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**THE DEVELOPMENT OF AN ECOLOGICAL TEACHING PERSPECTIVE:  
A TEACHER EDUCATION PROGRAM**

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**A Project  
Presented to the  
Faculty of  
California State University,  
San Bernardino**

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**In Partial Fulfillment  
of the Requirements for the Degree  
Master of Arts  
in  
Education: Environmental Option**

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**by  
Caroline Conway Kolbert**

**June 1996**

**THE DEVELOPMENT OF AN ECOLOGICAL TEACHING PERSPECTIVE:  
A TEACHER EDUCATION PROGRAM**

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**by  
Caroline Conway Kolbert**

**June 1996**

**Approved by:**

  
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*June 14, 1996*  
**Date**

## ABSTRACT

This project describes a teacher education program held at The Living Desert, a botanical and wildlife park. The program was designed for both formal and informal educators interested in environmental education. The focus of the program was to expand and transform existing environmental education in a participatory setting. This project chronicles how the program changed the philosophy and practice of environmental education at The Living Desert. It also describes the development of an "ecological perspective on teaching," a personal and group vision and resulting practice of environmental education based on the program's process and content.

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## INTRODUCTION

This project describes a four-year teacher education program conducted at The Living Desert, a botanical and wildlife park located in Palm Desert, California. The program brought 12 classroom teachers and 3 zoological educators together to expand their understanding and practice of environmental education. This project concentrates on how the program affected my educational philosophy, strategy and practice as an educator at The Living Desert, and how it shifted the focus of our department's docent (volunteer guide) education in general.

I chose this program for my master's project because it catalyzed a fundamental change in the way I view my role and purpose as an educator. It helped me form a philosophy and criteria by which to evaluate education in general. As a result of this program I have come to view environmental education as all education concerned with the fundamental interrelatedness of all things. It is essentially a lifelong, wisdom gaining process which includes an ongoing evaluation of the role of humans in the larger "scheme of things" in order to preserve the integrity of the whole environment, both social and natural.

The program was facilitated by myself and Jean Fredrickson, a consultant in multicultural, critical and environmental education. Jean was hired to help our department address the following concerns:

1. The lack of any multicultural emphasis in the department's educational programs and public tours.
2. The need to provide environmental education to more students than those who visit the facility or who participate in outreach programs (in-school programs).
3. The need to form a closer working relationship with valley teachers.

4. The need to provide more consistent and powerful environmental education for students at our own facility.

While the goals and objectives of the program were centered on increasing environmental literacy, Jean's background in critical pedagogy and multicultural education insured the consideration of many perspectives, issues, theories and processes, all of which greatly expanded the meaning of the term environmental "*literacy*." She gave me dozens of articles to read, which later became the source articles we gave to the teachers. While Jean was familiar with most of these writers and theories, I was not, and this helped me have a necessary background. These ongoing discussions of articles and our thoughts about them became a model for our program. Because we had so many questions and different approaches to the readings, we began to see it as a potentially rich alternative to teacher "training."

Jean and I decided early on that the program focus would **not** be a "product," i.e. curriculum, activities or a guide for teachers on the use of our facility. It would instead begin with identifying and questioning our world-view with its attendant assumptions and beliefs, and our visions for environmental education. We structured a three-year program, with two weeks of meetings in summer and monthly meetings throughout the school year.

As part of a "preview" of the program, we asked potential participants if they would be willing to do the following:

1. Commit to a long-term process.
2. Be an active participant in the creation of the process and content of the program.
3. Be willing to question the current "givens" of education.
4. Be willing to change.

We also made it clear that we were not going to provide "solutions" to the teaching of environmental education.

These seminal decisions about program structure guaranteed that we would have enough time, the commitment of our participants, the support of a group effort and a context in which to work. Within this framework we were able to ask questions that included the following: What is education for? What is knowledge and how is it gained? Should knowledge reflect the relationship and responsibility we have to each other and to the planet? What kind of knowledge teaches us how to live in the larger "web of life" without destroying it and ourselves?

Slowly we created criteria and goals for our program which we call an "*ecological perspective on teaching*." It is a continually evolving approach to living and teaching with the goal of living *within*, rather than *outside* of the larger "web of life." Though perceived and expressed slightly differently in each of us, it is something we created together and it nourishes and guides our teaching and living. Through both group and individual reflection on the choices and decisions we make on an everyday basis, we have been rethinking and reworking education based on this larger "vision."

How this process affected my role as a zoo educator is the subject of this project. I used its process as a model for the way in which I teach docents. The questions it has prompted in me are the ones I now pose to educators in other zoological and botanical institutions. As this program was designed to be used by each educator in his or her own and unique teaching context, my "translation" of it to my situation was part of the overall purpose of the program. In that translation I describe the kind of "meaning making" process we now seek to facilitate in our students.



## Significance of Project

Until we see the crisis of sustainability as one with roots that extend from public policies and technology down into our assumptions about science, nature, culture, and human nature, we are not likely to extend our prospects much (Orr, 1992, p. 1).

In September of 1994, delegates from countries throughout the world met in Cairo, Egypt to consider the issues of population and sustainable development. Vice President Albert Gore, the representative from the United States, set the scene in the following quote delivered in his opening remarks:

In the aftermath of the Cold War, the community of nations has been freed from many of the divisions of the past, and nations are moving ever closer together--economically, ecologically, and politically. In this transition period, the United States and all nations have an opportunity and responsibility to address long neglected, future-oriented concerns that will determine what kind of world we leave to our children and grandchildren (U.S. Department of State Dispatch, 1994, p.569(5)).

As a result of the conference, 160 nations agreed on a World Population Plan of Action which would limit world population to below 9.5 billion by the year 2050. While newspaper headlines concentrated on the dispute between the Vatican and conference leaders over language concerning abortion and family planning, Worldwatch Institute's Hilary F. French, noted that, "the real news was the remarkable consensus forged between the industrial and developing worlds, and among representatives of population, women's and human rights groups during the two years of preparation for the meeting" (Brown et al., 1995, p. 176).

Hilary French also noted that this conference recognized the "complex interactions among population growth, deteriorating social conditions, gender inequity, environmental degradation and a range of other issues" (1995, p. 176). Among the successes listed was

the opportunity the conference afforded as a "forum where countries can share experiences and plot joint strategies on issues of common concerns" (p. 177).

The Cairo Conference offered both a model and challenge to educators. It was a window to the future, a glimpse of the kind of work in which our students will be engaged: namely, the global effort to find sustainable ways of thinking and living. It prompts the question of whether we are providing an educational environment that encourages the skills necessary for global problem solving and thinking like that of the Cairo Conference.

