

MAKING SENSE OUT OF CHAOS: LEADING AND LIVING IN DYNAMIC SYSTEMS

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Before I moved to Los Angeles, I lived in Fargo, North Dakota. Life was different there and one example of the difference was in the traffic. In Fargo, I could predict how much time it would take me to get to work. I lived 9 miles from my place of work and it usually took me about 12 minutes to get there. About the only time this varied was when there was a snow storm. But even then, life was somewhat predictable. I knew that it would take me longer than my usual 12 minutes that day, but eventually the storm would stop and my travel time would get back to normal.

Driving in Los Angeles is not like driving in Fargo. Travel in Los Angeles is not drawn to scale. Driving ten miles on the same stretch of Los Angeles freeway can take anywhere from 10 minutes to an hour and a half regardless of time or day. Traffic in Los Angeles is unpredictable, and on the surface appears random and chaotic.

I believe that leading organizations these days is a lot more like driving in Los Angeles than Fargo, North Dakota. Our lives are more complex, the people in our organizations represent increasing diversity, our world is constantly changing, and our organizations are shifting to accommodate to these changes. Everyday we wake up to a world that is different than the day before.

I used to think that when I got older and more mature, everything would become clear. I used to think that white bread and frosted flakes were good for me too, and politicians had our nation's best long term interest at heart. I used to think that I could recognize who the good guys and bad guys were just by looking at them. These, and other assumptions, were things I took for granted twenty years ago. But these norms, and many others I grew up with, don't work in today's world.

We all have learned assumptions about relationships, marriages, careers, organizations, societal values, education, and leadership that don't seem to fit today's rapidly changing world. It's as if someone decided one day to take the stability out of our lives and substitute it with the word **change!!!** Now, in place of stability, permanence, predictability, and the possibility of control, there exists absences. The absence of certainty, absence of understanding, and absence of predictability have become norms in our lives.

A man named George Land (1986) wrote a book, Grow or Die. The title seems appropriate to what's happening today. He suggests that cultures go through phases, and in between each phase there is a break point where the beliefs that worked in one phase need to be released in order to move on to the next phase. I believe we are at a breakpoint in our society.

A breakpoint is like living in a paradigm shift. A paradigm is defined as a set of beliefs and assumptions that shape our perceptions of the world (Kuhn, 1970). Our traditional paradigm fits a more stable world where change is predictable and can be understood in an objective way. We are at a breakpoint because this traditional paradigm does not fit our present reality. In its place, a new paradigm is emerging that sees the world as constantly changing, unpredictable, complex, full of diversity, and turbulence.

Everywhere we turn, more of our old beliefs are being challenged. We are caught between two worlds, we know that our old beliefs don't work but we don't know what new beliefs will. This must be how Linus feels when his security blanket is in the dryer or how I might feel if I were swinging on a trapeze and had let go of one trapeze but had not yet caught the other. Hanging out in mid-air can create its own kind of anxiety about change.

Every time we turn around, a rule or norm is changing. In higher education, the rules of who our clients are - their age, race, culture, socio-economic background, and goals - are different than 15 years ago. Human

development theories, once seen as sequential, orderly, and stage-like, now are being replaced with individual differences and greater multiplicity of themes and patterns. Leadership, which was once taught as an extension of management and included bold actions, taking control, and individual initiative, has changed. These ideas are evolving into a view of leadership that stands apart from management and involves more intangible activities like creating common visions, empowering others, and shaping organizational cultures.

These are just a few examples of change in our professional lives. Our reaction to this constant professional and personal change is stress, anxiety, and a sense of pessimism about our work or personal lives. We may react with fear and anger, the “flight or fight” response that triggers the stress response from our bodies. Today, many people are feeling both anger and fear about what’s happening in our world.

Another psychological response to the complexity and uncertainty we feel is to search for saviors who will tell us what to do. In order for a person or organization to qualify as a savior, they have to reduce the complexity of the world into simple rules. The rise of fundamental religions and cults are examples of one form of saviors. Business is seeking saviors in the guise of leadership. Good leadership is seen as the savior of an organization, and possessing it will keep the organization competitive in a complex world. The United States sought a savior in Ronald Reagan who spent eight years telling us that the world wasn’t as complex or messy as our experience told us it was.

