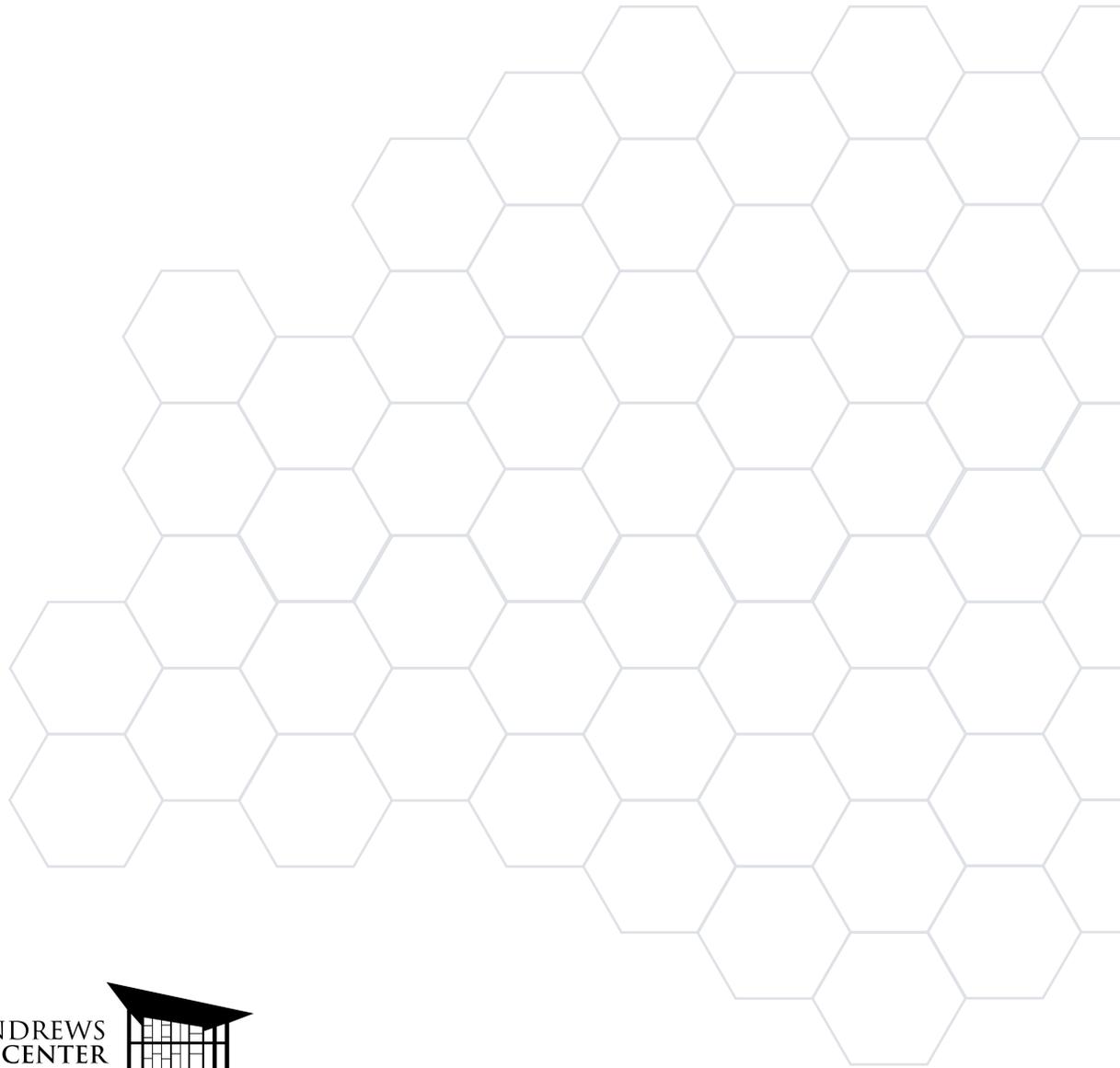# Unlock Potential. Empower People.

Leadership for High-Complex Systems in Future Ready Nashville

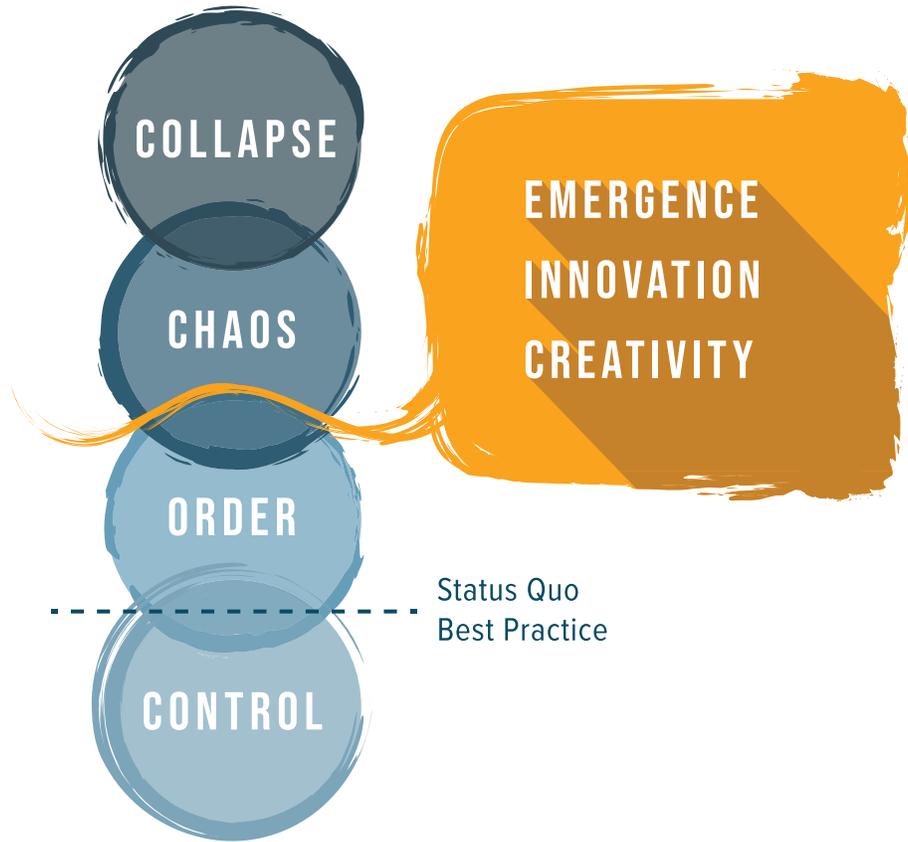NELSON ANDREWS
LEADERSHIP CENTER

2018

DESTRUCTION

COLLAPSE

CHAOS

EMERGENCE

INNOVATION

CREATIVITY

ORDER

Status Quo
Best Practice

CONTROL

OPPRESSION

Dee Hock, founder and former CEO of the Visa credit card association coined the term "chaordic" to describe the creative space between chaos and order.