For years, educational futurists have suggested that we begin to alter our educational course towards one of helping our students "expect, understand and cope with change, diversity and national and international interdependence" (Benjamin, 1989, p. 10) Yet we find ourselves locked into an educational system that, like the media coverage of the Cairo Conference, focuses on our differences and which usually finds change threatening. Rather than focusing on the interrelatedness of issues and subjects, it separates our thinking into discrete parts. In an article on thinking, educator Sam Crowell noted that, "We have separate subjects, separate skills, separate objectives, separate evaluations, segmented continuums, linear methods, behavioral techniques and isolated classrooms" (1989, p. 61).

These artificial categories deny a growing awareness that our world is a complex whole, but we continue to teach this way because this is the way we have been taught to see the world. Many teachers feel the need to change, responding enthusiastically to the theories and innovations proposed by educational theorists; those who have *time* to think. Yet the fundamental work that must precede any *consistent* change is left undone. Meanwhile teachers are "trained" in whatever methods and practices are politically favored

at the time, while our schools and the larger society they mirror, continue to splinter socially, morally and educationally.

One of the most important, and contentious decisions that we made about our program early on was that it would not be based on providing *solutions* to teaching. We offered no curriculum, no one theory, no set agenda. This made it harder to fund, harder to explain and harder to justify to those who would judge it. Instead we offered educators the opportunity, the time, the community and the context in which to question education.

By doing so, we made several assumptions. We assumed that if teachers were given the opportunity and background theories necessary, they would be capable of understanding other and generating *their own* educational theories and philosophy, from which they could plot their own course of action--whether it be educational content or process. Also, that consistent reflection *is* action and will lead to a change in teaching. As we struggled to understand the unspoken assumptions that guide our teaching and society, we were practicing a communal thinking process that was far more creative (and difficult) than our "traditional" role as teachers.

Like the delegates at the Cairo Conference, we came together with the understanding that there was no easy "solution" to our problem--that of rethinking our educational roles. But by accepting this as a premise for the program, we moved toward a new understanding of education. It became a creative process made richer by the complexity of the problem and the different ways of perceiving it by each of us. As Crowell noted, "The greatest challenge facing education is not technology, not resources, not accountability--it is the need to discover with our students a new way of thinking. This quest does not require merely different information but rather a whole new way of viewing the world" (1989, p. 60). In order to find something new, we needed to understand the

**basis of our current view. It was work each one of us had to do, but it was also work made richer by the group processes we practiced as a part of this program.**

## Statement of Needs

Through truth telling and dialogue and sincere attempts to see the world through the other person's eyes, together we can come to an understanding of what it is that needs doing, and to a joint commitment that it gets done. All my life I have heard the admonition, "Don't just talk, get out there and do something!" The problem is that in times like these we are all too likely to do what turns out to be the wrong thing. If it is to represent the best advice for such uncertain times, the maxim should probably be turned around: Don't just do something: get out there and talk (Harmon, 1988, p. 3).

Talk is cheap. When the Cairo Conference created a forum, the press rushed to show us the problems of talk; namely that it is emotional and sometimes angry. They also pointed to the lack of measurable results in the terms of policy. Yet, those who knew the complexity of the issues and the great diversity of world views represented, understood the need for talk. The Conference recognized other fundamental needs as well, and they are ones we tried to honor in our program.

As noted by Hilary F. French, the conference delegates recognized the issue of population to be a complex phenomena which could not be addressed as an environmental issue alone, but which involved cultural, religious, social and political perceptions and their resulting policies (Brown et al., 1995, p. 157). These interrelated issues were not ignored. The delegates knew that their discussion would cover broad ground, would elicit strong emotions and would uncover many of the '*divisions of the past*' alluded to by Albert Gore in his introductory remarks.

The decision to let the issue of population remain complex and whole was central to its meaningful treatment. Inasmuch as any environmental problem is also a problem of perception, the separation of nature, culture/society and human nature is only a partial approach. While it may yield temporary results, it often makes the situation worse in the long run.

Our program recognized that the complexity of environmental issues, of human perception and behavior, and of the learning process itself, lie within the sphere of education. It encompasses our social, cultural and political worlds, it affects our inner, human nature and all of our feelings about the world. Standard education, with its divisions and its compulsion to produce measurable results, is often willing to trade memory for knowledge; thus no real wisdom is gained about nature or the human nature that perceives it. By oversimplifying both environmental education and the learning process, we deny our children the opportunity to learn with all of their ways of knowing. We present a fragmented picture of the world, and do not teach the kinds of integrated thinking skills that help us challenge our existing way of being. We inhibit both the creativity and insight needed for the kind of decisions our students will have to make as adults.

In order to explore the complexity of population, the Cairo Conference designers encouraged the diverse views of the delegate countries to be expressed and explored. Difference was the basis for consensus building, not merely a hurdle to overcome. This allowed the inherent strength of diverse perspectives to help create, rather than debilitate the process. Science has long told us that diversity is the stability behind a changing world. Yet, diversity often cripples our teaching efforts. We strive for uniformity in our students that mirrors what we call a "body of knowledge" that is sanctioned. Even when we allow different voices and views to be expressed, we still *privilege* the voices that support the dominant culture's traditional view of the world. We also condone only certain expressions of knowledge.

During our years of exploring the role of education, differences (both those within our group and those we explored as part of our readings) pushed us to explore new theories and to more creative thinking about our role as educators. Based on the goal to

find a way of teaching and being that works in a continually changing world, we focused on processes that helped us use difference as a thinking tool. Thus, both the Cairo Conference and our program recognized that diversity was to be encouraged and that the process of exploring diversity was necessary work.

Among the successes named by Worldwatch Institute was the creation of a program that will allow ten developing countries who have had success in curbing population growth to share their programs with other countries (Brown et al., 1995, p. 176). These developing countries have very different religious, political and cultural views; yet they have much to gain by telling their stories. Therefore, the conference leaders encouraged those stories, giving them time and importance. In this way we also encouraged our participants to tell their stories and to try to make meaning of them in the context of our emerging vision of environmental education.

Cairo Conference leaders and delegates realized that this kind of sharing, or "communal thinking," takes time. The same is true of teaching, for there is no quick *solution* to effective environmental education, especially when we are trying to educate for a way of being we do not currently know ourselves--a more connected and thoughtful way of living. At times we found ourselves resisting change or avoiding the work involved. However, the group support and the long-term commitment each of us made helped us to keep coming back.

This long-term process, which used established theory and that of our own creation, became the "result" of our program--an on-going approach to teaching. It is based on a belief and trust in complexity, diversity and community as a means to knowledge. It relies on our willingness to think and to change based upon that thinking. It is a process akin to what we would call the "gaining of wisdom," as defined below:

Wisdom cannot be confined to a specialized field, nor is it an academic discipline; it is the consciousness of wholeness and integrity that transcends both. Wisdom is complexity understood and relationships accepted (Meeker, 1991, p. 22).