Saviors, however, will not make the complexity go away. Instead, we need to shift from one way of thinking to another. Most of us are trying to understand this complex world from a linear framework. We have been infected by Newton’s mechanical determinism. We use linear metaphors to describe organizations that “run like a well oiled machine” or people as cogs in an organizational wheel. We like to think people and organizations can be taken apart and put back together to be understood or repaired. Linear thinking leads us to believe that our organizations are objective and predictable and if they aren’t, it’s just because we don’t have all the information or we aren’t a good enough leader.

In disciplines all across the board, the mechanical metaphor is falling like flies. This metaphor is being replaced by non-linear dynamic systems where organizations are seen as riding on the waves of change and existing within an environment of permanent white water. In the disciplines of physics, mathematics, environmental studies, psychology, business, and sociology many experts now see the world as a non-linear, dynamic system instead of a big clock in the universe. We can no longer think of the world as existing in a placid environment. Politically, the recent changes in the USSR and the Eastern Block Countries suggest that rapid change can happen. The swing on what’s politically expedient on the pro-choice, pro-life issue closer to home suggests a similar radical shift.

There is a relatively new science called Chaos in the field of physics that has some wonderful ideas to help us make the shift from Newton’s mechanical determinism to a view that the world is a dynamic turbulent system. Traditional physics is the study of linear problems. The science of Chaos (Gleick, 1987) is a science of process, the study of turbulent systems and the non-linear problems of the universe. Chaos theoreticians believe that approximately 80% of the world is a turbulent dynamic system. The weather systems, the global environment, human beings, human organizations, the stock market, race tracks, football games, and the human heart beat are all examples of non-linear systems.

Individuals who want to lead in the future will need to revise their way of thinking. Traditional ideas of leadership work in an external environment that is predictable and stable. Figure 1 shows how some of our ideas of leadership are changing to match the shift from a stable environment to a complex, constantly changing environment.

The dominant paradigm reflects many of our present background assumptions about leadership. In this paradigm, leadership is blended with management and seen as a top-down phenomenon. This view sees

leadership as a set of tangible tasks, made up of producing results, running meetings, supervising, motivating, and setting goals. The organization in which leadership is practiced is seen as logical and rational with predictable cause and effect. The leader's effectiveness is measured by his or her ability to directly control outcomes. These leaders use power as a means of controlling other's actions. Vision is used as a motivating tool to accomplish a better "bottom line" for the organization. In this perspective leadership is practiced by an individual.

Figure 1

Dominant Paradigm

Hierarchical
 Leader and followers
 Tangible tasks
 Fragmented
 Management Concepts
 Organized
 Analytical/Objective
 Reductionist
 Linear Causality
 Compartmentalized
 Predictable Causality
 Rational (of the head)
 Power Over
 Organizational Goals
 Individual Focus

Emergent Paradigm

Heterarchical/Collective
 Leadership from alongside not over
 Intangible Tasks
 Holistic//Connected
 Meaning systems
 Messy/multi-perspectives
 Intuitive/connected
 Holistic ideas and perspectives
 Mutual Shaping
 Interdependency
 Dynamic Flexibility
 Head & Heart combined (emotions & spirit)
 Power to & Power With
 Purposeful Direction
 Common Good

The new paradigm outlines the common themes and patterns that are emerging from a variety of authors (Clark 1985; Cleveland, 1989; Gardner, 1990; Huff, 1985; Morgan, 1988; Nanus, 1989; Quinn, 1989; Terry, 1988; Vaill, 1989; and Weick, 1985). In this emerging view, leadership is seen as a dynamic relationship which is practiced from alongside rather than over others. Leadership is more intangible, having to do with shaping and creating meaning for individuals. It is complex, due in part to a rapidly changing world, expanded interdependent relationships in organizations, and increased diversity. Leadership is practiced in an organization culture where values and meanings help people connect their work to something greater than themselves. Multiple perspectives and mutual shaping of ideas are a natural part of organizational dynamics in this paradigm. In this paradigm intuition, emotions and analytical thought are needed to understand the relationship dynamics necessary for leadership. Leaders in this view think of power as energy. They use it to empower, and build an individual's capacity to become autonomous. The direction for this leadership is toward the common good. It goes beyond organizational success and sees leadership as contributing to the evolution of society. In this paradigm, leadership is practiced by individuals throughout the organization, not just the person at the top.