Although his insights are accurate, his *Birth of the Chaordic Age* never became popular—perhaps because the word "chaordic" is too cacophonous.

Welcome

Carter Andrews
Executive Director

In this paper, we invite you to join the Nelson Andrews Leadership Center in high complexity work.

Complexity lurks everywhere in the world, but it tends to remain unappreciated, unseen, and too often denied. Complexity maintains a mind of its own. It mocks boundaries. It delights in defying human intervention.

But complexity also drives our planet, dictates our most important outcomes, and lies in the very heart of our lives.

Over the years, specialized language, models, and mathematics have obscured the science of complexity. The introductory course at the Santa Fe Institute ("world headquarters for complexity science") illustrates the need to make complexity understandable. It provides lessons on "dynamics, chaos, fractals, information theory, self-organization, agent-based modeling, and networks."

Truly, complexity is more accessible than these titles might suggest. There are core theories and models to grasp, theories that lead to processes that work. When we apply these processes, gnarly systems grudgingly emerge into more productive states.

This paper will introduce you to some of the key concepts of complexity and, hopefully, inspire your continuing trek along this path.

As you embark upon this fascinating, woolly, and tantalizing trail, we happily welcome you to our complexity praxis.*

Carter Andrews

Executive Director
Nelson Andrews Leadership Center
April 2018

*Turn to the Language of Systems on the end pages for definitions of specialized words such as "praxis."

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Introduction

The Nelson Andrews Leadership Center supports leaders and communities in achieving the futures they desire. With a world-class facility and collaborative processes, we help people, organizations, and their systems realize their full potential.

The real voyage of discovery is not in seeking new lands but seeing with new eyes.

Marcel Proust
La Prisonnière
1923

Every system has unrealized potential, and high-complex systems often have the widest gap between what's ideal and what's real. Although the United States spends significantly more per person on healthcare than other industrialized nations, our health outcomes in some areas are no better—and often worse.

Unlocking the potential of high-complex systems such as healthcare is sort of the intergalactic travel of systems change work. The healthcare system has taken on a life of its own, and woe be to those who prefer it function differently. The stubborn persistence of the *status quo* in the system creates widespread opportunities for innovations.

An optimistic city that boasts twenty colleges and universities, the nation's center of healthcare delivery, and the global center of music, Nashville is a perfect-size city to realize potential in any of its complex systems. Yes, we're a city full of creators and idealists, and if any city can crack the complexity code, it will be Nashville.

So, what will it take?

It will take our believing we can make Nashville a city that works for everyone, a harmonic place where people connect, create, and prosper—without outdated systems blocking our way.

To unlock systems potential, we will build the city's capacity to exploit processes for systems change. With these processes, we will build a systems innovation capability that matches the complexity of our city. We will share expertise for dealing with wicked problems across sectors. We will transform high-complex systems so they continuously stay current with change.

Our approach shares a state-of-the-art capability for dealing with high-complex systems in Nashville. We will bring into design spaces people who represent all aspects of high-complex systems. In iterative processes, we will collaborate to contextualize relevant variables into new, coherent, and future-ready designs. We will create cultures of innovation that unlock potential and empower people.

To release the potential locked in high complexity, we Nashvillians will become practitioners of process, scientists of systems, and designers of our destiny!

Fasten your jet pack firmly because there's no simple way to surmount high complexity. But we Nashvillians *will* travel to our preferred future—together in community.

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Roadmap

Our journey will explore various aspects of systems complexity.

The Big Picture
At our first stop, we will study the intractable complexity of wicked problems, where every solution creates even more problems. We'll also learn how high-complex systems become living beasts fiercely protecting their turf. We'll discover how collaboration can help people change the beast.

We didn't build the interstate system to connect New York to Los Angeles because the West Coast was a priority. No, we webbed the highways so people can go to multiple places and invent ways of doing things not thought of by the persons building the roads.

Neil deGrasse Tyson 2012

Science and Process
At our next way-point, we'll highlight the "complexity science" of experts Ross Ashby and Russell Ackoff. We'll grasp how science-inspired practitioners are working in complexity to create new approaches. And we'll ponder how the emerging science of quantum mechanics confirms the importance of connections in systems.

Power in Systems
Continuing our journey, we'll investigate the challenges and opportunities in empowering people to lead innovation. Then, we'll consider the different kinds of power held by people at the top, middle, and bottom of systems. We'll tackle the role of leadership in the power dynamics of systems and investigate how power and culture connect in systems.

A Different Process
As we approach our destination, we'll consider how new guidelines for engagement replace rules of control in collaborative work. We'll investigate the role of design processes in taming complexity. Then, we'll visit the critical, misunderstood role of legitimate convenors in high-complex systems work.

Progress
Before we arrive, we'll see how all complexity work connects. And then we'll arrive triumphantly at our destination—as Nashville leads our regional effort to properly evolve high-complex systems.

Enjoy the journey!

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THE BIG PICTURE
It Starts with Wicked Problems

In 1973, Horst Rittel and Melvin Webber, professors of design and city planning at University of California, Berkeley, published a classic paper on what they called "wicked problems." These wicked problems are largely immune from traditional methods for managing complexity—and include, for example, systems of education, homelessness, and climate. The professors argued that everything is interrelated and concluded that high complexity confounds analysis.

None of the scientific or philosophical work of the complexity sciences seems to have permeated to the actual practice of managers who must deal with high-complexity problems on a daily basis.

Alfredo del Valle
2017

Despite our best intentions, solutions to wicked problems almost always create unanticipated problems. Because each new solution creates both problems and benefits, the complex interaction between "broken" and "working" is difficult to predict. We're stuck in a game of whack-a-mole, where we progress in one area only to lose in another.

According to Rittel and Webber, wicked problems cannot be fixed, only mitigated.

Education is full of wicked complexity. A vast number of actors, issues, disciplines, and cultures must integrate their work to improve the system.

Consider the numerous actors. There are students, teachers, principals, central office personnel, parents, siblings, reading specialists, foreign language experts, nonprofit executives, mental health workers, early childhood workers, librarians, researchers, transporters, housing specialists, social workers, community health practitioners, etc.

They deal with interrelated issues including student self-image, language acquisition, curriculum, poverty, transportation, housing, trauma, hunger, family, motivation, immigration, criminal justice, human resources, budgets, etc.

