Higher Education Administration in a Dynamic System

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Organizational Characteristics of Universities

There are nine attributes that characterize the bureaucratic university. These are: (1) high micro-specialization, (2) a focus on creating and disseminating knowledge, (3) organizing around academic disciplines, (4) a provost or academic vice president who is in command, (5) highly ordered and structured management layers, (6) rational and deductive decision making (while this is the typical process, decision making is also politicized and small grievances can play a disproportionately high role in outcomes, as can jealousy and envy regarding recognition and rewards), (7) measurements that are precise, quantitative and increasingly monetized, (while that is believed, in fact, measurements are imprecise and, at best, provide accuracy), (8) control systems that are formal, and (9) policies and procedures that are highly codified and detailed. In short, universities are the epitome of the industrial organizational complex. As an aside it is interesting that as universities have become more like the scientifically managed industrial enterprises of the 19th and 20th century the emerging model in many free enterprise organizations is to become more like the common university of the pre 20th century: more focused on informal controls, knowledge, creativity, and intangible assets.

Imagine an alternate universe in which a university is viewed as a complex, dynamic system. This alternate university is self-organizing, adaptive and fluid, and operates on a few rules instantiated at different

levels of scale. In this university we recognize emergent order that comes as a result of the interdependence of the elements in the system, not as a result of the imposition of control and authority. Schwartz and Ogilvy describe this as a change from "the rule by one to several rules by some."[1]

This university is controlled by feedback loops and morphogenesis. Through these processes, new, unpredicted and unpredictable forms emerge through the interaction of the various interdependent, interacting parts. The new form is constrained by the parts, but not determined by them. In the alternate university, patterns are more important than predictability. We understand that patterns that emerge on one occasion do not tell us in any important way which patterns might emerge on the next occasion, which means that causality takes on a different meaning. In a complex, dynamic university such as the one we are imagining, causal relations are so vast and interrelated that it is impossible to untangle them in any useful way. And, if we were able to do so in one situation, there is no reason to believe that the knowledge gained would be useful in other situations. In complex dynamic systems, where small scale intertwines with large, "the act of playing the game has a way of changing the rules."[2] This image contrasts with the bureaucratic university in which most of us work.

Purpose

The basic function of the university is the creation and dissemination of knowledge. This translates into how most faculty are evaluated annually, earn tenure and promotions and receive the most prestigious awards such as endowed chairs and national prizes. In our alternate university the basic function is the transformation of people and society. Research and teaching are the means to these ends. Only to the extent that the research and teaching helps to transform the faculty member, student and society is the organization truly making a difference.

Perhaps the most highly specialized of all individuals are found in universities. Just like race horses, as you breed in specialization (the ability to run a one mile race with great performance) you drive out general adaptability (the race horse is not good for much else). When the most important asset of the university is the faculty and they individually and collectively are the most specialized of the human species, their organization will share the same problem of lack of general adaptability.

Universities are traditionally organized around academic disciplines. The academic department is the key unit where resources are spent and work is accomplished. Each of these academic departments have faculty

that are more committed to their national or international academic discipline than they are to their university or local institution. Nationally and internationally connected faculty members have human and intellectual capital that is highly transportable and thus their mobility may keep them only loosely tied to the local institutional purpose or agenda.

Our alternate university will be organized around solving societal and world problems or pursuing similar opportunities. This creates a multi-disciplinary context for students and faculty to interact beyond their specialization while providing important knowledge and insights. The problems undertaken should be of such significance that they function as an attractor so that faculty and students self-organize around these problems and opportunities.

Scientific Management

Universities have embraced scientific management. Presidents and Trustees increasingly hire specialists to systematically and professionally solve problems. Notice the consultants that are hired to advise on information systems, program assessment, strategic plans, physical plant, human resource systems, marketing and communication, legal issues and so on. Universities have bought into scientific management and mimic industry to the extent that we now hire executive search firms to not only recruit presidents but also provosts, deans, and directors of programs in many cases.

Scientific management has brought considerable progress and we are not totally opposed to this method of management. However, it assumes that if you break down a problem into small pieces and solve it then you have solved the problems of the system. To understand a complex, open system, one must think about it as a whole. It can only be understood in the context of its total behavior, as it adapts and changes. It is the pattern of behavior that matters, and it cannot be analyzed into simple relationships without changing its character. Context matters. This requires a shift from the idea of an ultimate singular truth discovered by one "best" method to a "plurality of kinds of knowledge explored by a multiplicity of approaches."[3] We recognize the limits of human nature and the fact that human knowledge is always incomplete and partial. There will inevitably be some level of ambiguity in our knowledge and there will be several perspectives on any situation. The more different perspectives we can bring to bear on a problem, the more likely we are to generate useful knowledge. when studying complex phenomena.

