Ecological futures: Systems theory, postmodernism, and participative learning in an age of uncertainty.

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Introduction

The approaching millennium finds organizational theory struggling with at least two streams of thought that often seem quite at odds with each other. On the one hand, we have the call of the environmentally conscious for an ecological organizational theory, based on the perceived need for a (swift) reaction to, and reconceptualization of, industry's role in light of environmental degradation; we also find a different voice, namely that of postmodernists: this is a voice of profound suspicion in any 'project,' a voice that deconstructs attempts at developing theories and warns us that the road to hell is paved with good (and bad) intentions.

Some of the unresolved questions that immediately come to mind are: How can the urgent call for action of the ecologists be reconciled with the suspicion and 'negative dialectics' of postmodernists? How can the penchant for systems thinking in ecological thought (the word ecosystem gives it away) be reconciled with the almost visceral distaste for systems theory found in postmodernists? Furthermore, despite the emerging recognition of the need for a more ecological organizational theory, the implications of such a wedding a far from clear--about as unclear as a postmodern organizational theory seems at this point. In this paper we will attempt a 'shotgun' wedding of ecology and postmodernism--in reality more like a menage a trois, since we want to further wed this uneasy couple with organizational theory.

What we intend to do is not present an ecological/postmodern organizational theory, but rather attempt to develop a theoretical context for a set of practices with which we believe thinking about this wedding might be a little less awkward--or at least possible. Crucial here is the contribution of Morin (1994), whose work is as yet little known in the United States, suggesting a shift away from what he has called 'simple thought', which is reductive, disjunctive, and foundationalist. Morin's call for a 'complex thought' urges the need to completely and radically revise our ways of thinking. He suggests a shift from 'simple thought' to 'complex thought' which is systemic, dialogic, and conjunctive. A 'complex' alternative, epistemology is presented, inviting a form of thought that is systemic, conjunctive, and creative. Complex thought recognizes that system and environment can be said to exist in a dialogic, inter-retroactive relationship.

Complex, systemic thought and postmodernism share a lack of faith in prediction, control, and certainty. This suggests the need to think differently about the future, and engage in an ongoing process of learning/action that recognizes the incomplete nature of our knowledge. Rather than attempt to predict the future suggests the development of a plurality of scenarios based on

uncovering fundamental values regarding the relationship between specific organizations and their environment. We will present a) a necessary but not sufficient set of competencies for a process of ecological learning, that will provide participants with the appropriate knowledge-context for a systemic, collaborative/partnership, and creative learning process and b) propose that the use of scenario planning, participative design, and search conferences can be extremely useful when applied to the process of designing ecologically/economically sustainable futures by developing a systemic, collaborative and creative set of discourses/practices.

We begin by outlining the differences between modern and postmodern views. Before embarking on the development of a systems alternative we will first address the criticisms of systems theory by postmodern thinkers; then develop an outline for an epistemology of complexity based on the work of Morin and Ceruti (1989, 1994); finally we will speculate about its relevance for modern organizational discourse.

Modern/Postmodern

Rossi (1987) outlines the postmodern differentiation between modernity and postmodernity in terms of a number of different propositions. Modernity is seen as an age in which reason creates a unifying structure of thought and knowledge, and modernist knowledge is seen as resting on solid foundations. Reason is worshiped because of its supposed capacity to construct 'absolute' or totalizing explanations. The use of reason is connected to the idea of progress, whereby reason leads continuously to ever-greater 'enlightenment'. There is faith in technology, which is seen as being able to provide ever-greater control and domination over the natural and human environment. Time is linear, and novelty succeeds upon novelty to create an effect of ever-changing, ever-improving newness and originality.

In postmodernity, on the other hand, we find a weakening of reason, a breaking down of homogeneous, unifying models of knowledge, and "a plurality of non-homogeneous models and paradigms of rationality, which cannot be linked, but are tied together only by the specificity of their particular domain of application" (p.14). In other words, knowledge becomes relative and contextual, any pretense at linear progressive development is removed, and the fascination and faith with the new is replaced by a sense of irony and severe doubt in the ability of science/technology/reason to improve the human condition. Indeed, efforts at improving or controlling the human condition are often viewed with great suspicion.

A modernist approach to the perceived ecological crisis might be 'we can rebuild the ecosystem--we have the technology'. Postmodernists would immediately reply, 'that's the zeal you showed last time, when you got this modern ball rolling: your faith in progress always hides the dark shadow of those who get left behind by your need to control things.' A crucial disagreement therefore resides in nexus of power/knowledge. What is knowledge? Who benefits from it? How are knowledge and power used to create--and/or destroy?

