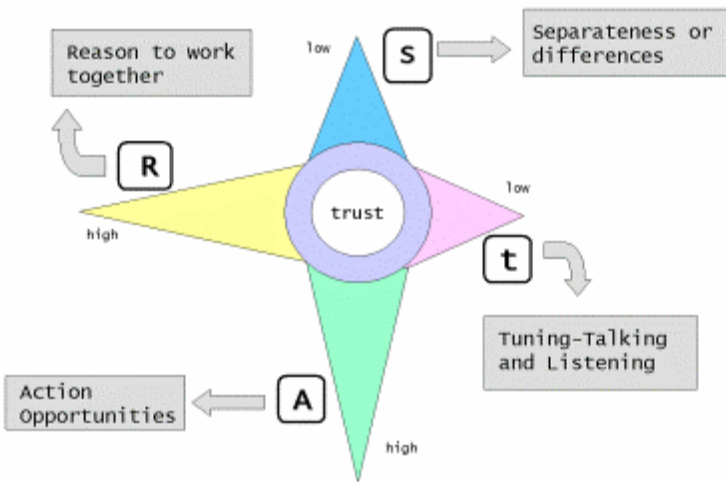


Figure 4. An "STAR" relationship



An STAR (see Figure 4) relationship was one where two parties were collaborating to address a problem but the parties were almost "clones". The employees had the same background and perspective. Although they had made time for "T", talking and listening, because they had so few differences, there was little challenge of the status quo.

NSSO is continuing to work with the lessons from complexity science to enhance their effectiveness. They have found that modeling their behaviour on some of the underlying complexity principles has enabled them to reconnect with their mission. They have used this reconnection to loosen their direct control and trust the staff to make decisions that support the mission even if they don't result in consistent procedures or service delivery. They have used CAS thinking to tap the discretionary energy of some, but not all staff and board members. They also found it useful to create a broader array of approaches to deal with decisions and methods to discern which approach is appropriate. In effect, they now have a contingency framework for decision-making. Orientation materials for new staff and Board members now contain several articles and resource materials on CAS.

NSSO struggled with the allure of CAS for some board members. This led to "complexifying" some simple tasks and issues. The complexification of issues led to a deepening of the split between board and staff. Staff, perhaps in response to the board's style, simplified complex issues when presenting data to the board. We labelled this phenomenon of complexifying simple issues as "empty headed complexity". It is empty because it does not use the insights of CAS in the right context. It is "fake" complexity. They found they could create information by surfacing disagreements on issues which when probed revealed deep agreements. They therefore fell into the trap of believing they were being innovative when they were actually being inefficient. It was "headed" because it was an intellectual concept rather than an "actionable" concept. This was seen when the board faced some truly complex issues that required a deep examination of the fundamental nature of the organization. Frequently these issues were discussed only briefly at board meetings. The lessons from CAS would have been most helpful for these issues but were missed or avoided for the most part in the early days of NSSO's journey into complexity science.

How can another organization avoid the trap of "empty headed complexity"? One of the challenges of complexity science is to remember to "honour the old". The power and allure of complexity can suggest to many that we need to eliminate all the old methods. Yet the paradox is that complexity tells us that CAS are dependent on their history. Rather than pretending that nothing ever worked before, we need to spend time reflecting on what worked and why. The tried and true methods drawn from Newtonian science are still useful in certain contexts within our organizations. They continue to be the most efficient and often effective method of dealing with problems where the future is quite certain and there is relatively little disagreement on what needs to be done. The real power of CAS thinking is unleashed when we are skilled at knowing when lessons from living systems are needed as opposed to lessons from mechanical systems.

NSSO's Board and staff are on a courageous journey. Their courage is evident in their openness to learn from researchers, to willingly share their lessons including their mistakes in this article and to use the relatively untested idea of complexity science as an opportunity to enhance their capacity to serve some of the most disadvantaged members of our community. Their strength of mission and purpose is a touchstone that prevents them from diverting resources into self-serving rather than community-serving activities. Complexity science is one of the approaches they use to reconnect with their mission and purpose.

6. Implications for researchers

Action learning methods are well suited to the Subject and stage of development of complexity science in organizations. The study of complex adaptive systems in organizations is a mode of learning, reflecting and

understanding how things happen. Members of organizations who want to understand more about complexity science can learn through this process of introspection while acting. The feedback loop of action, reflection and extension of theory works well for the practising manager or board member and for the organizational theorist.

Action learning relies on self-organization or emergence. It expects that unpredicted results will emerge through the process of interaction that is not explainable by the parts alone. In other words, the researcher learned through interacting with the organization. Observations alone could not create the emergent insights.

Complexity science is in many ways a humbling science. Emergent outcomes suggest that a CEO or other hierarchically dominant role cannot control all of the outcomes. The outcomes are not "owned" by any one person. They are the result of interdependencies and connections. This has implications for leadership (Goldstein 1994; Stacey 1996a; Wheatley 1992; Zimmerman 1993a). Like complexity science, action learning is a humble form of research. The research results and insights are not "owned" by the researcher. They are the result of the interactions between the researcher and the site. In our case, the emergent insights we gained could not have been gained by observation alone.

Lessons from complex adaptive systems applied to organizations has just begun as an area of research and inquiry. We have much to learn from and much yet to learn about living, evolving, sustainable systems in the natural world. Social scientists have an opportunity to learn along with natural scientists and practitioners as we continue this exploration. The interdisciplinary nature of this untested field increases the level of uncertainty about the outcomes of the research and the methods best used to study it. We believe that this is a call for openness in the research community to experiment, to honestly reflect on our lessons and limitations, and to acknowledge the discomfort we have with this as social scientists. As with NSSO, acknowledging our fear and anxiety about whether this is "good science and rigorous research" may create the safe container within which we can experiment and learn.

Notes

1. This exposure was primarily due to seminars provided by the authors through York University and other venues.
2. NSSO is the disguised name for the organization.

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