EDUCATION FOR SUSTAINABILITY: AN EXAMINATION OF IDEOLOGICAL PERSPECTIVES IN INTRODUCTORY TEACHER-EDUCATION TEXTBOOKS

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Abstract

EDUCATION FOR SUSTAINABILITY: AN EXAMINATION OF IDEOLOGICAL PERSPECTIVES IN INTRODUCTORY TEACHER-EDUCATION TEXTBOOKS

Hollace Lea Bristol

Education for sustainability refers to a process for reorienting human awareness, competence, values, and attitudes toward effective participation in environmental, economic, and community decision-making that promotes sustainability. The integration of principles of sustainability into teacher education is provided by the following three-part rationale: (a) the degradation of the earth's biotic systems, (b) the decline of sustainable human communities, and (c) the call by international agencies to advance the consciousness of sustainability through public education.

This study identifies principles of a shift in thinking referred to as *ecological consciousness*, to distinguish it from a Western mechanistic worldview. These principles are then used in a content analysis of introduction-to-education textbooks to determine the extent to which current texts integrate ecological consciousness into the foundations of Western education.

As no publishers have identified introduction-to-education textbooks currently in use that are structured within the ecological paradigm, sample texts were previewed to determine recording units that would provide evidence of the inclusion or omission of ecological principles. These recording units include current social issues and future issues that are mentioned as effecting education, how the content is prioritized, how process is

represented, what is said about individual identity, how values and ethics are referenced, and direct references to ecological and environmental issues related to education.

Findings of the study indicate that .09 percent or less than one-tenth of one percent of total content of six best-selling introduction-to-education textbooks relate issues of sustainability to education. Those few references that are included are in the context of science education, the geography curriculum, internet lessons, or future concerns. Although the claim is made that issues of ecology and environmental education continue to influence today's curricular materials, nowhere is this evidenced in the textbooks that were sampled. Omissions of the language and issues of sustainability represent a perspective of denial in reference to a now-limited habitat and diminishment of species, and a false sense of a manageable and sustainable future secured through technology and progress.

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Dedication

. In recognition of the light you bring to the world, I dedicate this project to you, my sons, Jason, David, and Daniel, and to you, my grandchildren, Allison and Sarah, to their mother, Shonna, and to grandchildren and daughters-in-law yet to come. May you continue the work of raising us up to see the light equally in each Being.

Namaste!

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God bless!

I say that it touches a man that his blood is sea water and his tears are salt, that the seed of his loins is scarcely different from the same cells in a seaweed, and that of stuff like his bones are coral made. I say that physical and biological law lies down with him, and wakes when a child stirs in the womb, and that the sap in a tree, uprushing in the spring, and the smell of the loam, where the bacteria bestir themselves in darkness, and the path of the sun in the heavens, these are the facts of first importance to his mental conclusions, and that a man who goes in no consciousness of them is a drifter and a dreamer, without a home or any contact with reality.

Donald Culross Peattie, from ***An Almanac for Moderns***

Chapter 1: Overview of the Study

Introduction

Students studying to be educators take an initial class that introduces them to the profession of teaching. Topics often include the function of education in the United States, duties and qualifications of those who teach in K-12 schools, social issues that relate to education, and questions of school reform. One part of this context is the textbook, a cultural artifact that often plays a significant role in the curricular structure of the class. In a world where dialogue on the topic of sustainability has risen to an imperative, teacher education can be influential in fostering ecological practices. This study employs the method of content analysis to examine selected *Introduction to Education* textbooks to document the extent to which they integrate principles of sustainability, here referred to as *ecological consciousness*. I begin my exploration through a personal reflection of experiences that have led me to this research topic.

Personal Context

My son waits tables in a restaurant in Lahaina, Maui. Tourists, when pointing to another island in the Hawaiian chain, ask often enough to be noteworthy, “Is that Japan

over there?" In my work with children in a technical climbing environment I notice that many children have a difficult time following directions about where to place their right foot, or left hand; their internal bodily reference points are not immediately connected. As reflected in the Peattie quote above, the sense of lively awareness of one's home, one's internal and external landscape, one's connection to the movement of the solar system, and the ever-changing life force present all around us, all speak to a quality of *paying attention*. This attention to which we are called can no longer be taken for granted as a natural consequence of being an inhabitant of Planet Earth. Our indigenous forefathers and mothers carried with them a consciousness of the interconnectedness of all that is. The monarch butterfly still carries the intelligence that draws it back to Mexico after a four-generation absence. How many of us can feel a change in the weather pattern before we see the rain? How many of us know the names of the plant species growing in our yards? Where are we taught the interconnection between our minute-to-minute decisions and their effect on generations of species yet to come? What are the consequences of not paying attention to the places we inhabit?

My interest in the topic of education for sustainability grows out of my childhood experiences on the family farm in Connecticut in the 1950s and, more recently, my desire to leave a habitat of lasting health and beauty for my grandchildren. Thinking of the word *sustainable* conjures up images of places I have known: evergreen forests fed by the seaside mist, rivers followed through state boundaries in search of the mystery of their source, wild strawberries along the dirt road at the base of the hill, compost heaps steaming by the garden, scents of manure from our chicken coop that my grandfather spread on the corn field, and the wild places that harbored our excursions as kids and

nourished our daydreams. I can find those places still; they are not just images of yesterday. I am also reminded of supportive relationships: friends who held me up when my sister was killed in South America, the light I have held for loved ones who have found their way into dark places, the fairly frequent event of our family rescuing abandoned animals, the aid my parents provided during the flood of 1955 when our only access to the road was by boat, the trips to my grandparent's farm in the old pick-up to fill tin milk jugs with water when our well went dry, the kindness of a British policeman who drove me to his friend's bed and breakfast in a neighboring town when I couldn't find a place to sleep. I am fortunate to have experienced these sustaining forces, firsthand, in ways that have instilled awareness of my interdependence with the earth's bounty, and I feel a sense of deep gratitude for all the instances in which I have been lifted up and also have been able to support, extend, and stand firm for others. The dimensions of sustainability extend beyond the realm of the ecology of humans within their environment, to the web of caring within community, and to an exchange of goods and services independent of our wallets.

Professional Context

My background as a post-secondary educator for the past twenty-six years leads me to consider opportunities for influencing the ecological consciousness of the human population through the educational system in the United States. While there are many potential openings within institutionalized education wherein the results of research may initiate change, my experience as a teacher of teachers influences me to look to the venue of teacher education for specific openings in which to introduce ecological consciousness.

The shift in thinking I deem necessary is akin to a re-evaluation of the dominant worldview. I do not see it as sufficient to teach about the degradation that has occurred within human and natural systems over the past few decades. Nor do I think that the answer lies in requiring a class in environmental science. The great hope in the early 1970s was that environmental education "as an interdisciplinary study [would] permeate all areas of the curriculum, kindergarten to grade twelve and beyond" (SMEEC, 1973). The societal change-of-mind that this implies has not been forthcoming. Environmental education is now referred to as necessary, but not sufficient, in that, according to Sterling (2001) "its values, theory, and practice are affected, influenced and constrained by the systems within which it is embedded" (p. 31). The systems to which Sterling refers are the broader educational and social systems in the West. Unless the assumptions and beliefs that undergird the foundations of these systems are examined, deep and significant change in the direction of environmental, economic, and community sustainability is not likely to be experienced. Those of us responsible for the task of designing curricula, writing textbooks, and facilitating the development of teachers must reconsider ideological and conceptual frameworks that define the criteria by which kinds of knowing are valued, and how the role and function of education are defined. In addition, teacher-education professionals must reconsider questions of who decides what priorities are played out in the classroom, what is deemed of value, and what guidelines determine ethical behavior. In other words, the trainers of teachers for positions in public schools must re-examine the worldview that grounds their assumptions; the philosophical and theoretical base on which our educational system is built must be reconsidered. The worldview on which the training of teachers rests must be intentionally questioned and

not assumed. The explicit and implicit ideology in teacher-education textbooks provides some of the evidence that researchers can bring forward to determine where colleges of teacher education stand in their relationships to *ecological consciousness*. My intent is to advance the research on messages in introduction-to-education textbooks (both manifest and latent) that enable or constrain an ecological worldview.

Context of the Problem

Sustainability

The current usage of the word *sustainability* refers to the ability of a system to maintain itself in relation to its environment over time. Conversations about the maintenance of systems are often in reference to natural systems including non-renewable resources, ecosystems that comprise forests, fisheries, rivers, topsoil, biotic species, and the atmosphere. A broad notion of sustainability refers to human, cultural and social systems, and economic systems (in addition to environmental systems) and their ability to persist over generations. The conversation carries a sense of insecurity about planetary conditions and practices that threaten the ability of these systems to continue in a mutually supportive relationship. Questions of what needs to be sustained, and how to best maintain natural and human systems with their associated beliefs, patterns, structures, and practices, are critical in framing the conversation. The questions are deep, and challenge the Western scientific worldview. Many use the term *paradigm shift* to refer to the transformative change required to adequately address issues of sustainability. In the foreword to Stephen Sterling's book *Sustainable Education* (2001), David Orr, Professor of Environmental Studies at Oberlin College, addresses the call for a new worldview:

> The disorder we see all around us reflects a prior disorder grounded in the paradigm of human domination that has now nearly conquered the entire world. That paradigm must be replaced by one that places us in the web of life as citizens of the biotic community. We must come to see ourselves as implicated in the world, not simply isolated, self-maximizing individuals. This battle will be won or lost in the schools, colleges, and universities around the world. (p. 8)

This call for a new consciousness is echoed by many contemporary philosophers and educators. Doug Brown (2002), Professor of Economics at Northern Arizona University, lays out two factors that would indicate that *sustainability* has the potential to be a new cultural paradigm, one of which is, "that a substantial majority of humankind comes to accept it as a yardstick by which to measure everything suggestive of social change" (p. 11). Alignment with this factor at times seems inconceivable in the Western world, where the modern idea of progress lacks any self-limitations such as how innovations affect relationships, how technological advances alter systems of mutual support within communities, and how the quest for *more* interrupts the self-renewing capacity of natural systems. Achieving consensus around sustainability as a criterion against which to assess personal daily decisions, business priorities, as well as local, regional, and national initiatives, requires re-educating the citizenship.

Personal Assumptions and Reflections

I know that my personal reverence for the Earth is not enough to defend against the current published opinions of those who feel threatened that education for sustainability may be a form of liberal indoctrination. In a recent issue of the *Sunday*

Oregonian (Swanson, 2004), organizers of a group called Operation Green Out paid for two advertisements at a cost of $50,000 that read,

> Political extremists in the Green Movement, from environmental groups to the Democratic left, are targeting children and pushing Education for Sustainability. Facts prove Education for Sustainability amounts to a covert plan to brainwash America's youth, kindergarten through college, with the core values of the international Green parties.

I have a sense that the energy and money invested in countering recent efforts to integrate environmental concerns into existing curricula are politically motivated given the heated nature of the 2004 presidential campaign. However, more accusations of indoctrination may be seen as newsworthy, and proponents should be prepared with a reply that offers more than sentimentalism. I offer my argument for the legitimacy of education for sustainability from three perspectives: current environmental and social crises, the calls from the international community for a commitment to education for sustainable development, and a theoretical argument that includes representation by contemporary voices. The first two will be explained in the historical and contextual review that follows in the next section. A more comprehensive explication of the philosophical perspective follows in chapter 2.

In order to situate my research in my personal understandings, I offer my own assumptions here in two categories: my philosophical position on the relationship of human nature to other biotic and natural systems, and my assumptions about the role of education in relationship to sustainability. Assumptions about my choice of research methodology are included in chapter 3.

The first set of assumptions concerns the dynamics involved in the long-term health and maintenance of natural and human systems. I assume that all natural, biotic, and human systems have intrinsic value. This is in opposition to the mechanistic perspective that focuses on the instrumental value of the natural world (i.e., how it is useful to humans). I start my research from the position that survival is a natural, innate motivation of each member of human and biotic systems. Moreover, every member of every human, biotic, and natural system emerges within an environment and, thus, is innately related to other beings and non-living entities. From an axiological perspective, I understand that members of the human community, as agents of problem-solving, and endowed with the propensity to care, have the responsibility to work with the natural and biotic systems to promote the survival of all species. I also accept as critical to this study the question posed by Bowers (2003), "What do we want to conserve?" (p. 1). This question is central to the conversation about the survival of biotic species and their supportive social and economic systems, and will be readdressed as a unifying idea in chapter 2.