Add to that list disciplines and professions affecting education such as psychology, anthropology, healthcare, management, brain science, sociology, law, etc.

Once you weigh the cultures affecting education—politics, higher education, ethnicities, native cultures, people in poverty—it's easy to see education is wicked, high complexity!

One specific wicked problem is ensuring that third-grade students read at grade level. This is important because prison populations correlate with children *not* reading at third-grade level. And students cannot progress academically in any subject if they cannot read with understanding. Despite decades of literacy initiatives, still, only about thirty percent of public school third-graders read at grade level.

What would happen if all Nashville third-graders read at grade level? We'd reduce the prison population, turn people into positive contributors, generate billions of dollars of impact—and create blessings of happiness we can only imagine. *This is possible.*

There's considerable wealth hidden in wicked problems. *And that wealth is the diversity of knowledge and energy locked up in systems that keep people from connecting and fully expressing their insights and creativity.*

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High-Complex Systems Become Locked Up

In times of change, learners inherit the Earth while the learned find themselves beautifully equipped to deal with a world that no longer exists.

Eric Hoffer
American social writer and philosopher
1983

In high-complex systems like healthcare or education, synergy underdevelops. Actors compete with crossed agendas. Issues play out in silos. Disciplines have their own professional vocabularies. Cultures rarely communicate with each other. Everything is related to everything else, but synergy—the ways things connect—largely remains untapped. Entropy ensues. The whole is worth less than the sum of the parts.

Dr. W. Edwards Deming, a professor, engineer, and statistician, reminded people the system itself—not the individual players—creates the majority of quality errors. Employing a metaphor, he explained once a factory is completed, quality faults create problems that cannot be fixed without redesigning the factory itself. Consider the example of the Avery Fisher Hall in New York's Lincoln Center. Despite millions of dollars spent to fix the problem, the acoustics in the hall remain "out of tune." The problem is baked in.

Dr. Shawn Joseph, Nashville's Director of Schools, manages a school system with a budget of almost a billion dollars. When he entered his education factory, so to speak, the assembly lines were already humming with layers of people, rules, and processes trying their best to deliver career and college-bound students. Unfortunately, only twenty-four percent of public high school graduates later graduate from two or four-year college, and this has probably been the case for decades.

When Dr. Joseph studied the layers of this inherited factory, he discovered scores of piecemeal programs. Kids not good at math? We have a program for that. Kids can't speak English? We have a program for that. Kids falling behind in school? We have a program for that. We have programs for everything, it seems, and lots more programs waiting in the wings.

Dr. Joseph presides over a complex system with a life of its own (a "living system") locked in patterns of solving problems. There are rules about everything. Rules prescribe what to teach, how to teach, how to manage students, and how to assess. The intertwining network of rules has become a beast with its own life, a culture of its own. If Dr. Joseph tries to evolve his factory, the beast will fight back ferociously. The beast does not like change—even when the change preserves the good in the system.

Today we would never design from scratch our awkward systems of education, government, and healthcare. But the "life-of-its-own" aspect of these systems makes innovation an uphill climb through wicked problems. This stops most systems change in its tracks.

High-complex systems lock up even with good leadership. Dr. Joseph wakes up every day determined to change the system. But education stays locked up because the essence of a factory is almost impossible to change once it's built—no matter how inspiring the leader.

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Community Holds the Key

As a society, we rarely use community-based collaboration to unlock potential. At best, we try to "manage" communities. More often, we "deal" with them. Too often, we "ignore" them. We simply haven't had reliable models to help complex communities evolve constructively. So, understandably, we default to what we know.

The real problem of humanity is the following: we have paleolithic emotions; medieval institutions; and god-like technology. And it is terrifically dangerous, and it is now approaching a point of crisis overall.

E. O. Wilson
Harvard Biologist
2009

Releasing potential in "living systems" is inherently messy. And leaders don't like messes. Bringing diverse people together to design a future is risky. And most leaders don't like risk. And giving decision-making power to a community of people captured in a static system—well, precious few leaders will do that!

Once established, systems preserve themselves with rules of control. Entropy ensures they fall back on old ways of thinking and decision-making. Leaders fear empowering communities to unlock their *own* potential will deliver chaos, not efficiency—even as their present systems deliver results they don't want.

So we remain stuck. We remain stuck in legacy systems, essentially out of touch with their communities. We remain stuck in a one-sided conversation in which a single-leader decides. When there are transparent ways to proceed, we remain stuck with suspicions of backroom horse trading. In a world of unprecedented connectivity we remain stuck in closed systems out of sync with high complexity.

Too often, we design our future using reductionist zero-sum games. Our legal and political systems shortchange complexity. In the legal system, casino verdicts reduce massive complexity to win or lose. To combat the reductionism, people use mediation rather than litigation to solve complex disputes.

When politics reduces issues to a PowerPoint deck, 140 twitter characters and a power broker calling the shots, there is no way to deal with the many variables. Prime Minister Cameron failed miserably when he reduced the Brexit issue to a "simple up or down vote." The issue was too complex for a simple solution—and he lost the vote. Our friend Tyl van Toorn persuasively argues:

> The traditional model doesn't allow for more than two stakeholders to effectively contextualize all the relevant variables into a set of viable solutions, let alone 25 competing interests at once. Top-down decision-making results in slowed economies, widened social divisions, paralyzed governments, and leads to friction which people increasingly reject.

In the past three decades, collaborative work has evolved to create reliable and scalable models. This work replaces, for instance, the single-issue negotiation process in law and politics. It designs a better outcome by incorporating the collective genius of interdisciplinary groups that create models far more capable than existing precedents.

When it incorporates all points of view, collaborative work reduces risk. It anticipates most possible objections and problems before implementation. The partnerships that emerge make implementation far more likely *because the co-designers share and own the new model.*

Twenty-first-century science mandates this approach—and refutes those who consider it Utopian fantasy.

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SCIENCE AND PROCESS

What Science Says about Releasing Potential

The process of reinventing the sacred requires a fresh understanding of science that takes into account complexity theory and the ideas of emergence. It will require a shift from reductionism, the way of thinking that still dominates our scientific world view.

Stuart Kauffman
Humanity in a Creative Universe
2016

In 1956, Ross Ashby, a pioneer in cybernetics, formulated the foundational law for governing high complexity.

His law is known as the "Law of Requisite Variety." If a system is to be stable, Ashby contends, the complexity of its control mechanism must be greater than or equal to the complexity of the system being controlled. This may seem confusing but simply stated, only the variety in complexity can govern complexity.