We will begin with one of the main sticking points, namely the systemic nature of much ecological thought. Can we legitimately think systemically, ecologically, in a postmodern context? Do 'wholes' and 'systems' immediately become part of a 'totalizing', oppressive story used for the domination of others? Or can we think systemically, contextually, in a way that is not totalitarian and orienting towards the status quo, as postmodernists have criticized systems thinkers of doing?

Next, we will summarize a systemic approach to knowledge as developed by the Italian epistemologist and philosopher of science Mauro Ceruti. The purpose of this section is to show how a systemic approach can in fact be pluralistic rather than homogenizing/totalizing, and how it recognizes both our fundamental ignorance and uncertainty, as opposed to the certainty sought after and claimed by modernist thought. This ignorance, we will later argue, can become a starting point for an inquiry into ecology and organizational theory, a starting point that can potentially generate a plurality of approaches to our problems if it is pursued in the context of relationships of partnership rather than domination.

The Postmodern Critique of Systems Theory

The postmodern critique of systems theory can be summarized in three parts. According to postmodern thinkers such as Lyotard (1979), systems theorists 1) operate with a modernist epistemology; 2) through their emphasis on equilibrium reinforce the status quo through the maintenance of power structures which, in deconstructive terms, can be found in hierarchical relations such as man/woman, humans/nature, and management/workers, disguised as symmetrical relations devoid of power dynamics and merely embroiled in logical/rational differences; 3) use the term 'system' in a way that becomes a totalizing, homogenizing description which, in the case of a human system, is strictly instrumental and/or functionalist in nature, i.e., 'this is the system, and all parts must collaborate for the benefit of the system or else-'--Lyotard calls this the 'terror' of 'systems performativity'.

Systems Epistemology

We will begin with a discussion of the claim that systems theorists (presumably all of them) operate with a modernist epistemology through a discussion of Italian epistemologist and philosopher of science Mauro Ceruti (1989, 1994) who has explained the historical nature of the shift in our conception of knowledge from a systems/cybernetic perspective by pointing out that the latter has rejected the ideal of a fundamental, objective vantage point, the result of a neutralization of the observer's values and perspectives. Consequently, no neutral language is possible or even desirable, and the observer cannot be considered as somehow standing outside of the events that are observed.

The systemic challenge to the modernist perspective is addressed very clearly by Ceruti who states that in our century we have moved from viewing knowledge as a cumulatively built edifice to one of context--an ecology of knowledge. This eliminates the possibility of the knower as outsider, or 'bystander', and reflects an awareness of how knowledge stands not outside our world, but is in it, and all knowledge passes through problem formulations, categories, and disciplines. Knowledge from this perspective has no foundations, but it does have a history.

Ceruti (1994) writes that knowledge is therefore beginning to study its own origins. In a shift triggered by Von Foerster's (1982) development of the cybernetics of cybernetics, we are studying not just observed systems, but the observing system, the context from which knowledge emerges. This is a shift from acquired knowledge (and the idea of possessing knowledge) to the roots and matrices of that knowledge in history, biology, anthropology, politics, and so forth (the historically constituted and constitutive nature of knowledge).

Ceruti argues that the historical development of knowledge is by no means predetermined. Paths open up and close down, and are not always followed. Paths are constructed by inquirers, whether

in teams, communities, research groups, or by individuals. Ceruti goes on to argue that therefore an encyclopedia is more the acknowledgement of a series of paths, rather than an exposition of results. Every path of knowledge is idiosyncratic and contingent, but the heuristic and strategic nature of every grouping of problems and theories has historically been left out and replaced by a linear view of acquired knowledge. In Ceruti's view we find different historical contexts, with different problems and questions, approaching knowledge in different ways and with different interests, as opposed to a univocal, homogeneous developmental process of edifice-building. With the loss of foundations we find instead historical trajectories, a series of paths, routes, voyages, and adventures that may or may not be followed or continued. Ceruti states that this shows us an enormous plurality of perspectives and positions that are at the same time complementary, concurrent, and antagonistic, and that the idea of a uniform, homogeneous knowledge with privileged ontological or linguistic access to reality is simply not plausible anymore.