In building awareness of sustainability within the educational system, a broad venue of opportunities exists today. I assume that education can empower people of all ages to accept responsibility for creating and enjoying a sustainable future. I believe that teacher-education programs can play an important role in initiating shifts in attitudes, values, beliefs, and competencies that contribute to the construction of a sustainable future. Further, I accept that within teacher-education programs, the textbook transmits messages about the dominant culture with its associated manifest and latent values and assumptions, so that this particular context of the textbook is a vehicle for developing

awareness within pre-service teachers. As my rationale will indicate, the introductory class in the formal pre-service training and education of teachers is significant in the primary socialization of students into the profession of teaching, no matter whether the course is taken when the student is an undergraduate or a graduate student. Thus, this venue is appropriate for teaching sustainability with regard to decision-making about cultural practices, values, assumptions, competencies, language, and metaphorical underpinnings.

These personal assumptions and beliefs serve as my starting point and situate my study. In the next section, I present a rationale for this research based on the areas of the current status of global systems, the recent international call for the involvement of higher education in problem solving associated with sustainability, and the appropriateness of introductory classes in pre-service teacher training as a venue for this research. I also discuss reasons why the textbook is an artifact worthy of study. In maintaining an interrelational perspective within this work, my intent is to describe the many facets of the context in which this inquiry is seated.

Environmental and Social Crises

There is a growing body of literature in the field of sustainability that characterizes our world as *a world in crisis*. Disturbing global trends provide evidence that human activity threatens our ability "to meet the needs of the present generation without compromising the ability of future generations to meet their own needs." This goal of sustainability, as defined in a report entitled *Our Common Future* (Brundtland Commission, 1987), will become less achievable without a dramatic change in our current mindset and behavior.

The Worldwatch Institute (L. R. Brown, 1998) reports that in the last five decades, the population of the world has more than doubled to six billion people, and the world's economic output has increased nearly six-fold (p. 3).This unprecedented growth is altering the face of the earth and the composition of the atmosphere. Pollution of air and water, accumulation of wastes, destruction of forests, erosion of soils, depletion of fisheries, and damage to the stratosphere ozone layer threaten the survival of humans and thousands of other living species. Some specific statistics that indicate changes since 1950 include:

- Half of the wetlands and 50% of the forests are gone (UNDP, 2000);
- Seventy percent of the world's fisheries are in danger (p. 12);
- The soil is seriously degraded in 65% of agricultural lands (p. 8);
- Freshwater availability per person is down 50% (*Human development report*, 1996);
- Eleven percent of bird species, 12% of mammal species, and 29% of all fish species are vulnerable or in immediate danger of extinction (p. 49);
- For U.S. consumers, making 100 lbs. of manufactured goods produces 3200 lbs. of waste (J. C. Ryan & During, 1997);
- The globally averaged surface temperature is projected to increase by 1.4 to 3.5 degrees Celsius over the period 1990-2100. Since humans have been keeping atmospheric records, the ten warmest years have occurred since 1983, seven of them since 1990 (*IPCC WGI third assessment report, Shanghai Draft, Summary for Policymakers*, January 21, 2001).

These trends, and others, prompted the United Nations Conference on Environment and Development in Rio de Janeiro, Brazil in 1992 (UNCED). The Rio conference, known as the *Earth Summit*, produced declarations of action, entitled *Agenda 21*, as well as treaties and conventions designed to move society toward a sustainable path. The authors of *Agenda 21* agree that education is the best approach in making widespread change. They write:

> Both formal and non-formal education are indispensable to changing people's attitudes so that they have the capacity to assess and address their sustainable development concerns. It is also critical for achieving environmental and ethical awareness, values and attitudes, skills and behaviour consistent with sustainable development and for effective public participation in decision-making. (1992, Chapter 36, p. 2)

Also recognizing that these trends place humanity at a profound crossroads, scientists around the globe, including 102 Nobel laureates, signed the *World Scientists' Warning to Humanity* in 1992, which reads in part:

> Warning ~ We the undersigned, senior members of the world's scientific community, hereby warn all humanity of what lies ahead. A great change in our stewardship of the earth and the life on it is required, if vast human misery is to be avoided and our global home on this planet is not to be irretrievably mutilated. (Kendall, 1991)

Despite these warnings and the rhetoric of commitment to address environmental problems since the Rio Conference in 1992, all the Earth's living systems have continued to decline. Moreover, the degradation of natural systems is likely to accelerate with the

addition of 78 million people to the planet each year unless strategies to meet human needs are made more sustainable and just. Currently, 83 percent of the world's resources are being consumed by twenty percent of the world's population. The world's poorest 20 percent earn 1.4 percent of the world's income (Cortese, 1999a). The rural poor continue to migrate and become transformed into an urban poor, thereby exacerbating environmental health and social problems. In the western Himalayas the culture of the Ladakh provides an example of this migration. In this remote mountainous area in northeastern Kashmir, the Ladakh lived sustainably with a deep sense of community and no perception of poverty for over 600 years. Norberg-Hodge's (2002) research shows that within a decade of "modern" external investment and development, the "Ladakh's local economy was swallowed up by the global economy, and its traditional culture was replaced by the consumer monoculture" (p. 38). People have been pulled into cities where they are "cut off from their communities and their cultural moorings, and face ruthless competition for jobs" (p. 39). With more access to consumer goods, the Ladakh demonstrate a "rootlessness" or anxiety and a strong feeling of "lack" as they compare themselves with superficial images delivered to them through commercially-generated media. The interrelatedness of environmental, social, and economic considerations comes to life in this example of Western intervention and the resultant cultural change. The sustainable lifestyle of the Ladakhi people is an example of a culture that understood the balance between human consumption and reserves of natural resources.

Paul Hawken, author of the *Ecology of Commerce*, points out that with a quintupling of population and an over 100-fold increase in economic output we have the reverse of the situation at the start of the industrial revolution. In that era, the earth held

an abundance of natural resources in reserve and a contained a biosphere that was able to assimilate wastes. Hawken (1999) states,

> the newly emerging pattern of scarcity implies that, if there is to be prosperity in the future, society must make its use of resources vastly more productive – deriving four, ten, or even a hundred times more benefit from each unit of energy, water, materials, or anything else borrowed from the planet and consumed. (p. 8)

Statement of the Problem

Educational Context

International directives. The ecological patterns and trends here described present a picture of the earth that begs for a different human perspective from the mechanistic mindset that dominates Western culture. Since the 1992 Rio Conference, other international agencies have been established and have organized conferences on education for sustainability. A growing body of international literature provides directives and recommendations for education to take the lead in securing a sustainable future. Some of these target education in general as pivotal in this effort; others speak to higher education, calling on it to assume a leading role in building an ecological consciousness.

The *Encyclopedia of Life Support Systems* (EOLSS) was initiated in May 1996 in the Bahamas to identify in-depth coverage of issues in the areas of inter-generational equity, intra-generational equity, risk aversion strategies, conservation of biodiversity, internationalization of environmental costs and enlightened educational institutions (EOLSS, 1998).

The following year, the *Congress on Environmental Education for Sustainable Development* met in Havana, Cuba, in September of 1997. The Ministry of Education in Cuba defined specific educational initiatives to be implemented from 1997 to 2001 including the integration of the environmental dimension into all disciplines. As of 2002, UNESCO (United Nations Educational, Scientific and Cultural Organization) reports that environmental education has been incorporated in one form or another in all of its teaching centers (CEESD, 1998).

In order to exchange information on new developments in environmental education, the *International Conference on Environment and Society: Education and Public Awareness for Sustainability* was convened in Thessoloniki, Greece, in December of 1997. The intent of the meeting was to increase public awareness around issues of sustainability. Among the outcomes of the conference was the recognition that education was not only just as important a factor in arriving at sustainability as the economy, legislation, science and technology, but that it was a prerequisite for all of the latter (ICES, 1998).

By the late 1990s, policy change was receiving specific attention. The *Institute for Global Environmental Strategies* was established on March 31, 1998 to promote ecological consciousness, to formulate new policy measures and to develop strategies for dealing with specific regional environmental issues. One of their six themes for research is international cooperation on environmental education (IGES, 1998).

Some international efforts called for the collaboration of scientifically-oriented environmental organizations with formal education to foster interdisciplinary solutions to the growing instability of natural systems. The *Workshop on the Promotion of Education*

and Public Awareness for Environment and Sustainability in the Mediterranean was held in Athens, Greece, in December of 1998 to address, among other issues, the contribution of ecological organizations to the improvement of environmental and sustainability education (UNESCO, 1999).

The *International Children's Conference on the Environment*, held in British Columbia in May of 2002, involved 750 participants from over 80 countries, 385 of whom were children. The goal of the conference was to allow children to learn, share experiences, voice their concerns, and join in a worldwide environmental network to promote positive action on environmental issues (UNESCO, 2002). In the last fifteen years there has also been significant attention in the international community given to the primary role that universities might assume in the long term health of the ecosystem. These conferences point to international interest in making education an effective avenue for reversing patterns of environmental degradation.

Centrality of higher education. Wright (2004) reports that since 1990 at least seven major international platforms have specifically targeted higher education for its increasing responsibility to promote ecological awareness. The Talloires Declaration of 1990 was the first official statement signed by university administrators that indicated their commitment to environmental sustainability in higher education. It is a ten-point action plan published by the University Leaders for a Sustainable Future for the purpose of incorporating sustainability and environmental literacy in teaching, research operations, and outreach at colleges and universities (USLF, 1990). The decade of the 1990s witnessed many such international efforts that focused on university education as the cornerstone of sustainable education, highlighting innovations in curricula, changes in the

ways universities function, and moves to ensure that research and its results serve the needs of economic and social development that is sustainable. After the Johannesburg Summit (World Summit on Sustainable Development) in May of 2003, education for sustainability became a watchword on the agendas of international agencies of education. The United Nations General Assembly at its 57th session adopted the prospect of a decade of education for sustainable development, starting in 2005. The minutes of the session emphasize that education is an indispensable element for achieving sustainable development. Therefore, [The General Assembly] "decides to declare the ten year period from year 2005 to be a Decade of Education for Sustainable Development [January 2005 – December 2014] …and plans to provide guidance for governments to incorporate concrete measures to promote education for sustainable development in their respective national educational plans" (United Nations, 2002).

The implementation plan for the Decade of Education for Sustainable Development ["Decade"] is jointly sponsored by York University in Toronto, Canada and UNESCO. The chair of the effort (Hopkins, 2004) calls on the administrations and faculties of institutions of teacher education to participate in bringing about "systematic, economically effective change" (p. 2). The chair of the "Decade" will develop a network of approximately thirty teacher-education institutions from diverse regions of the world that will develop effective methods of addressing teacher training and sustainability.

One of the requirements for participating in the network is that the teacher-education institutions must research, describe, and publish the changes they initiate at their institutions and share their experiences with other institutions in the network. Based on these practical experiences, the network will advise UNESCO on how best to bring

about institutional change in teacher-training facilities in general. In addition, Tier One institutions (those universities initially participating as described above) "will prepare a descriptive analysis of the status of education for sustainability in their teacher preparation program, including the influence of national and regional policy on the program" (p. 3). The chair proposes that the network adopt the goals and descriptions from *Agenda 21* (1996, Chapter 36, p. 2) which were agreed upon and signed by 179 world leaders and that these goals be implemented in a "locally relevant and culturally appropriate fashion" (pp. 4-5).

