NAVIGATING SOCIAL COMPLEXITY

Ken Bausch

ORIENTATION

Complexity is a term applied to systems that confound our efforts to spell out their inner relationships. Chaos theory has found laws that describe how self-organization works.

Complex social systems have special characteristics. Such social systems have been described by Ackoff as "messes" that present "wicked problems" (Rittel) because any effort to influence the system results in unanticipated consequences Any attempt to make sense of such global problems has been termed by Ozbekhan (1970b) a "problematique."

As with all complex systems, complex social systems resist efforts to spell out their inner workings. In fact, they confound reductionist efforts even more because social realities are constructed by people into often conflicting realities. It might see that chaos thinking is the only consistent way to deal with them.

We humans recoil against that idea. We insist on tinkering with our social systems to make them better. We are often successful especially in simpler social situations but even in some more complex ones. This success usually happens because people use their common sense and not because they follow some university inspired blueprint. There are some problems, however, that resist our rational tinkering. When we correct one aspect of these problems we mess up its other aspects. Getting a solid problematique of the situation eludes us.

The distinguishing aspects of social systems are the human beings who create them in history and the cognitive maps they retain for understanding them. These human beings are the keys to making sense of complex social systems. If we can get a meeting of minds among diverse, intelligent, and informed people, we can create a realistic problematique for wicked problems. To achieve such problematiques, we need to enable that "if."

Achieving effective collaborative action by means of egalitarian discussion is notoriously difficult. We have all sat through meetings where only one side of a complex situation was discussed. We have also been in meetings where differing views were expressed, but the discussants did not really understand each other or really listen to opposing views. The debates that ensued generated more heat than light.

We may have experience genuine dialogues where divergent groups of people actually listened to each other. These dialogues generate mutual understanding and respect.. They defuse hostile situations. They lead to solutions of many social problems.

Unstructured dialogues get waylayed, however, in trying to find solutions for complex social problems. They fall victim to a range of social pathologies and to cognitive overload. In such situations groups are afflicted with groupthink, spreadthink, and the Erroneous Priorities Effect (EPE).

THREE AXIOMS OF DIALOGIC DESIGN

Over the last 35 years a select group of systems theorist/practitioners has settled upon three axioms that underlie the science of dialogic design: They are the axioms of: complexity, cognitive limitations, and saliency.

Complexity Axiom: Complex social systems designing situations are multidimensional. They require that observational variety should be respected in the dialogue among observers, in an effort to strive for comprehensiveness. Comprehensiveness, however, is an objective not easily attainable by human observers.

If comprehensiveness is neglected, important considerations may be ignored. Narrow interest can be thrust upon people unknowingly. Relationships can be warped by inappropriate metaphors. Emergent solutions will lack sufficient noise.

Cognitive Limitations Axiom: Observers are subjected to cognitive limitations during social-systems-designing dialogue, which must be explicitly recognized and avoided during the dialogue. Cognitive limitations demand that designing teams: (a) control the pace of knowledge generation and assimilation, and (b) control the number of observations and relationships that observers must manage simultaneously during the dialogue.

The primary limitation of human intelligence lies in the limits of our short-term memory. This limitation is expressed in Miller's (1956) famous formula of "7 ± 2." In other words, we can hold only 5 to 9 things in our short term (working) memory at the same time. Simon's (1974) research indicates that people tend to "satisfice" when they reach the limits of their bounded rationality. Structured Dialogic design utilizes several strategies to work around this limitation:

- Precise definitions and stages of inquiry
- The mathematics of set theory to produce software that tracks the logic and requirements of the designing system. The software shortens the decision-making process, keeps track of the logic and generates products for the examination of stakeholders
- A smooth interface that integrates natural and graphic language producing efficient graphic language patterns.

Saliency Axiom: During social-science-designing dialogue, understanding the relative saliency of observations can be brought into play only when the observer's authenticity, learning, and appreciation of variety are ensured so that the observers are able to

construct categories of observations before assessing the relative saliency of individual observations.

This axiom has particular importance in our age where we no longer have an overall meta-narrative accepted across diverse groups of people concerning norms of rational action or values (Christakis and Bausch, 2006).

LAWS OF DIALOGIC DESIGN

This same group of systems theorist/practitioners has refined seven laws of Dialogic Design. These laws build upon the three axioms. They form the basis of an overall science of Dialogic Design.

Ashby's (1958) Law of *Requisite Variety:* This law asserts that a design must possess an amount of variety that is at least equal to the variety in the problem situation. One way to violate this law is to neglect some of the relevant perspectives and types of observers, and by not asking them to present their observations. Another way to violate the law is to disregard the cognitive limitations of the observers participating in the design.