One only has to think of the existing plurality of management theories or personality theories to grasp Ceruti's point. An attempt to homogenize these inevitably does violence to their complexity and the at times incommensurable nature of their basic assumptions. In this view, an observed system (or phenomenon we seek to study) does not exist 'out there', but is created by the observing system through an act of choice, of 'system definition' (Bocchi & Ceruti, 1988). Enormous complexity of experience is reduced to a manageable description. A system is constructed, not just described. Boundaries are traced by the inquirer, establishing what is 'in' the system and what is 'out', and at what level of detail one is choosing to study the phenomenon in question. Ceruti (1994/1986) writes that the process of system definition is where the observer's operations are first apparent, since they trace the boundaries between system and environment, and establish the relationship between system, subsystems, and suprasystems. Ceruti thus makes the case that depending on one's perspective, different worlds emerge as reflections of different positions. No longer is it possible to start with the assumption, as classical science did, of an ideal of omniscience, beyond 'positions', requiring an inquirer who had been external to the observation and whose presence was 'neutralized' for maximum objectivity. Ceruti points out the significance of this:

The radical integration of the observer into the fabric of knowledge necessitates the development of a new theory of the observer, the emergence of a new image of the subject, and the constitution of a new cognitive paradigm. The elaboration of a theory of the observer is outlined today as possible and paradoxically necessary only by foregoing the view of the observer her/himself as a condition external to the domain being observed. This corresponds to the nonexistence of a fundamental observation point whose privilege corresponded, paradoxically, to both the project of an epistemology without a subject and to the ideal of a neutral language. (p.107)

What we find in this position is the re-introduction of the inquirer--but also the environment--the context of inquiry. Clearly Ceruti, and the other systems thinkers he discusses (Morin, Von Foerster, Atlan, Von Glasersfeld, Varela, Maturana, and so on) do not hold to a modernist epistemology. Indeed, Lyotard's critique of systems theory is in actuality a critique of Luhmann, who is not representative of systems theory as a whole, (he is certainly not widely known in America, where he is mostly unreferenced in the systems literature) and indeed, given the fact that Lyotard's The Postmodern Condition was published in 1979, it is a critique of the 'first' Luhmann, since the German sociologists' work has undergone a considerable change, integrating the

epistemological shift of the second cybernetics of Von Foerster, which Luhmann developed most thoroughly in his book Social Systems (1984/1990). Our discussion of Ceruti also points to the fact that some systems theorists have in fact devoted an enormous amount of time to critiques of 'modernist epistemologies'. The postmodernists monolithic view of systems theorists is clearly untenable, as is their claim that (all?) 'systems theorists' operate with a modernist epistemology.

Expertism/Machine Metaphor/Learning

For critics like Lyotard, systems theorists view a system, such as an organization, as a machine whose purpose is 'performativity'. In the kind of machine-system critiqued by postmodernists (but also, we should note, many systems theorists), 'problems' are 'attacked' through 'social engineering' and the mentality of 'expertism.' When the machine is broken, one calls the expert--the 'systems analyst'. But unlike machines, which are literally dumb, human beings can communicate about their own predicament, and indeed occasionally change it. The expert mentality invalidates the knowledge of non-experts who are, in fact, considered dumb, whether explicitly or implicitly, literally or metaphorically.

More importantly, in such a machine-view of organization, our direct perceptual experience of the natural environment and social field is invalidated by the primacy of conceptual or abstract knowledge that compartmentalizes problems (whether they be organizational or environmental) as it abstracts them from the whole context. Such a perspective is linked to what Tulku (1987) refers to as the technological model of knowledge development, that requires specialized information processing by qualified experts with the "technical know-how" to find solutions to social and organizational problems. The main concern with technological knowledge is gaining power over our environment.

A telling example of how our dependence on scientific cognition is supplanting a more direct knowing of the natural environment is described by Mander's (1991) juxtaposition of wildlife biologists' models of resource management and the traditional, the Inuit Indian's intimate knowledge of caribou behavior. Mander argues that the intimate, personal knowledge of Inuit Indians is being replaced by complex computer print-outs that stress "a fast-paced, objective, abstract, quantitative kind of knowledge" (p.257), and that this knowledge has in fact often proved disastrous.

Expertism, by disqualifying the lived experience and knowledge of those who have been labeled "non-expert" individuals, and are viewed merely as interchangeable parts of a large machine, has been severely critiqued by systems theorists such as Emery (1983). One of the problems with the mentality of social engineering and expertism is that, in keeping with the reductionist/disjunctive nature of modernist thought, it reduces the number of individuals who have any kind of authority to address a problem, and then makes a strict (hierarchical) disjunction/division between those who can and those who cannot do this. This eliminates the possibility of systemic attempts at solutions by all stakeholders working collaboratively. In terms of research the new postmodern/second cybernetic/systemic approach suggests the need to explore the 'lifeworld' of organizational, through an existential phenomenology, hermeneutic, and ethnomethodological studies of the actual practices in organizations today (Gephart, 1993; Thachankary, 1992). Here we can find a potentially very fruitful interaction of systems approaches with qualitative methodologies, an effort already championed by Checkland (1981) and others.