In effect, those interested in assembling a high-complex system face a stern challenge *because their control systems must be as complex as the system itself.*

Traffic engineers originally invented traffic signals with only red and green lights. Because the variety in the signals was insufficient to handle the variety in traffic, numerous accidents ensued. When the engineers added an orange light, accident rates plummeted. Their controls added the variety necessary to manage the transition between a stop and go.

Over time, systems scientists have embraced Ashby's Law as ground truth. His law is so central to high-complex systems that it is, in effect, what gravity is to physics.

Ashby's Law requires us to innovate. As he reasons, systems require persistent, continuous innovation to remain requisite with the complexity of exponential growth and change.

Although it does not abolish hierarchy, Ashby's Law reminds us a central purpose of a hierarchy is to create conditions that foster continuous innovation.

And finally, Ashby's Law of Requisite Variety posits the true measure of community wealth as the quality of connections and synergies.

After Ashby formulated his law, management professor Russell Ackoff of the Wharton School instructed that we follow the mandates of Ashby's Law by starting with synthesis.

"The purpose of a system is what it does. There is after all, no point in claiming that the purpose of a system is to do what it constantly fails to do."

A comment from Stafford Beer, founder of cybernetics, a science that uses systems thinking to explore complexity (and led to lots of other coinages of "cyber," such as *cyberpunk* and *cyberspace*). Beer's work in Chile drew attention to Ashby's Law and inspired Chilean systems scientists such as Alfredo del Valle and Fernando Flores.

Perhaps the jazz, rhythm, and sway of South America paved the way for their systems scientists to abandon the unproductive search for control and settle into a productive quest for a viable model of order.

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Processes for Assembling High Complexity Emerge

In 1981, Professor Ackoff provided the next insight into releasing high complexity's potential. In the machine age, we believed a complete understanding of the world was possible. We analyzed everything to reduce it to its individual elements. Systems work, Ackoff emphasized, proceeds in a path opposite that of the machine age.

Ackoff concluded that in the systems age the whole cannot be divided into independent parts. *When we split the whole into parts, we lose the most vital aspect of a system—how it connects to everything else.* Analysis works, but only in partnership with synthesis.

In 1987, the architect Matt Taylor and his wife Gail Taylor built on Ashby's Law of Requisite Variety and Ackoff's systems logic to formalize a design process for dealing with wicked problems called the MG Taylor DesignShop. *Creating a future different from that arriving by default, they reasoned, requires a design process.*

A quick example. MG Taylor led the collaborative DesignShop process to redefine the potential of the F-15 fighter. The result? He doubled the capability of the jet, reduced cost by fifteen percent, and finished the redesign in only eighteen months. And he saved billions of dollars!

Most of the Fortune 100 and global consulting companies use variations on the process to design and implement systems innovation. *The World Economic Forum has adopted this process as its operating system.*

Another example. In 1991, Professor Alfredo del Valle, a Chilean systems scientist educated in the US, engineered a different process for solving wicked problems. Sadly, the Western world has mostly ignored his work.

In his native Chile, Del Valle's methods bent the accident curve of the traffic system. Over a six-year period, the team reduced the accident rates in a system where few followed traffic laws to rates comparable to those in the US!

In another project in Santiago, Del Valle's work contributed to reducing critical air quality episodes from seventy-eight per year to five.

Forty years after Ashby and Ackoff, the science of quantum mechanics confirmed their insights into high complexity. At the quantum level, the essential force in the universe is the connection. All entities connect to other entities. Webs of relationships form our organizations, our systems, and our world.

Processes for assembling high complexity continue to emerge. They help networks and communities design the future they desire. These emerging processes inform our complexity work at the Nelson Andrews Leadership Center.

In assembling complexity the bounty of increasing returns is won by multiple tries over time. As various parts reorganize to a new whole, the system escapes into a higher order.

Ilya Prigogine
Nobel Laureate
Physical Chemist
1984

No part of a human being is human; only the whole is.

Russell Ackoff
Creating the Corporate Future
1981

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POWER IN SYSTEMS
Empower People to Innovate

For our purposes, people have power in their lives when they believe they have choices for achieving their destiny. Three stories illustrate how a perceived lack of power pervades our society.

A few years ago, we staged a three-day DesignShop at the Leadership Center. Among others, a principal of a Nashville charter school attended. At the end of the second day, she approached me in tears, confessing:

> Carter, I've felt miserable for two days, and I've kept asking myself why. I just realized you've been asking me to dream, and I had forgotten how to dream. I've got it back now, *and I'm never going to lose it again.*

J. D. Vance, the author of *Hillbilly Elegy,* shares many poignant stories showing how people in the heartland feel they control little in their lives. They believe they're playing a game rigged against them. Taking any escape, even opiates seems perfectly acceptable behavior.

Vanderbilt University made a huge commitment to "immersion," an approach in which professors and students act as peers in an ungraded student-led learning experience. Despite the advantages, compulsive students feel lost in the process and continue to obsess about test scores. For them, an ungraded, creative curriculum feels dangerous. They struggle to embrace their power in this situation.

So, school principals, Ohio hillbillies, and elite Vanderbilt students struggle to believe they have the power to make choices.

Good luck convincing impoverished students in public school they have a choice to become successful college students! The lack of power in their lives persuades otherwise. Creating power in the school system for students, teachers, and administrators—that is a fundamental challenge.

Sadly, students and teachers could achieve far more than they do now, but they routinely settle for less. The education system beats down the power of individual initiative. The system maintains control, and it prevents higher levels of order from emerging.

For the past three years, we've conducted annual DesignShops for Antioch Middle School. Principal Celia Conley enthusiastically disperses power in her school. Each fall, her teachers, and administrators take more responsibility. They establish agendas and hold each other accountable. They organize task forces, set learning goals, and ensure learning happens everywhere. As a result, students return to school each year even more eager to learn.

The uptick in released potential illustrates the school's culture shifting towards innovation. Because of the nudging in the system, people in the school culture believe they can make a difference. They come together as a community and in the process release waves of potential.

Sharing power matters—it is critical to innovation.

Whenever people ask me what I'd most like to change about the white working class, I say, "The feeling that our choices don't matter."

J. D. Vance
Hillbilly Elegy
2016

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Power and Systems

Power issues have a profound effect on systems change efforts. Ideally, a convenor—whose only stake is the good of the entire system—would lead the process. When efforts to change systems begin, power players inside the system may try to take over the process. But if they succeed, the effort to change systems dies.

Organizations with system-wide power naturally wish to preserve it. They may conduct hearings, focus groups, and community meetings, but their model of listening usually does not involve others in systems redesign. The participants, ostensibly included, often doubt the legitimacy of the outcome created "for" them.