In addition to the international agenda, reports by universities and non-profit organizations on sustainability and higher education suggest facility-based and content-based strategies for reorienting the curriculum and the campus. Orr (2002) suggests that this integration of sustainable alternatives will enable graduates to be better prepared to counter, in thought and actions, the larger effects of non-sustainable practices such as "highways, shopping malls, supermarkets, urban sprawl, factory farms, agribusiness, huge utilities, multinational corporations, television and non-stop advertising that teach dominance, speed, accumulation and self-indulgent individualism" (p. 31). While Orr focuses primarily on the greening of the universities' physical operations, other authors (Bowers, 2001a; Cortese, 2003; Ford; 2002; Slattery, 1995; and Sterling, 2001) direct their efforts toward a realignment of the curriculum in higher education. Anthony Cortese (2003), founder and president of Second Nature, (a Boston-based nonprofit organization working to integrate sustainability into higher education) defines the following principles on which to build higher education for sustainability:

- The content of learning will require interdisciplinary systems thinking, dynamics, and analysis for all majors, disciplines, and professional degrees;
- The content of education will include ways to preserve and restore cultural and biological diversity, both of which are critical to a sustainable future;
- The context of learning will change to make human/environmental interdependence, values, and ethics a seamless and central part of the teaching of all the disciplines, rather than isolated as a special course or module within programs for specialists;
- The process of education will emphasize active, experiential, inquiry-based learning and real-world problem solving, both on the campus and in the larger community;
- Higher education will practice sustainability and make sustainability an integral part of operations, planning, facility design, purchasing, and investments and tie these efforts to the formal curriculum;
- Finally, higher educations' partnerships with local and regional communities that assist them in becoming socially vibrant, economically secure, and environmentally sustainable will be a crucial part of successful higher education. (pp. 18-19)

This list is inclusive of several of the themes presented by international directives since 1990 and sets the stage for further discussion of what *ecological consciousness* involves. Two of these themes are common to all: the moral obligation of universities to become models of sustainable institutions, and the need for public outreach activities

(Wright, 2004). Further, the development of ecologically literate staff, faculty, and students is a popular theme in these documents. All of the directives are clear about the need for concrete initiatives by universities to integrate sustainability into their policies and operations at all levels, not only as subject matter, but as a shift in consciousness and intentional practice. The call is for deep systematic change and shifts in awareness, cultural metaphors, and conceptual frames. The proposal by the United Nations of the "Decade" points to teacher education as having a significant role to play in this process.

Environmental education and the training of teachers. Over the past ten years, attempts have been made at a few institutions to require a course in environmental education as part of pre-service teacher training. Research into the integration of environmental education in the preparation of teachers provides evidence of mixed results which can be seen in the following summary of research studies. Using the language of *environmental education* in the review of the literature rather than *education for sustainability* reveals some substantial survey information about the status of environmental education within teacher-education programs. A paper published by Second Nature (Gabriel, 1996) summarizes research that focuses on the inclusion of environmental education in teacher education. Gabriel (1996) writes, "Historically, higher education has not been an active participant in developing programs to incorporate environmental perspectives into the teaching of our current and future teachers" (p. 4). She goes on to say that the "majority of existing environmental education [EE] programs target in-service teachers and were initiated and developed by state natural resource agencies and nonprofit environmental organizations" (p. 4). While the report notes a few excellent university programs, a 1992 survey report to Congress (National Advisory

Council, 1992) on the status of environmental education found that "in general, undergraduate teaching programs place low emphasis on preparing environmentally literate teachers capable of environmental instruction" (p. 46).

In addition to the statistics offered by Gabriel (1996), McKeown-Ice (1995) reports that the results of a survey indicated that only nine percent of teachers' colleges required a practicum in environmental education at the elementary level and only seven percent at the secondary level (p. 1). A literature review (Tilbury, 1992) of the provision of pre-service environmental education revealed that where environmental education does exist in teacher training programs, it is more a policy than a practice (p. 272). A 1994 survey (Lane, Wilke, Champeau, & Sivek, 1994) was designed to assess Wisconsin K-12 teachers' perceived competencies in, attitudes toward, and class time devoted to teaching about the environment. Responding teachers indicated that the lack of an environmental education background and the belief that environmental education is unrelated to their disciplines were the main reasons they do not teach about the environment. Results from a state-wide environmental education program in North Carolina (Office of Environmental Education, 1994) supported this conclusion. Teachers introduced to environmental education techniques during their pre-service studies are more likely to bring environmental education into their classrooms. Moreover, qualified environmental education teachers act as stimuli to the introduction of environmental issues into the greater school curriculum.

And yet, studies on the introduction of environmental education as part of an in-service training program indicate a lack of impact on *long-term* integration. According to a U. S. survey (Wade, 1994) conducted by the National Consortium on Environmental

Education and Training (NCEET) on in-service environmental education training programs, existing training efforts are not enough to result in the widespread inclusion of environmental perspectives in K-12 education. Two national programs that account for the majority of in-service workshops are perceived by educators as being science-based; they do not often attract teachers from other disciplines. Most environmental education is not truly interdisciplinary in nature. The NCEET survey also found that respondents perceive in-service providers to be more skilled in environmental content and less so in pedagogy. Involvement by teacher-education institutions in program development and curricular modification could help overcome current pedagogical shortcomings.

One consequence of using the term *environmental education*, instead of *sustainability*, is that in a search of the literature, environmental education is commonly viewed as a separate subject; only rarely is it viewed as a basic philosophical underpinning of the curriculum or as a basis for curriculum integration. As a result, according to Gabriel (1996), current and future teachers perceive teaching about the environment as science-focused and separate from their disciplines. This separateness is reinforced by the content of available training opportunities. Teachers interested in learning about the environment must attend a separate environmental-education workshop because of the lack of integration of environmental education concepts into either pre-service or in-service training opportunities. In addition to the perception that environmental education is a separate science offering, the associated belief that humans are separate from the environment is also perpetuated.

Despite evidence of a world ecological crisis, directives for the wide-scale integration of environmental education and sustainability thinking into public education

go largely unanswered. Specific calls by the United Nations and non-governmental organizations (NGOs) to institutions of teacher education for training teachers toward sustainability awareness have been responded to only sporadically. Voices in this conversation (Brown, 2002; Ford; 2002; and Sterling, 2001) call for a shift in the foundations of education toward an ecological consciousness. Within this multifaceted context there are opportunities for innovative research that promotes an understanding of the relationship of educators to this suggested alignment with sustainability. Clarity of the principles integral to this shift in thinking, along with a specific venue within which research might be productive, frame additional contextual pieces of this research project.

Purpose of the Study

The purpose of this report is to identify ecological principles that can serve as a foundation of education for sustainability and to apply these to an analysis of beliefs and assumptions inherent in teacher-education textbooks. My intent is to contribute to the shift in thinking toward *ecological consciousness* that contemporary authors argue is necessary as a new basis for education. In my analysis of the selected textbooks, I will look for evidence of principles of an ecological consciousness and note the extent to which these are incorporated into the text.

The focus of pre-service environmental programs and the curriculum of pre-service teacher training must be expanded to include the interdependence of humans, the biotic community, and the environment. Promoters of sustainability also address the community aspects of this expansion as well as the economic aspects. A balanced education about such issues as population, consumption, the environment, natural resource management, human health and well-being, diversity, and sustainable

development must become an integral part of the curriculum in teacher-education programs.

Significance of the Study

Textbooks

While the literature suggests an international agenda for the integration of sustainability into public education, and also offers ecological principles which could form the foundation of education for sustainability, there is a lack of research on ways of implementing these principles. Teacher-education programs as a venue for initiating a change of consciousness in favor of sustainability have yet to be explored in depth. A report by the Clintons administration's President's Council on Sustainable Development (Environment, 1994b) states, "Making the connection between the education of teachers and the environmental literacy of students as an outcome of education is a key step toward sustainable development" (p. 5). Yet little is being done in this regard. The report continues: "Most new teachers graduate from teacher preparation institutions with limited knowledge of education for sustainability and ways it can be incorporated into their teaching" (p. 6).

Aspects of teacher training that might serve as entry points into developing ecological consciousness include: faculty development programs, integration of sustainability principles into specific class presentations, and involvement of pre-service teachers with campus-wide projects such as recycling, energy conservation, or the composting of waste. A significant argument can be made for focusing on *language forms* as a strategy for raising ecological consciousness. Bowers (1993) addresses the connection between language forms and a cultural group's metaphorical thinking. He

says that “the thought process of the individual is always influenced by the tacit conventions of the language” (p. 51). As language is constructed from the root metaphors of the culture, implicitly encoded messages become part of the taken-for-granted assumptions and beliefs on which our thoughts rest. These assumptions include ideological patterns that then become the foundation for continuing cultural practices. Stables (2001) contends that the language of the curriculum, including that of environmental education, serves to marginalize aspects of community and ecological practice. He says, “the relationship of language systems (which are essentially culture-driven) to the workings of the ecosystem (which is essentially not culture-driven) is highly problematic in a way which has still been insufficiently addressed in the SDE [sustainable development education] literature” (p. 121). Oelschlaeger (2001) speaks of language forms that frame cultural codes and have the potential to shape individual and societal choices. He contends that the replication of culture is facilitated through language. If the dominant cultural codes serve to perpetuate the divide between nature and culture, it is only through intentional examination of the existing cultural codes and the offering of “alternative symbolic structures” (p. 227) that cultural stories and thus cultural practices can be changed.

Affecting the shift in consciousness toward an ecological worldview (called “ecosemiotics” by Oelschlager) is an approach that rests on the premise that humans are language animals or *homo narrans* (p. 228), and that the intentional changing of cultural codes through creation and use of alternative language forms is an effective way to challenge dominant narratives. The current research project focuses on the literary artifact

of the textbook, the document on which much of pre-service education depends as a source of legitimate knowledge about the profession of teaching.

Specifically, the subject of analysis uses entry-level textbooks, those adopted for the first course that pre-service teachers take during their formal program of teacher education. For some this is an undergraduate course titled *Educational Foundations*; for others it is a beginning graduate level class in a certification program, combining a master's degree with certification.

An additional rationale for focusing this research on entry-level teacher-education textbooks relates to the potential influence of the textbook on the student's introduction to the profession of teaching. This rationale will be included in the literature review in chapter 2 which will address: (a) the extent to which teachers rely on textbooks to frame instruction (Diegmuller, 1995; Green & Hurwitz, 1980; Ornstein, 1995; Reynolds, 1976; Thompson 1982; and Wang, 2002), (b) the role that textbooks play in representing the ideologies reflective of particular cultural, political, and philosophic worldviews (Apple & Christian-Smith, 1991; Bowers, 1993; Burstyn & Corrigan, 1974; and Merton, 1999), (c) the role of the textbook in the primary socialization of teachers (Bowers and Flinders, 1990; and Venezky, 1992), and (d) the potential of textbooks to change conceptual learning of students (Dole, 2000).

Textbooks are the primary source of written information and interpretation of fundamental social issues for the majority of college students (Green & Hurwitz, 1980). Professional teacher-education textbooks reflect the dominant theoretical foundations and educational practices of our time (Bowers, 1993, p. 119). They disseminate theory to teacher-education candidates, influence teacher preparation, school courses and programs,

and affect the conceptual understanding of future teachers and education specialists. And yet, an examination of principles of sustainability in selected editions of contemporary introduction-to-education textbooks used in the undergraduate and beginning graduate-level curriculum has not previously been undertaken.

Audience and Role of the Study

People who may find this study useful are: (a) faculty and students of teacher education at the undergraduate and graduate level at universities and colleges of education; (b) researchers and educators who are actively working in the area of education for sustainability in the United States and in other Western countries; (c) authors and publishers of teacher-education textbooks; and (d) practicing teachers K-12 who have an interest in education for sustainability.

Research Questions

In this research study I intend to address the following key questions:

1. What are the ecological principles that characterize a foundation of education for sustainability?
2. How are these principles expressed in best-selling introduction-to-education textbooks in the United States?

The first question provides the framework for synthesizing contemporary philosophical conversations on guiding principles of education for sustainability. This research is described fully in chapter 2 and results in an explanation of recommended principles that serve as a guide to the examination of selected textbooks. The second question forms the core of chapters 3 and 4 in which the method of content analysis is

used with a purposive sample of introduction-to-education textbooks to identify their alignment with the identified ecological principles.

Parameters of the Study

This study is not intended as a comprehensive statistical analysis of planetary indicators of unsustainability. This study is not an in-depth exploration of environmental education programs K-12, nor does it speak to innovations in the physical plants of universities that are oriented toward conservation. While this research includes recommendations for curricular change, it does not specify implementation at the K-12 level. The focus of this study is on leverage points for change in consciousness during teacher training. *Introduction to Education,* for purposes of this research project, is interpreted as the first course that a student takes when entering a formal program in preparation to become a teacher or a professional in the field of education. This definition includes undergraduate and graduate beginning level courses throughout college and university education in the United States.

Definitions of Terms

Definitions of terms that are relevant to this study follow. Definitions of these terms that refer to a context outside the limits of this study are omitted.

Anthropocentric: (a) Regarding humans as the central element of the universe; (b) Interpreting reality exclusively in terms of human values and experience.

Biotic: Of or relating to life.

Ecological: Characterized by the interrelationship of living organisms in an environment.

