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The nature and value of artistic competence

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THE NATURE AND VALUE OF ARTISTIC COMPETENCE

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ABSTRACT

THE NATURE AND VALUE OF ARTISTIC COMPETENCE

by Hilary Austen Johnson

The professional world is fraught with artistic problems. Artistic problems are characteristically systemic, complex and ambiguous. Typical American school curricula do not prepare students to grapple effectively with the artistic problems they will confront professionally. By emphasizing quantitative analysis, reductionism, and individual objectivity American schools severely inhibit students' ability to perceive and successfully engage artistic problems. The author proposes the nature of and the development of an artistic competence. This competence is characterized by a complex of processes including an ability to follow heuristic pathways, make qualitative judgements, invent intelligent conjectures, explore, improvise, integrate alternative perspectives, and self-organize. The author's experience indicates that a learning process that develops these cognitive abilities may be found in the arts, specifically painting. The author proposes that the explicit development of these abilities is possible and necessary if we are to be successful in meeting the complex challenges in our personal and professional lives.

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INTRODUCTION

> *But the pattern of the ocean, the pattern of the orange tree or the sea gulls, arises organically; it is a self-organizing pattern. The self-organizing activity arises, slowly changes, suddenly shifts, learns from mistakes, interacts with the ways of its fellows and its environment.*[1]

My first doubt in the unquestionable value of reductionistic, mechanistic thinking arose seventeen years ago when I was a university biology student. More specifically, it was sponge colonies, slime molds, and developing embryos that had caught and captured my attention--and then caused me to stop and reflect on how I thought about the world.

Viewed from within my scientific perspective these creatures astonished me. Somehow, without benefit of a nervous system or any other decision-making system that was familiar to me, they each exhibited unity, continuity, and an ability to collectively respond to internal as well as external change. Within these relatively simple unities the cells seemed to relate; co-operate; improvise; pursue a shared goal; make judgments about where to live and what to eat; shift roles during the processes of growth, reproduction, and metabolism; influence each others form and function; and, in the case of embryos, grow into ever increasing complex forms until the adult organism came into being.

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[1] Stephen Nachmanovitch, Free Play: The Power of Improvisation in Life and the Arts (Los Angeles: Tarcher, 1990), p.32.

As I looked for answers as to why such simple organisms should exhibit these disturbing self-organizing abilities, I found plausible mechanistic explanations. I read about equifinality, chemical triggers, genetic blueprints, cellular polarities, operon genes, and the like; but, as I sat in my lab watching the breath-arresting process of embryogenisis, these hypotheses left me unsatisfied and unconvinced. Whether or not these mechanisms did indeed effectively explain how these organisms live their lives, my questioning of my scientific paradigm had begun. There was just something about the processes I was observing that was both deeply compelling and that was left unresolved by mechanistic scientific thinking. Something indefinable was missing from how I was able to understand the world with the tools I was being given by my education.

At the time of my reflections, the concept of scientific paradigms was not as prevalent as it is today. I had no language with which to discuss the questioning that was going on in my mind. I moved on in my life without pursuing my thoughts, but carried a chink in my mental armour of certainty about the way the world worked. Maybe taking things apart, analyzing them, and looking for causal mechanisms wasn't the only way to explain everything and solve every problem.

Since my college days, much has been written that would have addressed my budding doubts. A scientific paradigm of a constructivistic, systemic, and holistic nature has emerged that continues to be elaborated and debated today.[2] Many fields, professional and academic, are reassessing their operating principles. Examples of the kinds of disciplines that have their roots in this reassessment are as varied as family systems

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[2] David Bohm and David Peat. Science, Order and Creativity (New York: Bantam, 1987); and William J. Reckmeyer, The Emerging Systems Paradigm (Ann Arbor: University Microfilms, 1982).

therapy, holistic preventive medicine, ecology, mediation, and organization development--the field in which I have become a professional.

In spite of the growing momentum of this shift of mind, operationalizing this constructive, systemic view of the world in the corporate setting in which I work has been problematic. While the intent of mechanistic thinking is to give us the ability to reduce, simplify, and control complexity, the intent of systemic thinking is to allow us to embrace complexity holistically. While many of us have learned the personal skills of mechanistic thinking--to analyze logically, systematize, organize, plan, control, nail down certainties, apply facts, and link cause and effect--in my experience few of us have learned the thinking skills needed to work with complex systems. I would venture to say that many of us do not even know what these skills are. When I first tried to identify what these skills might be, I came across words like creativity, intuition, flexibility, comfort with ambiguity, and so on--all words that I had previously related to artistic people like musicians, painters, and poets; not professionals, not scientists, not people who had to get "real" work done.

Finding this artistic perspective to be of possible importance to my professional challenges was both surprising and exciting for me. For a significant part of my adult life I had been an artist, most recently a painter, but, the answer to how I could apply my artistic experience to real-world complexity had eluded me. My life as an artist and painter had remained segregated, walled-off from the "disciplined" thinking of my academic and professional life. As I searched the literature I found many well-documented examples of scientists and professionals who have depended on the skills of an artistic type to help them resolve complex problems.[3] Creativity, intuition, insight, and pattern-seeing were all

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[3] Brewster Ghishein, ed., The Creative Process (Berkeley: University of California,1952).

words used to describe their thinking process. However, I was still left wondering how to translate these artistic attributes into action. I sensed there were skills involved in becoming insightful, in being able to find patterns in seeming chaos, or in leaping past apparently set constraints during moments of creative thinking. However, what these skills might be and how I might learn them remained a puzzle I found little help in solving until some years later.

Since the first flickers of this interest and its subsquent growth during the past seven years, I have divided my time between studying systems theory and working as an educator and consultant in the corporate world. In addition, two years ago I began to give serious time to watercolor painting. Each of these subjects has played an increasingly important part in my life yet their connectedness rather than their distictions were illuminated only recently. They began to resonate as I contemplated the following words of educator Elliot Eisner:

> The school's curriculum is currently heavily weighted toward a rule-governed view of learning; there is one correct answer to each question raised, the teacher knows the correct answers, the student's job is to get it right.
>
> In the arts no comparable "comforts" exist. There is no single correct answer to an artistic problem; there are many. There is no procedure to tell a student with certainty that his or her solution is correct. There is no algorithm that one can employ to solve an artistic problem; one must depend upon that most exquisite of human capacities--judgment.
>
> The exercise of judgment in the making of artistic images or in their appreciation depends on the ability to cope with ambiguity, to experience nuance, and weigh the tradeoffs among alternative courses of action. These skills not only represent the mind operating in its finest hour but are precisely the skills that characterize our most complex adult life tasks. The problems that perplex us as adults are not those that can be treated by algorithms and verified by proof. School programs that inadvertently teach children there is a correct answer to each important problem they encounter mis-teach children in serious ways. The cultivation of judgment and the ability to be flexibly purposive is best achieved when the tasks and content

> children encounter in school provide the space for such skills to operate. When the arts are well taught, such skills have an essential place.[4]

Eisner's words drove home to me the idea that artistic process is not only related to the technique of making art, but also to a way of thinking, a complex of learning processes, and an important way of operating in the world. Based on his discussion, it also became clear to me that an artistic way of thinking, or an artistic worldview, could be especially useful when operating in a complex and systemic world where few mechanistic "comforts" exist.

In the chapters that follow I will propose the development of a personal artistic competence that is defined by the ability to grapple successfully with complexity, follow heuristic pathways, and make sensitive qualitative judgments. To describe the nature of this kind of competence I will draw from all three areas of my personal and professional knowledge and expertise--systems theory, painting, and process consulting. I will elaborate on the potential value I think artistic competence holds for those of us who have chosen to confront complexity in our life and work. In addition, I will suggest routes to its development by defining five critical abilities that I believe to be the aspects of artistic competence: Taking Heuristic Action; Inquiry; Perceiving and Working with Complexity; Self-Managing Personal Learning; and Intuitive and Qualitative Thinking.

In addition to defining artistic competence, the intent of this paper is to synthesize three different discplines--organization development, art, and systems theory--and to explore the value that can be found in integrating disparate fields. By applying of what I have learned through this integrative thinking to the process of education I hope to point to

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[4] Elliot Eisner, "Why Art in Education and Why Art Education," Beyond Creating: A Place for Art in America's School (J. Paul Getty Center for Education in the Arts, 1985).

directions for research, and suggest strategies for developing individual competence in working with complex, indeterminate, artistic situations.

CHAPTER I

ARTISTIC PROBLEMS AND ARTISTIC COMPETENCE

Artistry is an exercise of intelligence, a kind of knowing, though different in crucial respects from our standard model of professional knowledge. It is not inherently mysterious; it is rigorous in its own terms.[5]

Introduction

If all problems were clearly defined with clearly identifiable solutions, writing this paper would not be necessary or interesting. All problems would be solvable by using a predetermined solution or by following rules that had been derived from past experience. A discussion of complexity, ambiguity, and creativity would not be relevant. But there are very few clear, straightforward problems that can be resolved with clear, straightforward solutions. Even a task as apparently simple as making a salad can become a qualitative process. Again, I quote Eisner:

> Most salads are modeled after stereotypes....Yet, in fact, the possibilities are infinite....Within the interplay of image and reality we go to work....We can decide not only what to use but, how to prepare what we decide to

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[5] Donald Schon, Educating the Reflective Practitioner (San Francisco: Jossey-Bass, 1987), p. 13.

> use....Each image of the desirable requires that we attend to, reflect upon, and speculate on the qualities of alternative potential salads.[6]

The alternative to confronting the creative possibilities of salad-making is, of course, to use a recipe. A recipe is a useful mechanistic tool that defines the rules of making a particular salad by defining its parts and giving causally-linked instructions that will produce a predictable and predetermined result. The use of a recipe requires the user to have acquired some predetermined degree of technical skill that will allow him or her to fulfill its prescriptions. With adequate technique and a recipe in hand salad-making can become a trivial task. But what if no recipe for the "right kind" of salad had ever been written down, or the ingredients prescribed in a recipe are not in season, or you are allergic to a main ingredient, or your recipe doesn't "fit" (for some indefinable reason) with the rest of the meal you are planning--then what do you do?

Although helpful in the process of salad-making, the technique of chopping gives you limited information about how to make a salad tasty, beautiful, nutritious, or one which fulfills whatever other goal you might have for making it. You are now faced with a complex and artistic problem. Your problem became artistic when the problem lost its clarity--when the available solution, the recipe, became unusable. You must now decide what you want to make and how you will make it. Now you must ponder what colors, what flavors, how much, what arrangement, what success will be. Will your salad be hot or cold? Sweet or savory? Plain or elaborate? Will you use vegatables, fruit, nuts or cheese? Will you dress it with olive oil and lemon or raspberry vinigrette? The problem at your fingertips is now complex, your problem-solving process must be heuristic, and the judgments you must make are qualitative. What do you think will taste good? You must

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[6] Elliot Eisner, The Enlightened Eye (New York: Macmillian, 1991), p. 18.

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[6] Elliot Eisner, The Enlightened Eye (New York: Macmillian, 1991), p. 18.

in a domain of uncertainty where the collection of more data and the generation of new theories do not seem to help very much. How can an organization balance the drive to maximize profits with the human urge to act ethically when these two values are in conflict? What will the next technological platform be for personal computing in the year 2000? What kind of organizational design would promote employee cooperation and reward individual empowerment at the same time? There are no undisputable empirically-based answers to these kinds of indeterminate questions.

TABLE I
Problem Typology[10]

Problem Type	Problem Definition	Problem Solution	Arena of Impact.
Type I	clearly defined	clear solution	local
Type II	clearly defined	unclear solution	system-wide
Type III	unclearly defined	unclear solution	system-wide

I hear about these Type II and III questions constantly. It is not my responsibility to answer them, however, it is my job to help people think them through and reduce their discomfort with the uncertainty of the problem-solving process. To attempt an answer to these kinds of questions demands that we embrace a complexity that crosses the narrow boundaries of expertise. In addition, there is no set of rules to follow, no linear path to a clear objective, no ultimate test of correctness for the solutions we create. However unsettling, there is only uncertainty, possibility, and our most thoughtful judgments upon which to rely. Adding to the pressure, the stakes are often high: people's lives will be changed,

[10] Adapted from Ronald A. Heifetz and Riley M. Sinder, "Political Leadership: Managing The Public's Problem Solving," in The Power of Ideas ed. by Rober Reich (Cambridge: Harper & Row, 1985, p. 186.

money will be made or lost, and the world will be helped or damaged by the solutions we create and implement.

My clients and many of my peers find the nature of this work difficult and disturbing, as I do. It doesn't seem to get any easier, even with years of experience. For some reason, expectations remain that there are "right" answers to complex questions; that somebody will know the best way to handle a situation; or that more information will yield a directive we can follow--all with the implicit assumption, that once we pick a solution, we can move on without looking back. Of course, this simplistic view is rarely, if ever, true. Artistic problems are not simple. They don't assume right answers, they don't follow rules, and they don't yield to experts.