These two paradigms reflect the beginning shift in assumptions about leadership theory that have appeared as a result of a changing environment. The emergent paradigm of leadership challenges some of the core assumptions of where leadership is located, what power looks like, who are leaders, and in what direction one leads. Leading in a constantly changing world will look more like the emergent paradigm than the dominant one. It also involves a shift in our way of thinking.

The purpose of this article is to identify some of the ways that we need to shift our thinking to live and work in a complex world.

What Can We Learn From Chaos?

The science of Chaos studies non-linear dynamic systems. Since that is the world in which we currently live, we need to begin to think in different ways than we have been taught. One way of developing a different way of thinking is to borrow concepts from other disciplines which study non-linear systems. The science of Chaos can tell us a lot about how dynamic human organizations function and the underlying principles of complex dynamic systems.

1. In a dynamic system, things don't progress in a linear, orderly predictable way. There isn't a single, linear line between cause and effect. Instead, there is a **mutual shaping** that occurs. Everything is interconnected and what one person does affects others.

In Los Angeles traffic, my actions are affected by the actions of the other drivers on the freeway. We are mutually shaping each other's behavior. Sometimes, I play a mental game in which I try to predict traffic patterns. I say to myself, "If I move into the right lane, I'll get to my destination faster," or "If the traffic is stopped, there must have been an accident." I consistently find that my "if – then" thinking patterns fails to help me understand this chaotic world of traffic.

This example is similar to organizations in which the leader thinks, "If I present this proposal in a logical way, then everyone will agree with me," or "If I am competent and knowledgeable, then people will follow me." These are examples of linear ways of thinking about leading people. If we applied the idea of mutual shaping to leadership, then leaders would be thinking, "I need to talk over my idea with many different people and see how it evolves and changes shape with their input." Another example of mutual shaping occurs in delegation when a leader delegates a task to a member who then does the task in his or her own way.

Leaders who shift into non-linear thinking will lead differently. They will recognize that they cannot control other people through their actions. Instead, they see themselves and all their members as mutually shaping decisions and events. They see that they are a part of a larger flow and their skill, as a leader, comes from learning to ride the wave, not control it.

2. A dynamic system appears random on the surface but actually has an underlying order and rhythm to it. The weather is a good example of this, we can't predict the weather with a great degree of accuracy. We can't predict when earthquakes will occur or precisely when a storm will reach our area. However, we can identify weather patterns and say with some degree of certainty that something will happen; we just don't know when. In a dynamic system, we look for patterns and themes, not accurate predictions.

Traffic in Los Angeles has patterns that help drivers to generally predict how long it will take them to get from one place to another. However, there will always be exceptions to the patterns. The experienced commuter has an eye for patterns among the apparent randomness of daily traffic.

Organizations also look random on the surface. Many of us have learned the hard way that things aren't always logical. There are days when experienced leaders just shake their heads and give up trying to understand the absurdity of it all. However, the non-linear thinking leader looks for the order that underlies the flow of the organization and each unique individual within it. They learn to pace events and think in terms of streams of decisions that fit the "high and low pressure system" patterns of their particular organization.

3. A dynamic system is more than the sum of its parts. There is a synergy that occurs when all the parts of a dynamic system come together that create more than the sum of these parts. The human body is a good example of this. It is not like a machine whose parts make up the whole. The human body is put together;

something more than its parts appears: our emotions, spirit, and our intelligence show up along with our heart and brain. This creates a system that is fluid, complex, unpredictable, and constantly changing.

Los Angeles traffic cannot be understood through analyzing its parts. When we all get on the freeway, something happens. It is no longer a group of individual cars, but a dynamic system that takes on a life of its own. (It's alive!!!) All of these cars are mutually shaping each others driving actions and this creates a system that is fluid, complex, unpredictable and constantly changing.