The mentality of expertism does not merely invalidate, and therefore miss out, on the potentially vital lived knowledge of those actually working in organizations for the sake of technocratic expertism. It also invalidates the experience of those living in communities and larger ecosystems affected by organizations. It invalidates lived, historically developed alternative and potentially very important 'non-scientific' forms of knowledge of peoples who have in fact managed to live in relative harmony with Nature for perhaps thousands of years. Although the argument can be made that this closed-mindedness is an example of the scientistic 'machine' paradigm of Western civilization, it also points us to the issue of knowledge/power: who benefits from certain kinds of knowledge, certain interpretations of the human/nature relationship? Most importantly, the question becomes, What are the alternatives to 'expertism'?

Systems/Power/Deconstruction

The issue of systemic thought's relationship to power is a theoretically very interesting and practically very important one. The criticisms leveled at systems theory have been, generally speaking, that it is a totalizing discourse, a grand narrative that opens itself up to the possibility of being employed by dominant groups to impose efficiency and performativity on the systems they seek to control. Lechte's (1994) summary of Lyotard's position is typical of the way systems theory and its practitioners is summarily dealt with in much postmodern discourse today:

For the systems theorist, human beings are part of a homogeneous, stable, theoretically knowable, and therefore, predictable system. Knowledge is the means of controlling the system. Even if perfect knowledge does not yet exist, the equation: the greater the knowledge the greater the power over the system is, for the systems theorist, irrefutable. (p.248)

Lechte's discussion is useful inasmuch as it isolates some of the assumptions of certain postmodernists regarding systems theorists: that they describe systems (typically organizations) that are, or at any rate should be, homogeneous and stable, and therefore predictable (a critique that misses the entire chaos/complexity development, see Stacey, 1992), and that the systems theorists knowledge is used solely for the purpose of gaining control over the system, which is viewed as being outside the theorist--in other words, it is really the observer/theorist's environment.

We shall return to some of these criticism as we go along, but should first note that these postmodern criticisms of systems theory are nothing new, and in fact seem woefully unaware of any developments in systems theory and cybernetics beyond the work done is sociology and political theory in the 1960s. McCarthy's (1991) critique of Habermas's flirtation with systems theory, for instance, uses the work of Buckley (1968) as its paradigmatic reference. This line of work was critiqued extremely well twenty years ago by sociologist Alvin Gouldner (1973). At that time, Gouldner criticized Parsons' systems-based functionalism because of its stress on interdependence, conformity, equilibrium, and 'controlled power'. Lyotard's critique of systems theory likewise adds nothing new to Gouldner's thoughtful criticisms, apart from a discussion of recent developments in science that, in Lyotard's view, challenge the fundamental assumptions of systems theory. Lyotard draws the work of systems thinkers like Prigogine and Rapoport to stress the new emphasis in science on heterogeneity, disequilibrium, and complexity against equilibrium and homogeneity. This seems rather self-defeating if it is intended to discredit systems theory, because the work of these scholars, who are themselves systems thinkers and both former

presidents of the International Society for Systems Sciences (ISSS), has been incorporated by many (though of course by no means all) systems thinkers. Lyotard is critiquing a functionalist equilibrium-oriented form of systems thought that was popular in the 60s, but has lost favor in the 80s and certainly the 90s, and suggesting it is the foundation of all systems theory.

In other words, the postmodern 'straw person' of an equilibrium-oriented systems theory is in fact a quite unsophisticated caricature of pioneering 60s work by Parsons, Buckley, Easton, and others. The postmodern criticisms of this position add little if anything to Gouldner's, apart from suggesting a profoundly misleading marginalization of systemic thought in the context of modern science.

Having disposed of the criticism that systems theory is somehow inherently, theoretically, biased towards maintenance of the status quo, we now turn to the issue of how power can be conceptualized in systems terms, and the potential cross-fertilization between systems theory and deconstructionism--in other words, the more vital question of who benefits by a maintenance of status quo, whose interests are systems theorists supposedly aiding and abetting, what are the discourses and practices of domination?

An answer lies in the whole notion of system-definition, and the relationship between what is defined as system and what is defined as environment. Ackoff (1983) has argued that our view of organizations has largely been environment-free. The implications of this have been spelled out in numerous works outlining the deleterious effects of industrial society on the natural environment. When studying a subject of inquiry such as an organization, our thought has essentially been context-free, focusing only on that small part of the environment that we can directly identify as relevant to the organization--perhaps competition, perhaps consumer preferences, certainly the stock market.

