The practitioner’s landscape

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Abstract

An array of complexity-based tools and techniques are available today, but how does the practitioner select a particular approach to respond to a particular need? We present a simple taxonomy to describe the landscape of complexity-derived methods for human systems dynamics. Practitioners can use the landscape to understand the diversity of tools and techniques, to foster respect for approaches different from ones’ own, to build an understanding of the field as a whole, and to select specific techniques to apply in specific situations.

In the beginning…

In the 1980s, when some of us first delved into applications of complexity to human systems, there were no preformed models or even solid metaphors to guide us. We dove into the science and mathematics of chaos and complexity, came up gasping for breath, and put together the language, tools, and methods that we thought would be most helpful for ourselves, our colleagues, and our clients. Though the deserted landscape was lonely and intimidating sometimes, it left us free to explore opportunities and to invent tools and techniques to meet the immediate needs as we understood them at the time. It also allowed us to make low-risk mistakes, either in our understanding of the science or in our expectations for its application to real-life human systems. We were a creative bunch and generated an endless stream of complexity-based inventions.

A rugged landscape

Today, the landscape is different. Early adapters and inventors have passed through this territory before. They’ve left a trail of methods, models, languages, and expectations that are not always consistent within each approach and certainly not coherent among the various approaches. Each explorer has synthesized his or her experience, theoretical frameworks, and client’s needs to create tools and methods that work in a given time and place. These creations have sometimes taken on lives of their own – being codified and generalized to be applied in multiple situations. What used to be a desert is now a rugged landscape of tools and techniques to help apply principles of complexity science to the challenges that plague individuals, institutions, and communities today. This emerging landscape of human systems dynamics tools and techniques includes:

- 15% Solution (Morgan, 1997)
- Complex responsive processes (Stacey, 2001)
- Self-organizing leadership (Knowles, 2002)
- Difference questioning (Goldstein, 1994)
- Metaphorical landscapes (Lissack & Roos, 1999)
- Difference Matrix (Olson & Eoyang, 2001)
- Generative Relationship STAR (Zimmerman, *et al.*, 2001)

And many, many more.

Making sense of the pattern

The accumulation of complexity-based techniques makes it possible for practitioners to address the complex adaptive nature of human systems without a deep understanding of the nonlinear dynamics that drive emergent patterns of behavior. More people can use dynamical approaches to increase the power and (usually) the efficacy of their interventions. On the other hand, the library of powerful tools can quickly become a graveyard of irrelevant approaches.

Given this complex, rugged landscape of complexity-related tools and techniques, how does a practitioner select which of the many complexity-based tools to use in a particular situation?

Differences that make a difference

We propose a two-dimensional, twelve category classification system that represents the landscape of the work of practitioners in human systems dynamics.

This approach clusters available tools and techniques into groups to help a practitioner think about the many options and select the approach that constitutes a 'best fit' for a given consulting challenge. This taxonomy is based on the two fundamental 'differences that make a difference' to practitioners when they engage with client systems to recognize and influence emergent patterns of complex dynamical interactions.

The first dimension deals with the phenomenon of interest. How are the relevant patterns exhibited in the situation? Of course a conversation between client and consultant is required to determine the relevant patterns. During this conversation the

Table 1

Human systems dynamics: The practice landscape				
Tools for understanding and Intervention				
Phenomena	Practice	Weak metaphors	Strong metaphors	Mathematics
Surface structuresExample	Act in response to the surface structures of human systems dynamics.15% Solution	Describe patterns that emerge in human systems with metaphors drawn from complexity sciences.Butterfly Effects	Intervene using tools derived from complexity to influence the surface structures of human systems.Coupling	Represent complex relationships among variables of the surface dynamics of complex human systems.Balanced Scorecard
Evident deep structuresExample	Act in response to the deep structures of human systems dynamics that are evident when I know where and how to look.Reflection	Describe subtle structures that shape human system dynamics using complexity metaphors.Attractors	Influence the self-organizing process in human systems by shifting the nonlinear dynamics that are visible.Future Search	Represent the more subtle nonlinear dynamics of human systems using tools of mathematics.Network Analysis
Subtle deep structuresExample	Act in response to structures that are so deep within the nonlinear dynamics that I am unaware of what the patterns are.Intuition	Support a system as it describes for itself the nonlinear dynamics that drive its tensions, productivity, and history.Open Space Technology	Represent the system dynamics so that the subtle deep patterns are visible and accessible to influence.Computer Simulation Models	Use mathematical tools to discover subtle structures in complex human systems.Nonlinear Time Series Modeling

practitioner learns where the challenge lies in relation to these three broad phenomenological categories.