Ecological consciousness: According to Leff (1978) "a specific ideal cognitive, valuational, and motivational orientation toward the world…more a goal to strive for than

a particular pattern of psychological functioning that we can readily investigate" (pp. 282-283). Ecological consciousness is comprised of four chief components: ecological systems thinking, a high ability to enjoy and appreciate things in themselves, an ecocentric value system, and a synergistic orientation in interaction with one's social and physical environment (Leff, 1978).

Education for sustainability: A key definition is advanced by Sterling (2004) who defines a role for education in meeting the demands of a sustainable future:

> *Education for sustainability* is a process that develops people's awareness, competence, attitudes and values, enabling them to be effectively involved in sustainable [practices] at local, national and international levels, and helping them to work towards a more equitable and sustainable future. In particular, it enables people to integrate environmental and economic decision-making. (p.1)

Ideology: (a) A body of ideas reflecting the social needs and aspirations of an individual, group, class, or culture; (b) a set of doctrines or beliefs that form the basis of a political, economic, or other system.

Leverage point: A place or venue of positional advantage; a place from which one has the power to act effectively.

Mechanistic: A worldview in which nature is regarded as predictable, measurable, reducible to its parts, and fundamentally physical. Value is determined by instrumentality. This model is unable to account for interconnectedness, wholeness, or dynamic interaction other than physical interaction.

Metaphorical: Pertaining to a figure of speech in which a word or phrase that ordinarily designates one thing is used to designate another, thus making an implicit comparison.

Natural system: According to Merriam-Webster's Collegiate Dictionary (1998), natural means: "having or constituting a classification based on features existing in nature" (p. 774). I also offer as a descriptive phrase: an interconnected set of relationships that prevail over time without human intervention.

Paradigm: The constellation of rules, domain, assumptions, theories, discourses, and values that govern and shape a discipline at a particular historic moment; a general mind-set or perspective which dictates in which direction research might go, what constitutes legitimate knowledge, and who is a legitimate speaker for the field.

Purposive sampling: Data sources chosen on the basis of the research question, its context, and their ability to provide information relevant to the goals of the study. Purposive sampling does not assume that the selected data sources are representative of the larger population.

Substantive codes: Words or phrases that provide an initial direction in developing relevant categories and properties and in choosing possible modes of interpretation.

Sustainability: The ability of a system to sustain itself in relation to its environment.

Approach to Research

This study takes a two-pronged approach to research: development of ecological principles and content analysis. In chapter 2, I synthesize the research in environmental education and sustainability education according to the research paradigm with which they are aligned (positivist, interpretive, and critical). In addition, chapter 2 contains further examination of the role and influence of textbooks in teacher education, and a philosophical discussion of education and sustainability. This research into contemporary philosophical conversations results in a description of *ecological principles* that could

serve as foundational to an ecologically-aware educational system. Once the ecological framework of principles is established, content analysis is employed to assess the extent to which the principles of ecological consciousness are integrated throughout the selected introduction-to-education textbooks. A detailed plan for the method of content analysis is described in chapter 3.

Summary

This chapter has presented a description of the questions that drive this research project together with a rationale for the choice of the topic and the personal, global and professional contexts within which the study is conducted. The literature reviewed in this chapter has addressed the historical and international context of the topic of education for sustainability (EFS). Given the global significance of the research questions, I have summarized statistical evidence of the degradation of human and natural systems, and included documents and directives from international governmental and non-governmental agencies. These documents provide rationale and support for the integration of issues of environmental, ecological, and ethical visioning into the agendas of our educational systems worldwide. I have also introduced a rationale for the choice of the specific context of teacher-education textbooks (to be expanded in chapter 2) based on contemporary educational research and theoretical understandings. A review of the literature follows in chapter 2. Chapter 3 presents the detailed design of conceptual content analysis as a method of inquiry. Historical and contemporary writings on content analysis are cited here. In chapter 4, I report on the findings of the content analysis of selected entry-level textbooks. My inferences, discussion, and interpretation of these findings are addressed in chapter 5.

To live content with small means,
to seek elegance rather than luxury,
and refinement rather than fashion,
to be worthy, not respectable,
and wealthy, not rich.

To study hard, think quietly, talk gently, act frankly,
to listen to stars and birds, babes and sages, with open heart,
to bear all cheerfully, do all bravely, await occasions,
hurry never.

In a word, to let the spiritual, unbidden and unconscious,
grow up through the common.

This is to be my symphony.
-William Henry Channing

Chapter 2: Review of the Literature

Introduction

The Study

The beliefs, assumptions, and practices on which public education is founded must be transformed if they are to support an environmentally, economically, and socially sustainable future for the natural systems of the Earth, including the biotic community that inhabits the planet. The literature suggests that the change-of-mind toward ecological consciousness might best be accomplished within a formal educational system. As our colleges of education have the major responsibility of training teachers for positions in public schools, these institutions serve as leverage points for initiating societal change. Given the lack of comprehensive reform of teacher-education programs to address sustainability, it is important to look to the documents used and produced by colleges of teacher education in an attempt to identify evidence of alignment with ecological thought.

Textbooks are one textual reference for the identification of beliefs, assumptions, and practices foundational to teacher education.

This study aims to address the ideological conceptions regarding education for sustainability in selected introduction-to-education textbooks. Chapter 1 presented an overview of the study and introduced the following research questions:

1. What are the ecological principles that characterize a foundation of education for sustainability?
2. How are these principles expressed in best-selling introduction-to-education textbooks in the United States?

Chapter 2 reviews the literature on sustainability in several categories. The first section includes early voices who spoke for ecological consciousness and presents a rationale for approaching a shift in awareness through education rather than policy. The introduction is followed by a review of the literature documenting the role of textbooks in teacher education. I then summarize the research literature at the intersection of economic, environmental, and community sustainability (cultural or societal). This review, organized in terms of the placement of the studies within research paradigms, provides a research context for the study. A discussion then follows on the aspects of philosophical inquiry that are necessary to the conversation on sustainability and education.

Early Voices

E. F. Schumacher (1973), one of the early editors of the radical British journal, *Resurgence*, and author of the book, *Small is Beautiful*, addressed a world on the brink of an era of global pollution, diminishing resources, individualism as a replacement for community, and corporate power. His words caught the attention of California governor

Jerry Brown and President Jimmy Carter and prodded Westerners to question their underlying beliefs about the domination of nature by human beings and the utility of ever-increasing consumer production. In the introduction to *Small is Beautiful*, McClaughry (1989) reminds us that, "[Schumacher's] concern about the exhaustion of the planet's resources amplified earlier works…and gave new emphasis to a whole generation of environmental defenders" (p xiv). Given Schumacher's (1973) historical prominence in building public awareness about the plight of the earth, his words are respectfully included here. He speaks to the irony inherent in the language that is used in reference to the relationship of human beings and the natural world:

> Modern humanity does not experience itself as a part of nature, but as an outside force destined to dominate and conquer it. Humans even talk of a battle with nature, forgetting that, if they won the battle, they would find themselves on the losing side. Until quite recently, the battle seemed to go well enough to give humanity the illusion of unlimited powers, but not so well as to bring the possibility of total victory into view. (p. 14)

According to Schumacher, a minority of people in the 1970s began to see that the view of humans dominating nature contradicted the needs of the continuing existence of humanity. Schumacher points to the word *battle* which is commonly used to characterize the relationship between human beings and the *forces* of nature. Metaphors of this kind have become embedded in the language of Western civilization and are indicative of a structural dualism that characterizes written patterns of thought. They signal a worldview lacking awareness of the inherent inter-connectedness of the all living things, and are representative of the hidden messages that are spoken unconsciously,

without a critical examination of their metaphorical meaning. Raising awareness of the language and assumptions humans take for granted is part of the work involved in promoting a change-of-mind toward sustainability. Just as Schumacher points to the embedded nature of the relationship of language to worldview, other research efforts attempt to uncover ways to promote different mindsets in three areas related to sustainability: the environment, sustainable development, and social relations.

A definition of sustainability offered by Sterling (2004) is the "ability of a system to sustain itself in relation to its environment" (p. 52). Sustainability is spoken of from many perspectives including agriculture, forestry, fisheries, and natural resources (Agyeman & Crouch, 2004, p. 114). Sustainability, as defined in a political context for the first time in the report *Our Common Future* (Brundtland Commission, 1987) is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (p. 24). Central to sustainability is the thesis that the vitality of earth's ecosystems is critical for all life on earth. In a sustainable society, environmental concerns and economic agendas are related in a tense but common framework. The President's Council on Sustainable Development's definition of sustainability reinforces the Brundtland Report and enhances the perspective to include social equity as one of the requirements for sustainability (*Sustainable America: A new consensus for prosperity, opportunity, and a healthy environment*, 1996). As Rietje van Dam Mieras said at the International Conference on Education for a Sustainable Future in 2003, "Because economic development is to a great extent determined by the national or local social, cultural and political context, this implies that with the concept of sustainable development always three perspectives are at stake: the ecological [or

environmental], the economic and the social/cultural one" (pp. 4-5). Conversations and research on sustainability have adopted this three-part view that is clearly implicit in *Agenda 21*, a report of the United Nations that garnered international support during the "Earth Summit": the United Nations Conference on Environment and Development in Rio de Janeiro in 1992 (UNCED).

Change at the Intersection

At the intersection of the three areas of sustainability – economic, environmental and community – there is a significant conceptual area that can be interpreted as the *change-of-mind* or *change in consciousness*. Bowers' (2001a) contention is that the current scientific, materialistic mindset of consumerism, progressive change through technology, globalization and outsourcing of the marketplace, cultural homogenization, and the anthropocentric prioritization of humans over nature dominates the Western worldview. This pervasive way of thinking sets up conceptual categories that are destructive to the control that the individual is able to exercise over his/her economic status, to the ecological health of the environment, and to our human communities and relationships. As suggested by *Agenda 21* (1992), a shift in consciousness to new conceptual categories is necessary in order to understand the effects of daily personal decisions on the domains of economic, environmental, and community sustainability. This transformation in decision-making must occur at the individual, institutional, community, state, national, and international levels.

We can find daily examples of challenges to sustainable thinking made by individuals in the domains of consumer habits, resource use, and recognition of biological and cultural diversity. Child-bearing couples face the implications of procreation on

population growth. Purchasing decisions involve considerations of the costs of using non-renewable energy sources for the transportation of goods manufactured by American companies overseas when locally-made products are available. When choosing ways to meet our transportation needs we may consider vehicle standards of gasoline consumption and emissions, options of using public transportation, walking or biking. The effect of energy use, water use, and the ecological footprint of human beings upon the habitat of other species are an ongoing concern of environmental groups. How often does the average consumer curtail activities with the concern of non-human beings in mind? Even though there are relational and economic benefits that come with community involvement and mutual aid, individualism and commodification often take precedent. Every time an American goes to the grocery store s/he is faced with decisions around the purchase and recycling of product and food containers. The consumer is also faced with a choice as to the consumption of genetically modified organisms (GMOs) in food. Reliance on GMOs reduces the diversity of edible plants and yet, in the United States, the Food and Drug Administration does not require that food manufacturers label their products as containing GMOs. Support or nonsupport of issues of protection of endangered species, pesticide and herbicide use on crops, and conservation of open space and farmland, also requires public education and individual decision-making. This description of choices that confront the consumer can be expanded to include more issues and can be broadened to include parallel decisions made by institutions, and by local, national and international governing bodies. It is apparent, however, that the shift in consciousness required to choose differently happens one person at a time. When people

make these decisions, or challenge public policy, they are doing so based on an ecological worldview.

A description of the *change of mind* to which I refer is offered by Borden (1986) who suggests that an ecological identity is "a reframing of a person's point of view which restructures values, reorganizes perceptions and alters the individual's self-directed, social and environmentally directed actions" (p. 1). Adding to this concept of ecological literacy, Lopez (1989) says that this quality of thought is related to the ability to relate to "where on this earth one goes, what one touches, the patterns one observes in nature – the intricate history of one's life in the land" (p. 65). There is some debate over whether the development of an ecological consciousness among people can best be promoted by policy decisions or through the vehicle of education. In the following section I reference some theorists who argue for the latter.

Approaches through Policy and Education

Policy legislation and education are two main areas in which it is suggested that a promotion of a shift in worldview can be approached. I use an example from the list of consumer decisions (mentioned above) to clarify the difference between them. In the case of genetically modified organisms in food, a policy approach might be represented by the action of legislators who initiate an ordinance requiring GMO labeling (as is done in Europe). To approach the issue through education, K-12 curricula could include units that teach a rationale for, and an appreciation of, the conservation of genetic diversity in human food sources. Bonnet (2002) advocates accomplishing this change-of-mind by choosing education over policy declarations. Bonnet (2002a) says that, "the notion of sustainable development as a policy is highly problematic, being heavily contested and

subject to internal contradictions and severe epistemological difficulties" (p. 12). He offers a second reason why his approach addresses the potential for education to influence sustainable thinking.