When we strip a problem of its context, we lose the kind of informa-

tion that allows us to see patterns. Instead of a one page description of a task given to a task force or committee, perhaps we could create narratives about the situation, written from several perspectives. The committee, instead of being charged to solve the problem, could be asked to imagine and write one or more next chapters to the narrative. This might allow at least three different things to occur: (1) the administrator posing the task would have to give careful consideration to the issue and its context, (2) the task force or committee would see at least some layers of complexity in the narratives from various perspectives, and (3) the committee would be less likely to generate simple solutions to complex problems if they are asked to imagine one or more next chapters, requiring that they imagine context.

Rationality and deductive reasoning have been the hallmarks of management science or organizational management. However, any person who has run a university or other organization would readily admit to the pervasive presence of ill-defined situations and environmental uncertainty under which they must make decisions. Decision makers often cannot wait or afford to obtain complete information. To survive, they must act immediately (daily, weekly, monthly), hence making it essential for them to rely on rules-of-thumb reasoning to find answers that transcend the information at hand.

In complex environments where actors evolve the relevant rationality is procedural rationality and not substantive rationality. Essentially, as Simon argues, the mind is the scarce resource and the procedural rationality issue becomes how the actor finds efficient and effective search algorithms. Simon suggests we look into the field of artificial intelligence and computational science to gain insights into rational search procedures.

Relatively new methods in computational science rely upon genetic algorithms induction. Essentially people have working hypotheses or rules of thumbs for how the world works and they test these hypotheses in the crucible of reality. The fitter rules (hypotheses) survive or are modified so they have higher evolutionary potential. Since information is incomplete the decision maker fills in the gaps with inductive reasoning.

In our alternate university we build the bridge as we walk across it. Improvisation is the dominant management philosophy in this university. We are like a jazz band where each member adapts and responds to each other and where adjustments are made quickly and easily.

Pilotage

Complex adaptive systems demand planning processes that are fluid

and responsive. Plans are made and treated as tentative approximations. The real plan emerges from dynamic course correction. Papert refers to this as "pilotage," which is being "vaguely right." That is, we move in a direction and then use feedback to correct our course. This is the way complex systems converge on solutions. The key to pilotage is frequent feedback loops, in the cybernetic sense of feedback, which is information that changes the way that the system operates. In our alternate university, when we create a new program, we understand that it will not play out in lived reality the way we anticipate when we create it, so we try to build in some flexibility. We watch carefully and meet often to share what we see. We obtain information about student perceptions and performance. The program becomes a living system that is expected to move and change as it grows and as new students and faculty move into and out of it. The processes of approval in traditional universities are not conducive to this kind of fluidity and, in fact, such a process occurs in spite of university procedures. In our alternate university, administrative processes will be intentionally designed to support dynamic planning.

When we create a culture of pilotage, being "right" begins to take on less importance. When a plan is treated as a rough sketch, with specified initial conditions and feedback loops, planners are less defensive about their ideas, since we have known all along that it was not a definitive product of our thinking, but a general best guess. Less energy is spent defending ideas and more seeing how the idea works so that we know how to tinker with it.

A university can be viewed as a bundle of resources, resistance and constraints. If we create conditions for patterns to arise and have good feedback loops that let us see which patterns further our mission, we can support that pattern with resources. If no such patterns arise, we will probably not cause them to do so by moving resources to them. For example, if a faculty member is conducting good research, giving them the resources to support their research will probably result in continued good research. Giving resources to a faculty member who is not producing research on the belief that they will produce if they have the resources seldom works.

Watching for sources of resistance is equally important. Sometimes resistance acts as ballast and counterbalances forces that tend to move too fast or too far. Sometimes the resistance is evidence of a different attractor. For example, a faculty member who has lost interest in research will resist attempts to improve their productivity if those attempts require energy on their part. The teacher/scholar model does not have to apply to each individual. It could apply to the College or Department,

so that people at various points in their careers might teach more while others dedicate more of their energy to research or service.

Another way to think about resistance is to assume that people want to do meaningful work. If someone is not productive, perhaps they are no longer finding meaning in their work. This might occur for a number of reasons. If we begin by assuming that they may be constrained by their ideas or expectations, sometimes we can remove those constraints.