Process Consulting

> *The cycle of perception cannot be maintained in a totally arbitrary fashion unless we collude to suppress the things we do not wish to see while, at the same time, trying to maintain at, all costs, the things that we desire most in our image of the world. Clearly the cost of supporting such a false vision of reality must eventually be paid.*[11]

For the past five years, I have been working as an educator and consultant with Fortune 500 companies. My three partners and I have grown a start-up into a thriving, 15-person company that specializes in developing process skills within organizations. Process consulting is distinguished from expert consulting because it is applicable across functions. We work with companies to improve effectiveness across functional areas, focusing on how people are interacting together to get their work done. When working with a group, for instance, process consultants want to know how decisions are made, how information and resources are shared, if people agree upon and are committed to a compelling vision, if

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[11] Bohm and Peat, Science, Order and Creativity,p. 57.

roles are clear and optimized, if people trust one another, and if they communicate effectively with each other. We are called in to design and facilitate decision-making processes, coach leaders on their leadership skills, facilitate the resolution of conflicts, develop teams, and help leaders define their organization's ethical standards and cultural values.

We conduct these processes with intact, cross-functional, project, and management teams; we also design and deliver company-wide organization development programs. The content we offer clients is made up of: (1) models of leadership and team-building; (2) processes that guide planning activities such as visioning, decision-making, strategic planning, and change; (3) methods used to track and diagnose organizational communication processes, resource flows, organizational culture, health, and values; and (4) skills to help develop and maintain healthy and humane interpersonal interaction amidst a pressure-filled environment.

In general, the issues that process consultants address have five characteristics in common. First, each of these situations is ill-defined. For instance, there is no single correct definition of leadership, no one agreed-upon set of ethical standards by which organizations can guide their decision-making, and no one best method for selecting and developing an organizational strategy. Many people ask for but never can find a clear definition of an "effective" organization. The definitions in these areas shift and move with the demands of the marketplace, trends of centralization and decentralization, and management style. Organizations are continually forced to reorganize and redirect their work force to keep up with these shifts.

Second, success in these areas is difficult to measure. How does one reveal whether or not the values that underlie an organization's culture are healthy or dys-

functional? How can one be sure the criteria used for measuring employee performance will truly and fairly reflect an individual's performance? Performance criteria are often difficult even to identify. The employee assessment process ranges from highly subjective conversations in management meetings to extensive employee surveys and performance reviews. Questions linger about how to identify and reward emerging leaders, while at the same time encouraging teamwork and risk-taking with their inherent potential for failure. How do you reward ethical behavior if it negatively affects profitability? When looking for success factors, causal influence is also difficult to locate and measure. For instance, how can one know with certainty whether the morale-devastating impact of down-sizing an organization will cause more long-term harm than the financial stress of keeping employees in the organization? How does one locate where product introduction cycle-time is being slowed down when each function involved is wound interdependently into the other.

Third, because these issues are ill-defined and difficult to measure in practice, competence in making these kinds of decisions is difficult to teach didactically with theories, facts, and figures. Grappling with topics like ethics and conflict involves judgment, as Eisner identified above, rather than the application of textbook data. In fact, there is little empirical data on which to rely--only historical accounts that cover the range of possibilities unique to each individual and the circumstances involved. These histories can only indicate possibilities; they can't dictate current realities. Individuals must learn about these issues through participation, trial and error, and experience. Knowledge in these areas must, in Carl Rogers' words, be "self-discovered" or "self-appropriated."[12] They are experienced newly by each person that confronts them. You cannot, it seems, simply give a

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[12] Schon, Educating the Reflective Practitioner, p. 89.

promising employee a description of quality leadership or definition of empowerment and expect them to internalize and act upon it. This kind of learning comes from internal personal growth and is therefore slow, risky, and costly to organizations.

Fourth, the problems that exist in these areas are "messy" and the solutions multiple.[13] By "messy" I mean they are difficult to define functionally, in time or intensity. They seem to take on a different nature, depth, and scope depending on the point-of-view from which they are described. The solutions to these kinds of problems are therefore varied and arguable. There is no obviously correct solution to apply. In fact, applying a solution often changes the nature of the problem, aggravating some previously trivial aspect into larger proportions, rather than resolving the overall situation. The structural functionality of organizations seems to aggravate problems by fragmenting them. People involved are often distanced from the problem by the limited participation that is defined for them by their organizational charter. When looking for the source of a problem, it is not uncommon to hear "it is manufacturing's problem, not ours" or "we did our part, so we are not responsible" or "it is not my job, so I don't want to get involved." Additionally, the problem can become "invisible" because no function or level of management can see the whole picture or have access to all of the relevant information needed to resolve it.

Fifth, these problems may not be bounded issues that can be solved with finality, but chronic concerns that must be managed over long periods of time. For example, employee motivation, organizational design, project planning, and product strategy are all issues that re-form on a regular basis with new as well as familiar features; they never go away, but take on different forms as part of the on-going work life in organizations.

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[13] Schon, Educating the Reflective Practitioner, p. 4.

In sum, these Type II and III problems, or what I am calling artistic problems, are difficult to define; have elusive criteria for success; must be understood through personal exploration and experience; are functionally messy, involving multiple perspectives and solutions; and are more manageable than solvable. My clients and I find the "real-world" systemic in nature--filled with messy, hard-to-identify problems with many possible solutions, none of which can be reached by following a pre-existing pathway, with no one person knowledgeable or powerful enough to identify the correct solution even if there were a single solution available.

Problems with these five characteristics are daunting, stressful, and ubiquitous throughout the organizations that our company, Catalyst, has served during the past five years. Concerned organizations have tried to overcome these types of problems by hiring consultants to work with specific management or functional groups on specific problems or by pouring money into employee development programs. Organizations often design internal universities that offer programs in such areas as leadership, team-building, decision-making, project planning, globalization, diversity, ethics, or quality. The list goes on and on. These programs are being offered at all levels of management, across functions and across industries.

Organizations that lack commitment to employee development often resort to simply adding new behavioral criteria to performance reviews or to designing what we call "sheep-dip" training programs in an attempt to corral their employees and install new behaviors. These "sheep-dip" programs are presented organization-wide, on a mandatory basis, in hopes that they inoculate employees with the company's contemporary strategies for dealing with the complex problems they currently face. These attempts to give employees the help they need in dealing with problems that are complex, heuristic, and qualitative in

nature fall far short in filling the need they have been designed to address. Where committed efforts are being made to help people gain competence in dealing with complexity through training or on-site assistance from a consultant, this falling short is not due to lack of effort or lack of quality in the efforts being made. Many dedicated professionals are hard at work in this arena.

Unfortunately, I believe these efforts have been directed towards symptomatic issues. We attempt to facilitate our clients through the rough spots or train them in new management theories, behaviors, and skills. However, the origin of our struggle with artistic problems lies at a deeper cognitive level than can be easily affected by the professional techniques currently used by most Organizational Development professionals. This struggle grows out of our tacit beliefs about the very nature of our world as well as the problem-solving approach these beliefs generate. It is at this underlying level that artistic competence must be studied, understood, and developed so that our ability to engage these kinds of problems will improve.

Prescott College

> *Knowledge is therefore not something rigid and fixed that accumulates indefinately in a steady way but is a continual process of change...When serious contradictions in knowledge are encountered, it is necessary to return to creative perception and free play, which act to transform existing knowledge. Knowledge, apart from this cycle of activity, has no meaning.*[14]

I would like to illuminate this point-of-view by describing when artistic competence first became important in my own life. During my sophomore year in college I entered Prescott College. Like my cohorts at the time, I had spent the previous fourteen years in America's public school system and traditionally-designed universities. We had arrived at

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[14] Bohm and Peat, Science, Order and Creativity, p. 56.

Prescott looking for something different in a school. At the time, I don't think any of us really knew what that something different would be; but, besides being out in the middle of nowhere, Prescott had a reputation for its experimental attitude and flexible curriculum.

During the first few weeks, this avant-garde reputation seemed to boil down to no grades, little supervision, and lots of free time--simply the lack of the structure and pressure to which we were accustomed. To my surprise, finding myself in these circumstances was overwhelmingly boring. Also to my surprise, no teacher, administrator, or system came to my rescue. No one handed me a class schedule or gave me a list of the semester's assignments. I was left on my own with no system to resist or methodology to assist me.

After a few months of wallowing dead in the water, the miraculous happened. Rather than sinking into apathy or rising into undisciplined chaos, as might have been expected, I and many of my fellow students decided to learn something. Without a system to manage us, we organized ourselves. It sounds simple, but it was a profound internal shift for us. In retrospect, I do not remember how we bootstrapped ourselves--but we did. We stepped forward under our own volition and motivation. We selected topics, designed our own classes, identified criteria for success, and negotiated with faculty for help in implementing our design. In short, we took responsibility for our own learning process. Although I will not go into detail about it here, I will say that the year which followed was one of the most joyful and rigorous of my life.

This new-found responsibility was tested mid-year when Prescott's private funding was cut and the school was forced to shut down within days of the announcement. After a week of feeling both shock and great disappointment, a well-spring of energy flowed from within the student body and faculty. We handled this crisis as we had the year's curriculum. We estimated budgets for teachers' salaries, facilities, and support staff. A tuition fee

was determined per student to cover these costs. Credit was arranged through the local Junior College. We rented office space in a building downtown and Prescott was open and running again in time for spring semester. The students and faculty took charge and "owned" their "organization" in a way that would turn many of today's corporate CEOs green with envy. Prescott College is accredited and flourishing today, sixteen years later.

At the time, I felt an exhilarating moment of personal power, freedom, and success. Looking back, I realize this process of personal and organizational transformation exposed and defied a mindset that I had constructed about operating in learning institutions: that the learning process is driven by institutional requirements, motivated by pre-defined performance requirements, and measured by expert authority.

Looking back to that year, I have found in my reflections the origins of three ideas that are central to this paper. For the first time in my academic life I was confronted with artistic problems and learning processes: the design and implementation of a self-managed learning program and the design and creation of an organization. Grappling with these two artistic challenges began the development of the perspective and skills I use most often in my work today. Through this experience I began to identify the differences between artistic problems and the kinds of problems I had been previously exposed to in school. In addition, the experience revealed to me the existence of what I will call a personal epistemic, or the personal framework with which we perceive and know our worlds.[15] Finally, I began to test the possibility of changing and developing this personal epistemic and felt the difficulty that lay in doing so. It has taken me the past 15 years to identify artistic competence as the quality that began to grow in me during my time at Prescott.

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[15] Samuel Bois, Epistemics (San Francisco: International Society for General Semantics, 1972), p. xxiii.

Conclusion

Artistic problems surround us. They place a demand on us we are not able to meet without a struggle that is not experienced when we are confronted by simpler problems. Simple, clearly defined problems with obvious solutions are few; instead, organizations are plagued by complex, qualitative issues in all areas of their business. As a process consultant I work with people who face these kinds of daunting problems everyday. While we must continue to work with these on-going issues each day, it is also important to look for the origins of the difficulty we face in resolving artistic problems. While our environment is filled with variables we may or may not be able to influence, we can explore, shift, and build our own abilities. If we can identify how, we have the option to develop our artistic ability to more successfully engage complex, heuristic, and qualitative problems. With my experience at Prescott College as an indicator, it seems under certain conditions that our education system is a place where these abilities could begin to grow. The identification of these conditions is then a necessary step.

CHAPTER II

LEARNING HOW TO LEARN

Storytellers do not convert their listeners; they do not move them into the territory of superior truth. Ignoring the issue of truth and falsehood altogether, they offer only vision. Storytelling is therefore not combative; it does not succeed or fail. A story cannot be obeyed. Instead, of placing one body of knowledge against another, storytellers invite us to return from knowledge to thinking, from a bounded way of looking to an horizonal way of seeing."[16]

Introduction

Reading Eisner helped me identify the link between my experience with corporate clients and at Prescott. It occurred to me that during the approximately 28,000 hours individuals spend in our educational system to complete a bachelor's degree, they may do more than learn the subject matter they are taught. As Eisner puts it, "School programs that teach children there is a correct answer to each important problem they encounter mis-teach children in serious ways."[17] I would go even further and, based on my own experience, say that it is ingrained in the learning process of our school systems to mis-teach students in this way. In addition, this mis-teaching cripples our ability to engage successfully with

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[16] James B. Carse, Finite and Infinite Games: A Vision of Life as Play and Possibility (New York: Ballantine, 1986), p. 133.

[17] Eisner, "Why Art in Education and Why Art Education," p. 5.

artistic problems as adults and creates an inability to cope with the complexity of the corporate environment.