> At the heart of any notion of education for sustainable development must lie a certain frame of mind involving some idea of a right relationship with nature…Focusing on this 'nature-oriented' frame of mind offers the possibility of both contributing to the clarification of sustainable development as an idea, and of identifying something which is of great educational importance in its own right, for in many ways our underlying relationship with nature defines both ourselves and our relationship with the world as a whole. (p. 9)

The emerging sense of what might be called *ecological consciousness* offers the ability to understand the connections between seemingly unrelated problems and issues such as environmental degradation and, for example, the globalization of the marketplace. The change-of-mind to which Bonnet refers is the centripetal focus of education for sustainability. One way of interpreting Bonnet's words is by reiterating that education as a vehicle for shifting consciousness is preferable to dictating behavior through policy decisions. The conversation on sustainability has seen a shift from nature conservation in the early years, to environmental education, and then to sustainability. These shifts have been accompanied by an increasing awareness of the need for democratic processes, a sense of empowerment, and environmental and social equity. The educational component of this ongoing discussion has become, over time, at least as important as the legislated environmental component. The educational system carries the responsibility of posing

questions of the relational aspects of values, beliefs, prioritization of knowledge and practices in order to address Bowers' (2001) question, "What do we need to conserve?"

While the intent of this part of the literature review is to synthesize the formal research on education and sustainability, there are few formal studies reported in the literature. Both the application of content analysis and the context of introduction-to-education textbooks are unique in formal inquiry in the area of education for sustainability. Furthermore, a change-of-mind toward sustainability is an area that has yet to be thoroughly explored, and only tangentially within the positivist paradigm.

Research on the Role of Textbooks

Introduction

The specific venue of introduction-to-education textbooks provides the research milieu for this study. In this section, I look at the potential influence of the textbook on the student's introduction to the profession of teaching. Specifically, what follows is a discussion on the extent to which teachers rely on textbooks for guides to content and curriculum, and finally, an exploration of studies that indicate the potential of textbooks to influence (a) the primary socialization of teachers, (b) the transmission of the ideologies reflective of particular cultural, political, and philosophic worldviews, and (c) changes in conceptual learning.

Teachers' Reliance on Textbooks

Textbooks are the primary source of written information and interpretation of fundamental social issues for the overwhelming majority of college students (Green & Hurwitz, 1980). Neumann (1980) has observed that "the book is…recognized as the most efficient, most cost-effective tool for teaching" (p. 8). For most students in the United

States textbooks are the primary basis of instruction. An often-quoted study on the role of textbooks (F. Wang, 2002) showed that up to 90 percent of classroom time is structured around them, and that the weaker the teacher, the greater the reliance upon the printed page. Wang noted that other studies indicate that students spend between 70-90 percent of their homework time using textbooks (p. 1). Reynolds (1976) in referencing a 1965 report by the Association for Curriculum Supervision and Curriculum Development, noted that "85 percent of classroom teachers follow the textbook and thereby honestly believe that the textbook adoption process is the major way curriculum content is changed" (pp. 275-276). He adds, "In spite of dissatisfaction, criticism, and demand for change, the textbook stands essentially unchallenged as the apparent core of the educational process" (p. 276). In a study of instructional practices, sponsored by the National Education Association, *Project on Instruction*, principals rated the textbook as the resource most useful for a teaching program when compared with locally prepared materials, state courses of study, and materials prepared by professional organizations, educational foundations, and national studies (National Education Association, 1962).

While these few studies indicate a significant reliance on textbooks by teachers, some research differentiates textbook use according to a teacher's experience. Woodward, one of the nation's foremost textbook researchers, reported that research shows a tremendous variation in the amount of dependence on textbooks in which "more experienced teachers tend to use textbooks as reference materials, while novices may be overly dependent on them" (p. 4). Ornstein (as quoted in Diegmuller, 1995, p. 4) says, "I don't think any teacher, or very few teachers, can match or surpass a good textbook in terms of the curriculum, the instruction, or in terms of laying out the content of the

course." Ornstein adds, "A good textbook is really worth a lot" (p. 5). Diegmueller (1996) also reports the results of a survey by the Association of Publishers' school division and the National Education Association. This study indicated that teachers rely heavily on texts; forty-one percent of the teachers said they use textbooks every day; only 9 percent said they never use them. (p. 1).

I have been unable to find any studies that specifically examine the use of textbooks by instructors in colleges of education. One study, however, is relevant to this research project in its reference to the proliferation of textbooks for foundation or introductory courses. Thompson (1982) reports that, "The greatest market is generated by those foundation courses [not discipline-specific] that are required in the greatest numbers of post-secondary institutions. Thus at the college level there is considerable duplication in publishing introductory texts" (p. 204). Textbooks dominate the written material used in beginning-level courses. They also play a role in the primary socialization of students into professional orientation, carry the potential to influence the ideological perspective of students, and affect specific conceptual interpretations.

Primary Socialization

Primary socialization occurs in any situation where a person is learning something for the first time from an already socialized member of a societal group. Teacher-education programs, while not the student's first exposure to the milieu of education, provide experiences in the socialization of teachers to the profession. Textbooks are one structural piece of conceptual scaffolding in the undergraduate experience of a pre-service teacher. They also represent, according to Venezky (1992), an authoritative "surrogate curriculum" (p. 437), which together with the faculty member's

presentation and interpretation may influence the professional socialization and the ideological perspective of the student. Bowers and Flinders (1990), in referring to the primary socialization of students write, “The first words and concepts made available to students provide them, in effect, with a specific conceptual orientation” (p. 109). Concepts included in these textbooks include statements about the purposes of education, current student demographics and social contexts, philosophical foundations, history of education, school governance and financing, ethical and legal issues of teaching, technology, and teacher effectiveness. As students come to their formal coursework with diverse backgrounds of informal apprenticeship to the profession of education, the beginning-level textbook provides an important piece of this conceptual orientation.

Ideological Orientation

It is the aim of this study to identify and distinguish the ideologies that inform the content of introductory textbooks used in undergraduate and beginning graduate level coursework in teacher education, particularly as they reflect or do not reflect principles of sustainability. In addition to attending to the significance of the textbook in the primary socialization of teachers, the study assumes that the manifest and latent ideological messages inherent in textbooks signify – through their form and content – particular constructions of reality, i.e., particular ways of selecting and organizing the vast array of possible productions of knowledge. Berger and Luckman (1967) have argued that our so-called “real world” is created through the social construction of intersubjectively valid meanings. According to Merton (1999), who references the role of education in the transmission of societal norms in his well-read 1938 essay, “schools are…the official agency for the passing on of…prevailing values, with a large portion of the textbooks

used in city schools implying or stating explicitly 'that education leads to intelligence and consequently to…success'" (p. 233). The textbook's role in the social construction of reality is not insignificant. Apple and Christian-Smith (1991), in discussing the political context of textbooks say that "texts are really messages to and about the future. As part of a curriculum, they participate in no less than the organized knowledge system of society. They participate in creating what a society has recognized as legitimate and truthful" (p. 4). This has implications for developing ecological consciousness. Tacit cultural patterns which inform textbook authors, editors, and publishers and their products perpetuate the Western, scientific, anthropocentric worldview without exposing its foundational structure. Bowers (1993) argues that it is not the factual information presented in the texts that needs examining, "so much as the cultural assumptions and analogues that frame how the 'facts' are to be understood and establish the boundaries of understanding" (p. 122). These underlying messages and parameters may be embedded in the form of metaphorical structures of language, visual representations, and structural prioritizations.

A similar view from late in the 20th century is presented by Burstyn & Corrigan (1974), who say that "textbooks mirror society…they may distort…they may present only a segment of the whole picture. Nevertheless, they provide one means of judging what a society wishes to pass on…" (p. 431). The above commentaries suggest agendas in the writing, publication, adoption, and impact of textbooks that beg for a closer look at the relationship of these factors to that of education for sustainability.

The research literature includes other examples of studies in content analysis of textbooks, the intent of which are to analyze both explicit and latent ideological messages such as ethnic or gender awareness. Wilson (1985) focused her research on the

ideological perspectives in introductory college social work textbooks; Baugh (1992) examined multicultural factors in teacher-education textbooks; Wang (1993) identified value-laden themes in school reading textbooks in Taiwan and Texas; and Sleeter and Grant's (1991) work analyzing symbolic messages of race, class, gender and disability in forty-seven texts used in grades one through eight, brought significant attention to the need for inclusion of multicultural factors in textbooks. Zittleman and Sadker (2002/2003) tracked gender equity in teacher-education textbooks as a follow-up on a study by Sadker and Sadker (1980) in which content analysis of 24 commonly used textbooks published between 1972 and 1980 indicated that 23 of them gave less than one percent of space to gender issues. Zittleman's and Sadker's (2002/2003) study found three percent of space assigned to gender in a content analysis of 23 texts. While it is not the intent of this study to evaluate the merit of such studies, this information does provide part of the rationale for the intended research. There is to date no such detailed analysis of factors of sustainability in textbooks at any level. The intended work is significant; the identification of principles that enable or constrain the worldview of sustainability in the mindsets of teachers and students has the potential to shift current practices, attitudes, and decision-making at all levels in the arena of formal education.

Potential of Textbooks to Influence Conceptual Learning

Because this study is investigating a change-of-mind in the direction of ecological consciousness, I looked for research that documents the ability of the textbook to influence conceptual learning. Conceptual change is defined by Dole (2000) as "learning that occurs when individuals, young and old, make a major restructuring in their thinking about something" (p. 99). This research project calls for such a change in

thinking, and argues for the effectiveness of the introductory textbook to influence ecological consciousness (or a lack of it) within pre-service teachers. Given the absence of research on this subject I am proceeding on the assumption that textbooks have the power to influence the ways in which students of education understand and interpret concepts resonant with ecological awareness. Dole (2000) reported that it is difficult to change a reader's prior knowledge by reading texts that are inconsistent with that knowledge. Research on the potential of the textbook to transmit a perceived cultural reality has been cited. It follows that unexamined conceptual understandings of the content that is transmitted by textbooks puts students at risk of not making significant connections between what is read in the text and reports of environmental peril.

In summary, this section of the literature review makes a case for choosing the venue of introduction-to-education textbooks as the focus of this study. Contextual elements of the role of the textbook have been presented in terms of the extent to which teachers rely on textbooks for guides to content and curriculum and the textbook's role in (a) the primary socialization of teachers, (b) the transmission of the ideologies reflective of particular cultural, political, and philosophic worldviews, and (c) change in conceptual learning. I now turn to a review of research reports on sustainability and organize them according to their alignment with particular research paradigms.

Research on Sustainability by Alignment with Research Paradigm

Introduction

In this section I review formal and informal studies on education for sustainability and organize a summary of studies according to their paradigmatic association: positivist, interpretivist, and critical/postmodern. I then evaluate the

effectiveness of the research to provide evidence of the change-of-mind toward sustainability that I am calling on education to promote.

Positivist Studies

Much of the research in the areas of environmental sustainability, economic sustainability, and community sustainability is grounded in a positivist paradigm. The United Nations Department of Economic and Social Affairs, Division for Sustainable Development (Nations, 2003), published a table of national research indicators of sustainability for the three areas (including a fourth area of institutional sustainability) (See *Appendix A*). Note that all of the indicators are measurable by scientific means and reportable through statistical analysis. Note also that none of the indicators refer to the intersection of phenomena that is referred to here as "change-of-mind." According to Gephart (1999), assumptions made by the use of positivist indicators are that: (a) "[T]here is an objective world which science can 'mirror' with privileged knowledge;" (b) "truth and fact are quantitatively specified relations among variables;" (c) knowledge consists of "verified hypotheses involving valid, reliable and precisely measured variables;" and (d) "causal relations among key variables can be predicted and explained" (pp. 2-3). This sample document is representative of the majority of research studies on sustainability. I also attach an agenda for a publication (see *Appendix B*) sponsored jointly by TuTech in Hamburg, Germany and the University Leaders for a Sustainable Future (ULSF) in Washington, D.C. that provides a list of the twenty main categories of UNESCO's Encyclopedia of Life Support Systems around which the publishers will accept research proposals. The launching of the *Handbook of Sustainability Research* is scheduled for May 2005.

