

# **The Human Systems Dynamics Paradigm Shift**

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## **Prologue**

I have taught human systems dynamics through models, methods, demonstration, and practical application. In all these approaches, I assume a particular view of reality. This paradigm is essential, but I have not spent much time or energy making it explicit until now. The purpose of this essay is to describe my view of reality as clearly as I can and to explain how that view shapes theory and practice of human systems dynamics.

## **An Emergent Reality**

I assume a mechanism for being, acting, and being acted upon that is different than the long-held atomistic or mystical views. Those views, originating among the ancients and continuing to shape much of normal science and thought in the 21<sup>st</sup> century, assume a strict distinction between the physical and the metaphysical realms. From those views physical space contains objects, and those objects have persistent qualities (extension, mass-energy, position). Change occurs when one or another of those qualities is altered by some external force over time. Non-physical existence, on the other hand, is based on subjective experience and emotional or spiritual engagement. Change in this domain occurs when the consciousness of one or more individuals shifts. Many people, from a variety of disciplines, have denied this split between "mind" and "body," but still the fundamental assumption persists across most of Western thought and action.

Human systems dynamics is founded on a different set of assumptions about the physical and non-physical contexts in which we make meaning and take action. It does not disallow the old paradigms. Solid objects still obey the laws of Newton and Einstein. Waves are waves and particles are particles, but the atomistic view becomes a limiting case of bounded, low dimension, and linear conditions. Beyond these limits in the physical realm, pattern-based language, models, methods, and tools give access to different phenomena. At the same time, the metaphysical realm is sustained, though it is transformed as well. People still experience deeply personal tensions and transformations in the traditional unbounded, high dimension, and nonlinear worlds beyond physical reality, but they are made accessible to conscious examination and shared understanding through the same pattern-based language, models, methods, and tools.

I believe that I am not the first to strive to see and describe this world view in which patterns and their transformation explain the unpredictable and emergent behavior of physical, conceptual, and social systems. Physical scientists such as Bohm and Goethe described realities that were fluid and generative. Mathematicians, such as Wolfram and Mandelbrot, explored open, high dimension, nonlinear domains. Social scientists such as Weick, Piaget, Dewey, and many others acknowledged emergent phenomena in human experience. In addition, many contemporary social scientists and practitioners explore applications of complex adaptive systems to human systems of psychology, teamwork, organization development, and management. I believe that all of these thinkers described the same phenomenon of emergence and generative action that I strive to see and influence through human systems dynamics. In the statements below, I attempt to articulate my understanding of the nature of this view of nature and to connect it to the praxis we teach through human systems dynamics. While understanding the HSD world view is in no way required to

use HSD models and methods, I intend this statement to be helpful to those who wish to expand the field of HSD as well as those who wish to compare and contrast HSD to other approaches to social interaction, including others derived from complexity science.

## Knowing

Reality, including things and our experiences of things, involves many differences that make a difference. We can say, then, that it has an unknown and potentially infinite (represented by  $n$ ) *dimensions*. One thing can be red, round, cold, big, heavy, mine, plastic, ugly, useful, and so on. Each of these can be considered to be a defining dimension of the thing itself, but human beings can only consider a finite number of dimensions at any given time. Those are the ones we consider to be relevant to a particular purpose or perspective—the differences that make a difference. For a two-year-old, “mine” can be the most relevant dimension; while an artist will focus on “round” or “red;” and a physical therapist cares most about “big and heavy.” Notice here that we do not distinguish between differences in physical traits and metaphysical ones. They are all simply different dimensions in the same way that mass, time, and distance are a familiar set of dimensions for physical quantities.

We are aware of dimensions of reality both through our perceptions of external senses and our abilities to focus, remember, and imagine. Using these capacities, we recognize similarities, differences, and connections<sup>1</sup> among various dimensions (or within the same dimension when we talk about more or less of one

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<sup>1</sup> Similarities, differences, and connections are one mid-level abstraction for the conditions for self-organizing (container (C), difference (D), and exchange (E)). For the purposes of this paper, I choose not to refer to the technical language, but rather to use the mid-level abstraction that is easier to integrate with other ideas of causality, perception, and meaning making.

characteristic). We acknowledge a collection of differences, similarities, and connections as a pattern, and we make meaning of patterns across space and/or time. The pattern seen by the two-year old is different than the pattern seen by the physical therapist, though they may be looking at the same object. They focus on different differences, they are drawn by different similarities, and they inquire about different connections, so the patterns they comprehend are distinct.