We have examples of this type of synergy in our organizations as well. It occurs when a group of relatively inexperienced program board members come together and produce an extraordinary event that surpasses anything that any one of them could do individually, or when a student senate meeting which looks so non-controversial on paper turns into something from your worst nightmare. We have stories in sporting contests where underdog teams win against all odds because of this synergistic effect in non-linear dynamic systems. Leaders who think in non-linear ways understand that their organizations have a personality that is more than the collective personalities of their members. This organizational persona can work for them and against them. The important thing is that these leaders treat their organization as if they are alive and work to release and shape a positive synergistic effect.

4. A dynamic system's underlying order has a sensitive dependence on initial conditions. Chaos scientists first discovered this principle when they were trying to learn how to predict the weather. They had loaded a number of variables into a computer to simulate a weather model. As the computer program ran, they noticed an underlying order in the weather simulation. The scientists were excited; they thought that this breakthrough could eventually lead to precise weather predictions and eventually weather control. One day they watched an interesting pattern emerge from this simulation which they wanted to repeat. They reentered the numbers on the computer printout from that section. They went to get a cup of coffee. When they returned, an entirely different weather pattern had developed. At first dismayed, they eventually realized that the computer printout only displayed six decimal points, but the computer program actually operated the simulation up to ten decimal points. This difference of less than one-millionth of a point created a completely different pattern! This observation changed the way scientists thought about errors in measurement. Up until this time, scientists believed that small errors in initial measurement led to insignificant changes in the end result. This assumption is true in linear systems. From this experiment, Chaos scientists discovered that in a dynamic system, small errors in initial measurement resulted in large differences in patterns over time. They eventually called this principle a "sensitive dependence on initial conditions." Applying this principle to the dynamics of weather meant that a butterfly added to the weather conditions in Beijing will drastically change the weather in New York. This illustrates how small changes in a dynamic system can radically change the predictability of a phenomenon. It also explains how one person can make a difference in the overall direction of a dynamic system called human organizations.

In Los Angeles, this sensitive dependence on initial conditions occurs every time I get on the freeway. If an accident has occurred five miles before I get on the freeway, my traffic pattern will be different that day. If one person's car stalls on the freeway, my drive to work will be effected. This "sensitive dependence on initial conditions" also happens whenever it rains in Southern California. Rain, as an individual condition, shifts all patterns of Los Angeles traffic. The only thing you can predict when it rains is that your drive home will be different.

In organizations, leaders who think in non-linear ways understand that external conditions, their organization's history, the returning members from last year, and one person's positive presence are all initial conditions that have an effect on the organization this year. This principle is modeled in folklore and slogans like "one rotten apple ruins the whole barrel" or "one person can make a difference," or "even the greatest creations start from small seeds."

5. A dynamic system can change rapidly. A machine view of change sees it as a set of incremental steps similar to an assembly line. A dynamic system, because of a sensitive dependence on initial conditions and the synergistic effect of the sum being more than its parts can change radically. When the 1980 U.S. Olympic Hockey Team achieved the unimaginable and defeated the Russians, the press said they had “surmounted incredible odds.” Today, we way political change is taking place at an “incredibly rapid pace.”

Los Angeles traffic can also change rapidly. I used to make the mistake of thinking that if it was slow at the beginning of my commute, it would be slow throughout my drive to work. Actually, the present condition of traffic has nothing to do with what it will be like ten minutes from now. It can show down, speed up, or come to a complete stop without any observable reason for the change.

Leaders who think non-linearly understand that they organizations can change rapidly. This gives them a sense of optimism about the future. They don't have to wait forever for their organizations to change so they tend to focus on possibilities rather than the limitations.

6. Dynamic systems are not drawn to scale. In a mechanical, linear world, a bird's bone structure is smaller than an elephant's bone structure. In a dynamic system, things are not drawn to scale. For example, driving ten miles on the Los Angeles freeways can take anywhere from ten minutes to an hour. These freeway systems are not drawn to scale because time and distance are not connected. Another example of the absence of scale is a ball of string which looks three dimensional when you hold it in your hand, becomes two dimensional when you look at it from fifty feet away, and becomes a one dimensional pinpoint from two hundred yards away.