In order for us to gain wisdom as humans within the larger community of life, we must begin to gather together in order to do the necessary work. As we become familiar with the process, we will pass it on to those we teach. In our small groups, as in the larger global efforts like the Cairo Conference, our goals are the same: the gaining of wisdom about how to live in the larger community of life without destroying it and ourselves.

Once we consider this larger picture, we can focus on our own teaching contexts without sacrificing our greater goals. As a zoo educator, I work within a context and tradition that has changed little in the last 2,000 years. Modern zoos, which began in the eighteenth century were much like the menageries of Alexander the Great. Only in the last three decades have we begun to question our own methods. This questioning led to the present SSP (Species Survival Plan) programs and more recently, to animal enrichment programs committed to animal well being as well as to animal care. But in most respects, education is still based on the factual presentation of zoological data to the public, while the animal serves as a living "object."

While the long-term success of zoo breeding programs depends upon a population of humans who understand and appreciate the need for biodiversity, we continue to concentrate on the physical act of captive breeding. Zoos have publicly recognized that education will determine whether we change in the way we see our role as humans within the natural world, but like most formal educators, we spend little time in reflection about *what* and *how* we teach.

The time has come when even those who are thoroughly convinced that zoos are necessary have to concede that we have not done all that we can to insure the long-term the continued survival of wild animals. As we re-think the role of education as a means to



this goal, we will not be able to rely on the traditional methods and strategies of formal education. We will need to see our facilities in a clear and critical light in order to question what kind of knowledge, what kind of relationship, we need to encourage with the natural world. We will need to consider diverse views, the connection between the natural and social worlds, the complex nature of both the natural world and education, and be willing to challenge ourselves and our institutions.

## PART ONE

### Assumptions/Belief

A person's total belief system is an organization of beliefs and expectancies that the person accepts as true of the world he or she lives in--verbal and non-verbal, implicit and explicit, conscious and unconscious...Belief systems have two powerful and conflicting sets of motives at the same time. One is the need for a cognitive framework to interpret new experience--to know and understand and act responsively. The other is the need to ward off threatening aspects of reality (Harmon, 1988 pp. 15-16).

One of the first and most important areas of inquiry for our teacher program was that of recognizing and "mining" the assumptions and resulting beliefs that guide our perceptions about the world and teaching--in other words, the basis of our world view. Jean's background in multicultural education and critical pedagogy had shown her that in order to make meaningful changes in thinking and action there needs to be a process of "bringing to the surface" that which is so basic to our understanding of the world as to be virtually unconscious. To this end, our first readings contained articles that revealed and questioned some of the standard assumptions of the dominant culture, as well as provided other cultural views of nature, science, culture and education.

We explored the creation and proliferation of the Cartesian/science-based logic from a feminist perspective in articles and selected chapters of books like Carolyn Merchant's, Ecological Revolutions (1989), Elizabeth Minnidh's, Transforming Knowledge (1990) and Ruth Hubbard's The Politics of Womens' Biology (1990). We also read excerpts from books by scientists and environmentalists, including Willis Harmon's, Global Mind Change (1988), Augros and Stanciu's, New Biology (1987), Erlich and Ornstein's, New World New Mind (1989). Our educational readings included writings of Paulo Friere, Edward T. Clark, Sam Crowell, David Orr and others concerned with the

future of education. In addition, we read works by writers whose culture did not see the world through a scientific metaphor.

The common denominator of all of these readings was the thoughtful criticism of the current assumptions guiding our cultural and societal structure and institutions, and the call for change. They helped us see culture and its determining assumptions as a continually evolving story that should be critiqued in the context of time, place and circumstance. An example is the following quote by Carolyn Merchant concerning science. "Science and history are both social constructions. Science is an ongoing negotiation with non-human nature for what counts as reality. Scientists socially construct nature, representing it differently in different historical epochs" (Merchant, 1989,p.4).

The idea that science is socially constructed contradicted the standard assumption that science is the only way to describe an objective reality we call "nature." This assumption is prevalent in zoological teaching. Though based on questioning that reality, science is often taught as a description of the world, not one of many processes by which we have been taught to know it. It also is used to the exclusion of other ways of knowing the world. By questioning the basic assumption of "science as reality," we could then look at the consequences of this presentation of science.

Walking through the assumptions behind science helped us begin to see that all of our perceptions and understanding of the world are based on the same kind of culturally generated and proliferated assumptions. Once we understood this, we realized that no teaching is neutral. We model and teach according to personal and collective cultural biases, and therefore, our teaching reflects these biases. Secondly, we realized that by teaching this view without questioning it ourselves or teaching our students to question it, we were responsible for its proliferation and consequences. Thirdly, we concluded that

we could make no meaningful changes in our teaching until we examined and questioned the unspoken beliefs based on these assumptions.

While these may seem very obvious conclusions, they did not come easily, nor do I think they are common in teacher education programs. At the time we were exploring these issues, I was taking a class on educational philosophy as part of my master's program. Most of the teachers in the class had never read any educational philosophy, nor had they realized that the school system, curriculum and their own teaching were based on various philosophies and theories which were not necessarily consistent. The class stopped short of pulling out the assumptions behind the thinking of the teachers, concentrating instead on those of the major philosophers. This emphasis did little to attune the teachers to their own biases and they finished the course with a generalized understanding of a few main tenets of each philosophy. There was no attempt made to link these philosophies to current practice beyond the most general and there was little discussion of how theory and practice have intersected historically or in the minds of teachers.

This process of uncovering assumptions, or "making the familiar strange" became, for me, a metaphor for the learning process. Sometimes I resisted, because what I discovered was not always comfortable. However, the process of questioning what I have always taken for granted is now part and parcel the way I see my role as an educator. As in the quote that begins this section, our beliefs about the world help keep us "safe" and to examine them is both difficult and threatening. For one thing, our very thinking has been shaped by the acceptance of cultural "givens." For another, we tend to think of our own way of being as *inevitable*, a response to the way things are.

In this respect we were helped in our readings by writers of other cultural views, including selections from Native American, Latino and African Americans. One article

comes to mind as illustrative of how differently disparate cultures view reality. The article was written by an anthropologist who lived with a certain African tribe for several months a year. One year, during a rainy period that kept everyone inside for days, he read his African friends Shakespeare's play, *Hamlet*. The Africans made very different sense of it, following its logic within the framework of their world view. Their conclusions turned *Hamlet*, as we know it, upside down, and yet their interpretation followed the words and ideas with a systematic logic borne of their cultural view (Bohannon, 1966, p.28). World view as expressed through thinking and behavior, is the source of meaning and the arbitrator of experience. In any attempt to help students evaluate their own and other assumptions, cultural differences must be recognized and explored.

In this sense our program was multicultural. Rather than learn about other cultures to become sensitive to them, we learned more about them to become better able to critique and transform our own. In the process we ran into much about our cultural story that resisted such efforts. Nonetheless it is a very old and sensible means of keeping culture adaptive to change, and practiced in this intentional way, we honored the complexity and evolution of cultural stories and peoples.