A systemic/postmodern approach changes our concept of, and relationship with, the environment. Whereas modernist epistemology and organizational discourse and practices can rightly be critiqued for being 'environment-free' as Ackoff (1983) suggests, in the sense that there was little or no awareness for the interconnectedness and mutually constitutive relationship between system and environment, a postmodern sensibility also draws our attention to the domination of the environment that was part and parcel of this so-called 'environment-free' approach. What this tells us is that in context-free, mechanistic modernism (as opposed to the romantic aspect of modernism, which idealized nature) the environment was not completely left out, but was rather viewed solely in terms of a thing to be exploited and dominated (Code, 1991). The 'environment' is therefore perceived as fundamentally 'other' to the system, and the relationship to the 'other', whatever is at the bottom of disjunctive oppositions, is fundamentally one of domination. In other words, the systemic critique of 'environment-free' reductionism has to be broadened to include the tendency for reductive/disjunctive thought to treat the context, the 'other', purely in terms of instrumental/power relations.

What we also see is that the term environment from a systemic perspective refers not just to the 'natural' ecology, but the social ecology as well, with equally exploitative relations. In 'environment-free' thinking everything that was not part of the system definition was part of the

environment, and therefore 'other', and that includes people. Most obviously this includes minorities, women, and other non-dominant groups.

The deconstructive approach championed by Derrida focuses on the hierarchical nature of oppositions so endemic in disjunctive thought, that appear at first to be 'horizontal': humans/nature, subject/object, man/woman, etc. Whereas these oppositions appear initially to just represent dichotomies, they in fact hide power relations which, from a systemic perspective, can be said to describe the choice of what is system and what is environment. In other words, we can see that historically modernity has favored one above the other (man over woman, humans over nature, etc.), and that which is dominant depends on who was making the system/environment definition, and who had the power to impose the dominant discourse. As an example, Wilden (1987) points out woman has typically been viewed as environment to man, and therefore has been viewed as the object of domination, the inferior term.

From this perspective, we can see that systems theory can in fact benefit from a reading of deconstructionists and other postmodern thinkers (e.g. Foucault), in addressing the need for a greater understanding of the discourse and practices of power/domination. But systems thinking is in fact extremely amenable to aspects of this approach, as we have suggested, and in the work of Eisler (1987), Montuori (1989), and Wilden (1987), we already find discussions along these very lines. Likewise, Morin's (1994) effort to develop 'complex thought' has captured the reductive/disjunctive nature of modern thought and extensively explored the relationship between disjunctive, dichotomous thought and domination.

By articulating the role the inquirer in the system-definition we can begin to answer the questions 'says who' and 'who benefits', and begin to develop an understanding of the system-environment relationship. Clearly more effort needs to be made by systems theorists to articulate the issue of power, but, as we have seen, far from being incompatible, there may be some important areas of cross-fertilization.

Further Considerations

In summary, the critiques of systems theory by between much postmodern thought and systems thought operate on several levels. (It should be pointed out that the systems theorist could here 'go on the offensive' and argue that the postmodern criticisms of systems theory could be turned around and become systems critiques of much postmodern thought.)

* The first is the intrinsically holistic and therefore potentially totalizing nature of systemic thought. As we have seen, a systems epistemology that draws on the second cybernetics (Von Foerster, 1983) places the role of the inquirer at the forefront. Having disposed thus of claims to absolute knowledge, we address the interplay of values/intentions/knowledge, taking a much more critical approach to knowledge generation and the politics of knowledge.

* The second is the 'scientific' element in systems thought, since science has become an extremely questionable enterprise in the mind of many postmodern thinkers. Some postmodernists seem to want to dismiss any discussion of science as somehow a priori untenable on theoretical grounds, and dismiss systems theoretical and cybernetic approaches as pseudoscience and pseudo-social

science. But particularly in the context of a discussion of ecology this effort seems extremely ill-advised.