Mechanistic Learning

> *The schools' view of professional knowledge is a traditional view of knowledge as privileged information or expertise. They view teaching as the transfer of information; learning, as receiving, storing and digesting information. "Knowing that" tends to take priority over "knowing how"; and know-how, when it makes an appearance, takes the form of a science-based technique.*[18]

My educational experience at Prescott was different from any other I had encountered up until that point, as was true for my classmates. Although I had shifted school districts and colleges a number of times before arriving at Prescott, my educational experience was very much the same at each of these institutions. My current work with educators and the adult products of our educational system leads me to believe my experience was and is still common. Our educational process seems typified by the following characteristics.

First, as Eisner emphasizes, it is predominantly "rule-bound." Much of this may be born of necessity; after all, we must learn the foundational rules of language, mathematics, and the sciences. Unfortunately, the single-minded focus on rules has wrung the richness from these subjects as well as from other "softer" subjects. For instance, history becomes boiled down to a set of dates to remember and English literature becomes lists of names associated with major works, many of which are never even read. I and my fellow students became masterful at memorizing and reporting volumes of structured data with little idea of the context and richness from which it had sprung. Data received without context has little meaning.

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[18] Schon, Educating the Reflective Practitioner, p. 309.

Second, the problems presented to students are predefined. The problematic aspects of the subject matter have been pre-identified for students. What they need to know or what is important is predetermined and revealed through structured lectures and tests.

Third, classroom learning is most often fact-based; that is, it presents current theories, understandings of the world, and social attitudes as fact--as truth--rather than presenting the development of knowledge as an evolving, dynamic process of change. Present-day knowledge is taught as a static reality.

Fourth, learning is answer directed. Experience and information are filtered by students with the goal of finding a single answer to a predefined problem that has been identified by someone else. Rarely, if ever, are students asked to identify the critical problematic features in a subject area and decide for themselves what kinds of solutions could best fit them. There is little room for designing creative solutions, sorting possibilities, or weighing options.

Fifth, subject matter is functionally organized. Periods, rooms, and faculty separate subject matter, leaving the links between subjects neglected or even completely severed. Each subject follows a separate track in historical as well as contemporary time. For example, nowhere in my education was the interweaving between social events and scientific discoveries revealed, nor the intertwined nature of politics and environmental sciences discussed. We studied each of these areas as if the others did not exist.

Sixth, classroom learning is driven by experts: teachers. They are bestowed by the system with ultimate knowledge in their area of expertise. They are the judge of right and wrong in the classroom in the areas of knowledge, motivation, and behavior. There is little or no leeway for students to challenge their instructors' attitudes, beliefs, and knowledge. In this situation, there is little or no chance for spontaneous behavior, for personal interest

to flower, or creative solutions to arise unless they lie within the comfort zone of the teacher. The unexpected is denied.

Seventh, challenge of expertise is not allowed because there is a clear and rigid power hierarchy in the classroom. Instructors have positional power over their students. They have the right to judge performance and attitude without significant input from students. Students are told what to do and how to do it. In a very heroic way, teachers carry the burden of deciding and evaluating everything that happens in the classroom. Personal choice is extremely limited. The weighing of options is virtually nonexistent.

Eighth, our learning process is inherently competitive because it is based on a grading system. Students are measured and compared continuously against a set of criteria and standards set by school systems, teachers, and testing services. These scores influence greatly which and what kind of opportunities students will get as well as the amount of praise and attention they may receive at home and in the classroom. Unintentionally or intentionally, students are compared and often pitted against each other by the system within which they work. There are few winners and many losers in the classroom. For example, my first year of college was spent at Rhode Island School of Design. There I found my fellow students unwilling to even discuss our assignments for fear of losing an original idea to someone else in the class.

Ninth, goals are externally set by authorities rather than being set by the learners themselves. Developing self-motivation in students is an espoused value. However, in practice there is no mechanism in our school system that can foster it. Pursuing one's personal interests and passions at one's own pace was certainly not encouraged in my experience because it interfered with the direction and sequencing of subjects in the pre-planned curricula.

Tenth, time, resource allocation, and rate of productivity are managed directly by the teacher and indirectly by the structure of our school system. Resources are handed-out, checked-in, and supplied in pre-apportioned amounts. Students are not required to estimate their needs or be resourceful about getting things done. In addition, sequences of classes, reading assignments, class schedules, and grade level requirements are predetermined and handed to students. A student's ability to act within these standards is as much a measure of academic success as their ability to fulfill class assignments. Students are rarely confronted with ambiguity in this area; nor are they allowed to make any of these decisions themselves.

Eleventh, our typical learning environment is one of reduced complexity. Because of the characteristics mentioned above, much of the unexpected, ambiguity, and possibility have been designed out of the learning process. Students face days filled with a structured and organized certainty. Within this structured environment as we do begin to choose topics of personal interest for research, we are encouraged to define a narrow scope, one we can successfully tackle in a semester. We are steered away from the confusion of interdisciplinary projects. As we step toward post-graduate work we are urged into greater specialization.

Mechanistic educational environments (See TABLE II) develop a competence in students that is useful only when employed in problems with similar characteristics. For simplicity's sake, I call this kind of competence mechanistic, although I find the term lacking full richness of my meaning. Mechanistic competence has limited value when the situations confronted involve many artistic attributes. As products of mechanistic learning environments, my corporate clients and I often find ourselves ill-equipped to navigate a dynamic and complex world filled with unpredictable events.

TABLE II
Mechanistic Education

1) learning is predominantly rule-bound
2) problems are pre-defined
3) learning is founded on unquestionable "facts" and "truth"
4) learning and problem-solving are answer directed
5) subject matter is functionally organized
6) learning is driven by experts
7) learning is managed by a clear and rigid power hierarchy
8) learning is competitive
9) goals are set by an authority
10) time use, resource allocation, productivity, and quality standards are determined for students
11) complexity and ambiguity are reduced to a minimum

As described earlier, the seemingly intractable problems my clients face are difficult to define; have elusive criteria for success; must be understood through personal exploration and experience; are functionally messy, involving multiple perspectives and solutions; and are more manageable rather than solvable. There is an obvious mismatch between the characteristics of our typical school environment and the characteristics of the environments we face as adults.

By the time most individuals enter their adult professions, they have spent between 16 to 20 years engaged in this mechanistic learning process. This learning process becomes embedded in our thinking, is used as our dominant learning strategy for the rest of our lives, and gives rise to much frustration and stress. We find it daunting that we must struggle in an environment where the rules are ambiguous and changing. Individuals still unproductively attempt to solve problems as if they were simple or look for help from experts. They wait for superiors to supply goals, map out strategies and measure their success. When generating solutions to problems, people commonly compete to win with their point of view, resist cross-functional work, and argue for the "right" solution that best fits the functional world they understand. I propose that developing artistic competence is an

alternative that will reduce the struggle we experience and improve the quality of our performance in complex, ambiguous, and qualitative situations.

Artistic Learning

> *The question of the relationship between practice competence and professional knowledge needs to be turned upside down. We should start not by asking how to make better use of research-based knowledge but by asking what we can learn from a careful examination of artistry, that is, the competence by which practitioners actually handle indeterminate zones of practice--however that competence may relate to technical rationality.*[19]

Attending Prescott College offered me the experience of an atypical learning environment. During both the academic process and the school's reorganization, I learned how to learn and engage with my environment in a different way than I ever had before. Although it remained somewhat implicit, the educational philosophy at Prescott held that the *way* in which students learn is as important--if not more important--than *what* they learn. The real learning task of students is the process of: choosing a personal direction; managing resources; organizing complex subject material; exploring the unknown, identifying critical aspects of subject areas; inquiring into different points of view; self-directing and self-evaluating learning; and creating solutions to our own resource, personality and intellectual problems. This learning environment had a very different set of characteristics, which I would describe as follows.

First, rules were replaced with heuristic pathways. Heuristic rules and processes include the "use of analogy, the appeal to symmetry, the examination of limiting conditions, the visualization of the solution"[20] and "searching out an unknown goal by exploration."[21] For example, we did not learn biology by working our way through the chapters

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[19] Schon, Educating the Reflective Practitioner, p. 13.
[20] Jerome Bruner, The Process of Eduction. (Cambridge: Harvard University Press,1960), p. 64.
[21] Stafford Beer, Brain of the Firm (New York: Wiley , 1972), p. 306.

of a biology text. Instead, we stepped into the middle of the subject. We worked in the field and in the lab, read historical and current articles and books, and by the end of the semester had constructed our own "text" from our explorations. We followed an unpredictable pathway to a conceivable yet transformative goal.

Second, we identified the problems we were interested in or felt we needed to solve to get where we wanted to go. Out of the vast possibility within the subjects we chose to study, we pulled together the elements that were significant to us. Our criteria for identifying these problems were a combination of the specialties of our instructors, standardized subject requirements, our personal interests, and available resources.

Third, we weighed the pros and cons of different theories and enjoyed exploring their strengths and weakness rather than being presented with one truth. Because our classes were not dominated by single experts we were able to explore subjects from many points-of-view. We were not pushed to acquire the beliefs of our instructors.

Fourth, we tackled problems with no clear answers. While we did expect to learn the relevant data in our areas of interest, much of our time was spent on difficult, big questions. Our focus was on embracing the whole of an issue rather than simply breaking it down into easy-to-digest and potentially arbitrary parts.

Fifth, we approached our subjects from an interdisciplinary point-of-view, by including in each class several faculty from different disciplines as well as students with different backgrounds. Again, our goal was to understand and integrate the variety of perspectives we had available to us.

Sixth, there were no experts in our classrooms. Our teachers worked with us as partners, co-designing and facilitating our learning process. We used their expertise like organizations use consultants -- in short, selective, highly-leveraged interactions.

Seventh, without expert instructors/evaluators, the power hierarchy flattened. We made decisions independently or collaboratively as a class depending on the nature of the decision. It was our first lesson in the challenge of cooperative decision-making.

Eighth, the self-determined and collaborative nature of the learning process eliminated much of the competitive feeling between students which I had experienced before. We attempted to value differences rather than compete with each other against normative standards.

Ninth, we set our own goals, performance standards, and measures of accountability. We used both grades and written evaluation; however, we contracted for individual as well as group goals. Our evaluation process included a self-assessment as well as input from the instructors and other students.

Tenth, because our curriculum and classes were not pre-planned, we designed them ourselves, projecting schedules, resources, and milestones. This design process pushed us to integrate creative methods with structure, personal goals with group goals, and personal interests with institutional requirements for those who wanted to go on to graduate school. Again, this was a collaborative and sometimes challenging process.

Eleventh, taking responsibility for our whole educational system threw us into an environment with little structure or organization. We faced a complexity that was new to all of us. I define complex issues as those in which there are more relevant details than one person can possibly cope with using predominately analytical processes. Some of the processes associated with handling complexity consist of pattern-seeing, intuitive thinking, sensitivity to qualitative issues, and the ability to learn through exploration. We must rely upon our strengths in these areas when working with issues that do not yield to analysis alone. Working successfully with complex issues such as ethics, values, integrating

multiple disciplines, projecting possible futures, and weighing alternatives--demands we follow our intuition, become connoisseurs[22] of qualitative distinctions, make educated guesses, and depend on our ability to make intelligent conjectures.[23] My experience of the neglect and suppression of these abilities is echoed in the words of Jerome Bruner,

> ...one may wonder whether the present system of rewards and punishments as seen by pupils in school actually tends to inhibit the use of intuitive thinking. The assignment of grades in school typically emphasizes the acquisition of factual knowledge primarily because it is what is easily evaluated; moreover, it tends to emphasize the correct answer, since it is the correct answer on the straightforward examination that can be graded as correct.[24]

I am convinced that, without the practice in dealing with complexity that we gained during the school year, we would never have been able to effectively mobilize to keep Prescott open after it lost its funding. Both these processes thrust us into a complex environment that demanded the application of different strengths than we had developed in our prior academic experience.

Artistic educational environments (see TABLE III) develop a competence in students that is useful when they are confronted by problems with similar characteristics. My own experience is that these kinds of learning processes have been, with few expectations, set outside our traditional mechanistic learning environment and curriculum. Issues of teaching and testing artistic competence are problematic from a mechanistic point of view. Artistic competence is not "teachable" in the mechanistic sense of the word. It is the practice of judgment, spontaneity, intuition, inquiry, flexibility, creativity, and (most importantly) continuous learning.

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[22] Eisner, The Enlightened Eye, p. 6.
[23] Bruner, Process of Education , p. 64.
[24] Bruner, Process of Education, p. 66.