A favorite story that is told about Richard Feynman is of his early days as a Physics professor at Cornell University. He had been working very hard in his lab and was not coming up with any new ideas or solutions. He had decided he was "burned out." He says, "They expect me to accomplish something, and I can't accomplish anything! I have no ideas."[4] Later, as he thought back, he realized that he used to enjoy Physics. He played with it and had fun with it. "I used to do whatever I felt like doing—it didn't have to do with whether it was important for the development of nuclear physics, but whether it was interesting and amusing for me to play with."[5]

He reports that within a week of recovering this playful attitude, he was walking through a cafeteria. He saw someone throwing a plate into the air. Feynman noticed something in the way the plate wobbled that interested him. He set about trying to understand it just because he was curious. It was hard to see how understanding the wobble of a plate could be useful to nuclear physics, but it was the beginning of the idea that led to his Nobel Prize.

Order

Emergent order is one of the delights of thinking. The experience of elements of an idea coming together into a new coherence is one of the satisfactions of human life. Scholars and poets alike know that this kind of ordering cannot be forced, and does not occur on a timetable. The best we can do is to have a prepared mind. To wait, as a faculty member once said, "Until the muse in my mind opens the door and is willing to share his wisdom." It may be that the annual reporting requirements of many universities are constraining the creative research that they are trying to encourage. Faculty can not produce good research like a factory produces widgets.

As we enter the alternate university, we will want to make a sweep of unnecessary constraints on fluidity. Necessary constraints would be those that lead to transformation of people and society. Unnecessary constraints are all the rest. Constraints introduced for the purpose of administrative convenience and/or reporting might be supportable outside

this space, but here, they have no place. In this university, administration is for the purpose of creating conditions for creative, adaptive solutions to emerge. That is not to say that reporting is eliminated, only that it is focused and it is not routine.

Learning is a complex, emergent phenomenon, as is creativity, surprise, insight, intuition and imagination. These phenomena are at the heart of what universities are trying to accomplish, and they require that we reverse the usual view of the teaching-learning relationship. In an emergent system, teaching follows learning. Teaching is a response to be made when we see learning, thinking, and creating occurring. The best we can do ahead of time is to try to create a fertile environment. Then we watch. When a promising pattern emerges, we respond to it. Every good professor understands this on some level and practices it either in class or in their research, or both. Few administrators make this practice the basis of their administration. The heart of administration, like that of teaching, is our work with people, one of the most complex phenomena on the planet. In that work, command and control may be efficient, but it does not build a university that is characterized by dynamic, creative thinking. It is, at least in part, the job of administrators to create spaces where such thinking can emerge. Such administrators will adopt the approach used in some martial arts. We will see where energy is emerging and, with a slight tap, influence it.

Order emerges from spontaneity and surprise in the complex adaptive system we envision. It comes about when people with a similar passion for solving a problem or pursuing an opportunity come together in an open and free form and catalyze each other. Scholars and students are free to come and go because there are no barriers to entry other than curiosity.

When promising patterns emerge, the administrative task is to protect them and move resources to them. Traditional administrators assume that if an innovation is "successful" it should be replicated. Replication is not a viable concept in a complex system. When, for example, a group of faculty come together and create an innovative class experience, it is tempting to try to recruit other faculty groups to create the same kind of experience so that more students can participate. But it will not work. Even with the same initial conditions, one cannot confidently predict that the same kind of outcome will occur. It might be better to watch for other innovative patterns that are emerging and support those innovations. As we support and develop spaces where creativity emerges, we will expand opportunities for students.

Organizational Change

In our complex alternate university there is a shift from focus on things to focus on relationships. We recognize what Fritjof Capra described as the dual nature of human organizations. On the one hand, they are social institutions designed for specific purposes, such as making money for their shareholders, managing the distribution of political power, transmitting knowledge, or spreading religious faith. At the same time, organizations are communities of people who interact with one another to build relationships, help each other, and make their daily activities meaningful at a personal level. Capra suggests that one of the obstacles to change is that CEOs deal with the purposive nature of organizations without adequately recognizing the social organization. Perhaps the same can be said of universities.

Capra said that we can better understand organizational change if we think about it in terms of the "natural change processes that are embedded in all living systems."[6] These processes are characterized by continual change within constraints. The system changes while maintaining its overall identity, a process that Maturana and Varela termed "autopoetic." Capra suggests that the basic phenomena underlying the processes of living systems are the "spontaneous emergence of order and the dynamics of structural coupling."[7]

Maturana and Varela use the term "structural coupling" to describe a co-evolutionary model of interaction with the environment. In this model, we are not just acting in or on the world, but with it. Structural coupling, for Maturana and Varela, is "our history of recurrent interactions." It is structural coupling, including linguistic coupling, that makes it possible for us to coordinate actions. In the course of acting out of structurally coupled relationships, our structure and our relationships evolve. In Maturana and Varela's view, we call forth a world through our actions and interactions. When we recognize that the fundamental relationships in a human organization arise out of our recurrent interactions and not from logical structures, our notions of order and control in the university change.