Miller's (1956) Law of *Requisite Parsimony:* This law, as already discussed, asserts that human beings can deal with only 5 to 9 observations at one time.

Boulding's (1966) Law of *Requisite Saliency:* This law refers to the range of importance that people assign to observations relative to other observations. It requires that good designs (1) highlight the different ways that group members judge the saliency of design options and (2) provide specific ways to reach consensual accommodation about relative saliency.

Peirce's (Turrisi, 1997) Law of *Requisite Meaning:* This law expresses in explicit terms the objective of inquiry and design – to discover the essence of problem situations and to plan desirable futures for communities of stakeholders. It states: In addressing complex design situations collaboratively, the observations of the stakeholders must be excavated though disciplined inquiry in order to grasp their full meaning. Armed with this understanding, the community can: (a) construct authentic, anticipatory, and autonomous descriptions of those observations, (b) interpret their meaning, and (c) transfer these descriptions in accordance with the tenets of Third Phase Science; that is, with full respect for the wording and autonomy of their authors.

Tsivacou's (1997) Law of *Requisite Autonomy of Distinction-Making:* This law asserts that power in the design situation derives to the person who makes the distinction adopted by the group. It says: the actors that have the chance to dictate the selection of the dominant explanatory path immediately put themselves into a position of power, reducing the others involved into a position of powerlessness. Independent of the social status and role, those who control the information distinctions in a given situation acquire power and restrict the autonomy of the others.

Usually, this power is wielded by the rich, the powerful, and the experts in a domain of knowledge. For good design, a corollary of this law demands that all participants must have an equal opportunity to explain their experience in the praxis of living. Only then will the power of persuasion be equitably distributed among the observers. It is not unusual that the key observation that illuminates a situation is made by some otherwise obscure person who would not have been heard if special care had not been taken to protect individual autonomy and authenticity.

Dye's (1999, 2007) Law of *Requisite Evolution of Observations:* This law was recently established by comparing two stages in the Structured Dialogic Design (SDD) process – importance voting and influence voting. Importance voting uses pair comparisons asking is observation A more important than observation B. Influence voting, on the other hand, uses paired relationships and computer assistance to ask and track a series of questions of the following nature:
If we were able to accomplish
Observation A,
Would that significantly enhance the requirement proposed by
Observation B?
The conclusions of this research are:

- Importance voting and Influence voting produce radically different results.
- Dialogues must go beyond mere consensus on the "importance" of elemental observations (problems, objectives, options, etc.) if they are to effectively deal with complex social systems.
- "Influence" voting identifies the key leverage elemental observations that must be addressed in order to effectively intervene and improve a situation.
- Using "importance" voting as the basis of action results in the Erroneous Priority Effect (EPE) and undermines the effectiveness of subsequent action.

Laouris' (2007) Law of *Requisite Action* asserts that action plans that are not founded on the authentic engagement of the stakeholders in dialogue and deliberation are unethical and are bound to fail.

These laws and other means of obviating the burdens of dialogue are incorporated in Structured Dialogic Design (SDD) which is described in a recent book by Christakis and Bausch www.harnessingcollectivewisdom.com.

HOW SDDP WORKS

SDDP is a prescriptive science. It is similar to the science of architecture in showing us how to proceed to create sound decisions and social designs. The observer-independent data, such as apples falling from trees, which are preferred for the analysis and design systems, have limited utility in complex social system situations. For that reason SDD uses observer-dependent data.

SDDP fits into the category of "Third phase science" as defined by Gerard de Zeeuw (1996). The three phases are defined as follows::

"First phase science" refers to that form of science in which it is assumed that the construction of high quality observations can be *fully separated* from the ations that are to be improved by their use (e.g., astronomy).

"Second phase science" refers to that form of science in which it is assumed that the construction of high quality observations *fully depends* on the actions that are to be improved by their use (e.g., first order cybernetics).

"Third phase science" refers to that form of science in which it is assumed that the construction fo high quality observations *fully includes* the actions that are to be improved by their use (e.g., second order cybernetics). (de Zeeuw, 1996).

Third Phase Science grounds its legitimacy in engaging stakeholders as "expert observers" of the situation in which they are embedded. They are the ones that should decide how to take action in their situation, since they are those most affected by the existing situation and its evolution. This grounding stands in contrast to first and second phase sciences, which assert tha t "academic experts" or authorities are more qualified to design the "systems" on behalf of the community of stakeholders (Christakis and Bausch, 2006).

The step-by-step process of SDDP is described below.

Step (a) is not really a step. It is the complex situation that Structured Dialogue is asked to address. It consists of many interrelated institutions, ideas, cultures, economic constraints, etc. This hodgepodge is investigated with the goal of framing apt triggering questions.

In step (b), the triggering questions frame the context of the dialogue. A sample triggering question might be: "What are the strengths of this organization and what is hindering its progress?"