Our teacher group discovered that, as individuals, we were often at odds with the "reality" we taught based on our cultural assumptions. This became clear during the second year's retreat to a mountain research station. We had spent the day reading and discussing articles on history, including those listed previously. Later that night Jean asked the teachers to tell her what they believed was the *intent* of formal education based upon all that they had experienced as teachers. After thinking about it for a while the teachers read their answers out loud. To a person, they described formal education's intent and consequences as the production of passive "citizens" who are rewarded for acceptance and compliance with the status quo. It is important to remember that none of

these teachers had joined our group out of profound discontent with the formal education, though they had agreed to question its assumptions; but almost every teacher discovered that when they gave it enough thought, they were very much aware of the gulf between their own teaching goals and those of the formal education system.

This was an important revelation to me for several reasons. I had felt this to be the case with my own formal education and it was part of the reason I had never gone into teaching within the school system. Hearing teachers (who I knew were conscientious, hard-working and enthusiastic about teaching) reiterating this thought about the "institutional" effects of teaching, I was further encouraged to try to create a different context in the informal setting. I was also forced to realize that informal zoo education did little to challenge the assumptions of formal education, even though our goal of protecting wild species requires that visitors take a stand that is not always politically or socially accepted within the status quo.

Modern zoos capitalized on the public's fascination with animals as curiosities. In response, they created menageries designed to excite the fear and thrill that close proximity to wild animals from exotic places produced. They entertained. This context mirrored other entertainment and educational inquiry of that time. Ornithologists were busy killing birds for huge collections in our nation's museums and anthropologists were charged with the task of collecting the bones of indigenous peoples with little regard for their beliefs about death. Visitors to museums and zoos were privy to the wonders of the world, collected and housed in one place (Brakefield, 1995, p.16).

It was not until the 1960s, when the world woke up to the realization that humans were causing environmental pollution and animal extinctions, that zoos took a hard look at the way they cared for their animals. Bowing to public sentiment which was more critical of captivity, they began designing better animal enclosures which improved the lives of

their charges. At the same time, zoo keepers realized that many of their animals, now endangered in the wild, were in danger of dying out in zoos as well. This was the beginning of more serious study of animal behavior and captive breeding, leading eventually to the Species Survival Plans or SSPs of today (Rutledge, 1995, p.1).

Today, zoos claim as their highest priorities both education and the breeding of captive species for the conservation of animals in the wild. Zoo breeding efforts are, at best, a stop-gap measure against extinction, with only slightly over one hundred Species Survival Plan animals and, of those, only slightly over 50 % successfully returned to the wild. These small numbers have led to the decision that in the twenty-first century, captive breeding methods will be used in the "wild" before animals face captivity as a last resort (1995, p. 2). This "in-situ" conservation reflects the commitment of zoo professionals to the plight of endangered species, but it also leaves the zoo educators to ponder what should be taught in existing zoos.

It is in the context created by our own facilities that we have yet to make huge changes. While zoo designers have made enclosures much more naturalistic in appearance and, in some cases, have attempted to group animals according to natural communities, the effect is still one of animals as entertainment. The animals are on display and they are explained to the public with the same stock phrases heard throughout the world. Our educational thrust is to deliver a message about the plight of animals, yet we display them like objects.

After working on assumptions, I was able to see that zoo educators ignore the base assumption that we can know and learn to respect animals by seeing them in zoos. I know children respond to this unspoken assumption because I read the letters they send docents after their tours. Even while they are saying how interesting and fun their tour was, a significant number record the unspoken reality of caged animals in their drawings.

Here the heavy bars of old-style zoos still prevail. Though the children rarely refer to them in writing, the bars exist within their minds. I believe they are especially prominent in the minds of those children who empathize with the animals more strongly, perhaps due to a feeling of what it is like to be captive in their own environments. By ignoring the issue, we model denial of the most basic kind. We suggest that zoos are an *inevitable* response to the need to be near or to know animals--the *only* response. We, like educators within formal systems, do not acknowledge the biases and agenda that fuel our institutions.

It is said that good parents make sure that their children have role models who embody the parenting skills they lack. This way children can get what they need and the parents need not try to be what they are not. In the same way, zoo education needs to address the fact that zoos were created as menageries and that we remain an institution based largely within a nineteenth century paradigm. Both zoo educators and their visitors need to keep this in mind. In problem posing, this is called the "what is," and it helps us frame a problem or question we can use to discover other possibilities. In this case, the questions might include: Can zoos be more than menageries of animals, and if so what and how do they need to change? What do zoos actually teach about nature and animals?

This might lead us to consider what truly makes the most impact upon visitors. Even in the moment when a visitor comes *face to face* with an animal, with all its emotional impact, we dilute the experience with explanations and scientific facts. We are immediately uncomfortable with other responses, perhaps because to dwell on responses other than intellectual might lead visitors to raise the issue of captivity. In any case, this has several consequences. Because visitor response is only elicited on the intellectual level, we never find out what our visitors truly "feel" about their experience. This focus



away from the "felt" response severely limits the knowledge gained in terms of meaning made of the zoo experience and context.

Meanwhile the problem of living in a world of animals is simplified--zoos will breed them and reintroduce them in a place called "nature" or the "wild." People can come to zoos to be near these animals and zoo educators will tell them how they live, how many are left, etc. Educators will never discuss the need that brought our visitors to the zoo--the need to experience animals, and through them the rhythm of nature both within and outside ourselves. We will also stay away from the obvious limitations of knowing animals through the zoo experience.

Although I realized that there were limitations to zoo education before the teacher program, I had not asked the types of questions that Jean posed as to the consequences. If the scientific view of the world is considered to be its "true nature" what happens to other views of the world? Has science been used to justify political and social mores? Is it used to justify zoos? Does a world that is perceived as "knowable" in terms of science and its institutions (including zoos) become more easily exploited for human purposes? Do zoos lead us to a new way of perceiving and relating to animals?

I had to ask several questions about my personal teaching methods as well. With science and its institutions so firmly established as the only legitimate study of the natural and social worlds, how could I begin to envision environmental education within a broader context that includes other "ways of knowing" the world? How could I begin to probe the felt responses of visitors? How could we begin to explore the relationship between humans and animals as part of zoo education? What would I begin to regard as "literacy?"