In my experience, artistic competence is more useful than mechanistic competence when people are confronted by complex problems. More importantly perhaps, mechanistic competence may offer more difficulty than assistance when it is brought to bear on complex corporate issues. If corporate problems are indeed as I have described them, then to

TABLE III
Artistic Education

1) learning followed heuristic pathways
2) problems were identified by students
3) multiple "truths" were explored and weighed
4) problems with no clear answers were tackled
5) learning was inter-disciplinary including multiple perspectives
6) there were no experts, only knowledgeable partners
7) students managed and evaluated their own participation
8) learning was approached collaboratively as well as individually
9) goals were based on personal interests, abilities, and institutional requirements
10) course design, scheduling, and management of resources was done by students
11) the complexity of our whole educational process was managed by students.

attempt to resolve them mechanistically is a dangerous business. Engaging complex problems functionally from a limited point-of-view, with a fixed strategy and narrowly-defined success criteria derived from theory rather than experience can lead to chronic and acute organizational difficulties. Unfortunately, this is all too often the case. Process consulting exists as a profession, at least in part, because of this kind of imprudence.

Conclusion

If mechanistic competency is so obviously inadequate to resolve complex corporate challenges, then why has artistic competency not been valued within our educational and corporate settings? Why do we stay doggedly committed to our familiar mechanistic

strategies and solutions? What must change to allow us to embrace and develop our artistic abilities? This has been a compelling concern of mine for many years and warrants serious reflection if modern organizations are to improve their ability to handle issues that are qualitative, indeterminate, and complex.

CHAPTER III

THE SYSTEMIC PERSPECTIVE

> *The artistry of painters, sculptors, musicians, dancers, and designers bears a strong family resemblance to the artistry of extraordinary lawyers, physicians, managers, and teachers. It is no accident that professionals often refer to an "art" of teaching or management and use the term artist to refer to practitioners unusually adept at handling situations of uncertainty, uniqueness and conflict.*[25]

Introduction

Dealing with artistic problems has remained a challenge for me, although my competence in this domain has increased steadily over the past several years. It has become one of the professional strengths upon which both I and my clients have relied. As I have worked hard on developing artistic competence, I have found help in two areas: systems thinking and the practice of painting. This chapter focuses on systems thinking, especially the epistemology of the systemic perspective. I will discuss the possibilities I feel they hold for developing artistic competence and the light they can shed on why it is apparently so difficult to acquire.

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[25] Schon, Educating the Reflective Practitioner, p. 16.

Systems Thinking

> *This means that any search for such absolute, fixed knowledge is illusory, since all knowledge arises out of the shifting, changing activity of creative perception, free play, unfoldment into action, and its return to experience.*[26]

Systems thinking lends support to developing artistic competence by offering a different way of approaching complexity than is usually offered by our dominantly mechanistic educational process. As Schon describes in his book, *Educating the Reflective Practitioner*, the current epistemological stance of our educational system is that of technical rationality. He defines this as:

> ... an epistemology of practice derived from positivist philosophy, built into the very foundations of the modern research university....Rigorous professional practitioners solve well-formed instrumental problems by applying theory and technique derived from systematic, preferably scientific knowledge. Medicine, law, and business...figure in this view as exemplars of professional practice.[27]

He emphasizes that technical rationality demands that professionals work objectively as functional experts, follow a rule-governed process of inquiry, and resolve disagreement by reference to facts. He states definitively that technical rationality does not help professionals deal with situations of "uncertainty," "uniqueness," or "value conflict."

Nor does it point to the development of what Schon identifies as the features of outstanding practitioners that do not spring from professional knowledge--"wisdom," "talent," "intuition," or "artistry." He states that it "is a high-powered esoteric variant of the more familiar sorts of competence all of us exhibit every day in countless acts of recognition, judgment, and skillful performance." I would only add to his words that technical rationality is embedded in the curricula of schools and in the minds of teachers at

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[26] Bohm and Peat, Science, Order and Creativity, p. 56.

[27] Schon, Educating the Reflective Practitioner, p. 3.

all levels and disciplines, not just the professional, and gives rise to the mechanistic learning environment I described above.

Again, I see a mismatch between the demands of technical rationality and the nature of real-world corporate problems. However, systems thinking powerfully assists me when working with artistic problems in two ways. First, it explicitly acknowledges the complex, indeterminate, and subjective nature of our world--and, by so doing, offers language and tools to help us deal with it without diminishing it. Second, it provides a constructivist epistemological base that helps explain some of the difficulty I have described in dealing with artistic problems and acquiring artistic competence as an adult. Systems thinking is founded upon a constructive or interactive epistemology and weaves in a perspective about cognitive development that is extremely important for the issues being discussed here.

The systems perspective describes a world of whole systems, defying technical rationality's mechanistic tendencies. To a systems scientist, the world is not reducible without a serious loss of understanding. Inquiry must be made at the level of complexity that is intended to be studied--we cannot know the forest through the trees alone. This study demands a cross-functional approach that can identify inter-relationships and inter-dependencies. Systemic rigor demands that complexity be embraced and engaged intact. It must be dealt with on its own terms, rather than reduced into convenient and neat, but incomplete and therefore misleading packages. Volumes have been written on the subject of systems thinking and I am happy to say it appears to be beginning a renaissance with management practitioners and theorists. For the purposes of this paper, there are several core assumptions of systems thinking that have helped me increase my ability to work with artistic problems.

Mutual Causality. Linear cause and effect break down in a systems view of the world. Events evolve out of looping interactions between multiple parts of a system. An action taken within a system can therefore trigger unexpected far-reaching changes that result from the accumulated non-linear interactions. These results may therefore never be traceable to a single causal event. This indicates that no single part of a system can be credited or blamed for the outcome of an interaction.

Emergent Characteristics. Systems have emergent characteristics that are not predictable through the study of their members or components. The interaction of system components over time produces unexpected behaviors and results that have inherently different qualities than the components display in isolation. From a mechanistic viewpoint emergent characteristics are more often than not surprising and unexpected. Whether they are trivial or catastrophic to the system, the systems perspective indicates these characteristics are to be expected and reconded with as creative elements.

Self-Organizing and Autopoietic. Living systems organize themselves through the interaction of their components rather than being organized by external forces. Consequently, these systems tend to resist external organizing forces and respond to them uniquely and often unpredictably based on their current internal nature. An autopoietic system "holds constant its organization and defines its boundaries through the continuous production of its components. If the autopoiesis is interrupted, the system's organization is lost and the system disintegrates."[28] Systems-oriented observers seek to understand the organization that springs from within systems, from the results of components' interactions that lead to its identity. It is this internal organizing process that keeps systems unified and

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[28] Terry Winograd and Fernando Flores, Understanding Computers and Cognition: A New Foundation for Design (Norwood: Ablex, 1986), p. 45.

viable. Systems thinkers seek to apprehend and work with the internal organization, rather than impose organization from an external source.

Dynamic Dissipative Structures. Systems tend toward equilibrium, yet they frequently cycle through phases of stability and instability. This opens them to internal re-organization processes that may allow them to reach higher levels of complexity or lead them to dissolution. The power of dissipative systems is that they "dissipate" the energy produced by change and are there by able to maintain their unity and identity when even radical change occurs. Change is constant within living systems. A systemic viewpoint tells us to expect dynamic cycles of growth that involve phases of equilibrium, steady growth, and transformation. Static final states or goals are unrealistic to expect.

Context and Observer Dependence. From a systemic point-of-view, all meaning is context dependent. Communication, events, and information are without objective meaning, for meaning is given to them by the individual observing or interacting with them. Contexts must be identified and defined by the observers of and participants in interactions in order for these interactions to have meaning. In addition, observers and participants themselves must clarify their points-of-view and perspectives. No two observers can stand in the same spot nor see through the same eyes. Events and interactions are experienced uniquely by different individuals, are based on own their personal histories and hold relative truth. In the words of Nelson Goodman, the "trouble with truth" is that it "....cannot be defined or tested by agreement with 'the world;' for not only do truths differ for different worlds, but the nature of agreement between a version of a world apart from it is notoriously nebulous."[29]

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[29] Nelson Goodman, Ways of Worldmaking (Indianapolis: Hackett, 1978), p. 17.

Requisite Variety. Individuals must be as complex as the system they are trying to manage. In corporate environments, personal complexity or variety translates into technical knowledge, experience, maturity, flexibility, creativity, and the like. Individuals with these qualities have a high degree of influence on their organizations. Because so many factors are involved in managing a corporation, it is often the case that one person does not have the requisite variety to run the business on his or her own. The management of complex systems usually requires the integration of multiple points-of-view, fields of knowledge, and resources. This demand leads systems thinkers toward a collaborative approach. It is the intent of this collaborative approach to build the composite intelligence, complexity, and variety of choices available to systems managers.

The world of my clients, more often than not, matches that described by the systemic view. It is a world filled with ambiguity and change. Our ability to act with certainty dissolves as we engage complex systems. Causal relationships are complex and our actions produce surprising and unpredictable results. The systems in which we work seem to have a life of their own. Organizations and the individuals within them grow, change, and develop in ways we cannot control. Points-of view are varied and the implication of events arguable. The strategic direction we choose today must be shifted tomorrow as the environment swirls and turns with the turbulence of converging currents.

Simply acknowledging the complexity of corporate environments is obviously not enough to increase our ease and ability to work effectively within them. In fact, it leaves many feeling overwhelmed. As Schon notes,

> The practitioner must choose. Shall he remain on the high ground where he can solve relatively unimportant problems according to prevailing standards of rigor, or shall he descend to the swamp of important problems and non-rigorous inquiry?

> This dilemma has two sources: first, the prevailing idea of rigorous professional knowledge, based on technical rationality, and second, awareness of indeterminate, swampy zones of practice that lie beyond its canons.[30]

Systems thinking provides a new platform from which to engage complex artistic environments and has spawned many new organizational tools and processes to aid the stronghearted who are willing to grapple with the ambiguity that lies beyond the technical rationalist's position.

Systems Epistemology

> *...the 'laws of the universe' are at best the laws of our interaction with it. Knowledge is not a simple approximation of the 'truth' or 'reality'; it is an interaction between knower and known, and depends on many factors of a biological, cultural, and linguistic nature.*[31]

While the media is filled with reports of declining verbal and written literacy, organizations are confronted with another kind of illiteracy. Their people are confounded and stymied by the subjective, qualitative, and complex nature of the work environment. In the face of this obvious and ubiquitous difficulty, why has gaining competency with artistic problems remained so difficult? I find answers to this question in the epistemological stance of system theory, that of constructivism.

In brief, constructivism proposes that, while there does exist an undeniable physical world, we construct our knowledge through our interactions with it. What we experience as reality is an integration of three dynamics: the nature of our biological and cognitive systems; the nature of the physical world; and our unique and personal interactions in our physical world. Total objective knowledge is not possible. Inquiring into and clarifying

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[30] Schon, Educating the Reflective Practitioner, p. 3.

[31] Suzi Gablik, Progress In Art (New York: Ruzzoli, 1976), p. 159.

different subjective viewpoints, all of which hold some truth in them, is the best we can do in our attempt to understand our world.

Constructivist epistemology is founded in our biological as well as cognitive processes. Vision research reveals that the eye "speaks to the brain in a language already highly organized and interpreted, instead of transmitting some more or less accurate copy of the distribution of light on the receptors."[32] This indicates, as cognitive scientists Terry Winograd and Fernando Flores state, that "perception, in other words, must be studied from the inside rather than the outside--looking at the properties of the nervous system as a generator of phenomena, rather than as a filter on the mapping of reality."[33] What we experience as real is as much a product of the nature of our nervous system as of the physical world we observe.

Through our interpretations of our interactions with the physical world, and with the people and events that take place around us, we construct an individual reality which I have referred to as a personal epistemic. Other writers have called these personal realities, mental models[34], world views[35], paradigms[36], or imaginary landscapes.[37] Regardless of how they are labeled, the impact of these personal constructions of reality in our lives is the same: our personal epistemic becomes our *truth* about the way the world *is*. These truths become tacit and are translated into action without our even being aware of it. As they guide our actions, these internal realities also guide and filter our perceptions. Through

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[32] William I. Thompson, Imaginary Landscapes: Making Worlds of Myth and Science (New York: St. Martin's Press, 1989), p. 102.

[33] Winograd, and Flores, Understanding Computers and Cognition, p. 42.

[34] Peter M. Senge, The Fifth Discipline: The Art and Practice of the Learning Organization (New York: Doubleday, 1990), p. 174.

[35] Thompson, Imaginary Landscapes, p. 111.

[36] Bohm and Peat, Science, Order and Creativity, Ch. 1.

[37] Thompson, Imaginary Landscapes, p. 102.

time we construct a world in which we believe. We continue to reinforce it by recognizing what matches it and, for the most part, disregarding what does not. Our worlds become self-fulfilling and self-creating as we explain the events that happen around and to us with the models and beliefs that make up our personal epistemic.

