Synthesis of Systems Thinking

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Systems thinking is a holistic approach to understanding reality and our interactions within it. This approach requires that we see beyond the bits and pieces of reality in order to understand systems. This is a difficult approach for many people because early in our lives we are taught to break apart problems to make them more manageable. Consequently, we fail to see the entire effect of our activities.

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Synthesis of Recent Applications of System Theory

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Systems thinking is a holistic approach to understanding reality and our interactions within it. This approach requires that we see beyond the bits and pieces of reality in order to understand systems. This is a difficult approach for many people because early in our lives we are taught to break apart problems to make them more manageable (Senge 2000). Consequently, we fail to see the entire effect of our activities. Senge (2000) states,

We tend to focus on the snapshots of isolated parts of the system, and wonder why our deepest problems never seem to be solved. Systems thinking is a conceptual framework, a body of knowledge and tools that has been developed over the past fifty years, to make the full patterns clearer, and to help us see how to change them effectively. (p. 7)

In addition, Checkland (Checkland 1999) states, "…systems concepts are concerned with wholes and their hierarchical arrangement rather than with the whole" (p. 14).

Two important parts of the body of systems knowledge and tools are hard systems methodology and soft systems methodology approaches to systems analysis. The hard methodology approach (hereafter HMA) focuses more on physical processes than on human activities and is frequently regarded as an engineering approach to systems thinking (Checkland, 1999). It is an "organized, step-by-step study of the detailed procedures for collection, manipulation and evaluation of data" (Checkland, 1999, p. 137). It seems to be a predominantly linear cause and effect analysis approach.

The soft methodology approach (hereafter SMA), however, appears to focus more on human activities and what they are doing relative to the hard business structure. Whereas HMA is

designed to address specific systemic processes that have well defined feedback loops in a more-or-less static environment, SMA is designed to address systemic processes as a mosaic that has ambiguous, or fuzzy logic, and feedback loops in a dynamic environment where the system changes as it is studied (Checkland, 1999). It appears that HMA is oriented toward analyzing systems that are logical, predictable, have clear relationships between components, have clear objectives, and do not have a significant human activity factor. SMA, however, appears to be oriented toward systems that are ambiguous, are in a state of flux, and have a significant human activity factor. Checkland (1999) states, "In soft problems the designation of objectives is itself problematic. Not surprisingly, hard systems-thinking was not usable in these problems, which were always those of a kind to which the concept, human activity system, was relevant" (p. 15).

The nexus in the systems thinking and systems practices of Checkland (1999) and Senge is the human activity system within a learning organization. The process of learning within a learning organization is more than homeostatic phenomena. Senge (2000) states,

> Through learning, we become able to do something we were never able to do. Through learning, we perceive the world and our relationship to it. Through learning we extend our capacity to create, to be part of the generative process of life…This, them, is the basic meaning of a "learning organization" – an organization that is continually expanding its capacity to create its future. (p. 14)

It is clear that "to perceive the world and our relationship to it" implies we have a systems approach to learning. Both Checkland's (1999) SMA and Senge's (2000) five disciplines use this perspective as a fundamental part of their respective methodologies.

The soft methodology approach is characterized by seven interconnected stages that form a feedback or learning loop. According to Checkland (1999, p. 163-180 salient characteristics of each stage include:

1. Stage 1: Find out about the problem situation without imposing a particular structure on it.
2. Stage 2: Express the problem situation in comprehensive, descriptive terms.
3. Stage 3: Develop a root definition of the problem. It is "a concise, tightly constructed description of a human activity system which states what the system is. The elements of the human activity system are expressed in Checkland's (1999, p. 225) CATWOE mnemonic. These elements include customers (C) of the system, actors (A) who are the agents that carry out the main activities of the system, the transformation (T) process that transforms inputs into defined outputs, a Weltanschauung (W) or world view that makes the root definition meaningful, ownership (O) of the system, some agency having prime concern for the system, and the environmental constraints (E) on the system.
4. Stage 4: Make and test conceptual models of the system in which the problem exists. Since the model is describing the human activity system, its elements will be verbs.
5. Stage 5: Compare the conceptual model with the problem expressed in Stage 2.
6. Stage 6: Develop feasible, desirable changes. The changes, according to Checkland (1999), "…must be arguably systematically desirable as a result of the insight gained from selection of root definitions and conceptual model building, and they must also be culturally feasible given the characteristics of the situation" (p. 181).
7. Stage 7: Suggest action to improve the problem situation.