In these examples from the separately-defined areas of environmental, economic, and societal research on issues of sustainability there is a strong alignment with a positivist worldview. Indicators provide access to measurement of planetary phenomena, perceived as necessary by national and international organizing bodies. As one researcher notes (BCGI, 2004), "It would seem that two decades after positivism and the quantitative tradition steered the definition and development of a research base for environmental education, their characteristics continue to be dominant in the research literature of today" (p. 3).

An example of the pressure to conform to a positivist paradigm can be found in a community study of quality of life indicators in the Canadian town of Woolwich, Ontario. While there "were no models to follow" (Wismer, 1999) in developing indicators of environmental health, researchers identified nine principles to guide decision-making by the Township Council. As indicators used for similar research in municipalities were not found to be useful, these principles were developed locally through an eighteen-month participatory action research project (p. 111). (See *Appendix C* for a list of the nine principles and corresponding indicators). Members of the research group were surprised at the limited amount of local-level statistical information. They felt pressure to emphasize the quantitative measures over a qualitative analysis, even though their interest was in interpretive findings (p. 113).

The list of behaviors that are considered indicators of high quality of life in a sustainable community are interesting in their representation of the movement by some toward a local, non-formal, change-of-mind approach to sustainability research. While not specified in the introduction of the study, the researchers in the conclusion state, "For

the group, the product is less important than the process. They hope that the Indicators Project can provide the foundation for a community-wide, awareness-raising and education effort…" (p. 113).

The majority of the international and NGO- (non-governmental organization) sponsored research initiatives are positivist in nature. It is not surprising, then, that there is pressure on the educational community to conform in order to be seen as credible. As positivist tools to assess change-of-mind are lacking, many studies use either originally-developed lists of indicators or accept social indicators such as measures of social inclusion, social capital, self-esteem or strength of association (RMIT, 2004). Another example of movement away from common governmental indicators is the report, *Measuring Australia's Progress* (MAP), that was launched by the Australian Statistician on April 4, 2002. It uses a set of indicators to help readers assess whether the economic, social and environmental aspects of life in Australia progressed over the 1990s. The researchers (Hawke Research, 2004) state in their report that there is no consensus about what quantitative measures indicate national *progress* and invite the readers of the report to offer alternative definitions (p. 2).

All of these examples of research have been oriented toward the second agenda item of Chapter 36 of *Agenda 21*: increasing public awareness of sustainable development. These projects have been community-centered or non-formal. That is, while some have been initiated by university research institutes, the data collection has taken place outside the structure of formal educational institutions. Given the mandate by the United Nations and its subsequent *International Implementation Scheme* for the Decade of Education for Sustainable Development, the role of higher education in

sustainable development is clear, yet the path is unpaved. Universities have been presented with both an opportunity and a challenge.

Within the context of teacher education, some formal positivist studies of pre-service perceptions of environmental education and sustainability are found in the literature. In a study by Moseley, Reinke, and Bookout (2002), pre-service teachers' perceptions toward self-efficacy were evaluated after participation in a three-day outdoor environmental education program. Outcome expectancy – which is a teacher's estimation of his or her influence on student learning – was also studied. Participants were a convenience sample of 72 pre-service elementary teachers taking a science methodology course at a state university. Participants were divided into two groups for this modified pretest/two-posttest/control group study. The instrument for all three tests was Sia's (1992) *Environmental Education Efficacy Belief Instrument* which is a five-point Likert-type scale response system. The authors used parametric *t* tests to compare group means. The results suggested that the pre-service teachers' self-efficacy was high before the program and remained unchanged by their teaching experiences but dropped significantly approximately seven weeks after teaching. The lack of change in self-efficacy from the teaching experience was attributed to the structured nature and success of the teaching experience, but the negative effect of time on self-efficacy was believed to have resulted from the pre-service teacher's reevaluation of their ability to teach as they learned more about teaching methodologies. In addition, there was no significant change in outcome expectancy as a result of participation in the program or over the seven week period following the program.

In another study by Paul and Volk (2002), the authors focus on quantitative and qualitative methods to examine the training model for Investigating and Evaluating Environmental Issues and Actions (IEEIA). The authors examined (a) the relationship between IEEIA implementation rates and type of training; (b) workshop participants' perceptions of support for their use of IEEIA and the relationship between those perceptions and implementations; and (c) workshop participants' perceptions about the impact of the instructional approach on themselves, students, administrators, colleagues, parents, and the community. A direct-mailed questionnaire was used to collect data from 132 teachers who had participated in IEEIA training between 1990 and 1999. Interviews were conducted with a purposive sample of eight workshop participants. More than half of the teachers used the approach. Participants of extended or multiple trainings tended to use IEEIA more than their counterparts. Support after the workshop was important to implementation. Recommendations include: two to three years of implementation of EE may be optimal for teachers to fully develop their competencies and gain confidence in using an interdisciplinary environmental education curriculum.

If the results of this study are considered significant in their call for a period of integration of environmental education measured in years, it is not surprising that change in the direction of sustainability consciousness is slow in coming. Not only are studies of implementation infrequent, leadership at the level of higher education is inconsistent and initiated only by a few institutions. Focusing its sustainability work on post-secondary education, Second Nature, in a 1995 report, indicates that positivist indicators of institutional shift in consciousness at universities include: number of hours of training in occupational and environmental medicine in American medical school curricula, number

of schools of business and management that have courses on business and the environment, percentage of teachers' colleges that require a practicum in environmental education at the elementary or secondary level, percentage of programs in public affairs and administration that require classes in environmental management, planning or policy, number of disciplines that integrate units on sustainability or environmental education, number of internships in community or off-campus efforts in sustainability, kinds and numbers of investments in environmentally just and sustainable public companies, percentage of total campus energy consumption from renewable sources, and the percentage of university vehicles that are energy efficient (*The Essex Report*, 1995). It is striking that despite international mandates and directives and well-documented research by non-profit and non-governmental agencies, higher education is slow to implement strategies for comprehensive reform in the direction of sustainability. As of 1999, with the exception of Georgia Institute of Technology, no engineering school had made design for the environment a cornerstone of engineering education (Cortese, 1999).

Campus indicators of sustainability as identified above are external representations of the process toward sustainability. While this statistical evidence of environmental initiatives is important to accountability they do not report the shift in consciousness on the personal level that is so critical to a healthy future. Cortese (1999a) follows a similar line of thinking in pointing out that sustainability receives scant attention in higher education: "Despite these efforts and those of a number of colleges and universities with active environmental studies programs that train graduate professionals, education and research about the interdependence of, and a sustainable

relationship between, humans and the rest of the environment is not a priority in higher education" (p. 3).

Positivist research at the university seems to dominate the literature due to issues of accountability and reliance on scientific measures. There are, however, two other paradigmatic contexts, interpretivist and critical, from which the mindset toward sustainability is studied, both inside and outside the university.

Interpretive Studies

According to Gephart (1999), "positivist concerns to uncover truths and facts using experimental or survey methods have been challenged by interpretivists who assert that these methods impose a view of the world on subjects rather than capturing, describing and understanding these worldviews" (p. 1). Interpretivism assumes a much different ontology and epistemology than is found in positivism. Through the interpretive lens there is no uniformity in the construction of reality; instead the focus is on the intersubjective world of the individual and the meaning-making that occurs internally and relationally and is reflected in language, social interaction, and written texts. Reality is socially constructed and is the result of perspective and cultural and relational context. Positivist research on sustainability seeks to reinforce patterns of alignment with behaviors and decisions that are seen as environmentally conscious. Interpretive research, on the other hand, looks to build a theoretical frame from differing responses to the same or similar situations. Categories and themes emerge from response-generated data that are coded for use in theory building. Research methodologies draw on theories of "symbolic interaction, ethnomethodology, phenomenology and hermeneutics" (p. 3). Data collection (method) revolves around interviewing, autobiography, participant observation,

conversational analysis, and thick description based on experience and participation. Philosophic inquiry can also be considered as interpretive in its hermeneutical concept analysis of underlying assumptions and subdivisions of meaning.

In the research on shifts in attitudes around issues of sustainability there are some examples that are representative of the interpretive paradigm. Many of the available studies, however, are not reported as research, but rather informal documentation of program effectiveness. Thomashow (2002) defines ecological consciousness as, "all the different ways people construe themselves in relationship to the earth as manifested in personality, values, actions, and sense of self" (p. 3). Attempts to reveal this ecological identity span the methodology of the interpretive paradigm. Several studies use autobiographical accounts of expanded ecological awareness. Project summaries report testimony from both teachers and students of changes in conceptual and ethical frames as a result of experiences in environmental education programs and exposure to nature. One example is the Common Roots program in Barnet, Vermont (Kiefer & Kemple, 1999) which involved both graduate-level course training for teachers and implementation of a K-8 "school-wide journey of seasonal thematic units based on the unique story of the Barnet community" (p. 32). As teachers describe the program, "Students gain practical first-hand experiences in observation, data collection, habitat monitoring, and strategies for preserving the diversity of their own natural ecosystems" (p. 37). An autobiographical sample from a junior-high teacher reads:

> The thing that builds an ethical human being, an ethical child, is not reasons, but *feelings*. This energetic base of morality is compassion which requires being in touch with things, feeling empathy. That's not just environmental

> ethics, it's any ethics. And you cannot feel empathetic toward something until you're intimate with it somehow. Intimacy is the key word here. And these students that are going out into the woods year after year are establishing a certain intimacy with that habitat by developing a personal connection to a place. Every year they become more and more aware about what's going on; they really know the relationships not just intellectually, but they can sense them. (p. 42)

This autobiographical account reflects the growing awareness of teachers in regard to influences on children of experiences built around relationships with the natural world. Personal statements such as these are considered legitimate data in the interpretive paradigm and would be discounted in a positivist orientation. The numbered responses in a positivist study mask the rich responses generated in an interpretive study. In another example, Corcoran (1999) reports the use of autobiography in a course on environmental education with the intent of demonstrating the power of self-reflection to reconceptualize students' relationships to education, to their environment, and to each other. One student wrote:

> We looked over to where he was pointing to see two beavers working on their lodge. It was, far and away, one of the most wonderful things I had ever seen. I was only nine years old that morning on the pond, but I knew at that moment that I wanted to give other kids those kinds of experiences. At the end of the summer I would return to the concrete of New York City, learn how to survive as a child in that environment, and dream of summers, ponds and beavers. (p. 184)

Themes that Corcoran (1999) recognized in the autobiographies include: the power of the natural as compared to the human-made environment, appreciation of the privilege of knowing natural places, presentation of multi-sensory experiences as memorable, a sense of comfort, experience of nature without a specific purpose, a sense of wonder, and a sense of service (p. 186). One participant noted that autobiography was "…a fantastic tool [for] prompting us to examine our own experiences and memories for authentic and significant testimony which might have otherwise remained forgotten" (p. 187).

Autobiography reveals rich, personal responses that are hidden behind the statistics of a positivist study. A phenomenology approach, as well, yields in-depth personal descriptions of events and situations. Phenomenology as a method of inquiry is based on the premise that reality consists of objects and events as they are perceived or understood in human consciousness and not of anything independent of human consciousness. Hill (2000), in a phenomenological study, describes changes in human consciousness in the context of human resources and adult education. Results of this study report, "Several major characteristics of global consciousness were described by the participants, the most important of which seemed to be holistic thinking informed by ecology, social justice, systems thinking, global awareness, and, for some, global transformation" (p. 2). One participant observed that the corporation has the obligation to "look at the earth from space and say, 'Am I doing anything to damage or how can I do my work while doing the least damage to or no damage and maybe the enchantment of the globe?' which is the only thing we've got" (p. 2). Another participant reflected on systems thinking as, "all things are things in themselves, but they are also parts of others

and nothing exists in and of itself" (p. 3). This documentation reflects significant individual attitude shifts toward a worldview of sustainability. It is interesting to note the variety of contexts in which these studies were conducted. Whether within formal education, or in a setting of human resource training, change-of-mind through guided experiences is revealed.