From a constructivist viewpoint, learning can take place in two ways. First, there is learning that fits within our personal epistemic, reinforcing and solidifying them with proof. In this way we add to our information base and expand our internal encyclopedia of facts. Second, there is learning that involves a shift or change in our personal epistemic. Large or small, this kind of learning changes the way we conceive of the world, transforms what we are able to perceive, and subsequently offers us the possibility of new choices for experience and action. Authors who have written about variations of this kind of learning have termed it "double-loop," "level 3," or "generative" learning; by all accounts, it is much more difficult to evoke than learning that takes place within our personal realities.[38] This difficulty is well described by William Thompson: "One can change one's mind with facts, but to change mentalities one has to change the structure of one's world view.....Most people would rather die than go through that agony of loss."[39]

The difficulty in updating personal epistemics is apparently double-fold. Not only do they become tacit and difficult to bring into our awareness, but we grow into them comfortably like an old pair of soft leather shoes. Who ever wants to give them up? Even when they have holes in the sole that let in rain or stones as we walk, we hang on to their comfort

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[38] Chris Argyris, Reasoning, Learning and Action: Individual and Organizational (San Francisco: Jossey-Bass Publishers, 1983); Diana Smith, "Some Notes On Mapping Intervention Practice," unpublished (July 1989); and Gregory Bateson, Steps to an Ecology of Mind: A Revolutionary Approach to Man's Understanding of Himself (New York: Ballantine, 1972).

[39] Thompson, Imaginary Landscapes, p. 111.

tenaciously. We have formed to them and they have formed to us in a way that makes them very difficult to leave behind. In a similar way, our personal epistemics are experienced as part of our self. They are difficult to separate from our sense of reality and identity, and therefore are difficult to change without going through what Thompson describes as a "conversion experience in which the personality is radically transformed." This process of worldview transformation is not one we have been raised to engage in lightly as individuals or as a society.[40]

This self-creating process of interaction with our environment has been identified as structural coupling by Humberto Maturana and Francesco Varela.[41] They describe it as a kind of unity that evolves between an organism and its environment through "repeated," "similar," and "consistent" interactions over time. They present this concept from an evolutionary as well as an individual perspective. For my purposes, we will look at the individual level.

An individual's cognitive processes, imaginary landscapes, and behavioral strategies develop to fit with the consistent patterns of interaction he or she experiences with its environment. The longer an organism remains in this consistent environment, the stronger this structural coupling becomes. As the word structural implies, this fit becomes tighter and stronger, growing into a highly adapted neurological as well as behavioral relationship between the individual and its environment--which makes it less responsive to and less able to change. The cognitive "space" that develops becomes highly adapted and less

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[40] Bohm and Peat. Science, Order and Creativity, Ch. 1.

[41] Humberto R. Maturana and Francesco Varela, The Tree of Knowledge: The Biological Roots Understanding (Boston: Shambala, 1987).

adaptive over time.[42] We construct an imaginary landscape of our world and form ourselves comfortably, and somewhat rigidly, to it.

In a static environment, of course, we would do well to achieve a high degree of structural coupling. In this way, the nature of our cognitive system takes advantage of stability by developing tacit models and responses. However, in times of change, when generative learning is demanded, these couplings get in our way if they do not allow us to perceive difference, recreate our constructions, and generate new behaviors in response to change.

During the years we spend in a school environment most of us become structurally coupled with it. Year after year, we feel, think, behave, work, live, and so develop the cognitive space and pathways that fit this environment. We engage with its characteristics and succeed to the degree we couple ourselves to them. After approximately 16 years of schooling, the beliefs we form become tacit and our cognitive processes and behaviors become routinized, integrated into our nervous system patterns. These patterns become invisible to us, are felt as part of us, and are therefore resistant to change.

The problem lies in the apparent differences I have described between the environmental characteristics of our school system and those of the corporate environment. During our school years, we develop a personal epistemic that reflects our structural coupling with an inherently mechanistic environment. At some point, as we step into our professional worlds, we are thrust into a more artistic environment. During this transition we literally get "bent out of shape." We lose our unity with our environment as we enter the professional, corporate world. This transition hurts; it is frustrating and it is stressful.

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[42] Maturana and Varela, Tree of Knowledge, p. 112.

Most of my clients meet this transition with great resistance. Their sense of self is being challenged and overwhelmed. They try hard to act upon their familiar inner world, but are stymied in the ways I described earlier.

Applying the Systemic Perspective

> *A cloud masses, the sky darkens, leaves twist upward, and we know that it will rain. We also know that after the storm, the runoff will feed into the groundwater miles away, and the sky will grow clear by tomorrow. All these events are distant in time and space, and yet thay are al connected within the same pattern. Each has an influence on the rest, an influence that is usually hidden from view. You can only understand the system of a rainstorm by contemplating the whole, not any individual part of the pattern.*[43]

There is another result of this structural resistance to change which I find even more disconcerting than the personal discomfort involved in this change of mentality. Because individuals are not prepared to engage artistic problems in a creative way, they try very hard to solve these problems with the tacit strategies they have learned in mechanistic educational programs. I have repeatedly watched my clients (and all too often myself) draw artificial and arbitrary boundaries around problems to make them small enough to "solve," argue tenaciously for their point-of-view, victimize themselves and others in power struggles, succumb to boredom for lack of a personal vision, and choose a sub-optimized solution to a problem just to end their discomfort with an ambiguous situation. These kinds of actions tend to perpetuate as well as generate the very situations they are intended to relieve--they make things worse.

Using a systemic and constructivist perspective has helped me and my clients begin to work more effectively with their challenges. For example, Henry Mintzberg describes

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[43] Senge, The Fifth Discipline, p. 6.

how the process of developing a corporate strategy is reconceived when engaged systemically or artistically rather than mechanistically from a technically rational point-of-view:

> Imagine someone planning strategy. What likely springs to mind is an image of orderly thinking: a senior manager, or group of them, sitting in an office formulating courses of action that everyone else will implement on schedule....Now imagine *crafting* strategy.
>
> ....What springs to mind is not so much thinking and reason as involvement, a feeling of intimacy and harmony with the materials at hand, developed through long experience and commitment. Formulation and implementation merge into a fluid process of learning through which creative strategies evolve. My thesis is simple: the crafting image better captures the process by which effective strategies come to be. The planning image, popular in the literature, distorts these processes and thereby misguides organizations that embrace it unreservedly.
>
> ....Purely deliberate strategy precludes learning once the strategy is formulated, emergent strategy fosters it.
>
> ....Craft requires control just as it requires responsiveness to the material at hand.[44]

For me the lessons of systemic perspective have been and still are difficult to learn but powerful in their implications. My clients and I can no longer justifiably argue for the "truth" of our points-of-view, set goals and expect them to remain fixed, blame "the other person" as the single cause of a difficult situation, or look to someone else for the "right'" way to do things. Together we are learning to learn from others, become "flexibly purposive" while pursuing goals, take responsibility for the events that spring from our interactions, trust our hearts and judgments as guides to action, and work to the best of our ability with the knowledge we currently hold. We are challenging ourselves to uncover our tacit assumptions, to define explicitly the context within which we act and interact, and to expect and take advantage of the unexpected.

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[44] Henry Mintzburg, Crafting Strategy (Cambridge: Harvard Business Review Special Publication, 1985), p. 2-6.

When working in groups, we are beginning to collaborate in the true sense of the word. We are learning to construct complex "problematiques" including multiple points-of-veiw (rather than leap to solve isolated problem components), design integrative cross-functional solutions, work iteratively with strategic and implementation processes, and continuously question and update the personal and organizational models in which our beliefs and choices are founded.[45] This process of shifting mentalities is probably the most difficult, for it removes the accustomed certainty of the current status-quo, clarity of direction, and clear dependable criteria for success.

In a design meeting of the advanced technology group of a highly successful major computer company, the topic involved possibilities for the next paradigm or platform for personal computing. This meeting was one in a series that had been going on for months and the group was still far from resolution in its search for a concrete directional goal. Many frustrating hours of brainstorming options, arguing about direction and features, and disagreeing about how to commit development time and resources had brought the group to a standstill. After a lull in the conversation, a surprising suggestion--a shift in mentality--offered them the possibility of moving forward. I will paraphrase their proposal:

> We cannot create or even imagine the ultimate P3 (Paradigm 3) computer while we are still bounded by P2 (Paradigm 2) thinking and are working with P2 computers as design tools. We must generate our best ideas, guided by our wildest dreams and then throw them away. If we follow them specifically, we will fall far short of what is possible. We must follow the 'perfume' of the ideas that intrigue us and let what is surprisingly possible emerge.[46]

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[45] John N. Warfield, The Science of Generic Design, 2 vols. (Salinas: Intersystem, 1990), p. 285.

[46] The Paradigm 3 (P3) computer is as yet not invented. P2 refers to the desktop/workstation model of personal computing. P1 refers to mainframe computing with little access for personal users.

Conclusion

While the systems perspective offers an interactive and constructive mentality for dealing with complex qualitative issues, it also indicates the need to develop cognitive strengths that fall outside a purely analytical domain. We must become adept at engaging the unpredictable and unfamiliar, at navigating through ambiguity, and at sensing the subtle nature of our interactions. As my clients and I shift our approach to resolving problems, the dynamics of our interaction with co-workers, and the nature of our personal learning, we need different ways of thinking than are conceivable within a technical rationalist mentality. If our education systems have been stripped of these artistic processes, where can we learn them?

CHAPTER IV

THE NATURE OF ARTISTIC COMPETENCE

> *Perhaps, then, learning all forms of professional artistry depends, at least in part, on conditions similar to those created in the studios and conservatories: freedom to learn by doing in a setting of relatively low risk, with access to coaches who initiate students into the "tradition of the calling" and help them, by "the right kind of telling," to see on their own behalf and in their own way what they most need to see. We ought, then, to study the experience of learning by doing and the artistry of good coaching.*[47]

Introduction

I believe that the process of **making** art can be used to develop a generally applicable artistic competence, and, in addition, that the education processes that support **learning to make** art can be used a template to design curricula in other subject areas that will successfully develop artistically competent individuals. While my deepest experience lies in painting, I expect that the ideas I outline here will apply to other arts as well. Jazz musician and psychologist, Stephen Nachmanovitch, writes eloquently about the improvisational aspects of jazz he finds applicable to everyday life.

> Technique itself springs from play, because we can acquire technique only by the practice of practice, by persistently experimenting and playing with

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[47] Schon, Educating the Reflective Practitioner, p. 17.

> tools and testing their limits and resistances. Creative work is play; it is free speculation using the materials of one's chosen form.[48]

Although an exhaustive study of a spectrum of the arts will undoubtedly reveal aspects of artistic competence I have never experienced, in the pages that follows I will describe some of the artistic processes involved in painting and identify five aspects of artistic competence I have derived from my experience painting.

The Practice of Painting

> *Creators actively court chance. They're always ready to notice and amplify into insight some accident of their environment virtually everybody else thinks is trivial or fails to notice. This capacity is in a deep sense, what makes creators creative.*[49]

At first glance it may appear that painting has little to do with such corporate concerns as strategic planning, marketing strategy, or organizational design. Our contemporary view of artists as inspired, emotional, and spontaneous individuals--who are often seen as self-absorbed or as erratic genius types--leaves a wide gap between an artist's world and the corporate world. However, in clinical psychiatrist Albert Rothenberg's view,

> ....the truly creative person is oriented toward producing something outside himself, is rational, and is completely aware of logical distinctions....he knowingly formulates unusual conceptions in order to improve on reality and create. He is able to take mental risks and formulate the seemingly illogical and incredible because he is relatively free of anxiety and can assess reality well. At those moments, his thinking is unhampered by emotional interference.[50]

Engaging with corporate problems and making a painting have much in common at a cognitive level. Nelson Goodman notes,

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[48] Nachmanovitch, Free Play, p. 42.

[49] John Briggs, Fire in the Crucible: The Self-creation of Creativity and Genius (Los Angeles: Tarcher,1990), p. 278.

[50] Albert Rothenberg, Creativity and Madness: New Findings and Stereotypes (Baltimore: Johns Hopkins, 1990), pg. 35.

> The genuine and significant differences between art and science are compatible with their common cognitive function.
>
> Education for the arts, like the sciences, is seen as...developing the skills involved in understanding and discovery, and upon providing motivation and conditions for the exercise of the skills...
>
> ...comprehension and creation in the arts are not matters of passive contemplation or pure inspiration but involve active constructive processes of discrimination, interrelation, and organization.
>
> Perception, problem-solving, and painting have much in common.[51]

As anyone knows who has confronted a blank perfectly white piece of paper or canvas, the process of making a painting is both a joyful and a frightening struggle. It carries inherent in it many of the characteristics I have attributed to systemic corporate problems. As Eisner states, there are "no single correct answers" and there is "no procedure" to follow when engaged in creating a work of art. The creation of solutions demands "the ability to cope with ambiguity, the exercise of judgment," and the ability to "weigh trade-offs" and "experience nuance."[52] The creation of each unique painting is a complex, heuristic, and qualitative process filled with indeterminism. Where to begin and what direction to pursue are unbounded possibilities mediated only by what is conceivable to the artist and the technical ability they have developed.