The teacher education program led me inevitably to these and other questions. If the program had stopped here, I might have dismissed them as just too troublesome to

**pursue. The second part of this paper will focus on processes which we explored as means for addressing these questions in our everyday teaching situations.**

## PART TWO

### The Development of Ritual/Symbol

In order to explore other ways of knowing the natural world I began to think about my own experiences in nature. I had come to my job as a teacher of natural history without a science background. I had received my college degree in literature and had become modern dancer and choreographer. Although I enjoyed being in natural environments, I did not study natural history or biology until I came to The Living Desert. When I first began to take college courses I felt as if I had discovered a new world. I learned to identify plants and birds. I studied geology, botany and the natural sciences. Before this education, nature had been a refuge which I sought out daily. It was largely undifferentiated, a background to my thoughts and emotions. It now became the focus, and I became a much better observer. However, my observations were largely based on identification, which removed me from the fluid relationship I had known in the past.

As time went on, and I reached a level of comfort about my abilities as a naturalist, I began to feel that something was missing. I enjoyed educational outings, but I did not feel the sense of communion with nature that I did before I came to the desert. I also sensed that, although I was learning more about nature, I was not deepening my relationship with it. Slowly, I began to make small changes. I ceased to take my binoculars. I went to the base of a nearby mountain night after night, simply to be there. I found that what the mountain had to teach me did not resemble anything I learned on nature outings with docents and colleagues. It was based less on observation and more on the sharing of time, of rhythm and of stillness punctuated by encounters of all kinds. My learning approach changed from one where I *found out* about nature, to one in which I felt a part and knew by *participation*. The participation was highly imaginative, linking

the outside world to my inside world of symbol and image. I was making meaning from the flow of experience and this meaning challenged the "order" I had learned to perceive. Plants became animate beings; owls warned me to pay attention; rocks slowed my pulse rate and sense of time. My environment often ceased being a "place," and I ceased being separate. I was changing and everything became "strange."

This was very important in my thinking about education. Edward Bohm points out that the word awareness comes from the word wary - a whole body response to what is new (Bohm, 1991, p.134). When truly confronted with the unknown we are immediately wary, careful. Our hair stands up on our arms and the back of our neck. It is in this moment that we learn about ourselves and that which we encounter. We can re-image the world; we are changed. The combination of bringing to the surface my old map of the world and the simultaneous rediscovery of a new one convinced me of the powerful possibilities of education based on transformation rather than accumulation. In both, the goal is to re-vision the world.

During the first year of our program we would spend time going repeatedly to a "sacred spot" of our choosing gaining a sense and familiarity with a location. We would also begin and end each of our meetings with some form of ritual which each of us took turns presenting. Many of these involved different ways of "coming to know" nature, so that we could examine how they changed our perception. In these openings and closings we danced, chanted, read poetry, and shared our most powerful physical "totems." Sometimes we were profoundly uncomfortable with these rituals and we talked about why this was so. However, when we did not have time, or when we felt too rushed to take the time, we keenly felt the absence. Not only did ritual enrich and solidify the community we were building, but it reminded us just how powerful this kind of "meaning making" can be, and how easy it was to undervalue it.

In retrospect I believe that the rituals we enacted were a way of celebrating the importance of what we were trying to do together. In ritual we acknowledged that our group was committed to changing and affecting our whole selves. I think this is also one reason it was intimidating and made us uncomfortable. In nature, I developed my own rituals which acknowledged the importance of what I learned. They came naturally, and had to do with honoring the power of the relationship between myself and my surroundings. Ritual activity is one of our oldest ways of paying attention to that power. Though not linked directly, my growing sense of symbolism and ritual helped me look at zoo education in a different way.

I have come to view the idea of immersion in the natural world, with the whole self and without prescribed learning goals, as an important part of environmental education. In my zoo education we now focus on helping children rediscovery or discover for the first time, those sensory skills which will help them connect. Taking the children to a secluded spot, just to listen, has become a standard part of our tour. We are also taking time to elicit the responses of children and to allow their sense of symbol and ritual to surface. While this is not easy in a standard 1 1/2 hour tour, we can indulge this in summer and other classes. Our docents now listen carefully and elicit more successfully the responses our visitors have to what they see in our zoo.

## Metaphor/Language

One process which continued throughout our teacher program was the routine consideration of language and its resulting metaphors. Did we all mean the same thing when we used certain language? What happened when the word was slightly altered? Did the assumption of common meaning of language hinder our efforts to remake our world?

Using Metaphors We Live By by Lakoff and Johnson (1980) we began to examine metaphor as a means to help us uncover the beliefs we had about our role as teachers. We read about metaphor in language and in our cultural stories, we tried to discover those that we taught, as well as to find new ones which would reflect our changing views more completely. As we explained these chosen metaphors to each other, they revealed our needs for security, power and control. Some of the metaphors that emerged during this exercise included benevolent dictator, carpenter, rafting guide, quilter and hiker.

Lakoff and Johnson explained that "The most fundamental values in a culture will be coherent with the metaphorical structure of the most fundamental concepts in the culture" (1980, p. 22). Our efforts to name the basic assumptions of our cultural heritage were aided by linking the metaphors so fundamental to education. By recognizing the coherence of these metaphors, we were better able to test the coherence of our personal teaching metaphors.

The coherence of a metaphor has to do with its full story, including the details, the language. For instance, when the teacher who chose the rafting guide as metaphor played it out in detail, she became more consistent in its use and thus it was more powerful. To help her think about it we offered scenarios for her to consider. For instance, what if one person on the raft had no regard for the safety of the passengers? What if everyone on the raft wanted off? Who guides, the rafter or the river? These questions became ways for

her to imagine a context for her teaching. It offered a map of possibilities, and it allowed for the inevitable twists and turns of the river. The meaning made is something like what is learned in nature, for its language is symbolic and metaphoric.

In order to explore metaphors we had to pay attention to language and the metaphoric nature of language. Jean knew that unless we looked at the language that shaped our metaphors it would be easy to overlook the importance of the words we choose as both a pathway and barrier to consistent and thoughtful change. It wasn't until we began to identify and examine the assumptions contained in some of our language, that we began to realize how subtly and thoroughly we instructed through our choice of words. In phrases like "human resources," "measurable results," "objective testing," "minimal standards," we reduced human and knowledge complexity to conform to a society obsessed with the end result or product. In words like "nature," the "wild," we create a separation between ourselves and our environment.

As we explored the language we use to describe the gaining of knowledge, we began to recognize the over-reliance on visual metaphors and vision as a way of knowing. This seemed important for my work because it shows how closely we align visual observation with knowledge, especially in the world of nature. The role of observation is so embedded in our scientific view of the world that we often do not consider how we effect that which we are trying to observe.

Because educators have been trained to believe that the observer and observed are separate, we forget that children are not yet trained in the belief of an objective world. In our Discovery Room, which was designed for children, we have skull and skins for children to see up close. These objects often profoundly disturb children, even when we tell them that the animals died of natural causes. Adults do not question the need to see these items up close. Indeed, this is one of the main justifications for zoos. We believe

there is no substitute to seeing the animals up close. We value this so much that we do not question the means to that end. Instead, we send the message that seeing is a right and necessary part of learning. We do not need to spend a lifetime learning the ways of the animals, we simply go to a zoo. We see the consequences of this when we take visitors on our wilderness trail. They have neither the skills or the patience to wait for real animals and their traces. They do not need them.