* Third, following from the second point, is that much of present-day systems thinking, particularly in ecology, draws our attention to the biological and physiological nature of humanity (Laszlo, 1987; Morin, 1994) and its environment, rather than merely the semiotic component (the linguistic/semiotic 'turn'), and again we find much of postmodern thinking profoundly at odds with this notion. A fundamental reconceptualization of the environment as not merely the natural environment, or just the semiotic environment (simulations/hyperreality/information age/culture of images/TV as the 'unreality industry', etc.) but the whole socio-ecological or bio-psycho-social system in which the participants live seems necessary to avoid extremely partial discussions. The environment, from a systemic perspective, is not just an abstracted Nature, or abstracted signifiers without signifieds, but humans as part of Nature and Nature as part of humans. This requires an understanding of a perspective whereby the fundamental interconnection between humans and nature is made clear, and the physicality, the embodiment of human beings is made apparent. Particularly in an age of so-called 'knowledge-workers', when we are told that brains is replacing brawn as the arbiter of job-worthiness, it becomes important not to leave our bodies at the door once we enter our organization, and remember that the mind/body disjunction is an equally pernicious correlate of the human/nature disjunction.

* Fourth, systems approaches in the social sciences generally address the need for action rather than merely interpretations of interpretations, particularly since they are applied in the much vilified domain of 'management.' Indeed, the flirtation of organizational theory with postmodernist philosophy is not being reciprocated, and some postmodernists view organizational theorists' efforts towards integrating postmodern thought as merely another opportunistic attempt to misappropriate intellectual discourse for the sake of greater control and productivity (Rosenau, 1993). This raises a host of questions that cannot be addressed in this paper. While the postmodernists' suspicions may not be entirely unjustified, they are also in some respects related to the previously mentioned, rather limited notion and consequent 'totalizing' (and profoundly 'suspicious') misrepresentation of organizational theory and systems theory by postmodernists like Lyotard.

* Fifth, and most importantly, perhaps the 'real' issue here is power and control, and the use of systems models to engage in precisely the kind of social engineering of whole systems so prevalent in Taylorist 'scientific management' with its mentality of 'expertism.' As we have suggested, this is a legitimate issue that needs much study and is being addressed to some extent by systems theorists.

It appears, therefore, that there are signs that systems theoretical approaches are not entirely incompatible with postmodern critiques of modernity, and some form of postmodern systems theory--incomplete and even embryonic though it may be--is already emerging. In the next section we will explore some of the implications of this development for ecological organizational theory.

Ecology/Postmodernism/Learning

What are the implications of the Postmodernism/Systems Theory dialogue for organization theory? Let us try to summarize them here: Postmodernists argues that linear progress, faith in technology, and our capacity for prediction are not only discredited but dangerous. Nevertheless, ecologists argue, we need to think about the future, although not in the 'old way,' with technological fixes or just lip-service to 'green slogans'. Our suggestion is that this indicates the need for an ongoing process of learning that recognizes that we simply do not really know how to deal with the ecological crisis at present, or how organizations may best address this problem, and that the search for one answer is part of the problem. We assume that 'more of the same' will most likely not work, and we therefore need to engage in a process of collective, contextual discovery to see what might work in our situation (given our local resources, constraints, possibilities, etc.) and how that relates to the work of others. In other words, rather than calling in the experts, we are calling for the development of a participative learning process with members of organizations and their communities generating knowledge that may or may not involve bringing 'experts' who would, if called, take on a role more akin to 'expert witnesses' or advisers.

Two things suggest themselves: a) a curriculum to foster ongoing learning, and the need to develop a theory base for such a curriculum, and b) ways in which this ongoing learning may be applied to real world organizational/ecological problems. For the curriculum of ongoing learning we propose the development of a set of competencies that can best be described, in Morin's terms, as the development of 'complex thought.' Montuori (1989, 1993; Montuori & Conti, 1993) has likewise argued that what is required is a shift towards a triad of systemic thinking/partnership-conjunctive thought/creative discourse and practices, as opposed to (modernist) reduction/domination-disjunctive thought/conforming (more of the same). These competencies would enhance the ability of organizational members to think together about problems in a way that much of present organizational discourse discourages. The 'ideal type' of the modern organizations can be described as hierarchical, homogeneous, stable, fear-based, deviation-reducing, stressing machine-like conformity, simple, emphasizing control and prediction, and fragmented in such a way that knowledge is parceled out on a 'need-to-know' basis. The development of the competencies we are proposing would be a necessary but not sufficient step towards developing discourses and practices that might enable an organization to shift such a 'postmodern-systemic' organizational type. The alternative, postmodern-systemic ideal type we are proposing, would, while incorporating at some levels some of the characteristics of the former type, stress heterarchical organization, heterogeneity, dynamic, alternating between simplicity and complexity, emphasizing understanding along with control and a degree of scenario planning (recognizing the contingent, non-deterministic, 'creative' nature of the future), with knowledge radically distributed throughout the organization (Montuori, 1989, 1993; Morgan, 1986; Purser & Montuori, in press).