Another venue for interpretive research reflects the effects of outdoor education on the attitudes of participants toward the environment. A review of literature in experiential education from June 1999 to the present summarizes data that is primarily captured through open-ended interviews, participants' observations and field notes. Content analysis is employed to digest the qualitative data. One study employed a mixed-method approach and included the use of the MGOIA (*Millward-Ginter Outdoor Attitude Inventory*) to measure changes in attitude on a pre- and post-test with Likert scales relating to environment, education, pollution, and socialization (Mittelstaedt, Sanker, & VanderVeer, 1999). Participants showed an increase in environmentally responsible behaviors that became integrated into their daily lives. While seemingly promising in its ability to capture changes in attitudes toward global consciousness, the use of this positivist measure is within the context of residential outdoor-education programs and thus cannot be generalized to programs of a non-residential nature with limited exposure to the outdoors.

Some reports provide interpretive evidence of change-of-mind with university students and pre-service teachers. At a university in western New York, Kowalewski (2002) designed a four-credit course on deep ecology with cognitive and experiential aims and offered it to sophomores in 1996 and again in 1998. Didactic methods of

instruction were used for the first aim: teaching eco-centrism and contrasting it with anthropocentrism. Less conventional class and home-journal exercises reflective of experiences in the natural world were used for the experiential aim. At semester's end, students evaluated the course and reported high levels of appreciation, not only of the concepts but also the experiences of reconnecting to the natural world. They experienced greater awareness, deeper attachment to the natural world, a relief from stress while experiencing the natural world, deeper attachment to other human beings, and metaphysical involvement including a sense of transcendence from their physical bodies.

Within the interpretive framework lies the area of philosophic inquiry. In this literature can be found an examination of underlying beliefs and assumptions both of modern scientific thought since the Enlightenment, and ontological, epistemological, and axiological foundations of thought that promote a change-of-mind shift toward ecological consciousness. Among oft-quoted authors can be found Bonnet, 1999, 2002a, 2002b; Bowers (1984; Bowers, 1987, 1993, 1995a, 1995b, 1997, 1998, 2001a, 2001b, 2003; Bowers & Flinders, 1990), Capra (2002), Doll (1993), Oelschlaeger (1995), Orr (1992; Orr, 1994), Regan (1990), Slattery (1995), Sterling (2001), and Taylor (1986). Their work provides rich philosophical conversation important to this study. Areas of philosophic inquiry represented by these authors include semiotics, critical pragmatism, ethics, and aspects of postmodernism. Some studies in the area of philosophic inquiry fit within the interpretive framework while others are more closely aligned with the critical/postmodern research paradigm. Even within the work of a single author, (e.g., Bowers), can be found influences of interpretive, critical, and postmodern frameworks.

Philosophic inquiry often focuses on human language and the use of it to bring clarity and depth to an understanding of problems and social issues. The approach of philosophic inquiry plays a significant role in raising awareness as to the beliefs and assumptions embedded in language, assumed sources of authority, and legitimated statements of what is considered true. According to Bowers (1993),

> But if the thinking that guides educational reform does not take account of how the cultural beliefs and practices passed on through schooling relate to the deepening ecological crisis, then these efforts may actually strengthen the cultural orientation that is undermining the sustaining capacities of natural systems upon which all life depends. (p. 1)

Philosophical inquiry is important to this study in the contributions it brings to the discussion of epistemological and axiological frameworks for an ecological mindset. A summary of the philosophy of sustainability reveals a deep examination of accepted metaphorical structures in language as well as critical scrutiny of concepts such as intelligence, morality, progress, prioritization of knowledge sources, assumptions embedded in the use of technology, self, and community. Some of the strongest voices in the discussion on education for sustainability write from this form of inquiry. A review of the literature on philosophic inquiry is presented in detail in the latter part of this chapter in an attempt to delineate the principles of education for sustainability with which the textbooks will be analyzed.

Contributions under the Critical Paradigm

Articles and books on philosophic inquiry of sustainability call for deep and significant changes in underlying beliefs and assumptions. However, few research efforts

have been invested in tracking, promoting or inspiring change from the standpoint of perceived contradictions in the social, environmental, and economic ecology of the modern world. One notable exception is the work in ecofeminism represented by the writing of authors such as Schwartz (1999), Shiva (1997; Shiva, 2000), and Warren (1997). Ecofeminism draws a parallel between the domination of women by men, over the centuries in Western civilization, and the embedded idea expressed previously by Schumacher (1973, 1989) of domination of nature by humans. Schwartz (1999) discusses the contribution of, "critical ecofeminists" who point to "the root causes of the universal domination of women and nature across all cultures – from First to Third World, from northern to southern hemisphere" (p. 105). She says that through the adoption of "a global perspective, critical ecofeminism offers inexhaustible opportunities to approach issues of injustice from our own vantage points" (p. 105). Schwartz (1999) uses critical inquiry in elementary school classes to foster the following principles:

> (1) [A]ll forms of life are part of a living system; (2) natural geographic regions define the social, political, and economic realities of our society; (3) mind/body and nature/culture are not separate but interdependent; (4) knowledge is multidimensional, influenced by diverse epistemologies and cultural traditions; (5) human beings have the capacity to create and recreate the world by recognizing their own subjectivity and agency; and (6) creating a world in which neither humanity nor the earth is in jeopardy requires an ethic of Gandhian nonviolence because the means are as significant as the ends. (p. 107)

Schwartz's research revolves around the use of bioregional narrative and valuing

traditions of the past through children's literature. The use of story to inspire community-oriented experiential activities transposes the stories into examples of agency. Inspiring students toward action in the world is a primary focus of these studies. This is also evident in Kaza's (1999) research in radical environmentalism. Kaza (1999) employs Fourez's (1982) work in structural ethics and waking up the conditioned conscience to move undergraduates toward new ecological awareness. Kaza (1999) writes, "Though outcomes of this kind may not be easily measurable, I am convinced by my students' experiences that this work is essential for long-term environmental change" (p. 159).

Evaluation of the Effectiveness of Research under the Three Paradigms

Kaza's (1999) comment is useful in evaluating the status of research on the worldview of sustainability in interpretive and critical/postmodern frameworks. Philosophic inquiry clearly dominates the literature on developing human awareness regarding issues of sustainability. The voices are strong, determined, and necessary to shifting underlying beliefs and assumptions. As yet there is no agreed-upon template for how to create this shift in thinking. This, I believe, has been one of the challenges for research. One example of this challenge comes from researchers in New South Wales, Australia (Walker & Loughland, 2003) who say that despite what many researchers see as advantageous interpretivist and critical postmodernism frameworks, there is still a disproportionate reliance on quantitative measures in environmental education literature. They report that their work has been

> clearly influenced by the positivist paradigm in environmental education research. We are aware of the critique of positivis[m]…within the broader domain of education research over the last 25 years, yet this type of research remains

> prevalent and useful in environmental education. One reason for this situation is that the…outcomes of this paradigm are presented in a form that can be understood by the government and other agencies responsible for environmental education policy, programs and curricula. (p. 2)

UNESCO's international effort to organize a sustainability focus in education attempts to bring coherence to the issues and approaches for raising environmental awareness on a global level. Philosophical inquiry may be less than effective in satisfying many players who may see quantitative analysis as a more *legitimate* form of research. The organization's international agenda will hopefully be instrumental in convincing national governments and higher education to forefront sustainability as the Decade of Education for Sustainable Development is implemented, and government agencies will continue to view positivist research as convincing. If the international directive and requirements for participation are combined with recommended strategies for implementation, the result will be a substantial, although not necessarily coherent, outline of how to proceed in a way that is viewed as helpful and accountable. It seems, then, that research toward education for a change-of-mind toward sustainability will better serve the integration of ecological principles if it is inclusive of multiple paradigmatic approaches. While interpretive studies on individual classroom programs are useful for the testimonies that they provide and the examples they set, more broad-based research on curricular change and integration of sustainability into the underpinnings of teacher education will satisfy the requirements of the Decade of Education for Sustainable Development.

There seems to be a contradiction here that may be problematic. While suggestions are ripe with terms like *interconnected, interdisciplinary, interdependent, dynamic, values, ethics, experiential, inquiry-based,* and *contextual*, that reference a relational epistemology, ontology, and axiology, the pressure is on to report innovations within a positivist framework. Bowers' (1987) view is informative in this regard: "Cognitive psychologists, symbolic interactionists, and phenomenologists establish a dialectical view of the 'individual' as an intersubjective being that denies the legitimacy of the contemporary view of the autonomous individual" (p. 23). This socially constructed view serves to ground the relational epistemology of the interpretive research paradigm. In this statement of denying the "contemporary view of the autonomous individual," one hears a critical perspective. According to Myers (1997), "it is the commitment to a dialectical analysis that most clearly differentiates critical postmodern research from positivism and interpretivism" (p. 7). Critical postmodern inquiry attempts to provide interpretations which allow readers "to transcend their narrow, ideologically based views of social phenomena, to de-reify social structures that were previously seen as immutable to change" (p. 7).

My sense is that tight interpretive studies are necessary – reports on how internal experiences shift with exposure to intimacy in relationship with the biotic world, to different cognitive understandings, and through training in the practices of sustainability. I also think that the discourse, debate, and reflection promoted by critical inquiry is vital to the radical questioning of societal structures and procedures that is proposed by this study. Research in sustainability that inspires participants toward a greater sense of agency and responsibility can be viewed as useful and even necessary.

While universities offer a venue and serve as an important leverage point for initiating research in the direction of an ecological consciousness, they are grounded in the same Western scientific paradigm that works against interconnectedness and relationality. Ford (2002) reinforces the need for a change-of-mind in higher education in this way:

> If the university is to become a force for good in the world it will need to move beyond academic disciplines, philosophical materialism, and economism, and it will need to endorse a worldview that affirms the meaningfulness of human life, the intrinsic value of the earth and all of its inhabitants, and the relational aspect of life. (p. 7)

Gage (1989) tells us that pragmatism comes into play in considering which research paradigm is more useful in transforming the university in general, and teacher education, specifically. It seems that a range of studies grounded in multiple research paradigms will be highly preferable toward influencing a foundational shift in worldview. Positivist studies will satisfy those who require quantitative data and accountability; interpretive studies reveal the in-depth intersubjective world of learners and teachers while offering opportunities to explore relationships with *place*, *self*, and the *biotic community*; and critical/postmodern theory can help students uncover the layers of assumptions and metaphorical structures inherent in culture and language in deconstructing socialized views. It seems then, that what might be most helpful as a research agenda is a facilitation of diversity in methodology among researchers around the common question or issue of sustainability. Wals and Corcoran (2004) suggest that "the process of determining how to become sustainable as an institution of higher

education as undertaken by a group can be viewed as a particular manifestation of social learning…involving multiple interest groups or stakeholders" (p. 223). They say that the process is about "discursive dialogue and cooperation between people positioned within different configurations or frames with regard to the key issues involved" (p. 223). Multiple and diverse partners in this dialogue are critical to the process of coming to terms with the issues through a pluralistic process that uses difference and conflict as driving forces. With leadership that values inclusion and full participation, deep consensus-building and respectful disagreement, all research led by the question, "What do we need to conserve?" (Bowers, 2001a) is accommodated in an environment of social learning. Sustainability talk potentially brings together different groups in society searching for a common language to discuss environmental issues. Where these different perspectives meet, dissonance is created and learning is likely to take place. Dialogue across boundaries of this nature allows the socio-scientific dispute characteristic of emerging knowledge and values relevant to ecological consciousness to surface (Dreyfus, Wals, & Van Weelie, 1999).

Examination of teacher-education textbooks is one of the many ways to gather information in the research arena expressing vital interest toward the continuation of the diversity and bounty of life on the earth. Hopefully, this interpretive and critical study will contribute to textbook language that is more intentional, explicit in its open representation of the environmental and social issues involved in a sustainable world, and inspirational toward responsibility for sustainability through education.

Philosophical Inquiry

Introduction

A shift toward ecological consciousness requires a framework of assumptions and beliefs that go beyond our attitude toward the environment. Bonnet (2002a) offers that

> The issue of sustainability as a frame of mind…represents a perspective on that set of the most fundamental ethical, epistemological and metaphysical considerations which describe human being; a perspective which is both theoretical and practical in that it is essentially concerned with human practices and the conceptions and values that are embedded in them. (p. 14)

This section addresses the research question: *What are the ecological principles that characterize a foundation of education for sustainability?* Once a philosophical framework is established, I examine the contemporary philosophic literature on education for sustainability in order to develop a description of these ecological principles. Philosophic inquiry is an area of educational research within which many voices contribute to the discussion of what constitutes ecological consciousness. Earlier, I referenced contemporary authors whose work has focused on an examination of underlying beliefs, assumptions, and cultural metaphors. The intent of this section is to work within this literature in order to develop a description of ecological principles that might serve as a foundation for an educational system that fosters ecological thinking and practice. The call for a shift toward ecological consciousness brings into question epistemological, ontological, and axiological definitions as well as scrutiny of language forms, prioritization of knowledge sources, and concepts such as intelligence, progress, and technology. Without this careful and deep exploration, suggested educational change

cannot be grounded in conceptual and philosophic contexts. My intent is not to statically define a new worldview, but to present a relational approach toward synthesizing current philosophic thought on education for sustainability that will serve in a content analysis of introduction-to-education textbooks.