After executing Stage 7, the SMA analyst should repeat the stages and make adjustments based on the results of changes proposed in Stage 6. The key to successfully using SMA is to reiterate the seven steps until acceptable results are achieved. Each successive iteration generates new information about the system and provides feedback and learning that should improve the efficacy of the next change. In fact, Checkland (1999) posits that the seven-stage process should be regarded as a learning system because it embodied a sequence of four kinds of mental acts. "Stages 1 and 2, carried out in the real world, entail 'perceiving'. Stages 3 and 4, which embody a formal system of ideas, entail 'predicating'." "Stage 5 entails 'comparing' the system models with what is in the real world, and stage 6 entails 'deciding' what to do in light of the comparison" (p. 214).

Senge's (2000) concept of the learning organization is predicated on the idea of combining five fundamental human-activity based disciplines that create a "developmental path for acquiring certain skills or competencies" (p.10). The important characteristics of each discipline, according to Senge (2000, p. 6-10), are:

1. Discipline 1 – Personal Mastery: "Personal mastery is the discipline of continually clarifying and deepening our personal vision, of focusing our energies, of developing patience, and of seeing reality objectively" (p. 7).
2. Discipline 2- Mental Models: "Deeply ingrained assumptions, generalizations, or even pictures or images that influence how we understand the world and take action" (p. 8). Analogous to Checkland's (1999, p. 225) "Weltanschauung" or worldview.
3. Discipline 3 – Building Shared Vision: Share your personal vision and build commonality of purpose. Listen to others, allow freedom of choice, and acknowledge current reality.

4. Discipline 4 – Team Learning: This discipline "…starts with 'dialogue', the capacity of members of a ream to suspend assumptions and enter into a genuine 'thinking together'" (p. 10).
5. Discipline 5 – Systems Thinking ("The Fifth Discipline"): "Systems thinking is a conceptual framework, a body of knowledge and tools that has been developed over the past fifty years, to make the full patterns clearer, and to help us see how to change them effectively" (p. 7).

The five disciplines create a mental approach for breaking away from linear thinking thereby enabling humans to be cognizant of the holistic effect of their decisions while simultaneously broadening the scope of their learning.

Comparison of Checkland's (1999) SMA and Senge's (2000) five disciplines show important common characteristics. The characteristics are:

1. Each methodology is a continuous process.
2. SMA and the learning organization approach are iterative processes.
3. An analyst does not have to follow the seven stages or five disciplines in any particular sequence. The analyst may start anywhere.
4. Each methodology includes activities that combine real-world thinking and systems thinking.
5. Both SMA and the five disciplines are human-activity based learning systems.

The commality of SMA and the learning organization concept suggest that most, if not all, analysis of human-activity based systems require the same soft systems perspective. Furthermore, this perspective appears to produce a learning-driven analysis process. It seems that the terminology used and steps in the analysis methods vary but the core focus remains the

same, namely, dealing with problem situations rather than specific problems. The situational aspect related directly to research this writer is performing relative to the Hersey – Blanchard (Blanchard 2001) situational leadership model.

The Situational Leadership II (hereafter SLII) model is based on the idea that different leadership styles are needed to successfully guide followers relative to the person's level of capability and commitment. The SLII model, presented in the appendix, shows a leadership curve that is composed of four leadership styles: directing, coaching, supporting, and delegating. This writer believes that each leadership style has a corresponding component in the SMA and learning organization approaches. These relationships are presented in Table 1.