Using readings on religious metaphor and myth, we tried to imagine how the world, our thinking and our teaching might be different were we guided by a "God the mother" rather than "God the father" metaphor. As we very often did, we clustered our thoughts about both of these metaphors and discovered that we felt very differently about these two possibilities. We also explored the "Earth as Gaia" or living organism metaphor. These exercises helped us realize, as Lakoff pointed out, that we "understand the world through our interactions with it" (1980, p. 194). That these interactions are largely metaphoric in nature, and that we contribute to and perpetuate them in language was an important step to reimagining our teaching. If students are taught to entertain a fluid, imaginative and critical relationship with their own and their cultural metaphors, they might be better able to address problems and adapt to change.

In working with the language of metaphors, I began to see places where we could acknowledge other ways of perceiving nature and animals. I now help my docents create their own metaphors and point out those taught to us in science. I also suggest that as teachers, we need to examine these metaphors and symbols ourselves before we can encourage our visitors to do the same.

When I began to examine the assumptions and resulting metaphors in our docent program, I found much that could be changed. Simply by describing what we do with children as *sharing* the desert rather than teaching it, we created a context which was



much more conducive to the goals I was beginning to shape as part of my ecological perspective on teaching. This metaphor challenges the idea of knowledge as acquisition, of teacher as expert and of student as passive recipient. While working with docents on the consequences of this change, many more shifts in our understanding of our role as teachers became possible. Within that act of sharing, a more equal power exchange is possible, with each side contributing to that which is known.

The process of paying attention to language and to the metaphors they create is extremely important in creating a learning environment. If we accept all language, without question, we are not modeling critical thought. We also overlook many opportunities for meaning making. Some of the most significant conversations we had as a group were those centered around the question, "what do we mean when we say \_\_\_\_\_?"

## Problem Posing

In order to encourage docents (who are mostly people in their 60s and 70s) to take a "wider" view of their role, I used processes Jean introduced within the theory that shapes critical pedagogy and the practice of "problematizing." This worked especially well in a workshops developed for park rangers and zoo educators which were of short duration. I asked the participants to take some time and think about what they were truly trying to accomplish in the interpretive or other work they did within their natural history institutions. We then listed these responses which often included the following:

1. Increase awareness and respect for nature.
2. Create a sense of excitement and enjoyment in the natural world.
3. Increase a sense of stewardship
4. Help people realize that nature needs protecting.

We called this the "what might be" list and when it was finished, we went on to make a list of what we actually *do* in our educational programs. We called this list the "what is" of our programs. Our list contained the following types of activities:

1. Zoo tours.
2. Critter close-ups (animals shown one-on-one, with touching allowed).
3. Special interest walks, including bird, plant, animal walks.
4. Special topic programs on astronomy, geology, Native American history, etc..
5. Information about the adaptation of organisms to environment.

This list, next to the "what is" list demonstrated the huge gulf between what we felt was necessary and desirable to teach and what we actually taught. This gulf became our "problem." Within our exploration of this "problem" were the realizations that science information, or experience in natural settings only go so far. It also led us back to our

reliance on standard teaching patterns. When we examined the "what might be" list, we realized that we did not know, nor did our cultural and social teaching guide us towards education which could reach these goals. In a short period of time we were led to the important question of what it is we are trying to teach and how. We then considered a typical program of most zoos and nature centers as a way to "walk through" the work ahead.

Within the average critter-close-up, popular in zoos and parks, we discovered many inconsistent and contrary messages. Our "what is" column illustrated what the visitor saw--a person holding an animal who cannot get away, who is offered to the visitors to touch and who is "explained" in a few sentences. While our goal was to increase respect for animals, our physical and verbal metaphors were ones of submission and object status of the animal. Based on the "what is" of critter close-ups, we had to think hard about whether they achieve our "what might be" goals.

The "problematizing" of critter close-ups had already changed the way we taught them to docents at my zoo. Though we realized their drawbacks, we decided that they offer an important and rare opportunity to be close to an animal and to explore the feelings produced by this experience. Docents are now taught that their primary concern is that the animal be comfortable and that visitors treat the animal with respect. They are encouraged to ask questions of the visitors that encourage them to pay attention to the animal and to share their observations and feelings. We also encourage docents to share their reasons for doing critter close-ups out-loud with visitors and to then listen to their estimates of its success. On the other hand, we never forget the unspoken message we send. This "solution" reflects the nature of the changes we made based on this program. There is no "right" solution, there is only our examination of the problem and our attempt.

to let it remain a problem for all (our visitors included) to consider. In this way we can all contribute to change.

This workshop, though only a first step, initiated thought about whether our institutions and our own teaching are working towards the goals we state. In our teaching program we went beyond this to question whether many of our programs and institutions actually have the *same* goals.

## Dialogue/Relationship/Community

Finally, true dialogue cannot exist unless the dialoguers engage in critical thinking which discerns an indivisible solidarity between the world and the people and admits of no dichotomy between them--thinking which perceives reality as process, as transformation, rather than as a static entity--thinking which does not separate itself from actions, but constantly immerses itself in temporality without fear of the risks involved (Friere, 1993, p. 73).

Whenever we tried to explain what we were looking for in the way of environmental literacy the word relationship surfaced. The idea of relationship went beyond learning about something or someone, towards a recognition of connection and interrelation of ourselves and that which we sought to know. Our group's participatory structure was based on the idea that only if members participated in the life of the group, could we truly gain knowledge which would affect our teaching and living in a meaningful way.

This group relationship, while solid as long as we were not stressed by time commitment, often took a back seat to family and other school commitments. It was difficult to keep the time free and to honor the commitment. Often we were overwhelmed by how much work it was to communicate, as well. It was unnerving to discover how different the members of this all white, middle class, "environmentally aware" group could be. It was not always easy to understand one another or to follow the connections we made in our discussions. Still we remained polite, steering carefully to avoid any potentially explosive topics, yet drawn to them as part of our explorations. One teacher, who later stopped coming due to family commitments, told us that she had already explored the issue of racism and had no desire to do so again. While we were not exploring racism in any structured way, it surfaced often enough to make her uncomfortable.

Jean and I had discovered that relationship building could be an emotional affair. After most meetings during the first two years, Jean would stay at my house for the night. We rarely got to bed at a reasonable time because we would compare notes. Very often we would have different takes on what happened and the overall success of the meeting. We would remember people's comments very differently. In short, we interpreted events in our own way. In our effort to structure the meetings we often abandoned our separate instincts so that we would better reflect a joint approach. This often mitigated the results, leaving us both frustrated.