In other words, the competencies would stress:
1) the importance of a postmodern systems thinking, which makes participants aware of the nature of open systems, embeddedness in larger ecosystems, the nature of inter-retroactive relations, and so forth. A way of thinking, in other words, that is not reductive/disjunctive but contextual and realizes the inextricable connection between system and environment and the role of the inquirer in the process of system/environment definition--in sum, an awareness of the role of space (context/ ecology/ interconnectedness, etc.), time (evolution/ history/ process/ genealogy), and knowledge (the role of paradigms/mental models/mindscapes).

2) An ongoing process of learning into the nature of the system/environment relation form a perspective such as that presented by Eisler's template of partnership/domination, which takes into account not only the deconstructionist critique of domination but also presents an alternative based on the potential for partnership. Who defines what is system and what is environment? What are the forces at play in the dominant discourse, in the system definition--who imposes this order? What of the other, alternative definitions?
3) A recognition of the fundamentally creative process involved in system/environment definition (i.e., the constructive, creative role of metaphor (Pepper, 1942) in system definition and the possibility of reframing), and in the possibility of generating a number of possible future scenarios for systems. This suggests the need for training in basic 'creativity awareness', and for a training that is also systemic/partnership oriented, which, in other words, focuses on creativity as a systemic process occurring in time and space within a context that includes other people, and that these people can be collaborated with in order to develop social creativity.

A form of social creativity (thinking and acting together in new ways), informed by the above curriculum, we would argue, is what is needed to think about the future in a manner that is not likely to fall victim to the excesses of modernism (more of the same/technological fixes) and the apocalyptic nihilism of some postmodernists (e.g. Baudrillard, Vattimo). Although we are proposing this foundation for our curriculum in the context of learning about an organization's relation to its larger ecosystem, it is clear that we believe its applicability is in fact much greater than that. Learning to think beyond reduction/disjunction (i.e. in a 'complex' or systemic manner), developing an understanding of the nature of partnership as opposed to domination as the central image of human relations, and nurturing our ability to think and act creatively are skills that we think have great general value, and in fact turn the traditional organizational competencies (specialization/need-to know; competition/domination; conformism/obedience), at least in terms of the theory-in-use, upside down. We therefore believe that the context of this learning process is of great importance. The introduction of what might potentially be creative disorder into the existing organizational order can be chanelled by focusing it on the development of positive, collective, attainable goals.

From Prediction to Participative Scenarios: Postmodern Ecological Futures
The modernist paradigm held a view of linear growth, bigger is better, more of the same, imbued with a profound faith in technology and as postmodernists like to remind us, a faith in control and prediction. Postmodernists and ecologists question the wisdom of this process, and critique what is--present organizational discourse and practices vis a vis the environment. Given the crisis of what is, the question often put is, What next--where to now? And the answer seems to be that we do not know, or at least, if we wish to be generous, that there are many different possible directions. It seems to us important to recognize also the need to understand what ought to be, particularly given the collapse of modernist 'manifest destinies', of modernist certainty and linear progress. Where should we go from here?

Again, we feel a systemic approach may be useful here. Along with the return of the inquirer in the second cybernetic/systems epistemology of observing as opposed to observed systems (Von Foerster, 1983, 1990; Von Glasersfeld, 1987), and an appreciation of the active role of the knower, we also find a shift from a position of certainty and authority, so typical of much modernist discourse, to one of uncertainty and exploration--a recognition of ignorance that is in many ways

very heartening. It suggests to us that instead of individual knowers, certain of our inexorable path, we might now consider ourselves cooperative learners, engaged in a search for new pathways, new trajectories, new possibilities.

If the modern project focused on the content of knowledge on which to build (organize) its edifice, then a postmodern-systemic organization may develop the capacity for knowledge in a radically distributed network throughout the organization and its environment (Montuori, 1993). Clearly this would entail a much greater degree of participation and representation on the part of everyone involved in an organization and its environs.

Given the irruption of fundamental uncertainty into organizational discourse, thanks to the postmodernists, we cannot rely on a certain future in which, thanks to technology, every day in every way we are getting better and better. Living with uncertainty becomes necessary. Prediction fails us--and positive predictions seem missing entirely. Nevertheless, as the ecologists remind us, there is a need to take action to remedy environmental destruction. Furthermore, it can be argued that people need hope, the possibility of a better future (Ogilvy, 1992). What becomes necessary is developing the capacity to develop new forms of knowledge, and alternative futures, which go beyond the gloom and doom of many ecological predictions. Useful as they may be, the Club of Rome-style global predictions must be counterbalanced with the creation of hopeful possible 'little' (local) futures as well as 'big' or global futures.