Malcolm Gladwell analyzed complex social systems in his recent book, *The Tipping Point: How Little Things Can Make a Big Difference*. Gladwell's analysis reflects the dynamic known in the New Sciences as the butterfly effect. Gladwell's central thesis is that very often significant changes take the form of epidemics in the sense that the rate of increase in those "infected" is nonlinear, which is the feature of epidemics that gives rise to the term "Tipping Point." The tipping point is reached when what was initially a slow-growing phenomenon begins to increase

exponentially. This nonlinear pattern of growth or change is of course a dynamic characteristic of complex systems, and is a major reason why initially small changes can result in large effects.

Creating Emergence and Evolution

It is interesting, and perhaps helpful, to imagine alternative universes. However, it is not advisable to try to change an entire university at one time. What we envision is creating an island within the existing university. The principles we have argued in this paper will guide the formation, purpose, organization and activity in this island, even though the rest of the university still operates on bureaucratic principles.

We envision that there are only five things needed to create the island:

1. A charter that allows it to operate unfettered by virtually all traditional university policies and procedures for a period of five years.

2. A small group of at least three tenured faculty members willing to devote at least three years to this endeavor. These individuals most be of the utmost integrity, have no hidden agenda, and have a passion to see this effort succeed.

3. Studio space to allow the faculty to work collaboratively and grow beyond their nucleus to perhaps 8-10 individuals. The space should be designed not as traditional offices but as a studio for the mind.

4. A modest annual operating budget to include at least one full-time staff person. Depending upon the aspirations of the institution this budget could be as low as $50,000 annually but ideally at least $100,000 annually.

5. The commitment of the Provost and Chancellor or President to protect this unit from outside or internal interference for a period of five years.

Once the structure emerges convergence may occur naturally. Convergence will be noticeable when existing units on campus begin to approach the unit about collaborations. It is hard to predict where this convergence may occur but we suspect it could come from non-academic departments such as honors programs. However, convergence could also occur from the outside, for instance, if the unit begins to work on the problem of poverty it may find convergence with local or regional social agencies.

Once convergence reaches a critical point or tipping point proliferation may occur. The unit will become highly visible and others will want to be a part and will not be able to ignore the attractor it represents. It is at this point that the university will need to begin to prepare its old institutional structure and transition mainstream functioning to the new structure. Parts of the old structure and bureaucracy may remain, but perhaps as a museum exhibit or as a shrine to the roots of the university.

Evolution will not stop. If the new structure which as emerged, converged and proliferated and truly has evolutionary potential then it will itself allow divergence and create new emergent structures that have the potential to replace it as it becomes outdated.

Notes

[1] Peter Schwartz and Jay Ogilvy, *The Emergent Paradigm: Changing Patterns of Thought and Belief* (Menlo Park, CA: SRI International, 1979), 13.

[2] James Gleick, *Chaos: Making a New Science* (New York: Penguin, 1987).

[3] Peter Schwartz and Jay Ogilvy, *The Emergent Paradigm: Changing Patterns of Thought and Belief* (Menlo Park, CA: SRI International, 1979), 15.

[4] Richard Feynman, *Surely You're Joking, Mr. Feynman!* (New York: Bantam, 1985), 155.

[5] Feynman, 157.

[6] Fritjof Capra, *The Hidden Connections* (New York: Doubleday, 2002), 100.

[7] Capra, 101.

References

Capra, F. (2002). *The hidden connections.* New York: Doubleday.

Feynman, R. (1985). *Surely you're joking, Mr. Feynman!,* New York: Bantam.

Gladwell, M. (2002). *The tipping point: How little things can make a big difference.* Boston: Little, Brown.

Gleick, J. (1987). *Chaos: Making a new science.* New York: Penguin.

Isenberg, D. J. (1984). How senior managers think. *Harvard Business Review 62*(6), 81-90.

Maturana, H., & Varela, F. (1987). *Tree of knowledge.* Boston: Shambhala.

Papert, S. (1993). *The children's machine: Rethinking school in the age of the computer.* New York: Basic Books.

Schwartz, P., & Ogilvy, J. (1979). *The emergent paradigm: Changing patterns of thought and belief.* Menlo Park, CA: SRI International.

Simon, H. A. (1978). Rationality as process and as product of thought. *American Economic Review, 68*(2), 1-16.

Simon, H. A. (1979). Rational decision making in business organizations. *American Economic Review, 69*(4), 493-512.

Whyte, L. L. (1960). *The unconscious before Freud.* London, UK: Julisan Friedmann Publishers.