While a painter begins with an image, feeling, urge, or goal in mind, each brush stroke creates serendipity--the unexpected opportunity. While painting, one must balance the need to achieve, to finish, with the attraction to endless opportunity. As the vision and plans appear on the paper differently than the original conception, possibilities emerge. Some are followed, others are left behind. These choices are made in the context of a direction--a direction that may hold the artist to a path or may evolve with the unexpected

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[51] Nelson Goodman, Of Mind and Other Matters (Cambridge: Harvard, 1984), p. 157.

[52] Eisner, "Why Art in Education and Why Art Education."

events that occur in the work. In any case, one must finish to see the results of these choices. In Eisner's words, a working artist must be "flexibly purposive."[53]

One can only look inward for direction, yet there is much to be learned by inquiring into the perceptions of others. A painter will look at the work of other artists, masters and novices as well, not to find predefined solutions, but to reveal and expand the personal epistemics through which we see and filter what we see. The moment of being shaken out of a certain *way of seeing* has startled and exhilarated many a student of painting. This kind of shift in a personal epistemic cannot be forced. It can be enticed by exposure to new possibilities and by the acknowledgement and exploration of its nature. The process of learning to paint is as much about bringing to awareness and then shifting ways of seeing as it is about the development of technical skills. Each step of learning to *see* shape, light, color, form, composition, and space involves an experienced shift in perception.

If a painter continues to develop, these shifts recur throughout life as he or she learns new ways of seeing these features and finds ways to express them on paper or canvas. "Artists knowingly set out to destroy a previous style by the creation of a new one and, in an essential sense, the production of anything radically new always involves the destruction of the old."[54] This willingness to destroy and recreate provides the freedom not only to respond to change with enthusiasm and an open mind, but also the ability to create change.

To paint with personal meaning, one can only paint for and from one's personal experience. No one can tell an artist what to paint, how to paint it, what color to use, what the eye should or should not be attracted to, or what is beautiful and what is not. These

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[53] Eisner, "Why Art in Education and Why Art Education."
[54] Rothenberg, Creativity and Madness, p. 68.

decisions must come from within or the artist paints someone else's painting. Likewise, the feel and movement of paint must be experienced to be understood. No lecture or demonstration can replace the sensation of the brush on paper; the awareness of texture; and fluidity during the union of brush, paper, and paint. No analytical criteria or measures exist for these processes; therefore, learning of this kind can only happen through participation--it is qualitative and must be self-appropriated.

Schon talks at length in his works about the necessity for "coaching" to replace traditional methods of teaching if students are to develop artistry. Coaching is a certain special kind of "telling" teachers use in combination with demonstration and public self-reflection on their work process that can evoke the desired experience in a student. I concur with this idea whole-heartedly, for my best teachers fit his description of an exemplary coach. However, because of the scarcity of this kind of teaching mentality in the public and corporate educational systems, we can not rely upon having access to good coaches. Instead, I believe we must self-manage our own learning process. In this regard, painters must become adept at the "skill" of self-appropriating learning. Painting involves a process of learning how to learn. The exploration, experimentation, and reflection that occurs while painting and the dedicated inquiry into personal and others' perception and experience model this kind of self-managed learning.

Perceptually, painting demands seeing both detail and wholeness; perceiving the inter-relationship of the 360,000 discernable colors, each of which affect each other differently; and being sensitive to the balance and interaction of the pattern, light, form, and color that make up a composition. These are qualitative processes that defy detailed analysis. Painters become connoisseurs of these and other qualities of their work process. Over

time, they become sensitive to nuance and subtlety that escape the unenlightened eye. Painters become facile at making these qualitative judgments.

In addition, each painting initiates a cycle through the creative process in its entirety. With each work, painters experience the frustrations, successes, failures, leaps of understanding, surprises, brickwalls, empty spaces, and doubts inherent in creative activity. We learn for ourselves to live through them and make it to the end to finish our piece or we never become painters. There is no way to make it simpler, less complex, or reduce the possibility of failure. Painting is always a risk.

In Plates 1 through 7, I have included samples of my own artwork. I am currently exploring watercolor painting, and these pieces were recently done. Watercolor is an extremely demanding medium particularly with respect to the artists ability to remain flexibly purposive. Each brush stroke remains as it is placed, unchangeable, affecting every other part of the painting. There is no going back, no way of "fixing mistakes." As Nachmonvitch states, the mistake must become the creation, the pearl in the oyster.[55] Once begun a watercolor painting seems to take on a life of its own. The process of painting becomes a gentle negotiation--between the artist's vision and skill, and the paint, paper and brush--that leads to an unexpected, often surprising, resolution. In addition, the nature of the materials themselves add complexity to the process. Each color of paint has different properties of flow, variable mixablity with other colors, and "sits" on the paper uniquely. The unexpected is a regular event simply through the interaction of the paint on paper. Working in watercolor might well be described as follows:

> The empirical fact about our lives [watercolor painting] is that we do not and cannot know what will happen in a day or in a moment in advance. The

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[55] Nachmanovitch, Free Play, p. 88.