This explains why distance changes and shapes perspectives. A person in the state university office does not see things the same way as a person in the trenches. Hence, you see the implications of a state university system decision (which they see as a pinpoint) in its full three dimensional implications (the ball of string). Higher education has many examples of things not being drawn to scale. A colleague of mine is the president of a very small theological seminary. He was observing the other day that his accreditation report was the same size as U.C. Berkeley's. Leaders experience this absence of scale when a small problem takes an incredible amount of time to resolve, or when an issue is very important to a member of the program board but not at all important to the adviser of the organization.

Leaders who think non-linearly understand that one cannot accurately predict the amount of time an item will take on an agenda because scale is not stable in a non-linear dynamic system. These leaders also appreciate and nurture multiple perspectives because people see issues from different dimensions (either as a ball of string or a pinpoint) depending on how close they are to it. These multiple perspectives help the whole organization understand a phenomenon. This is a lot like the story of five blind men who together are trying to understand what an elephant looks like by each feeling a different part of the animal.

Shift From Linear to Non-Linear Thinking

A dynamic system will require us to shift from linear thinking to non-linear thinking. Here are some examples of typical linear thinking in organizations and how it may change in a non-linear system.

Linear Thinking

Problems are separate

Non-linear Thinking

Problems are connected – solving one problem will frequently trigger new problems that are related to the old one

Every problem has a solution	Problems do not always have a solution and often return in a different form to be solved again
Decisions are separate events	Decisions are not single events but become a stream of decisions as they respond to constantly changing conditions
You can get ahead of this game	There is no ahead or behind, only “being in” the game; your life will not be more sane when graduation or thanksgiving comes; something else will take its place
Events are separate	Life is made up of streams of events; events are connected
Planning for control	Planning is done to help an organization improvise, to respond to the unpredictable
Product focus – how to	Process focus – ways to

Organizationally, there is a corresponding shift from linear thinking to non-linear thinking. Linear thinking in organizations looks like a pyramid with the leader at the top controlling the direction and generating a vision based on the bird’s eye view he or she has from the top of the pyramid. The linear organization has a set of dependable rules and structures, solid boundaries that shield them from each other and the forces from the outside world. They believe that there is a single, objective reality that explains what is happening.

Non-linear organizational thinking makes a shift from a top down, pyramid model to thinking of organizations as a raft on a river of permanent white water. These organizations see leaders at all points of contact with the river, because they need their initiative and thinking to keep the raft afloat. Leadership and communication is linked through relationships rather than structure to allow for flexibility. Boundaries shift between departments and the raging water around them. Multiple realities are experienced because each person’s perspective tells the organization more about the dynamic situation.

Shifting Our Definition of Personal and Professional Competence

The shift from a linear to a non-linear dynamic system creates a need to change the way we think about the world, our organizations, and the skills and abilities we need to develop. Because we are a shifting point between these two ways of thinking (hanging out in mid-air between two trapezes), no one is an expert on what personal and professional competence will look like in a non-linear, dynamic system. Here is a shopping list of strategies that I’ve generated from reading, hitchhiking off other’s ideas, personal experience, and reflecting on these issues. They are not in any order of importance.

1. Our complex world is becoming more and more specialized. This creates an isolation in our work and disciplines. In a dynamic system, connections are important. Develop a lively intellectual curiosity and cross department relationships so that you can make connections between things. It will help you understand the system better.
2. Work to develop a sense of unwarranted optimism. This is the conviction that there must be some more upbeat outcome than would result from adding up all the available expert advise (Cleveland, 1989). Remember that a dynamic system can change very fast. You can co-create the future.
3. Change your language. Figuring out how to do things is based in our mechanical metaphor. Look for “ways to” and “why to(s)”. Finding multiple ways to accomplish things puts our focus on process. A dynamic system is a system of process that also happens to produce a product.
4. Learn to flow with the constant change of a dynamic system. Control is not possible so think of shaping instead. Give up the search for perfectionism. It will drive you nuts and keep you focused on your self

perceived inadequacy. Learn to flow by watching surfers, taking improvisational workshops, dancing on slippery floors. They all exist in a dynamic interplay between uncontrollable conditions and our ability to respond to them.