Phenomena category 1: Surface structures. In some situations, the client invites the consultant to deal with patterns that are evident to any observer. Interpersonal conflicts, lagging sales, customer dissatisfaction are examples of patterns that arise in such surface structures. They are immediately evident to observers of and participants in the human system. We call these 'surface structures' because they are patterns that emerge in the most evident facets of our human systems.

Phenomena category 2: Evident deep structures. Other times, the presenting problem is opaque to the client. He or she describes a sense of discomfort with people or dissatisfaction with processes and products. Though the pattern may not be evident to the client, the tools and discipline of a human systems dynamics professional allow the practitioner to discern and describe the patterns in ways that the client understands and recognizes as accurate. We call these 'evident deep structures'. These patterns emerge from dynamics embedded deep within the system, but they become evident through applications of fairly accessible tools and techniques.

Phenomena category 3: Subtle deep structures. Finally, some situations exhibit emergent patterns that are both subtle and deep. Neither the client's native instincts nor the tools that function as simple cognitive filters can articulate a coherent pattern of relationships in the complex dynamics of the system. The complexity of these situations transcends the capacity of one level of complexity tool and demands more subtle and/or complicated methods and models. Hospital error rates and other complex phenomena where data points are distributed across time (e.g., 1/*f* 'pink' noise phenomena) are examples of deep structural patterns that require more subtle analysis techniques.

Each of these levels of subtly and depth requires a different set of complexity tools and techniques, and an adept practitioner will be able to assess the environment and select approaches that fit the phenomena of interest and the complexity of the patterns emergent in the client system.

The second dimension that defines the categories of the Practice Landscape deals not with the situation itself but with the tools that are chosen for understanding and intervention. In short, these are ways that the situation can be represented by the client and the consultant. They are epistemological distinctions, and they determine how the team thinks and talks about the patterns that emerge from the dynamics of the situation. We define four different categories along a continuum from least abstract (practice) to most abstract (mathematics) tools for understanding and intervention. The four are described below.

Tools category 1: Practice. It is possible to respond to quite complex dynamics immediately – without aid of language or conscious analysis. Some complexity-based approaches are defined to support just such practice-oriented response. Many clients are perfectly satisfied with options for action that do not come along with complicated explanations, strange language, or sophisticated justifications. They ask, "Did it work?" If the answer is, "Yes," that is all they need to know. Such tools were not accessible in traditional organization development or management practice because explanations or interventions were expected to predict their own success. The unpredictability of complex adaptive systems removes this requirement and makes accessible to study a whole new domain of intuition- and practice-based interventions that can only be assessed in retrospect.

Tools category 2: Descriptive metaphors. Complexity science is full of rich and engaging metaphors. *Butterfly effects, attractors, fractals, edge of chaos* – they are poetic and easily accessible terms for the lay person. They can also be meaningful descriptors of patterns that emerge from human systems dynamics. We refer to these as 'descriptive' metaphors not because they are less valuable than 'dynamic' ones, but because the application requires a less literal interpretation of the mathematical complexity concept as it is applied to social systems. Using descriptive metaphors, one can think about how 'butterfly effects' name patterns that appear commonly in human systems. For example, the descriptive metaphor can represent small deviations in team procedure that may generate a major shift in direction. Such descriptive applications of the complexity concepts can help build shared mental models, even when sensitive dependence on initial conditions cannot be measured or proven in any formal way.

Tools category 3: Dynamic metaphors. Moving up the scale of abstraction and toward quantitative methods, we reach the tools category of dynamic metaphors. Here we encounter methods of qualitative analysis, but ones that hold more closely to the literal interpretation of the complexity metaphors. Rather than just a superficial isomorphism with patterns of complex adaptive or deterministic chaotic systems, dynamic metaphors focus on similarities between the underlying dynamics of the human system and other nonlinear dynamical systems.

Tools category 4: Mathematics. The most abstract of the ways to understand and intervene are those that derive from mathematics. Quantitative languages are much more formal and less ambiguous than metaphorical or practice approaches. This does not make them better, but it does make them more precise. Only the practitioner in a specific environment can choose whether the situation, client needs, and resources warrant investment in mathematical analyses and interventions.