In response to this question, the participants articulate their ideas in their own words to the full attention of the other participants, step (c). Their words are posted on a wall and everyone agrees not to alter them. In a second round robin, step (d), participants respond to questions asking them to clarify (not to alter) their ideas, and are given the opportunity to respond to questions in order to explain their meaning..

This methodology authenticates each person irrespective of his or her education level or position of power. It produces a palpable reduction of tension. People seem surprised as they are being heard, perhaps for the first time, in important policy-making matters.

In step (e), the participants collaborate to inductively cluster the observations they have made. Then in step (f), they agree upon labels for the clusters they have created. These steps build a sense of shared competence within the group.

In step (g), participants rank these clusters according to their relative importance. This step brings into sharp relief the different priorities and values within the group. In the ensuing discussion, parties come to understand where their co-participants are coming from, which leads to a respectful working relationship based on defined mutual interest.

In step (h), participants explore relationships among the observations and construct a tree of relational influences. In this step, they order their observations in paired comparisons asking whether A really influences B, and vice-versa.

Finally in steps (i) and (j), the stakeholder/designers examine the "tree of meaning" they have constructed, with computer assistance. As a group, they analyze and interpret the cross-impacts existing among the observations they have made.

In these ways, step-by-step, Structured Dialogue progressively clarifies the situation and opens the way to greatly enhanced decision-making and action-planning. In addition it:

- Authenticates every stakeholder/participant;
- Elicits ideas and points of view from all stakeholders;
- Moves toward effective consensus;
- Elicits and deals with the different priorities of stakeholder participants;
- Equalizes power relations among the stakeholders;
- Goes beyond identifying factors that are important, to specifying those that are most influential in achieving goals.

Subsequent steps of SDDP build upon this strong foundation.

CONCLUSION

It would seem that the sciences of Chaos/Complexity and Structured Dialogic Design both have important things to say about social complexity, but from different points of view. Chaos/Complexity relies as far as possible on observer-independent data and *describes* how complex systems change. In this way they supply clues that enable us to influence systems at their tipping points.

SDDP relies upon observer-dependent data in order to *prescribe* the most desirable and efficient ways to change existing situations.

REFERENCES

Ashby, R. (1958). Requisite Variety and Its Implications for the Control of Complex Systems, *Cybernetica,* 1(2), pp.1-17.

Boulding, K. (1966). *The Impact of Social Sciences,* New Brunswick: Rutgers University Press.

Christakis, A.N. and Bausch, K.B. (2006). *Harnessing Collective Wisdom and Power to Construct the Future.* Greenwich, Information Age.

Christakis, A.N. and Dye (2008*)*. The Cogniscope: Lessons Learned in the Arena. In B.H. Banathy & P.M. Jenlink ***Dialogue as a Collective Means of Design Conversation***.

de Zeeuw, G. (1996). Second Order Organizational Research, *Working Papers i n Systems and Information Sciences,* University of Humberside, Hull, England.

Dye, K. M. and Conaway D. S. (1999). *Lessons Learned from Five Years of Application of the* ***CogniScope*** *™ Approach to the Food and Drug Administration,* CWA Report, Interactive Management Consultants, Paoli, Pennsylvania.

Laouris Y., Laouri R., Christakis A. N. (2008 in press). *Communication Praxis for Ethical Accountability: The Ethics of the Tree of Action: Dialogue and Breaking Down the Wall in Cyprus*

Miller, G. A. (1956). The Magical Number Seven, Plus or Minus Two: Some Limitations on Our Capacity for Processing Information, *Psychology Review* **63**, pp. 81-97.

Özbekhan, H. (1969). Towards a general theory of planning. In E. Jantsch (ed.), Perspectives of planning. Paris: OECD Publications.

Özbekhan, H. (1970). On some of the fundamental problems in planning. *Technological Forecasting*, 1 (3), 235-240.

Ozbekhan, H. (1970b). *The predicament of mankind*. http://sunsite.utk.edu/FINS/loversofdemocracy/Predicament.PTI.pdf

Rittel, H.and Webber, M. (1973). "Dilemmas in a General Theory of Planning," pp. 155-169, Policy Sciences, Vol. 4, Elsevier Scientific Publishing Company, Inc., Amsterdam.

Simon, H.A. (1974). How Big is a Chunk, *Science*, **183**, pp. 482-488.

Tsivacou, I. (1997). The Rationality of Distinctions and the Emergence of Power: A Critical Systems Perspective of Power in Organizations, *Systems Research and Behavioral Science*, **14**, pp. 21-34.

Turrisi, P.A., (Ed.) (1997). *Pragmatism as a Principle and Method of Right Thinking,* State University of New York Press.