Table 1
Comparison of SMA, Systems Thinking, and SLII Model

Checkland		Senge	Blanchard
SMA		Systems Thinking	SLII
SMA Stage	Learning System	Disciplines	Leadership Style
1 and 2	Perceiving	Personal Mastery	Directing
3 and 4	Predicating	Mental Models	Coaching
5	Comparing	Build Shared Vision	Supporting
6	Deciding	Team Learning	Delegating

Comparison of the SMA learning system characteristics, Senge's (2000) disciplines, and the SLII reveal similarities that provide continuity between each approach. For instance, perceiving entails observation and comprehension of reality, personal mastery relates to seeing current reality, and directing involved focusing on orienting and defining. Predicating in SMA relates to

the formal use of ideas, mental models is concerned with testing assumptions and espoused theories, and SLII's coaching involved training in new ideas. Comparing in SMA involves comparing system models to reality while the building shared vision discipline focuses on acknowledging current reality and creating common purpose, and SLII's supporting involves comparison and collaboration. The last SMA learning system characteristic, deciding, is concerned with what to do in light of the system model-reality comparison, the team learning discipline focuses on people acting as equal colleagues, and the SLII delegating style relates to empowering followers to act independently; to become colleagues.

Comparison of the approaches presented in Table 1 appear to have common characteristics that facilitate problem analysis and learning in a human activity system. Used in combination, the methodologies have potential to provide the direction and skill that permit a person to effectively change what he knows, thereby creating a learning process through systems thinking.

Conclusion

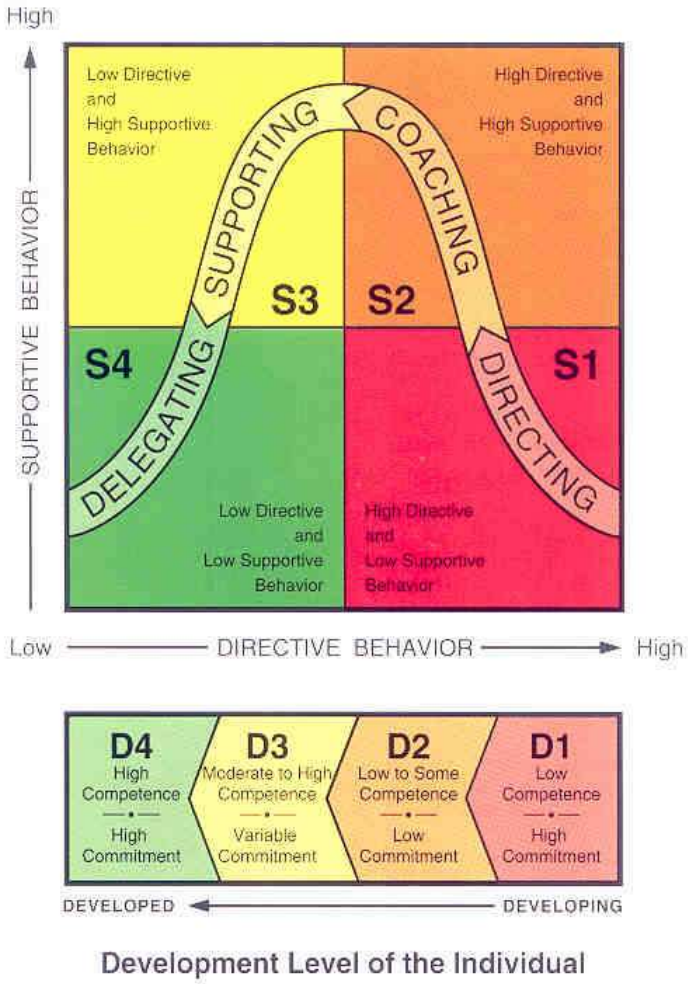
The classical analytic procedure to studying systems (entity) has been to reduce a system to its individual elements and study them in isolation from the larger system entity. The problem with this approach is that by exploring an element's characteristics without considering its intersystem interactions, the analysis fails to reveal the complete nature of a subsystem. Systems thinking, however, emphasize a more holistic perspective to systems analysis; it encourages us to look beyond the bits and pieces in order to understand and develop systems.

The soft systems analysis approach of Checkland (1999) and Senge provide a way to compare the world as it is with models of what the world may be. This comparison increases our understanding of reality and enables us to develop effective ideas for improvement. Furthermore, a systems approach to problem solving has definite leadership implications. Bass (1990) states,

“A systems approach looks at the leader as someone embedded in a system with multiple inputs from the environment, the organization, the immediate work group supervised, the task, the leader’s behavior, and his or her relationships with subordinates and outputs in terms of effective performance and satisfactions” (p. 908).

Appendix

Situational Leadership II: SLII Model



Source: Blanchard, K. (2001). Situational leadership II: The SLII model. San Diego, The Ken Blanchard Companies**:** 4.

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