These three phenomenological and four epistemological categories define twelve clusters of complexity-inspired interventions. Table 1 defines and gives an example of each category. We will not attempt a definitive categorization of each of the many complexity and human systems approaches because that is beyond the scope of this paper. We do believe, however, that this rubric can help practitioners select an appropriate suite of complexity tools based on the immediacy of the emergent pattern and the desire of the client and consultant for precision of understanding and planned intervention.

Applications in practice

The twelve areas represented on the landscape provide ways to categorize the many options for working with and within complex human systems. Each cell represents a class of approaches that can be used to understand and influence complex human dynamics. Table 1 also gives an example of an approach that fits each of the locations on the Practice Landscape. These examples are provided merely to help explain the options that the Landscape describes. Any one of the areas could include a large number of other interventions or approaches. These examples should help explain the structure and function of the Practice Landscape. The following sets of examples demonstrate how a practitioner might use each of the tools categories might be applied within each of the phenomenological categories.

Some phenomena in complex adaptive systems are obvious even to the casual observer. These are the surface structures that appear across the first row of the Practice Landscape. For a variety of reasons, practitioners might choose to focus on these

phenomena rather than the more subtle patterns that emerge in self-organizing systems. A practitioner might take this path when a client is new to the field and somewhat skeptical, or when time is short and dynamics are particularly disruptive. Even when focusing on these obvious patterns, options for complexity-inspired interventions are many. Gareth Morgan's 15% solution (Zimmerman, 2001) encourages one to take action and observe how that action influences emergent patterns over time. Another option is to name the obvious pattern of behavior using one of the beautiful and descriptive metaphors of complexity, such as the butterfly effect (Wheatley, 1992). Moving beyond the language, there are interventions that can shape intervening action when the metaphors of complexity are taken somewhat more literally. *Coupling* (Eoyang, 1997) is an example of using the relationships of complexity to shape not only descriptions but decisions in a dynamical human system. Finally, complex dynamics can be captured in simple mathematics when measures, such as the Balanced Scorecard (Kaplan & Norton, 1996), are used to track mutually causal factors in a complex and adaptive system. So, a wide range of options (from action to mathematics) is available when a practitioner needs or wants to influence the superficial structures that emerge in a complex system.

Right below the surface in human systems dynamics are patterns that might be missed by the casual observer. These patterns, called evident deep structures, can be accessible to the 'naked' eye, but they require training and heightened sensitivity to discern the patterns as they emerge. Some clients and many human systems dynamics professionals are trained to see these patterns as they emerge. Various tools help articulate and translate these patterns into meaningful action. In terms of practice, reflection is a method that uncovers patterns that otherwise would be hidden from view. Practitioners use a variety of reflective activities from journaling to guided imagery to help people see emergent patterns in their human systems. Moving to the descriptive metaphorical ways of understanding and action, many metaphors can be used to represent these patterns as they emerge. One often used (and sometime misused) metaphor is the *strange attractor*. 'Attractor' presents the image of emergent behavior that has a finite bound and infinite variability within the bound. This language can help a group be aware of and use its inherent patterns of behavior. The next group of tools, dynamic metaphors, can shape shared action in a group as they become aware of their own emerging patterns. Future Search (Weisbord & Janoff, 2000) is an example of an approach that uses the evident deep structures of a dynamical human system (such as sensitive dependence on initial conditions, self-similarity, coupling, and mutual causality) to establish conditions for organizational transformation. Finally, the mathematics of network analysis (Barabási, 2002) can make the invisible visible to a group of people seeking to understand their shared dynamics. So, each category of tool, from unspoken practice through descriptive and dynamic metaphors and to mathematics, can be used to help articulate the deep structures of human dynamics that are accessible to trained observers.

The third, and final, level of phenomena involves those patterns that cannot be directly observed, even by trained observers. This level is called *subtle deep structures.* Depending on the dimensionality of the system and/or its stage of evolution, some complex adaptive systems evince patterns that are so deeply ingrained and so subtle that they cannot be seen without special tools and techniques. Intuition is a practice tool that accesses these subtle structures. Some gifted individuals can sense a 'subtle realm' when it is inaccessible to others or even to a conscious investigation by the intuitive. Open Space Technology (Owen, 2004), a large group meeting facilitation technique, uses the dynamics of complexity to build system-wide patterns of understanding. Open Space depends on simple rules that define the underlying patterns of individual and group behavior, so it gives names for the deep and subtle structures that drive the dynamics of human systems. Computer simulation models generate even stronger metaphors for invisible patterns in human systems dynamics. By representing the systems' interactions and emergent patterns, the simulation can make visible the deep, subtle patterns that emerge from complex interactions. Finally, these subtle patterns can be uncovered by complex mathematical analyses, such as nonlinear time series analysis (Kaplan & Glass, 1995). These different types of tools can be used to discover, describe, and influence the deep structures and patterns of behavior that emerge in complex human systems.