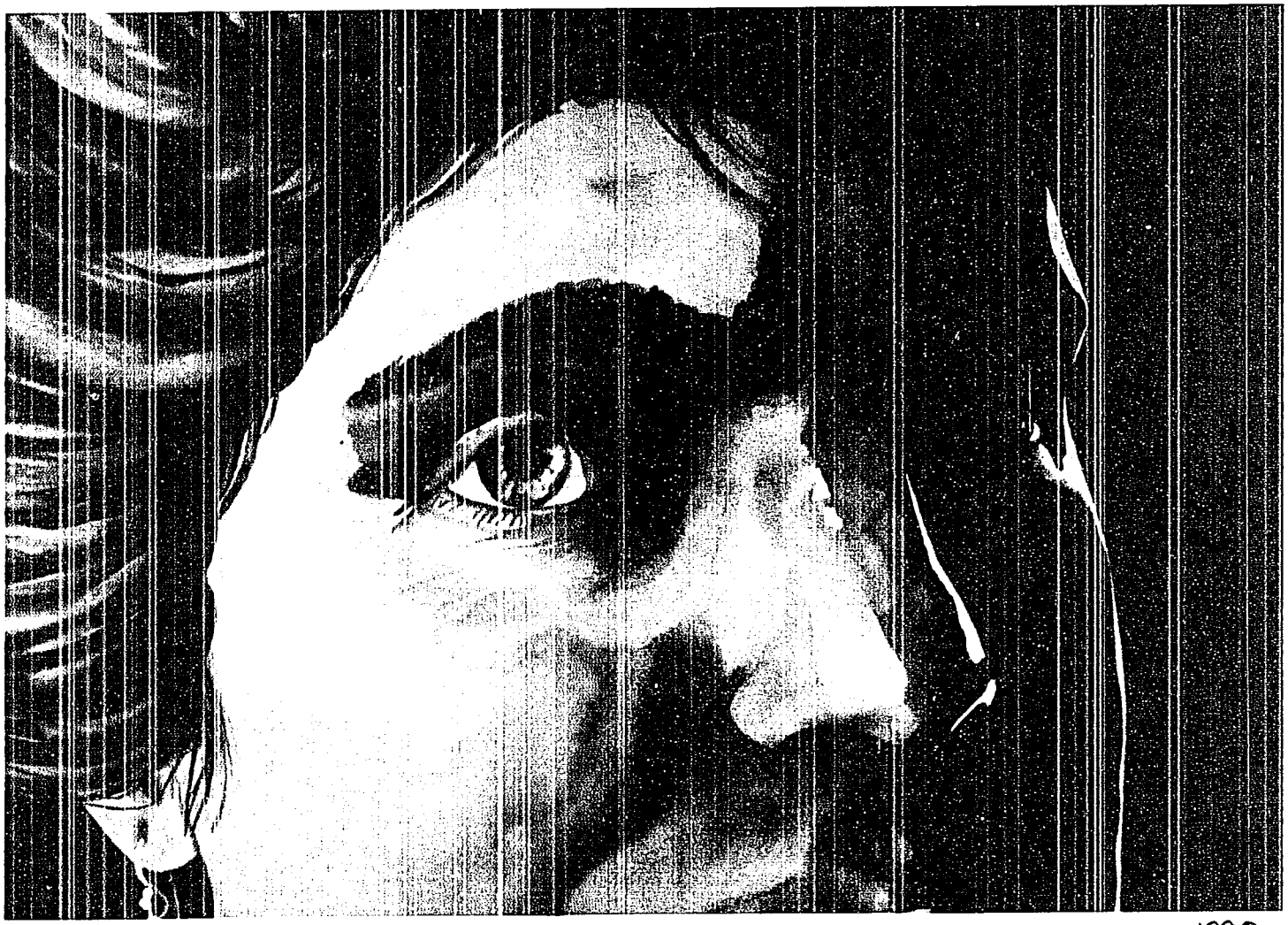

PLATE 1. SELF-PORTRAIT 1990

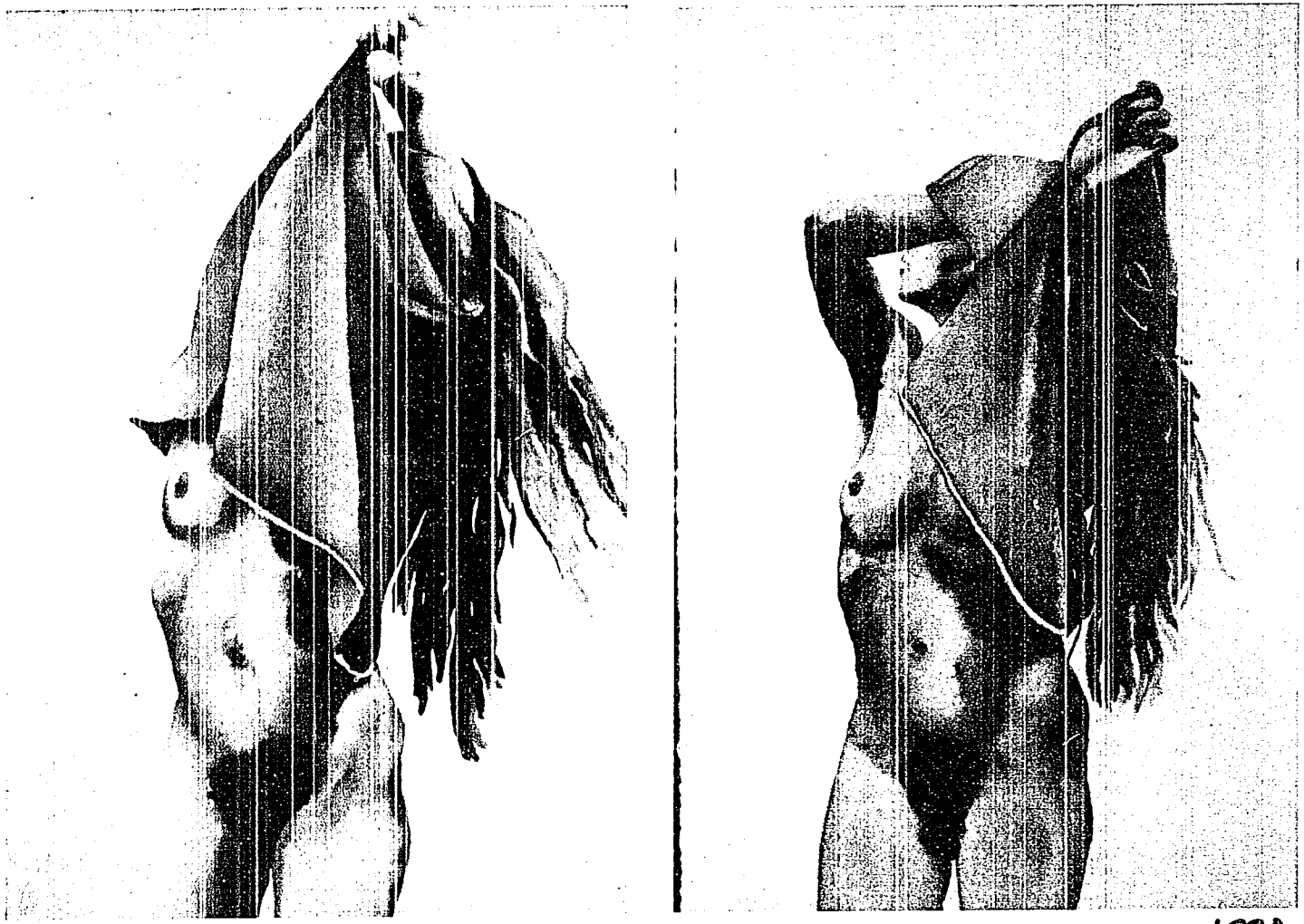

PLATE 2. BLUE DRESS

1990

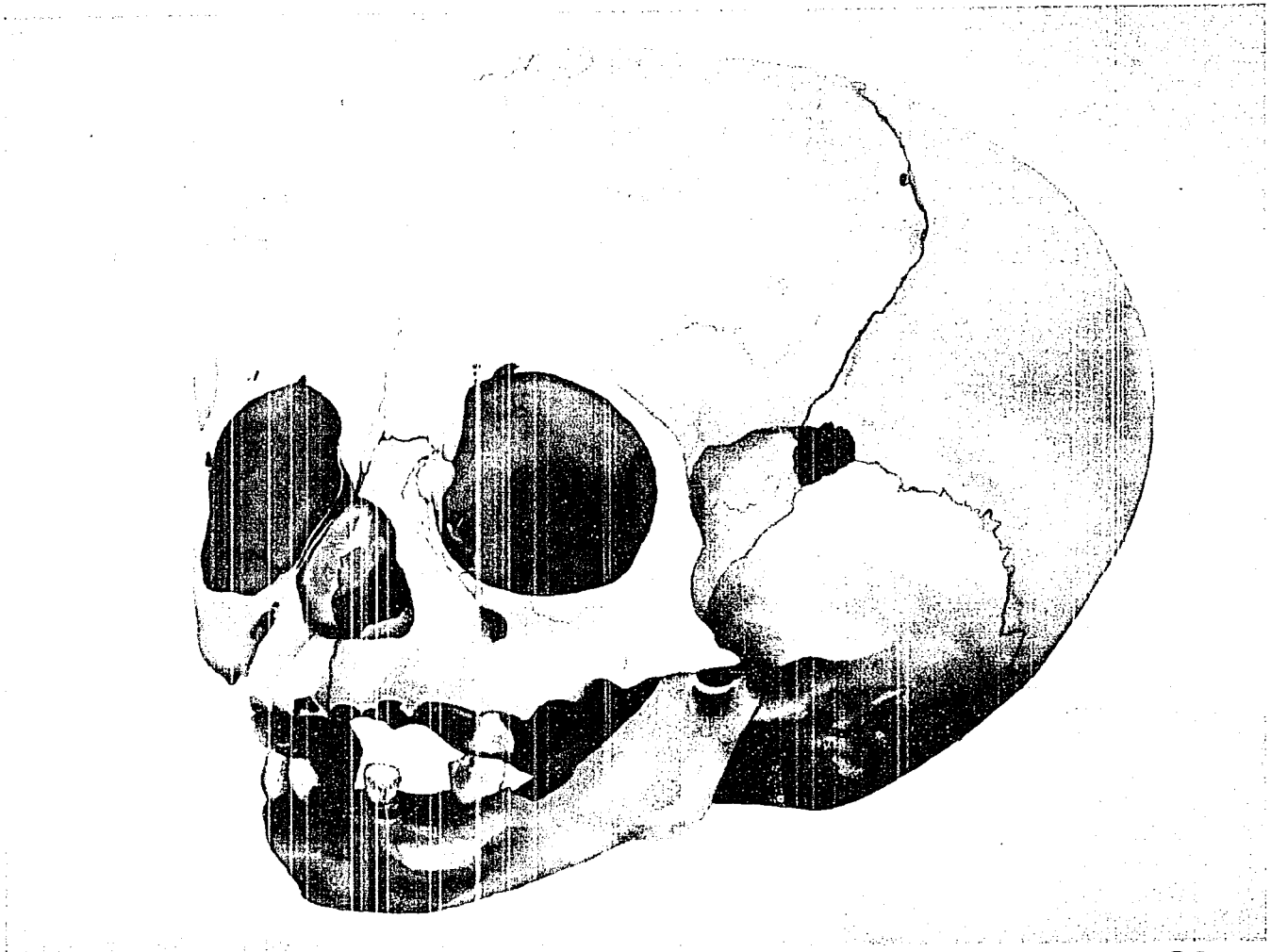

PLATE 3. MAYAN BABY SKULL 1990

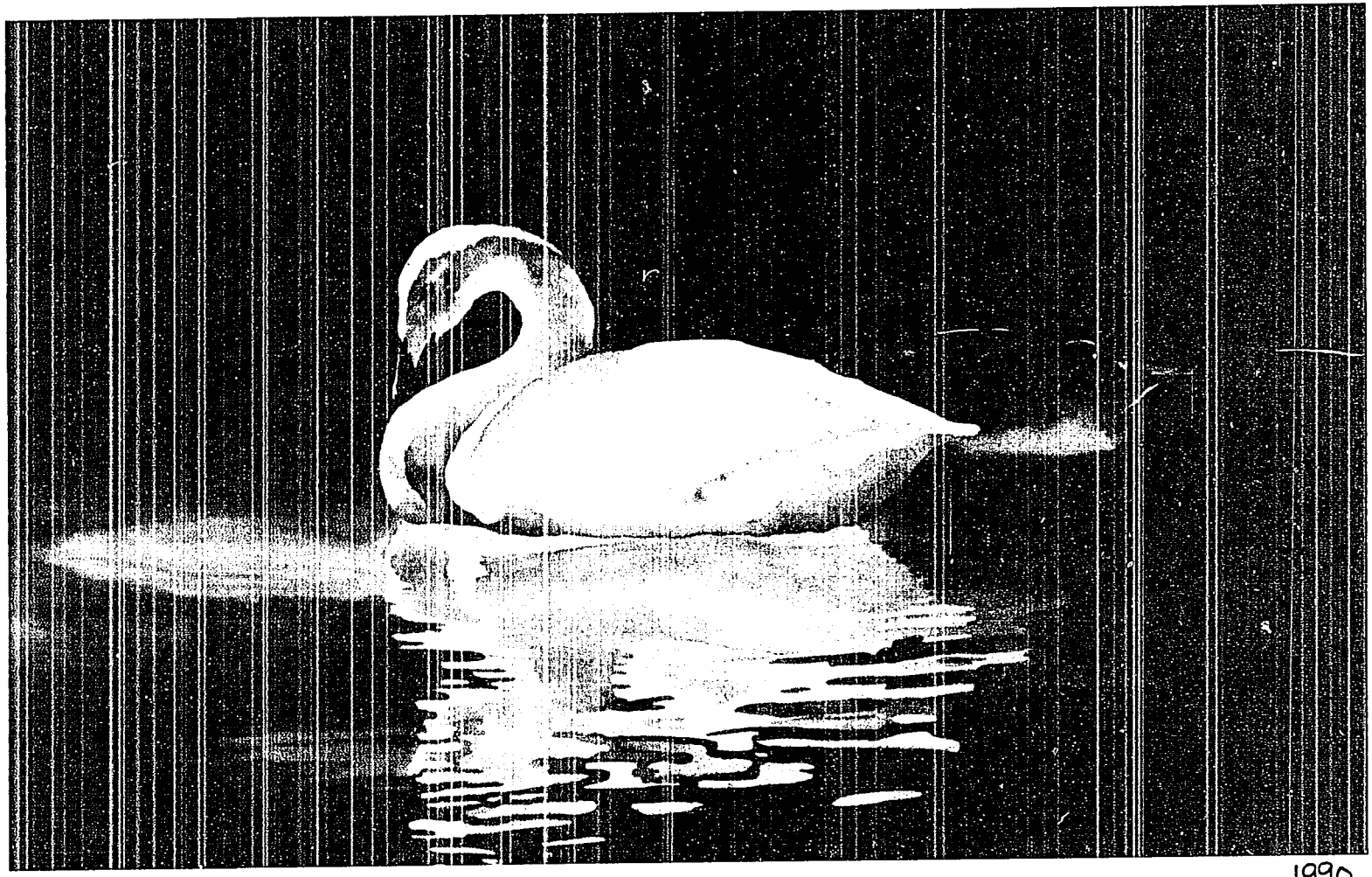

PLATE 4. SWANS

1990

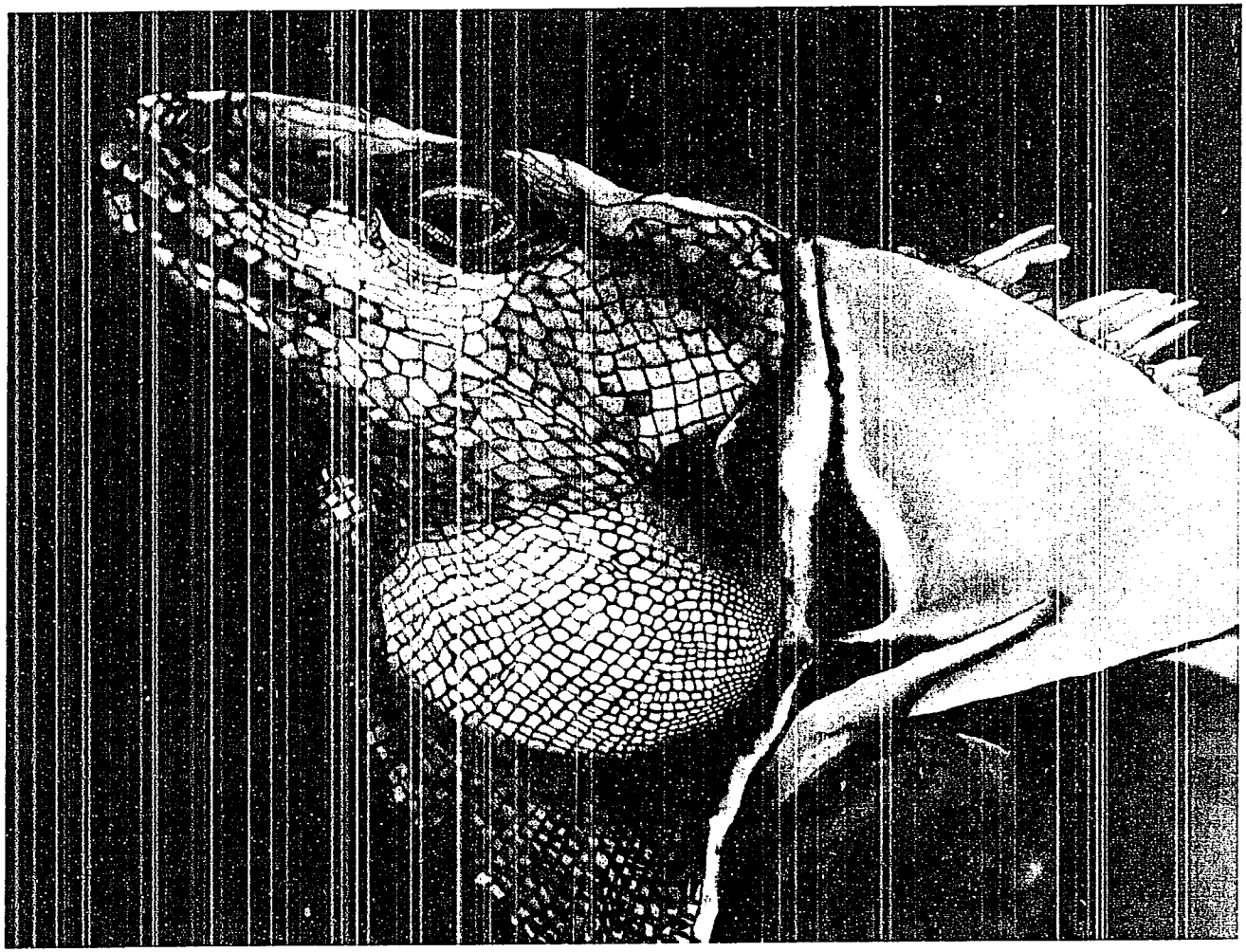

PLATE 5. IGUANA 1990

PLATE 6. CAGED BIRD 1990

PLATE 7. SWEET PEAS 1990

> unexpected awaits us at every turn and at every breath. The future is a vast, perpetually regenerated mystery, and the more we live and know the greater the mystery. When we drop the blinders of our preconceptions, we are virtually propelled by every circumstance into the present time and the present mind: the moment , the whole moment, and nothing but the moment. This is the state of mind taught and strengthened by improvisation, a state of mind in which the here and now is not some trendy idea but a matter of life and death, upon which we can learn to reliably depend. We can depend on the world being perpetual surprise in perpetual motion. And a perpetual invitation to create.[56]

Five Aspects of Artistic Competence

Seizing upon the mistake, the mind suddenly bursts into the open and takes a new route toward vision.[57]

The time I have spent painting has compelled me to attempt to describe, organize, and apply my experience. The urge is to identify the links between the artistic processes involved in painting and artistic processes involved in tackling the corporate issues I spend my professional life assisting my clients to resolve. I suggest here five aspects of artistic competence that I have experienced while painting which are also involved when working the non-art-related artistic problems that make up systemic environments, corporate or otherwise. These aspects begin a description of the nature of artistic competence that can point-the-way to an educational process facilitative of its development .