We can also compare and contrast patterns with each other and make meaning of the patterns formed by relationships among patterns across space and/or time. When we do this, we are aware of patterns at different scales. For example, at the same time that the red ball constitutes a pattern, it may also participate in a pattern of a collection of many-colored balls. The collection of balls may participate in a pattern of toys, and toys in the collection of objects our two-year old can name. Notice, again, that the patterns, like the dimensions, make so significant distinction between physical and non-physical substrata.

Often we think of scales as indication of the level of organization. Individuals in a team constitute a pattern of similarities (e.g., membership, commitment, location, etc.), differences (e.g., expertise, height, hair color, etc.), and connections (e.g., shared stories, meeting times, agendas, measures, etc.). A collection of teams constitute a pattern at a different scale, as we focus on more generalized similarities, differences, connections, and meanings. We might also recognize lower scales in a system as the personality of each individual represents a different confluence of similarities, differences, and connections; and his or her physical appearance represents another. In this way, a single system manifests as patterns at many different, though interdependent, scales simultaneously. Some scales are defined as higher because they include multiple patterns within. Others are lower scales

because they are included within larger patterns. Any given pattern is simultaneously higher than some and lower than other scales. The scale of a particular pattern is determined by the observer, based on relevance to purpose and fit with other perceived patterns. In HSD this concept appears in our simple rule, "Attend to the whole, the part, and the greater whole."

## **Change**

In a given pattern, the differences, similarities, and connections may not be in balance. If there are

- Too many differences, the connections may be strained, and the similarities may be difficult to discern.
- Too few differences, the similarities and connections become redundant or irrelevant.
- Too many similarities, and the differences are difficult to recognize, and the connection may be constraining
- Too few similarities, the differences don't fit together, and the connections are hard to hold
- Too tight connections, and the differences push against the pattern as the similarities are amplified.
- Too loose connections, and the differences and similarities are not perceived as context for each other.

When the pattern is balanced, it is coherent, and tensions are at a minimum. When the pattern is not balanced, tensions accumulate within it. These tensions will be physical ones, if the pattern is manifested in material. They will be emotional if the differences are relevant to human feelings or perceptions. Social tensions emerge

when the dimensions of interest describe social patterns. Whatever the underlying substrata, mismatched conditions will generate tension within the pattern.

When tension develops, if the components are free to shift, the similarities, differences, or connections that constitute the pattern change spontaneously to adjust and resolve the tension. If one or more of the components is constrained from movement, then the tension will continue to accumulate until it can no longer be sustained by the other conditions, and an adjustment occurs somewhere in the pattern to release the tension.

Resolution of tension within a pattern at one scale has the potential to increase or decrease tension in patterns that are connected to it at the same or different scales. This release of tension may include patterns that are in scales immediately higher or lower or both higher and lower. Because various scales of a system are not simply nested (they are massively entangled) a change in one can affect changes in many others (same scale, higher, and lower) simultaneously. In this way, a release of tension in one pattern will tend to change tension in other patterns, which in turn will move to resolve tension and/or build it elsewhere.

This accumulation and release of tension applies to all kinds of change in physical and metaphysical contexts, it also applies to meaning making and learning. (Piaget captures the phenomena of tension accumulation and release in his developmental learning theories of assimilation and accommodation.) When both knowing and change depend on tension and resolution of tension between and among patterns at multiple scales, any system has the capacity to be open, high dimension, and nonlinear. In other words, they meet the criteria of complex adaptive systems, and they will exhibit complex, nonlinear behavior. Change, when seen as arising from

this causal mechanism, has a variety of counter-intuitive characteristics. Change in these systems is .

**Not teleological.** It is driven from conditions in a given moment, not from some intention or future goal (except in so far as that intention or future goal contributes to a tension in the here and now). We say, therefore, that change is *emergent*.

**Not predictable.** The number, variability, and interdependence among tensions in a system result in paths of possibility that are too numerous to track and too close to symmetry to anticipate, except over short spans of time or within local boundaries. We say, therefore, that change is *sensitive to initial conditions*.

**Not always observable from outside of the system.** The accumulation of tension, which ultimately leads to change, may generate no externally observable evidence until it reaches a critical point. From within the system, however, indications of rising or reducing tension may be observed or otherwise discerned at lower scales before the higher scale reaches the critical point. We say, therefore, that change exhibits *self-organized criticality*.

**Driven from the top down and from bottom up.** Scales above and below are equally capable of influencing tension (and therefore change) at any given level. We say, therefore, that change is *heterarchical*.