Our group efforts also vacillated between the need to be "on task" and the equally compelling need to let conversation take us on journey. If we followed the internal logic of our discussions, we generally felt it was worthwhile. However, it bothered the teachers that, once away from the group, they could not tell others exactly what they were gaining. We seemed to go back and forth between wanting to have a "product" which we could use to make others understand our program, and our own experience which told us that our process was indeed valuable even at our present stage in which we were unable to articulate it well.

To my mind these were not problems. The articulation of the program lay in the changes I made with docents. Most of them were small changes, but I knew why I made them, and I was evaluating their effectiveness using processes we (our teacher group) used in our meetings. Another reason I did not need a "product," in the sense of something which would convince others of the program's worth, was my own experiences learning from nature and in dance. When we are truly making meaning from our experiences, changing our very perception of the world, we are changed wholly. The results of such a change are seen in the subtleties of everyday choices. They are cumulative and amass with time and reflection. It was the same with the study of literature, my college major. To

this day I cannot quote passages from the books that transformed my thinking so profoundly, but I do experience the sense of those books, recalling their similarity to current situations and events.

In order to satisfy our different needs concerning process and structure, we began to follow a schedule with certain things built in and timed. Journal writing, reflection on the evening's process and even socializing were scheduled. This had mixed results. For those most concerned by the lack of structure, this helped ease their conflict. For others, it was too structured. It seemed to work best when we connected it to some kind of overall rhythm, which returned us to certain activities in a circular fashion. We negotiated time in order not to cut off something the group decided was too important to leave on schedule.

But always, nagging at our heels, was the fear that our program might be just so much "talk." Did we fail to connect it to our everyday actions? Was it worth the time and effort? These doubts were apparent whenever one of the teachers attended a more "product oriented" workshop having to do with a teaching technique. More often than not, the participating teachers came back convinced that all they had to do was to follow the guidelines presented in the workshop and they would be able to teach in an ecological and meaningful fashion. One teacher began a bilingual master's program and at first she was absolutely convinced that this would be her "solution" to teaching. Other teachers went to workshops on whole language and peer coaching. Each time they followed a pattern that began with absolute belief that this theory or practice was the "answer." Over a period of time we heard less about it.

Conversely, we continued to meet, not because we felt we could solve our problems, but because we felt the need to continue to recognize and deal with the complexity of teaching and of relationship or community building. While we did not

always leave our meetings feeling we had solved something, we often did feel that we had gained something--whether it involved asking an important questions or sharing and evaluating our actions and ideas.

It was around this time (the third year of the program) that Jean introduced the idea of dialogue as something to explore as a group. In some ways we were attempting to engage in dialogue, but we had no model, nor an understanding of what it was or how it how it might help us toward our goal. In our first introduction to dialogue as a theory, we read articles by both Paulo Friere (1970/1993) and David Bohm (1989). It was about this time that the artificially structured meetings ended and we began working with the "structured chaos" of dialogue.

Jean and I still posed questions, but we let the conversation take its own course based on the group's involvement and our own. I am not sure that this pleased everyone; at least one member began to come less often after this, but a core group of about five continued to come regularly. Also, Jean and I began to have more consistency between our overall impression of the meetings. In my mind, this began a period where each of us became a participant and the "regulars" no longer had as many doubts about the group's importance because they had slipped over the edge and joined a process for which they were responsible.

We had already become familiar with the idea of "problem posing" and "praxis" through Jean and articles by Paulo Freire. Dialogue took this one step further by postulating that in the reflection that precedes and prologues action, we transform the world. "There is no true word that is not the same time a praxis. Thus, to speak a true word is to transform the world. (Friere, 1993, p. 68). This mirrored our efforts to clarify language as a constant negotiation of meaning.



We also read David Bohm's "On Dialogue," a transcription of a meeting that took place in Ojai, California in 1989. For me this was the beginning of a very important shift in how I viewed education, for Bohm places the true power of dialogue in the very idea that there is no agenda.

Now I'm going to propose that in a dialogue we are not going to have any agenda; we are not going to try to accomplish any useful thing. As soon as we try to accomplish a useful purpose or goal, we will have an assumption behind it as to what is useful, and that assumption is going to limit us (Bohm, 1989, p. 9).

Obviously we had an agenda--to become more effective proponents of our ecological teaching perspective. Our assumptions included our belief that such an action was necessary and desirable. Indeed, one of our tasks had been to recognize and question the agendas we followed even unconsciously as a result of our cultural training, but the idea that, once identified and examined we try to suspend these assumptions for the sake of meaning making, made sense.

Its power lay in the acceptance of the *idea* of dialogue, as well as in the practice of it. It represented an entering into relationship with thought, word and with others. It was a metaphor for the kind of connection I sought with nature and human nature and the act of teaching itself. It represented profound trust and belief in life as process and relationship with the whole. If teachers trusted dialogue as a process by which we explore meaning, we and our students would learn to think creatively and critically together. If we could trust that this was our true role, then students would be free to go beyond our cultural restraints, our own perceptions into the future. As Friere stated, "Dialogue cannot exist, however, in the absence of a profound love for the world and for people. The naming of the world, which is an act of creation and re-creation, is not possible if it is not infused with love" (1993, p. 70).

This love is demonstrated in our attempt to listen, to create together a web thought and words in which to name the world we live in: an ever evolving story. To think critically in an atmosphere that is fluid with the thoughts and perceptions of others seemed to me very much like my own experiences in the natural world. Dialogue, therefore, encompassed a complexity, a sharing of power and a recognition of true relationship beyond our professed beliefs and situation.

I do not believe that this is all that is needed, but it encompasses much of the process of relationship building. It also shifts power back to the learner, engaging us in our learning process. With its emphasis on listening, it reintroduces the idea that respect and attention must be paid to all aspects of the world. Whether we have a dialogue with other people, a book or nature; we attempt to pay attention and make meaning that comes from relationship.

My work with dialogue has remained mostly within our teacher group. Though I feel I am often in a dialogical relationship to things I read, a group dialogue is something that takes practice and time. However, it is something I will continue to work on, for I believe it to be a potentially powerful process.

How might it change my own situation as a zoo educator? If we learned about the world by engaging in a dialogue with it, we might not choose to know a mountain lion by caging it, dissecting it with our eyes and other instruments. We would understand that only in the context of the mountain lion's world does it truly exist as a subject, and that in order to have a relationship with mountain lion, we would need to go to its world, not imprison it in ours. Mountain lion would cease to be an object of study and would enter our perceptual world on his own terms. We would be changed in the process.

There are risks involved. Could we trust children to think for themselves, to decide what to do with zoos and animals? Could we live with mountain lion in such a way

that it remained whole, able to destroy as well as captivate us? Could we begin to recognize all of those we have separated at "other" and begin a dialogue?