These twelve categories of practice, defined by the object of focus and the tools of investigation, provide a rubric to help a practitioner understand the wide variety of complexity-based approaches and to select the one that is most appropriate for a given situation. Armed with this understanding, the practitioner can select the approach that best fits the needs and opportunities of the situation and the moment.

Benefits of the practice landscape

When one is faced with the multitude of complexity-inspired approaches, the Practice Landscape can provide a variety of benefits. Choices are simplified without restricting options. When a situation is viewed through this landscape, practitioners have two choices to make. One can view more or less subtle patterns with more or less abstract tools. Focusing on these two variables, a practitioner can focus in on a small subset of tools and approaches that might meet the immediate need.

All options are equally valid. No one part of the landscape is by nature superior to another. In some circumstances you need to deal with the patterns that are already seen by everyone in a group. Sometimes you need to practice your insights about complexity without using the language. In other situations you may be able to use the mathematical tools of complex adaptive systems to demonstrate subtle and surprising dynamics. No place on the landscape is any less useful or true than any other. The only question is, "Which of the options fits your practice environment at a particular place or time?"

New approaches can be envisioned that take a known approach from one domain and finds ways to apply it in another.

Likewise, this set of categories can be a framework for personal development as a practitioner recognizes his or her strengths and works to overcome personal weaknesses.

A group of colleagues can use the Practice Landscape to support a planning process. It provides a shared language that acknowledges the power of multiple perspectives while providing meaningful distinctions and criteria for shared decisions.

Challenges to the neatness of the landscape

It would be nice to believe that the Practice Landscape provides unambiguous order for the messy collection of practices in human systems dynamics. This is not the case. Like most models, this gives one some level of meaning and leaves other questions unanswered. Some questions for future study include:

Can subtle deep structures and evident deep structures be objectively distinguished? Any abstract definition of the two would appear to be arbitrary, on the other hand, in practice a specific case offers little ambiguity. Either the practitioner is able to recognize and describe emergent patterns in ways that make them manifest to the client or not. If so, then the structure can be said to be evident, though deep. If the patterns become manifest only with the application of some more sophisticated methodology, then they can be said to be subtle deep structures.

Is the distinction between dynamic and descriptive metaphors a helpful one? The terms are not meant to be pejorative – both descriptive and dynamic metaphors can be equally useful. But there is a practical distinction between the two. Descriptive metaphors use the language of complexity to describe patterns that emerge in human systems. These descriptions are based on apparent isomorphisms between chaotic or complex adaptive patterns in physical systems and emergent behavior in human systems. No causal connection is perceived or implied. Dynamic metaphors, on the other hand, posit similar dynamics between the physical and human systems, allowing the practitioner to use the principles of complexity to influence intentionally the conditions or interactions that result in the emergent behaviors.

Are the number of categories for either the phenomena or the tools sufficient? Are more divisions needed to capture the meaningful distinctions among current human systems dynamics tools and techniques? Both dimensions – phenomenon and tools – are probably more continua than discrete clusters, but the finite number of distinct categories simplifies the process of recognizing the needs and matching methods to requirements.

Like most useful models, the Practice Landscape introduces a whole new set of meaningful questions that will affect both research and practice in the field. Some questions for future consideration include:

- What is a catalogue of complexity-inspired approaches that fall into each of the twelve categories?
- Which categories have most tools and techniques available and which categories need further development or investigation?
- How does a practitioner assess a situation to determine whether the patterns are more or less deep or evident?
- What is the appropriate role of client awareness and consultant consciousness of the phenomena and available tools?

There is no doubt that principles from chaos and complexity can be helpful to practitioners who work in human systems, but the myriad approaches and tools can be quite confusing. The Practice Landscape provides a taxonomy to articulate useful differences among tools and techniques that have been developed by scholars and practitioners. Based on these distinctions, methods, tools, and techniques can be selected that are most fitting for the situation and for the expectations and perspectives of the client and the practitioner.

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