Scenario planning (Ogilvy, 1992) offers enormous opportunities to develop these alternative futures, while at the same time asking the fundamental questions, Where do we want to go, and what might happen if we decided to go there (Montuori, 1989)? A host of new methodologies, from scenario planning (Ogilvy, 1992; Schwartz, 1991) to participative design (Emery, 1993) to interactive planning (Ackoff, 1981), to search conferences (Purser, Rehm, & Emery, forthcoming), lend themselves to this process of uncovering values, and figuring out where we want to go from here. In the process of scenario development we also come to uncover many of our previously hidden assumptions about the present. Indeed, much of science fiction can be read as a linear extrapolation of the present into the future, and proves highly instructive for that very reason.

What is particularly important about processes like scenario planning is that they stress collective learning--learning together about problems for which there is no one clear solution. In terms of the competencies we have suggested, scenario building and participative design ask of participants that they employ their creative abilities together (in partnership) within the larger context of their organization and ecosystem, to develop organization/environment/community and other intra-systemic partnerships. And, as we have argued elsewhere (Montuori & Purser, in press), this opens up the possibility for a much needed social creativity in attempting to overcome societal/ecological problems. Particularly with the development of easy access to computer networks, one could imagine on-line scenario building and simulations (along the lines of such popular games as Sim-City and Sim-Earth) in which alternative futures are debated and discussed openly and applied within the context of organizations/communties/ecosystems.

Clearly this points away from the need for experts to come in and plan one organizational trajectory, and ideally suggests instead a democratizing process in which members of an organization and members of communities work together to develop scenarios that are contextually

appropriate to their circumstances. Such a process would in and of itself represent a training in systems thinking, in the creation of partnerships, and in creative thinking, that could benefit from outside resources for purposes of instruction and facilitation, but would leave the ultimate directions and choices in the hands of participants.

Industry is in a remarkable position to develop what amounts to small laboratories in which ecological thinking could be nurtured within the inevitable real-time context of economic demands, and relative small-scale, community projects could be developed along the lines of Lyotard's 'little narratives' as opposed to one, dominant new ecological 'metanarrative' (THE new paradigm). These small paradigms could be just that, in the original sense of the word, new models or examples of ways in which organizations learn not just to deal with the constraints of environmental realities, but with the possibilities of co-creating their relationship with the environment.

What we are proposing therefore is the development of small ecological learning communities within the context of organizations and their larger communities, in which participants can develop appropriate scenarios with appropriate technologies, based on the resources and needs of their community ecosystem. Companies like The Gap already have ecological task forces, a Director of Environmental Services, and an organization, Gap Environmental Organization (GEO), which addresses such issues as minimizing pollution from dyes used in producing clothes, and using organic cottons.

One of the important potentials in such a participative design/scenario building/search conference approach to the future is the potential to bring together members of an organization with the hope of effecting positive change to their conditions, and envision an alternative future and leverage the existing initiatives of organizations like The Gap even further. In the process of working together in the 'microcosm' of ongoing ecological learning, organizational members may: a) develop an ongoing process of learning of 'transferable' methodologies (scenario planning, participative design) which can be applied to other aspects of their work experience, such as job redesign; b) engage in a process of uncovering values and assumptions, and develop a greater awareness of their 'mental models' or paradigms, and their constraints and possibilities; c) engage in systematic study of systems theory, partnership/collaboration development, and creative thinking as the 'theory-base' for the ongoing learning process and the ecological learning process; d) develop a systemic understanding of their organization within its larger ecosystem, and therefore gain a better understanding of their organization as a whole, including financial, structural, and procedural constraints and possibilities.
As with all democratic processes, but particularly the ones we are proposing, it is important that they not be seen merely as exercises, but actually gain the support, active participation, and follow-through of top management. Nothing kills participation as quickly as the experience of it not making any difference in the eyes of management.

Conclusion

In this chapter we have attempted to show that the systems perspective that underlies much ecological thought is not incompatible with postmodern thought, and that there is indeed a form of postmodern systems theory emerging. We have also argued that the postmodern and systems-theoretical perspectives can help us to think about the future--in this case, the future of the industry/ecology relationship by proposing a) the need for an ongoing process of learning that is

systemic, based on partnership, and creative, and b) that this process can be assisted through various projects of participative design, scenario planning, and search conferences in which members of organizations can apply their ongoing learning to the process of designing their organization's role within its larger ecosystem.

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