There is no "we,"
There is no "them,"
There is only you
And me
And all of us.

Barry Oshry
2007

Once a neutral convenor gathers the requisite blend of people, she empowers them to co-create the path forward. Alfredo del Valle, our colleague and Chilean systems practitioner, emphasizes that in a legitimate process:

> Strong participation is a product "of" the actors, not a product of experts "for" them. It multiplies intelligences and enriches ideas. It humanizes, dignifies, and actualizes people. With the right tools, it can be a realistic, effective, interesting, and attractive process. And it offers the most efficient and effective solution to high complexity.

Engagement gives people power.

It was Barry Oshry, a pioneer in the field of systems leadership, who noted that systems have tops, middles, and bottoms. People at the top have the power to assemble resources and develop systems. They give everyone in systems a clear understanding of opportunities and perils.

People in the middle are systems integrators. They move back and forth in systems to connect the parts. They diagnose problems and opportunities and move resources and knowledge to where needed.

Because they hold the ground truth about systems' functions, the people on the bottom are the systems fixers. They identify areas needing work; explain the costs and consequences of doing the work; and deliver the goods their systems produce.

When the tops discover an issue, insert themselves, and apply their power to solve it, they limit the problem-solving brainpower. This reinforces the counter-productive belief that others have no power.

When middles become stuck in silos, they squander their power. They cease viewing the big picture, cause parts of systems to disconnect, and create more issues for the tops.

When bottoms reflexively expect the higher-ups to solve all the problems, they yield what little power they have. They leave problem-solving to tops and middles, people remote from the solution. This increases the likelihood problems will persist.

Tops, middles, and bottoms each have a unique power to unleash systems potential. If an Alpha leader causes others to abdicate their power, systems remain locked. When leaders share power, systems evolve beyond hierarchy as power distributes appropriately to tops, middles, and bottoms.

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Leadership to Unlock Potential

Robert Townsend, former chairman of Avis Rent-A-Car, penned the popular book, *Up the Organization: How to Stop the Corporation from Stifling People and Strangling Profits.* While building on the popular "We Try Harder" campaign at Avis, Townsend utilized the processes for taming complexity that we advocate.

Nelson Andrews, our Center's namesake, adopted Townsend's measure of leaders. Nelson, a popular speaker on leadership, always ended his speeches with this insight from Townsend:

> As for the best leaders, the people do not notice their existence. The next best, the people honor and praise. The next, the people fear. The next, the people hate. When the best leader's work is done, the people say we did it ourselves.

The temptation to lead as a chess master, controlling each move of the organization, must give way to an approach as a gardener, enabling rather than directing.

Stanley McChrystal
Team of Teams: New Rules of Engagement for a Complex World
2015

Nelson sought integrity, courage, and humility in leaders. Yes, good leaders are humble, but why would they prefer a low profile?

Because they prefer *power to be pushed to the front lines where those engaged know most about the situation,* the best leaders welcome obscurity. Indeed, Avis tries harder—its people are free to innovate to serve the customer.

Certainly, we need leaders who lead more and control less. We need wise leaders who realize leadership should pass to people at their moment-of-knowing what needs to be done. We need leaders who prize connection over compliance.

Alfredo del Valle pleads for leaders who enable, not leaders who dominate.

Leaders must learn about processes that engage high complexity—just as Robert Townsend did at Avis. MG Taylor's DesignShop and Alfredo del Valle's Participatory Innovation have established track records for improving the performance of complex living systems.

But other technologies also align with our goal. Consider three examples:

1. Zappos' Holacracy management process empowers employees to such an extent they do not even have job descriptions. In a vote of trust, they are free to work on whatever they believe advances the best interests of the company. Refined rules of engagement organically create order.

2. Open source efforts such as Linux and Wikipedia employ guidelines for engagement that result in extremely complex, sophisticated products.

3. Global DesignShop leader Brandon Klein has developed artificial intelligence software that changes network organization from gut-based hunches to data-based, scientific connections. These networks optimize connections among people.

Simply stated, today's leaders must continue learning how to lead in high complexity. They must embrace emerging technologies that support large-scale collaboration. They must use current tools like those employed at the Nelson Andrews Leadership Center—tools that help leaders accomplish their visions for systemic change.

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How Culture Can Manage Complexity

In our past explorations, the tradition was to discover something and then formulate it into answers and solutions that could be widely transferred.

But now we are on a journey of mutual and simultaneous exploration. In my view, all we can expect from one another is new and interesting information.

We cannot expect answers. Solutions, as quantum reality teaches, are a temporary event, specific to a context, developed through the relationship of persons and circumstances. There will be no more patrons, waiting expectantly for our return, just more and more explorers venturing out on their own.

Meg Wheatley
Leadership and the New Science
1993

Culture is a direct outcome of the processes communities adopt to make decisions and manage complexity.

Static cultures tend to manage high complexity through top-down controls. They assume truth derives from wise leaders, workers competently carry out directives, and employees work in specialties apart from others. In those cultures, there is a hush in the air. Appointments and agendas determine what occurs, and everyone accepts their job is to support their boss.

Stagnant communities crank out incremental innovation, but events often outpace response. These cultures struggle to keep up with the pace of change.

An energized culture emerges when communities unlock complexity. In an energized culture, teams spend their energy managing innovation, not solving problems.

One culture is a slow death. The other feels risky and exhilarating.

In 1984, Edgar Schein, a former professor at MIT's School of Management, explained:

> One of the critical functions of leadership is to provide guidance at precisely those times when habitual ways of doing things no longer work, or when a dramatic change in the environment requires new responses.

Leaders can change cultures—but not by mandates and reorganizations. Leaders can change a culture by encouraging those closest to the ground to design and implement innovations. Leaders can change cultures by giving people confidence to abandon old, stable responses while they design and test new ones.

When people together experience transformational innovation, they see the world differently. And they learn to trust each other. They stop worrying about assessing blame. In the thirteenth century, the Persian poet Rumi famously wrote:

> Somewhere beyond right and wrong, there is a garden. I will meet you there.

Culture shifts profoundly when people meet in Rumi's garden and participate in co-creating their future.

A culture of continuous innovation aligns its full complexity with the team's potential, and they remain highly motivated. This renews energy. It causes new leaders to emerge. It fosters robust alliances and networks. It shares responsibility and authority. It redefines the meaning of work.

Each DesignShop at the Nelson Andrews Leadership Center results in two distinct outcomes. One outcome is tangible, the other intangible.