Taking Heuristic Action. To work heuristically, individuals must be able to construct problems out of situations that involve multiple points-of-view, contradicting pressures, and many ambiguous elements. A constructed problem becomes an entry point into a situation. It is a place to begin a process of learning, rather than a place from which to determine a fixed end-point. Many possible future outcomes must be imagined and developed before an orientation can be selected. Heuristic action demands flexible purpo-

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[56] Nachmanovitch, Free Play, p. 22.

[57] Briggs, Fire in the Crucible, p. 279.

siveness. Because this kind of action involves continuous learning and takes place in a dynamic environment, directions and goals must evolve in response to change and new experience and information. The changing and emergent nature of complex situations often generates the unexpected--something that is easy to overlook, fear, or deny. Individuals skilled at heuristic process are tuned to the emergent aspects of situations. Even though these individuals may become diverted from their original purpose, new purpose evolves hand-in-hand with and informed by emergent elements. Heuristic process is a process of exploration as one must step forward and act without clear pathways and with limited knowledge.

Inquiry. Artistic situations demand individuals to develop their understanding of a new situations and many perspectives; therefore, an ability to inquire is necessary. Constructive inquiry involves using "truth" and "fact" in an unbinding way, acknowledging that these are far from absolutes. Questions must be framed that allow assumptions to be uncovered, multiple perspectives to be explored, and distinctions to be understood. Listening, observing, and interacting become processes of learning rather than a process of self-validation. This learning can be generative if self-reflection and personal inquiry into tacit assumptions and paradigms is explicit, public, and creative.

A conversational version of inquiry has been identified by David Peat and David Bohm. They distinguish "dialogue" from "discussion" by defining dialogue as--"a free flow of meaning between people in communication, in the sense of a stream that flows between banks; and they define discussion as--"where people hold relatively fixed position and argue in favor of their views as they try to convince others to change."[58] Through

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[58] Bohm and Peat, Science, Order, and Creativity, p. 242.

discussion the best that can be hoped for is agreement, from dialogue something creative and new can emerge.

Perceiving and Working With Complexity. Complex situations demand an ability to discover and work with non-linear, mutual causal situations. This involves looking at shifting levels of influence and patterns of relationship between many component parts. In addition, looking at one isolated component of a problem at a time is less helpful than being able to simultaneously work with specific components and whole systems. The whole system provides meaning and context for specific components and their interaction. Resolving complex issues often involves synthesizing seemingly antithetical elements, juggling and weighing multiple options at the same time, or integrating information across disciplines. When analytical methods of representing a situation fall short, metaphoric or homospatial thinking are helpful in generating understanding by uncovering relationships, similarities, differences, or possibilities that had prior to remained unseen.[59]

Self-Managing Personal Learning. The ability to self-manage learning in the face of an artistic problem depends on a complex of processes, including self-direction and motivation; personal flexibility and responsiveness to change; experimentation and exploration while using "failure" as a learning tool; and learning generative rather than simply acquiring new self-validating data. In this regard, Nachmanovitvh discusses the usefulness of mistakes in his book, Free Play:

> In school, in the workplace in learning art or sport, we are taught to fear, hide, or avoid mistakes. But mistakes are of incalculable value to us. There is first the value of mistakes as the raw material of learning. If we don't make mistakes, we are unlikely to learn anything at all.

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[59] Rothenberg, Creativity and Madness, p. 27.

> ...when a mistake occurs we can treat it either as an invaluable piece of data about our technique or as a grain of sand around which we can make a pearl. [60]

It is both the development of technique and the creation of the pearl that are important to a self-managing learning; however, it is in the discovery of the pearl that artistic competence lies, for in that moment we have the opportunity for generative learning.

Intuitive and Qualitative Thinking. Intuitive and qualitative process are experienced in the inner world of mind's eye or as a felt sense in the body. They are not developed through the second-hand acquisition of data, but through observation, experience, awareness, and sensitivity. These processes include an ability to learn by exploring randomly or imposing structure on a problem situation; following tacit awareness of congruence or quality to indicate solutions; making intelligent guesses and conjecture; and becoming a connoisseur of the subtle features of a situation or discipline. Eisner defines connoisseurship as, "the means through which we come to know the complexities, nuances, and subtleties of aspects of the world in which we have a special interest."[61] Learning to take a special interest goes hand-in-hand with the ability to make sound qualitative judgments.

Table IV provides a summary of these five aspects of artistic competence. In my mind, these five aspects are simply a place to begin defining the nature of artistic competence. They remain as yet unscrutinized or tested, for they come solely from an initial attempt to identify and sort out my experience. Certainly much exploration and study is necessary. Yet, as I apply these competencies to corporate and other complex problems,

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[60] Nachmanovitch, Free Play, p. 88.

[61] Eisner, The Enlightened Eye, p. 68.

they seem to match the demand of these issues. Slowly, and in an intriguing fashion, a new ease with complexity and change has begun to develop.

TABLE IV
Artistic Competence

1) **Taking Heuristic Action:**
   - problem constructing
   - flexible purposiveness
   - recognizing and responding to emergent characteristics
   - projecting future scenarios
   - acting without clear pathways and with limited knowledge

2) **Inquiry:**
   - constructing questions
   - exploring and valuing multiple perspectives
   - uncovering and testing tacit assumptions
   - self-reflection and generative learning
   - using "truth" and "facts" in an unbinding way

3) **Perceiving and Working with Complexity:**
   - perceiving and working with mutual causality
   - working simultaneously with whole systems and components
   - juggling and weighting multiple options
   - seeing patterns and relationships
   - synthesizing seemingly antithetical or oppositional system elements

4) **Self-Managing Personal Learning:**
   - self-direction and motivation
   - creative process skills
   - using "failure" simply as experience
   - self-organizing skills
   - improvisational skills

5) **Intuitive and Qualitative Thinking:**
   - working randomly and with structure
   - using tacit awareness of congruence to pursue solutions
   - making intelligent conjecture and guesses
   - becoming a connoisseur of qualitative features

The Development of Artistic Competence

How does one bring the child to his full analytic powers in a discipline while at the same time preserving in him a robust sense of the uses of intuitive thinking, both in intellectual activities and in daily life.[62]

The challenge for me personally has become clear: How do I transform my mentality in the face of the embedded mechanistic paradigm of technical rationalism that I carry with me? How do I develop my personal artistic competence as it applies to my professional and personal life? I have begun to answer these questions through my work with systems thinking and painting.

Beyond my personal development, the need for the development of artistic competence of individuals working in complex environments has been compellingly voiced and demonstrated to me through my work with clients. If the five aspects of artistic competence discussed above help us comprehend and act in complex systemic environments, then the conscious development of our ability to do them effectively is imperative. Certainly a deep and thorough exploration of the nature of artistic competence seems warranted as well as the development of educational methods that will facilitate its development. Whatever the nature of artistic competence, it seems prudent to begin its development early in our educational process. Instead of teaching students to memorize, take direction, narrow their scope, and follow rules, we must help them develop their ability to:

- construct problems out of ambiguity
- follow heuristic pathways to flexible goals
- inquire into and integrate multiple perspectives
- generate and weigh multiple solutions to complex problems
- balance the commitment to structure and clear direction with a responsiveness to change

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[62] Jerome Bruner, quoted in Gabriele Rico, Writing the Natural Way (Los Angeles: Tarcher, 1983), p. 74.

- use intuition, imaging, and pattern and qualitative sensitivity in tandem with analysis
- self-reflect and learn generatively
- explore, improvise, and learn in unfamiliar territory and,
- self-organize individual performance and collaborative participation.

However, I fear the paradigm or mentality of technical rationalism is deeply embeded in our educational system. The alternative is to learn to grapple with the artistic as adults. As adults we face the potentially painful process of changing mentalities--changing the nature of our internal landscapes. In the corporate environment, process consultants have been attempting this, as have other professionals who courageously work with complex, qualitative, and systemic issues. It has been and remains a difficult journey; yet, for many of my clients and myself, it has been a worthwhile and fruitful struggle that has yielded the shifts in perceiving and acting described earlier.

Whenever one attempts to develop artistic competence, my experience suggests it can be fostered in two different ways. First, it can be developed through practice in the arts. If this development is accomplished through the practice of the arts, then explicit bridges must be built to allow these strengths to be applied to non-art–related subjects. In my educational background this bridge was in no way apparent until I pursued it with my own motivation. To be effectively employed, this connection must be made explicit and be clearly defined. While the systems perspective is gradually being accepted and mainstreamed into corporate environment, the field of the arts has lain relatively fallow as a resource for the development of capable individuals. Although practice in the arts can offer a means to build artistic competence, painting and drawing may seem far removed from the demands of corporate America. There must be another means to ensure the development of artistically competent individuals.

In this regard, the second way I propose artistic competence can be developed is to practice directly with problems that exercise these abilities during our education development. The features of complex environments must be acknowledged by our educational institutions. Ambiguous, qualitative, intuitive, and heuristic problems and processes--must be explicitly integrated into, rather than systematically removed from, educational programs whether they be public or corporate. We must learn or re-learn how to approach complexity by engaging it with the five aspects I have identified. We must develop learning environments that can foster these aspects. The educational environment described in Table III is a beginning description of this kind of learning environment could be designed.

Conclusion

> *I can adopt the traditional attitude, treating what I have done as a mistake: don't do it again, hope it doesn't happen again, and in the meantime, feel guilty. Or I can repeat it, amplify it, develop it further until it becomes a new pattern. Or beyond that I can drop neither the old pattern nor he new one but discover the unforeseen context that includes both of them.*[63]

I have offered a possible description of the nature of artistic competence based on my experience working with the demands of a complex corporate environment, my studies in systems theory, and my experience as an artist. In my mind this synthesis is a first step in an exploration of the subject. While my process of developing and applying artistic competence has begun to yield the results the pressures of practicality and existing norms make this transformative journey difficult.

Corporate environments and the vast majority of people who live and work within them operate with a tacit mechanistic framework. Typical organizational design and

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[63] Nachmanovitch, Free Play, p. 90.

dynamics are an expression of a technical rationalist paradigm. The flow of the environment attempts to follow a rigidly linear process of goal-setting, planning, organizing, implementing, and controlling. Corporate hierarchies provide a means for promotion and quantifiable, objective measures of success, and organizations are indeed in business to make a profit. These pressures generate resistance to any potentially risky shift in how corporate systems work. Those of us who believe a systemic, artistic paradigm can add valuable alternative ways of thinking and acting to corporate systems, as well as other complex systems, must find a way to demonstrate this value--we must find way to operationalize this way of knowing the world and verify its viability. We must become practitioners of this way of engaging the world to discover what it might produce.

One such practitioner is Peter Senge. In his book, *The Fifth Disciple*, he describes a systemic, artistic shift of mind that he believes will enhance the viability of today's organizations:

> This, then, is the basic meaning of a 'learning organization'--an organization that is continually expanding its capacity to create its future. For such an organization, it is not enough to merely survive. 'Survival learning' or what is more often termed 'adaptive learning' is important--indeed it is necessary. But for a learning organization, 'adaptive learning' must be must be joined by 'generative learning,' learning that enhances our capacity to create.[64]

In addition to Senge, there are other writers and practitioners who have eloquently described the potential of the shift of mind I have proposed. However, even with this vision in place, the shift of mind, the change in mentality, from mechanistic to artistic must happen inside each person, through personal experience. Leaning to learn, learning to

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[64] Senge, The Fifth Discipline, p. 14.

behave, think, feel and act artistically is akin to the process of learning to ride a bicycle as a child, and is well described by Nachmanovitch:

> A girl riding her bike discovers the secret of effortless control is balance--continuous adjustment of continuous change...she has learned that she can use less and less means to control greater and greater power. She has learned to encounter and continuously play with rhythm, timing, weight, balance, geometry, right- and left-handed coordination. She does this by herself, from her own body. The emotions attendant on such a discovery are fear, delight, pride, disbelief, and a desire to try it again and again.[65]

Those of us who are committed to exploring and fostering an artistic way of knowing must take steps to develop our artistic competence. Within both our personal and professional lives the challenge is to participate in and offer learning opportunities on the order described by Nachmanovitch--experiences that allow change to come from within. These learning experiences must shift our conception of what is possible, of what is true, and offer us an opportunity for generative learning and creative action. Because the shift from mechanistic to artistic competence will not be easy, the learning opportunities must also stimulate a "desire to try it again and again." It is this desire that gives us the courage and patience that the shift to an artistic way of knowing the world requires, especially when this shift demands that we trade certainly for ambiguity, truth for possibility, and that we make delicate, important judgments with limited knowledge. In an artistic world, even knowledge becomes part of a creative process. As physicists Bohm and Peat tell us, "Knowledge of reality does not ...lie in the subject, nor in the object, but in the dynamic flow between them.[66] As I finish writing these words I suddenly know it is time to go back to my studio and paint, and paint, and paint.

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[65] Nachmanovitch, Free Play, p.48-49.

[66] Bohm and Peat, Science, Order, and Creativity, p. 67.

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