5. Develop an eye for patterns. Look for the underlying order to your dynamic systems.
6. Look for your degrees of freedom not what you can't control. Some individuals focus on what they can't control. This causes stress and worry for the individual and doesn't really help one feel good about him or herself. Look for what you can control. For example, you can't control what's on a test, but you can control the amount of time you study for it. By identifying what you can control, you find the wiggle room within any situation. This points the way to what you can shape.
7. Think of streams of information and rhythms to decision making. Learn to keep pace to the rhythm of your environment. A leader's role may be in regulating the speed, direction, and rhythm of the organization to keep pace with external events.
8. Develop some sense of peace with the unknown and the absence of understanding. Say good-bye to certainty, predictability, and single truths. Engage life; get on the roller coaster!
9. Get used to accelerating change and frequent surprises. Get in motion, its easier to enjoy the rapids if you are on the river in an inner tube laughing and having fun with friends. People in motion shape their future and enjoy it more. People resisting change experience anger and fear. Both are sources of stress. Look at surprises as things that help you see patterns.
10. Let your head, heart and intuition help you understand this world. A dynamic system is understood through all one's senses, not just the brain. Understanding also comes from being in the system, not separate from it. Being in the river, on the inner tube, gives you information that you won't get from being on the shore.
11. Reach out to people who have different perspectives. People who come from different cultures, different experiences, and different ways of perceiving all help to contribute to a whole picture of what's happening.
12. Talk with people. Collectively reflect on what's happening to see if you can identify patterns.
13. Develop your inner balance. Our inner ear provides balance when we dance on a slippery floor. In a world where the earth moves, you will need an intangible anchor. Learn what you value. Be able to state what you believe in and why. Your values provide balance, like the inner ear, in a world of permanent white water.
14. Develop a fully equipped tool chest. If you only have a hammer, every problem tends to become a nail. The more tools you add to your tool chest, the more problems you will be able to solve.
15. Develop a sapling's flexibility. In big winds, a mighty sequoia may be uprooted because it can't bend with the wind. A sapling bends with the wind and lives to grow taller. Keep a sapling's flexibility throughout your life. Develop flexibility exercises for your mind, your spirit, your body and your emotions.
16. Take time to reflect. We live in a world of information overload where reflection and understanding are rare commodities. Our fast food approach to life has us consuming without understanding. Cultivate time in your day to connect events and create possible meanings for them.
17. Look for multiple right answers. We have been trained to search for right answers. This means that when we encounter a different opinion, a competition begins between people on "who is right". This natural response decreases our ability to learn from people who think and experience the world differently from us. When TV first came out, it was in black and white. I knew that it didn't reflect my reality, because the world I saw was in color. Often our views of life are like the black and white TVs, only we don't realize that the rest of the world is in color. The next time you encounter a different person or idea, choose to explore and understand before you debate its "rightness". Stop thinking in rights and wrongs, better or worse, higher or lower. Develop the language of different and equal.
18. Develop a sense of sovereignty. Sovereignty is a sense of personal responsibility that one has for his or her own life and the community in which s/he lives. If a person has a sense of sovereignty, when s/he sees something wrong, s/he thinks, "This is wrong, I must not let this pass." This person rights this wrong by asking and expecting others to help him or her. Others, in turn, will help because it is the right thing to do. On this issue, this individual acts as if everyone in the organization reports to him or her, regardless of their positions.

19. Substitute effectiveness for perfectionism. In a non-linear, dynamic system, the concept of being perfect doesn't apply. Achieving the state of perfectionism assumes a stable system. In a dynamic system, the state of being perfect doesn't last very long because of the rapidly changing nature of the system. I'm trying to become more effective and less perfect everyday.

Summary

Our world is changing and we are being pressured to give up one way of thinking and search for a new one that fits a non-linear dynamic system. This is going to require an attitude of adventure on our parts. A poet, Ted Loder wrote that "he was tired of being frightened into pretended gaiety. I'm sick of a string of 'Have a nice days.' What I want is exciting days, passionate days, blessed days, wondrous days, and surprising days." This is what's in store for us; exciting, surprising, and passionate days. If we can give up our own expectations that being competent is the same as being in control of our lives, we will have accomplished the first step toward engaging life in a different way. A way that paces the turbulence of a dynamic system.

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