Tangible outputs include innovative strategies, new products, and merger plans. The intangible result is a profound cultural shift towards innovation built on trust. Clients often pursue the process for the tangible results, but later realize the intangible culture change produces the most long-term benefits.

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A POWERFUL PROCESS

Why Collaboration Employs Different Kinds of Guidance

...Upcreation—self-organization that brings forth an emergent level of complexity that encompasses, without destruction, the previous lower levels of organization.

Without an outside agent, the parts cohere into a new organization that brings forth an "emergent" level of self not present before.

Since the new emergent level of complexity encompasses, without destruction, the previous "lower" levels of organization, I call this self-creation of higher levels 'upcreation'.

Kevin Kelly
What Technology Wants
2010

Old school command-and-control approaches to factory production in the Industrial Age produced reliable, disciplined results day-in and day-out. Now that exponential change is the default, factories have to be far more flexible.

There are still guidelines for changing systems, but the guidance is different. New approaches to systems change tend to create gardens in communities, so to speak, rather than factories set in concrete.

Joi Ito, director of the MIT Media Lab, works in the white spaces between disciplines. He contends that the potential in those white spaces is as important as the potential in the disciplines themselves.

In the collaborative process, guidelines for engagement replace rules of control. Guidelines that codify values of mutual respect, continuous learning and resilience replace rules that govern means of production, authority, and regulation.

The guidelines for collaborative engagement are pivotal.

Collaboration is pull, not push. People pull resources from each other when they need them, rather than using resources pushed to them.

Collaboration is compasses, not maps. Objectives set outcomes for designers to achieve, but instead of following prescribed maps, they create their own path to engage complexity.

Collaboration is emergence, not authority. Talent and leadership emerge organically. Rather than badges of control, titles are badges of emotional intelligence.

Collaboration is innovation, not revolution. It is a disciplined process that makes existing assets more productive rather than blowing up the old order.

Collaboration is learning, not education. Learning is what we do for ourselves. Education is what others do to us.

To the uninitiated, the process may feel like risk instead of safety. It is far riskier to keep generating suboptimal results in old systems than to try leaping into a higher order. In fact, today's process guidelines ensure dependable, disciplined results.

A strong collaborative process employs rigorous tools that guide designers through the creative process. Various models and lenses reveal all perspectives and guide participants towards the desired outcome. Unlike prescriptive rules of control, the guidelines of engagement expand, engage, and empower.

At the Nelson Andrews Leadership Center, each design engagement begins with precise objectives, a set of questions to answer, and well-defined outputs for participants to deliver.

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What are the Guidelines for Engagement?

I do this work because we are destroying the world and the planet we've created. And we seem unable to recognize it. And out of all the methodologies and practices that exist, not one can turn deep-rooted science-based academic theory into tangible action in a way the MG Taylor method and process can.

Charlie Ursell
Collaborative
Design Facilitator
2016

To explore broadly and plan thoughtfully for the future, we must expose ourselves to diverse ideas; scan massive overlapping datasets; and design-build-use in rapid cycles of iteration. We need guidelines that "discipline" the creative process.

The DesignShop practice at the Nelson Andrews Leadership Center establishes guidelines for engagement. Matt and Gail Taylor created these classic axioms in 1981 and they remain relevant nearly forty years later:

- Nothing fails like success.
- If you can't have fun with the problem, you will never solve it.
- The future is rational only in hindsight.
- You can't get THERE from HERE, but you can get HERE from THERE.
- Discovering you don't know something is the first step to knowing it.
- Everything that someone tells you is true. They are reporting their experience of reality.
- To argue with someone else's experience is a waste of time.
- To add someone's experience to your experience to create a new experience is possibly valuable.
- The only valid test of an idea, concept or theory is what it enables you to do.
- You understand the instructions only after you have assembled the red wagon.
- Every individual in this room already possesses an answer. The purpose of this intensive interaction is to stimulate one, several, or all of us to remember and extract what we already know.
- Creativity is the process of eliminating options.
- In every adverse condition, there are hundreds of good solutions.
- You fail until you succeed.

Please notice the inherent playfulness of the guidelines. These are not the rules of helicopter parenting. These are guidelines to promote synthesis and incorporate analysis. *And these guidelines make the collaborative process fun.*

That's why the Nelson Andrews Leadership Center has established a gentle, respectful, egalitarian vibe when people come together. As Matt and Gail Taylor emphasize, "If you can't have fun with a problem, you'll never solve it!"

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It Takes a New Design Process

Building new models is a design process. The collaborative process assembles people from every vantage point in systems to co-create new models that render existing models obsolete.

After a lifetime of innovation, the futurist Buckminster Fuller concluded:

> You never change things by fighting the existing reality. To change something, build a new model that makes the existing model obsolete.

Co-creative system scientists are already amongst us. They are really practicing an art to be danced: she is the weaver of networks, the tiller of soil preparing fertile beds for ecologies of seeds to grow; he is the combiner, the great big magnet, the flow-director.

Irma Wilson & Pamela Buckle Henning
A Call to Action for the Systems Sciences Community
2015

Like any design process, building new models requires multiple iterations over time. This means the process must be engaging and stimulating for the participants so they'll stay in design long enough to create an elegant new model.

New design processes introduce new languages for participants. New lenses and fresh models reveal perspective. While the tools are powerful, they deserve broader adoption from people working with systems.

Currently, only a few process models for tackling wicked problems are in wide adoption. The mentioned MG Taylor DesignShop process underpins most collaborative complexity work today. But Participatory Innovation, Future Search, and others also light the complexity space.

Frameworks such as Collective Impact, Theory U, and Behavioral Change are conceptual frameworks that help inform design work, but they are not tools for redesigning complex living systems.

The IDEO product design firm and Stanford's School of Design popularized the design thinking meme. They use the design process to create products with great rigor and to good effect. But Taylor's and del Valle's work cope with far more complexity using disciplines dedicated to systems.

Tools such as Agile and Google's Design Sprint process can effectively manage complexity in systems already open to collaborative change. They are not made to change cultures locked down in wicked problems, a strength of the Taylor and del Valle processes.

In short, the collaborative design process works.

It works because it gives power to participants. It works because the community creates outcomes instead of their being imposed. It works because participants iterate to create better ideas. It works because people love what they create, and they own what they design. Ultimately, it works because people create new models and open the way to abandoning old models.

The setting where design occurs plays a pivotal role in the outcome. That's why the Nelson Andrews Leadership Center's elegant environment—built specifically to support collaborative design—remains such a valuable resource for the community.

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We Need System Convenors

Convenors are critical. If they follow Ashby's Law of Requisite Variety, they will attract to the design process people who represent the full diversity of the system. Convenors start their work by defining the system they want to engage, or the "system in focus."