While every system has the potential for heterarchy, self-organized criticality, sensitivity to initial conditions, and emergence, not all exhibit these qualities all the time. When systems are more strongly bounded, dimensions are relatively few in number, and causality is asymmetrical enough to appear linear, then traditional

expectations hold, and Newtonian explanations are sufficient. When systems are totally unbounded, active dimensions are innumerable, and causality is symmetrically balanced as nonlinear, then clear, predictable patterns disappear and mysticism may become a reasonable approach. Regardless of the systemic conditions, responsible humans strive to understand and interact intentionally with both the physical and metaphysical patterns that surround them. For that, we need to articulate the implications for action that arise from the pattern-based understanding of knowing and change.

From an HSD perspective, this is accumulation and release of tensions across multiple scales is how change happens in all systems—physical, social, cognitive, spiritual, aesthetic, chemical, physiological, and so on. Tensions accumulate between or within dimensions. Tensions among dimensions manifest as tensions within and among patterns. At critical points, the patterns are not able to sustain the accumulated tension, and shifts result in one or more dimension to rebalance similarities, differences, and connections in many related patterns simultaneously.

## **Influencing Patterns**

Another hallmark of HSD is its commitment to praxis—practice informed theory and theory-informed practice. When we understand both the process of change and the process of knowing to result from accumulation and release of tension in the patterns (similarities, differences, and connections), then a whole range of questions about seeing, making meaning, and influencing change in the real world emerge.

In a world of pattern-based evolution such as this one described by HSD, the answer to “why” is always the same—tensions accumulating and resolving. Tension and its

release are the purpose for change, the mechanism of change, the substance of change, and its motivation. When one sees clearly the differences in a system, the tensions that emerge from those differences and the similarities and connections that hold the tensions until release, then one can see clearly a wide range of meanings and options for action. One is free to observe with minimal bias and to act with optimal intent.

In a pattern- and tension-driven reality, one can never be certain of certainty. The system must be artificially and intentionally bounded to uphold any semblance of stability or predictability. And even then, the illusion will be temporary. Because system bounding consumes energy (physical energy to hold conditions still in physical boundaries; emotional energy for emotional ones; cognitive energy for cognitive ones; etc.), it is impossible to sustain a single system boundary indefinitely. As a result, any given certainty has a lifetime that is always indeterminate and usually short.

In the absence of certainty, inquiry becomes the only path toward learning. A cycle of Adaptive Action (What? So what? Now what?) shapes the iterative process of observing, deciding, and acting that connects the knower/actor with the known. What is the current pattern? So what are the tensions within this pattern and between this and others as same or different scales? Now what can/should I/we do to shift conditions and change the patterns? As soon as any action is taken, new patterns emerge with new and accumulating tensions, and the Adaptive Action process begins again.

In addition to dissolving the boundary between physical and metaphysical patterns, HSD's pattern thinking and Adaptive Action dissolve the boundary between observer

and observed. Any observation is extracted from the reality of the thing itself—its differences, similarities, and connections. One subjective view is not different from, it is a subset of the nature of the object.

The same pattern dynamics are relevant in a wide array of human experience and interactions, including mental models, linguistic constructs, psychological well-being, and social rituals. As I make meaning, I will hold a collection of schema as a coherent mental model until tensions within it or between it and other patterns disrupt the schema's (pattern's) capacity to support coherent meanings for me. At that point, the patterns held in my mental model shift into some meaning-making pattern that is a better fit with current state of memory, perception, and social expectation. In the same way, my statements or explanations will hold until their internal inconsistencies and/or their mismatches with incoming data until the tension grows strong enough to necessitate a shift. Intrapersonal experience and memory of experience (influenced by either nature or nurture) establish similarities, differences, and connections in psyche that can be recognized as either patterns of mental health or mental illness. Rituals, too, function to hold and release community-wide tensions that emerge from, but cannot be resolved at, the scale of personal experience and identity.

The HSD pattern-based model of knowledge and change has far-reaching consequences for how one observes, makes decisions, and acts to influence emerging patterns in both the physical and metaphysical worlds that fill and surround us. While ethics and actions of the past can be reinterpreted from the HSD perspective, it also releases a variety of constraints and creates the potential to consider knowing and action in a system that is open, high dimension, and nonlinear.