## LIMITATIONS

*We make the path as we walk. anon.*

This quote was written on an old piece of cardboard which we set out at each meeting. It reflects the limitations as well as the strengths of the program. As neither Jean nor I had chosen a particular path, our movement was sometimes clumsy. There was also a lot of time spent deciding on which way to go next, especially in the beginning. Jean and I were often reluctant leaders, stopping often to make sure we were followed, only to change courses.

Even with a commitment to the idea that gaining knowledge is a complex and sometimes chaotic endeavor, the group often felt frustrated by the lack of firm structure and direction. It was difficult to take the time to feel that frustration and to assertion whether it was a response to our expectations about learning or whether we truly were going astray from our goals. For the six of us who still meet, this question has diminished. We have begun to utilize what we gained from the program in our individual settings. We are on our own paths as educators, and the group's is one that sustains us for our individual work.

Other limitations have to do with our ability to sustain and realize our visions for education. We must hold them, articulate them to our peers and supervisors, share them with our students and find ways in which they are reflected in all parts of our learning environment. This is difficult work which requires us to be many things. This is one reason why we still meet. It is a life-long process. Within the context of our group, we are helped along by the different talents and strengths that each of us have.

Also, there is still the nagging compulsion to deliver a "product" which pleases all. Test scores, docents who can recite correct information; these and other "concrete results" continue to seduce us. Every time we take time to concentrate on the process of learning,

or reflect on the meaning of our learning experiences, we have less time for rote education. Our students have come to expect to take this time and, for the most part, we insist upon it.

In my teaching situation, time will tell. The shift in philosophy and teaching methods are being most effectively felt only by new docents. It is a slow process. My administrators would like more "sexy" programs, but I have so far resisted and our programs still please our visitors. A discussion on whether zoos should focus on education or entertainment has begun in the zoo world. At our last American Association of Zoos and Aquariums (AZA) conference, a Disney representative and a college teacher/bioregionalist debated the issue. Like all who are convinced that things will continue to change, I will wait to see what develops. Meanwhile I continue to evolve my own ecological perspective on teaching and am able to explain why I make the teaching choices I do. I would appreciate the chance to enter into a dialogue with other zoo educators, but so far this has not happened. I will continue to ask for it at each conference.

For all of our program's stumbling, I believe that making our own path has helped us develop an integrity of purpose. We know what we are doing and why we are doing it. As more people begin to enter into a dialogue about these deeper issues of education, we will be ready to join them--so too, will our students.

## CONCLUSION

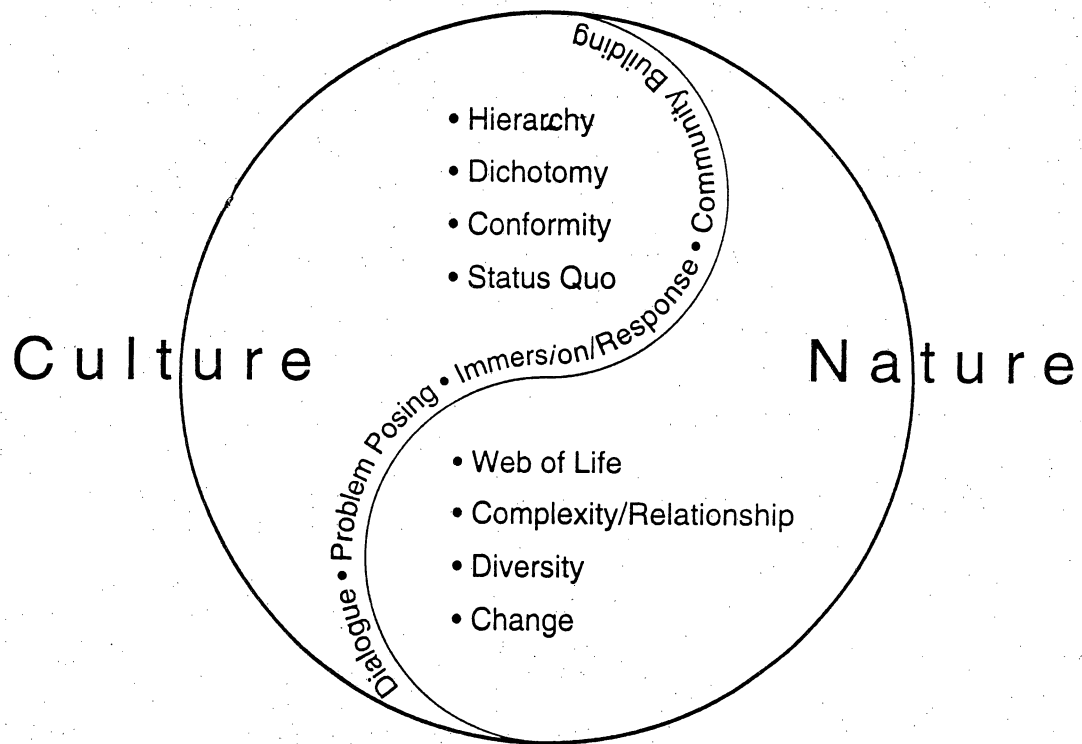
I designed a relationship diagram shown in Figure 1 to accompany a grant proposal for a teacher workshop (see Figure 1). I include it because it provides a visual representation of some of the most important aspects of my ecological perspective on teaching. It is also a direct result of our teacher education program.

In it, nature and culture (society) are side by side in a yin/yang relationship. Though the concepts listed on each side are different, they are intrinsically related in our minds and perceptions. The processes listed on the wavy line that separates yet links both sides, are ways or processes which can be used to explore the relationship between nature and culture.

The diagram presents no solution. It sets us a "problem" or a way of beginning to explore relationships between things which are sometimes considered as unconnected. It suggests that the way we perceive nature and the way we perceive our cultural world are related. It poses questions. Do we perceive nature as a web? Do we have a hierarchical cultural view? Does our way of seeing nature have anything to do with the cultural world we create? Have we evolved a way of perceiving nature that has left our cultural structure in need of change?

Through dialogue and other processes we can begin to make some kind of meaning from these seemingly separate concepts and of questions they bring up. The point is to relate nature and culture as fundamentally interrelated, and in that relationship, begin to make new meaning of both.

## **Ecological Perspective on Teaching**



This diagram is a conclusion in the sense that it is a radically different vision of environmental education than that which I held before the program. It is, for me, the real work we all have ahead of us. As time goes by, I hope to discover more creative ways to approach this work. In dialogue with others, I may discover some which I might otherwise miss. This diagram will remain most meaningful only to me, as representative of a vision that guides my teaching efforts.

Philosophers, educators, scientists, activists and futurists of all kinds have begun to consider the relationship between nature and culture. While we will gain much by listening to them, we must also travel a path that takes us through a process of rethinking our own perceptual maps. This group, more than anything else, has taught me that transformative education begins in small groups of people who are committed to learning. It is slow; it is messy; but it is also powerful.



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