There may be questions about the legitimacy of convenors. If a convenor owns a stake in the outcome, others will recognize the potential conflict of interest and be less likely to engage.

Others will recognize the legitimacy of convenors *if the convenors' only purpose is to unlock the potential of the entire system*. To succeed, legitimate conveyors also need to be native to their systems, fluent in high complexity processes, and adequately funded for their work.

Suppose you want to be the legitimate convenor for Nashville's healthcare system. Here's the problem. Patients, payors, providers, and the government all have enormous stakes in the system. A legitimate convenor in healthcare must be enough of an insider to navigate among these power centers. However, the convenor cannot be a service provider in the system. The convenor needs a thoughtful complexity praxis.

Ultimately, we must ask if any entity has the necessary combination of independence, clout, expertise, financing, and vision? In the above example, substitute Nashville's schools, homelessness, affordable housing, transportation—you name it. The answer remains no.

We lack convenors because there is no obvious funding source for someone whose only job is the good of the entire system. Either philanthropy or the system's power players must provide income for convenors.

Too often, the selection of system convenor defaults to the most powerful entity in the system. Imagine what would happen if the New York Yankees were the Commissioners of Baseball. It would wreck the game.

Allowing a single powerful stakeholder to convene systems also tempts others to conclude "it's not my problem." Indeed, this is human nature and a serious moral hazard. When only one player in a system takes responsibility, it makes the problem go "over there." But in complex systems, there is no "over there."

Citizen drivers concern themselves less with mass transportation if the government takes full responsibility for transportation planning. Too often, decisions by a single stakeholder give people the privilege to enjoy their perks while the struggle plays out "over there."

Legitimate convenors create considerable power for unleashing the potential in systems. *Convenors in social services, for example, can impact actual social change —which is more powerful than providing social services.* And stopping homelessness before it starts is far more elegant than managing chronic homelessness!

An essential business purpose of the Nelson Andrews Leadership Center is to support convenors as they tackle their work.

A system of education is not one thing, nor does it have a single definite object, nor is it a mere matter of schools. Education is that whole system of human training within and without the school house walls, which molds and develops men.

W. E. B. Du Bois
The Talented Tenth
Sociologist and Fisk University Graduate
1903

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PROGRESS
Everything Connects

The iconic spiritual song *Dem Bones* describes how the body connects. Indeed, "The toe bone is connected to the foot bone. The foot bone is connected to the heel bone..." and eventually all dem bones come together to create a lively skeleton.

Actually, the body as a system is more complicated. Molecules connect into cells which connect into organs which connect into a body—and, miraculously, these connections add up to a conscious being. People connect as families and friends. Neighborhoods and cultures connect and develop. At the highest level of recursion, systems come together to form the living environment—the ecosystem of the globe.

Literally, connections never end, and these cascading levels of organization are known as "levels of recursion." When we work on wicked problems our efforts on any part of the system inevitably cascade to other levels of recursion. Without a doubt, systemic change efforts require a holistic response.

Aside from their preoccupation with how things connect, systems scientists obsess about the future. This interest arises from understanding that the future derives from the sum of all the connections on our planet. If we redesign how things connect, we change the default future.

Today, systems scientists agree the major challenges of our age are of our own making—with human behavior at the core. They assert human action has overtaken nature as the ultimate arbiter of how the planet's ecosystems will evolve or crash. They have named this era of human impact at the planet-wide scale the "Anthropocene."

In the Anthropocene Age, systems scientists believe we can align hundreds of thousands of groups in generative, life-sustaining ways that make the world work for everyone.

So, when we Nashvillians work on wicked problems, we honor the fact that our efforts matter at every level of recursion. What we do locally will reverberate in Peoria as well as Polynesia. *When we change our local systems, we change the global network.*

Complex systems exist in biology, too, where they have been tuned for robustness and function by eons of evolution. These systems share common characteristics such as decentralized power, redundancy, inclusion, and diversity that could inspire the creation of robust and functional human-made systems. Thus, our path to maximal wellbeing (and perhaps even survival) may well go through purposeful, consciously-designed, flexible decision-making systems that mimic what we find in biology.

Boik, J., Fioramonti, L and Milante, G.
Rebooting Democracy
2015

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Standing on Shoulders

We stand on the shoulders of giants who came before us.

Matt and Gail Taylor, the inventors of the DesignShop process, started us on this journey. I recall hundreds of hours in Matt's modest Nashville apartment as he expounded on these topics. Gail Taylor's friendship and gift for embracing and teaching complexity inspires me to learn and teach.

If I have seen further than others, it is by standing upon the shoulders of giants.

Isaac Newton
1676

Alfredo del Valle, a recent friend, influences our thinking as well. While Matt and Gail assume the perspective of architects and artists, Alfredo lives the engineer's perspective. Relying on the same thinkers as Matt and Gail, he developed an original process for unlocking high complexity over time. His process is worthy of investment and broad adoption. In this writing, I have liberally appropriated his wisdom.

Bryan Coffman, another master of this work, has imbued our practice with the necessary rigor for designing and delivering collaborative design events that reliably deliver well-defined outcomes. As an engineer and artist, Bryan's original perspective always astonishes.

Our friends Rob Evans and Carolyn Buck Luce, arguably the most experienced practitioners active in collaborative design, inform our work. Rob writes books that, for the first time, make the MG Taylor method and philosophy understandable by mere mortals!

Canadians Tyl van Toorn and Charlie Ursell, our friends at Watershed Partners, influence our thinking and writing. They exemplify the eco-humanist values that drive our work and are creating new technologies that optimize large-scale collaboration.

Scores of people inspire and push our work forward. They include my colleagues at the Leadership Center, our board members, and other local systems enthusiasts who gather to discuss this work.

And it was my father, Nelson Andrews, who began the journey. His work forming Leadership Nashville harnessed an intentional diversity of participants to focus on the potential of the city he loved. Our work at the Leadership Center takes the trust, networking, and civic commitment engendered by Leadership Nashville and purposefully moves it into collective outcomes.

My father and all of these pioneers are idealists. They want only what is best for the planet.

Haven't we always known somewhere deep inside that
the only silver bullet for solving high complexity,
the only way to effectively contextualize all the variables,
the only way to unleash the great potential of our times,
the only way to create a world that works for everyone—

That only way is people, realizing their potential together, in community.

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Why it Matters—Join Us!

Nashville is a collaborative city.

Whether recovering from floods, supporting the less fortunate or even making music together, our collaboration is common knowledge. Working together is what we Nashvillians do.