It is one thing to think about individuals moving into this way of knowing, but one of the implications is that such knowing is also a social experience. Tensions among members of a group become key “causes” of the emergence and resolution of tensions within. If a learner (or a group of learners) is in isolation, he or she will reach a state of stasis in which all internal tensions have come to equilibrium, and no new stimulating sources of tension are accessible. Learning will stop, and adaptation will cease. For this reason, the community of HSD practitioners is critical our on-going learning and adaptive action.

## **Community of Learning**

Understanding the nature of change is not an end in itself. In HSD we strive to understand emergent phenomena in order to engage with it in ethical and effective ways. For that reason, we consider the implications that this pattern-based world view has for action. We also recognize the importance of community of learning in which individuals benefit from the tensions accumulating and releasing as other individuals and groups learn and adapt. It is critical, therefore, that HSD support a community of learning that is diverse, adaptive, and coherent at the same time.

Complex adaptive systems provide a model and method for establishing coherent action in the midst of uncertainty without over-constraining the players—short list of simple rules. The short list of simple rules of the Human Systems Dynamics Institute results in action that is intentional and constructive in a context of emergence, sensitivity to the nature of change as we understand it, including sensitivity to initial conditions, self-organized criticality, and heterarchy.

The short list of simple rules for the HSD Institute are:

**Teach and learn in every interaction.** This rule shapes an HSD pattern of perpetual and profound inquiry. When the environment is characterized by similarities, differences, and connections within and across many, massively entangled scales, no one can be certain of certainty. The engagement of teaching and learning—of inquiry—establishes a relationship in which the knower contributes to both the accumulation and the release of tension between self and other, and potentially in other patterns as well. In this way he or she participates in and influences the conditions that determine physical, social, cognitive, emotional, physiological, artistic, and a myriad of other patterns.

**Search for the true and the useful.** This rule encourages a pattern in which theory and practice play significant and well-balanced roles. Knowledge that is only coherent with abstract patterns of truth, may not be relevant in concrete patterns of perception and action. On the other hand, action that fits with the concrete patterns of use may not be consonant with the abstract patterns of knowledge. When truth and use are considered as equal players, the tensions between theory and practice constantly accumulate and release, leading to adaptation in both thought and action at the same, or nearly the same, instant.

**Attend to the whole, the part, and the greater whole.** This rule allows HSD practitioners to engage with change patterns at multiple scales. Given that tensions accumulate and release across scales, it is possible to intervene in a pattern at one level and influence patterns at many other and quite distant levels. By focusing attention on three (of the infinite number of possible) scales, one can imagine results of intervention, even though they cannot be predicted. For these reasons, we

identify a focal scale or unit of analysis that is central to the work, and monitor influences from and influences on the scale immediately above and below.

**Give and get value for value.** This rule establishes connections that are fluid to encourage flexibility of the pattern over time and adaptation for individuals and groups within the whole. Such a rule supports a sustainable system because resources (physical or metaphysical) are not accumulated unduly in any one part of the pattern. Individuals in their interactions are encouraged to both receive and distribute differences that are perceived as value.

**Share your HSD story.** This rule connects the HSD pattern with the other patterns that shape knowing and action in the larger world. If we truly believe that difference is the engine for change, then we must expect ourselves to connect across the HSD/Non-HSD difference in ways that establish a pattern of the whole. Not only does this extend the influence of the HSD pattern, but it also ensures that the HSD pattern continues to be influence by others through living and learning engagement. This rule also acknowledges that there is not one, single, immovable HSD story. The pattern of HSD adapts into coherence with each teller's already-existing patterns. Patterns of HSD co-evolve along with the experiences of all who hold them.

**Engage in joyful practice.** This rule reinforces the sense that the energy driving the system is generated from tensions and release of tensions from within the pattern, not imposed from outside. The HSD world view removes many aspects of the solid identity and the absolute certainty that have been used to characterize joy in the past. We redefine the joy of praxis in terms of the increasing richness and coherence of the patterns we are able to see and influence, individually and collectively.

## **Epilogue**

Human systems dynamics practitioners embrace a variety of methods and models to support systemic change. Each of these is designed to reveal tensions across differences, suggest options for action to shift patterns, and/or facilitate effective action. Some practitioners are more and some are less aware of the concepts of pattern-driven nature that underlie HSD theory and practice. I am still not convinced that not knowing the nature of the paradigm shift is a bad thing, but I am convinced that articulating the nature of the paradigm will contribute to coherence of the field as a whole. In the spirit of this new reality, I look forward to the conversations that will accumulate or release the tensions held in this articulation of the emerging pattern of human systems dynamics.