We must stop trying to isolate problems and instead try to join them.

Tyl van Toorn
2017

Yet Nashville is changing a lot faster than our institutions.

If we make necessary investments to convene and work at the level of systems such as public education and healthcare, we will transform those systems. We will ensure our public school children have lifelong opportunities to flourish. We will empower healthcare customers, keep more people healthy, and save money as well.

To stay requisite with growth and change, Amazon, Apple, Facebook, Google intrinsically use the art and science we advocate. Their capacity to innovate is so encompassing they leapfrog political boundaries to become more powerful than the governments of most nations. Well-integrated high complexity is powerful indeed.

Systems thinking is an opportunity to view the world differently. At the Nelson Andrews Leadership Center, we use the concepts described in this paper in approachable, engaging and fun collaborative design sessions. You don't need to be a systems scientist to join us and work in a new way.

In afternoon discovery sessions, we'll work with you using a systems lens to unpack your issues. You'll emerge with a better understanding of the roles of context, change, culture, and strategy in your opportunities and challenges.

If you're interested in the role of systems convenor, we will happily help turbocharge your work.

Through our website, blogs, and other communications, you'll discover many opportunities to enjoy enlightening conversations and design experiences.

We welcome you in joining our growing tribe of complexity thinkers.

Together we can make Nashville the first truly Future Ready city in America.

Let's work together, have fun, and get results!

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Helpful Systems Language

Complex Adaptive Systems This assembly of words describes any large system. When describing systems, the adjective "adaptive" means the same thing as "living" or "emergent" or "self-organizing." All of these words are metaphors for properties of complex systems.

Design is a process of investigation that results in a model of something that can be built. Too often, people believe design thinking is a magic bullet for systems work. Design thinking was invented to create products. *It emphasizes empathy with the person the product is designed for,* hence the phrase "human-centric" design. Systems thinkers are interested in "eco-centric" design, which widens the focus to consider the environment around the product. Eco-centered design considers the impact of the product's design, construction and ultimate disposal.

Emergent People describe systems as "emergent" because they emerge over time into their properties in a mysterious process that is a function of the complexity of systems rather than the intent of a person or organization trying to get a particular result. The outcome of a system is the emergent result of how things naturally come together. Despite the central role of water in life, no one can explain why water is wet. Wetness is an emergent property.

Entropy is also called the second law of thermodynamics. It means that absent fresh energy injected into a system, the system will naturally decline into disorder. Entropy ensures your coffee will get cold when you set the cup on a desk and wait a bit.

Future Ready A high-complex system is future ready if it undergoes constant innovation to remain requisite with exponential change.

Higher Levels of Order When systems improve their output, we say they have assumed a higher level of order. This emphasizes that systems change is an evolutionary process that results in the current system organizing into a more powerful frame. With evolution instead of revolution, the old system is not destroyed when it assumes the higher level of order.

Innovation In common parlance, innovation means doing something novel or new. But innovation is meaningless unless it is adopted by others. Since there isn't much that is actually new, innovation usually indicates something old is being adapted in a new context. Upon adoption, a successful innovation must be diffused through systems. In systems work, the process of diffusion occurs through attraction, like flowers attract bees, rather than through "selling" or "mandating." Innovation enables a community of change advocates to stay requisite with exponential changes occurring in their environment.

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Iteration is doing something over and over again to make it gradually better. Iteration is one of the most important elements of design. You build something, see how it functions, and then build it again, a bit better.

Language is important in systems work both as a tool of cognition and a tool of communication. We may be tempted to see language solely as a communication device that would become irrelevant if, say, we are stuck alone on a desert island. But we consider our dilemma on that island using language as a tool of cognition.

Legitimate Convenor It's hard to find a complexity praxis in Nashville's healthcare, education and governance arenas. That's because there is no one acting as legitimate convenor. Almost anyone who has the knowledge to be the convenor cannot play the part because of their conflict of interest. It's unusual to find a powerfully-connected, neutral systems convenor who is properly funded to pursue a complexity practice.

Living Systems Many systems are so complex they take on a life of their own so we call them "living" systems. Systems behave and organize themselves in ways similar to nature, giving us another reason to consider them "living".

Model Systems work uses models and theories in similar ways. A model helps us understand a particular aspect of a system by describing the system across many different contexts. For example, the MG Taylor Vantage Point model uses vantage points of philosophy, culture, policy, strategy, tactics, logistics and tasks. Models help us align under the same viewpoint when we describe something in systems.

Praxis is the process by which we enact, practice, embody or realize a theory, lesson, or skill. Praxis is what we do when we follow a theory, apply a process to investigate that theory and use the applied process to do something useful in the real world. Many complex organizations need a complexity praxis but don't understand what they're missing.

Process When we adopt an approach to deal with systems, that approach is a process. Processes engaging systems are extremely varied. Good processes incorporate models and theories to inform the praxis.

Recursion Systems are almost always embedded in other systems. When a similar property manifests itself across different levels of systems, we say it recurs. When we change something at one level of a system, it reverberates through other levels of recursion as well, often with unanticipated effects.

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Reductionism Simplifying a system into its component parts is reductionism. When we are confronted with complexity, we tend to reduce it to simpler forms so we have a way of dealing with it. Reductionism ignores or denies the complexity of the context or the way things connect in systems. Systems thinkers try to avoid reductionism because it almost never works. We can say, for example, that our process of education is a bit of a blunt instrument because it reduces complexity so educators can do the same things for students on a consistent basis. In the reduction, the needs and contexts of individual learners can be lost. The proverbial cutting of the Gordian knot with a sword defines reductionism. The context, information, and elegance of the knot are destroyed by slicing the knot. Systems scientists "join" the problem of the knot by mapping every curve rather than "isolating" the problem by severing it into pieces.

Requisite describes something that can keep up with whatever is required, which usually means complexity and change when it comes to systems. Something is requisite if it has the necessary diversity and complexity to handle an intended systems task.

Self-organization When systems adopt a life of their own, we say they "self-organize." Nature self-organizes itself into an ecosystem. Ten thousand bees self-organize their hive. The bees produce honey, but no discernible entity directs the process.

Synergy is the additional power a system generates when connections between different parts of the system improve. Synergy makes the whole worth more than the sum of the parts.

System A system is any collection of parts that work together as a unit. The human body is a system. Systems tend to intertwine and function as parts of other systems.

System in Focus When we work on a particular system, it becomes "the system in focus." We are all systems architects—whatever we perceive to be a system is a system in focus. Most often, defining a system in focus involves widening the lens to capture its full context. As the lens widens, the systems in focus become increasingly esoteric to a point of diminishing returns.

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