Relevant Philosophical Questions

The questions that are asked in my study with regard to ecological consciousness are not necessarily the questions that are answered in the development of an introduction-to-education textbook. A philosophical exploration of ecological principles within an educational context provides a reference point for choosing recording units and context units from the sample of textbooks. These principles also provide contextual information for the development of the inferences and implications suggested in chapter 5. The concluding chapter is comprised of a summary of the relationships between ecological principles that are developed here, the findings of the content analysis, and further comments on the context and rationale for the study.

Educational philosophy, according to Knight (1998) serves to "bring [educators] into face-to-face contact with the large questions underlying the purpose of life and education" (p. 3). Questions that arise in this exploration include the nature of reality, the meaning and sources of knowledge, and the structure of values. Critically reflecting on these questions helps guide educators in the development of an "internally consistent point of view and a program that relates realistically to the larger world context" (p. 3). The exploration of the literature that is synthesized in the description of ecological principles is guided by questions in the following categories.

Cosmology: Cosmology entails the study of ideas about the "origin, nature, and development of the universe as an orderly system" (Knight, 1998, p. 15). Examples of cosmological questions are: *What is my purpose in life?* and *What is my place in the universe?* In asking the question, *What do we need to conserve?* Bowers' (2001) is speaking not only of value, but implicates an inquiry into whether the universe is made up of discrete, separate parts or interconnected systems. Does the conservation of a single entity involve ecological aspects of its place within the whole? Can ecological consciousness be discussed without reference to the relationship of human being's understanding of their place in the universe?

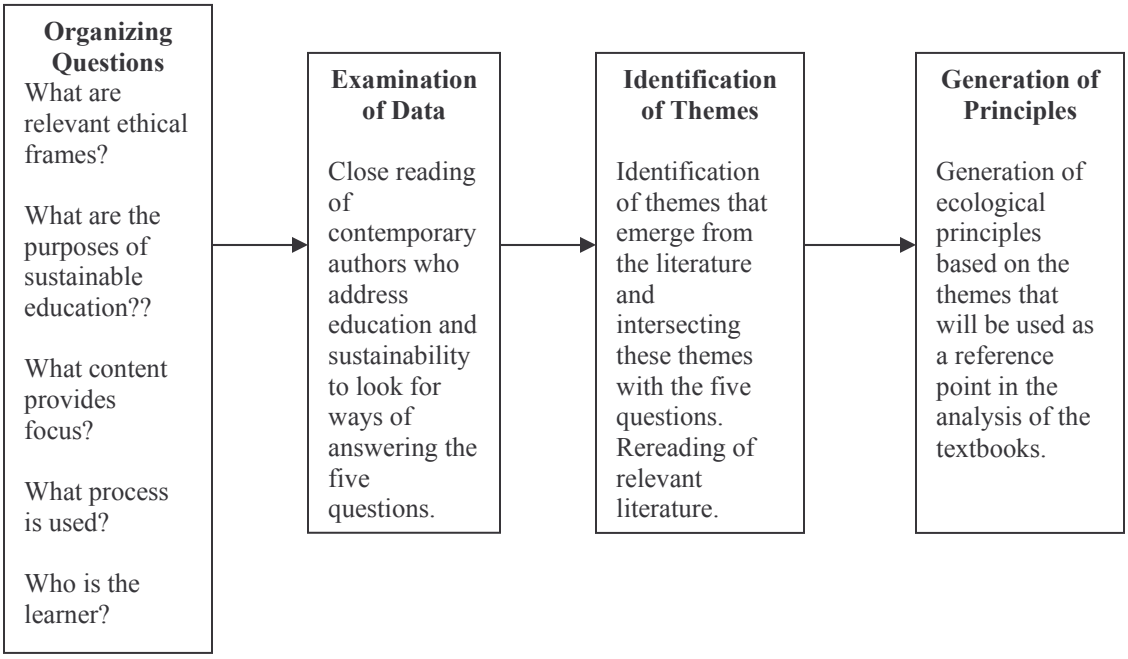
Epistemology: The questions *What does it mean to know?* and *What constitutes knowledge?* are addressed through epistemology. Does knowledge come to us from the outside? Is it internal and intuitive; is it divinely revealed; or do we know through relationship? Answers to epistemological questions drive the process of learning. Curricular and pedagogical decisions are always in keeping with some epistemological foundation.

Axiology: Questions of value are answered through axiological deliberations. Prioritization of what to conserve and what to disregard depends on how one answers questions of what is deemed of value. Included in this category, is the relational aspect of axiology or ethics which connects values to actions toward one another and in the world. Axiological discussion informs the content of what is taught as well as the behavioral norms in the classroom.

Arising out of these broad philosophical areas are the questions that will orient the philosophic-inquiry section of the literature review: *What ethical frameworks best*

supports ecological consciousness? What is the role and function of an educational system that promotes sustainability? What content provides the focus for the curriculum? What process orients the pedagogy? Who is the self that is being taught? Answers to these five questions will result in a description of ecological principles that will be used as a reference in analyzing the introduction-to-education textbooks. The following chart represents the intended path of this research: (a) posing these five organizing questions; (b) reading contemporary authors on education and sustainability who refer to these areas; (c) identification of themes that intersect with the five questions; and (d) identification of ecological principles based on developing themes.

Figure 1: **Chart delineating the development of ecological principles.**



Development of Ecological Principles

While there are many publications that address the philosophical underpinnings of education for sustainability, there is no agreed-upon template that lays out the principles and defining mindset of a worldview oriented towards sustainability. In the absence of a

list of principles and ideological framing around which contemporary authors agree, a review of the literature is appropriate in order to delineate an understanding of the concepts of ecological consciousness in reference to which the introduction-to-education textbooks are analyzed.

In the case of this study, the ecological principles developed in this chapter are specific to the research question and represent a foundation for the content analysis – they provide a reference point for comparing the positioning of the context and recording units of the textbooks. The process employed in this chapter is one of building toward a philosophical framework that is representative of a different world view than that on which our current Western educational system rests. The result is a document reflective of the rich conversation and descriptive of an ecological worldview. These findings are used in the content analysis of the textbooks.

Discussion of Philosophical Questions

In the first reading of relevant literature on education and sustainability several organizing themes emerged. They are represented in the discussion that follows.

Cosmology

The cosmology that dominates Western culture consists of the view of the world as a mechanical system. In a mechanistic worldview the whole is reducible to its parts. With the success of the Scientific Revolution[1] mechanism has not only prevailed in the scientific community; its assumptions permeate Western cultural values. In the mechanistic view, value is limited to measurable quantity; truth is external and scientific.

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[1] The birth of modernity was fueled by four foundational movements – Renaissance humanism, the Reformation, the Scientific Revolution, and the Enlightenment. These led to a significant transition from the medieval worldview of a holistic universe and embedded economic and social practices. I offer this brief mention of the roots of mechanism to give the reader a reference for the cosmology in conflict with that of organicism.

This view separates mind from matter, and mind from body. There are few explanatory, unifying cosmological frameworks (Darwinism is one) that address the teleological and relational aspects of the interaction of these separate entities. The tools for understanding the universe within a mechanistic model are "objectivism, rationalism, the mechanistic worldview, reductionism, and scientism" (Spretnak, 1999, p. 40). The separation of humans from nature (to which the quote by Schumacher (1973) referred; see page 46) is characteristic of the mechanistic worldview. This separation facilitates seeing human beings as disconnected from the natural world and alienated from one another.

In contrast to this model are the two theoretical approaches in process philosophy (Whitehead, 1929) and systems thinking (Capra, 2002; Madron & Jopling, 2003; Sterling, 2001). Both theories provide a cosmological view of an interconnected, holistic universe. Ford (2002) describes this worldview as one of organicism. Organicism represents the universe as an interdependent realm of existence.

Whitehead's (1978) cosmology is an "endeavor to frame a coherent, logical, necessary system of general ideas by which every element of our experience can be interpreted" (p. 3). In this schema, every entity has the character of a particular instance of the general scheme. In process thought the fundamental unit of reality is an event or a moment of experience, not an object. Events are temporal and happen or emerge over time, influenced by previous events. The whole of reality bears on the creativity of the world in each moment. Further, in process philosophy everything inherits both feelings of the past and possibilities for the future. This inheritance leads to the assumption, according to Ford (2002), that "all real entities are momentary events that take account of their environment and react to it" (p. 76). The environmental aspects of Whitehead's

philosophy of organism or *process philosophy* are summarized by Ford (2002): "The philosophy of organism…holds that everything actual is an organism that grows out of a particular environment and then becomes a part of the environment of other organisms" (p. 76). Relationality and interconnection of entities in the universe are basic to a cosmological view. Authors on systems thinking add to this discussion.

According to Bertalanffy (as cited in Bellinger, 2004), considered the "father of wholeness," a system is an "entity which maintains its existence through the mutual interaction of its parts" (p. 1). Systems exhibit characteristics that *emerge* from the interactions of the parts of the system. A systems cosmology (Bossel, 1998) interprets the world as a system of interacting subsystems that have evolved together and depend upon one another. The system concept of emergent properties, similar to Whitehead's concept of events, requires us to think in terms of whole systems and their relationships. Self-organization means that the behaviors of the entities within the system are established by the system itself, not by some external agency. This degree of internal order is also reminiscent of the validity of Whitehead's internal experience. Natural systems are adaptive, which means that they can adapt to changes in their environment without losing their integrity; parts of the system may change, but the system as a whole maintains its identity. Features of complex, adaptive, and self-organizing systems are that: (a) [T]heir membership is interconnected and relational; (b) all system exchanges of energy are cyclical and without waste, requiring pervasive partnership and cooperation; (c) limited variation provides stability; and (d) diversity provides resiliency (Madron and Jopling, 2003, pp. 33-34). Systems and sub-systems are interlocking in this view and interact reciprocally in an "interconnected cosmic web," according to Capra (1975/1991). This

relationship applies to the gravity at play in interplanetary connections as well as the human cellular "network's nodes and links" (Capra, 2002, p. 81).

Capra (2002), a physicist and Director of the Center for Ecoliteracy in Berkeley, California, makes the link from natural and biological networks and connections to social contexts, in which communication is the medium of thought, shared meaning, and system self-generation (pp. 82-83). This extension of systems thinking and organicism to social reality is reiterated by many holding indigenous perspectives. According to Deloria and Wildcat (2001), "American Indians are natural systems thinkers" (p. 16). For them, the world constitutes a social reality in which everything has the possibility of intimate knowing relationships because everything is related. This is a unified world view that acknowledges a complex totality in the world, both physical and spiritual. This interdependence of systems is explained further in its application to the Earth as a system of interrelated parts.

Gaian theory is modeled after the planet Earth's "physical, chemical and biological systems as a single evolving, self-regulating ecosystem" (Madron and Jopling, 2003, p. 12). Gaia's systems have evolved naturally and "are all self-organizing and interactive" (p. 12). They are complex, which means that their behavior as a whole cannot be explained in terms of linear cause and effect. Systems need to be understood from a holistic approach rather than seeking to divide the organism or system into separate elements. Further, any system modeled after a natural system is purposeful: it evolves; it can replicate itself; it adapts; it dies; it is complex. It is impossible to reconfigure purposeful human systems without first identifying, understanding and describing their current purpose and underlying values, and then working out what the

different purpose and underlying values of the reconfigured system should be. Adopting a framework within which to view the environmental and social aspects of sustainability implies honoring the diversity and importance of all species native to Gaia. It means recognizing the dynamic of each person's relevance in the purposefulness of the Gaian system, and acting on the potential of peoples of the world to co-create global networks of just and sustainable democracies. Democracies based on Gaian principles integrate shared purposes, participatory change, network government, and systems thinking toward the management of complexity along the same principles evolved in nature. Sustainability is surely an urgent and cohesive-enough concept to motivate participation in a Gaian democracy

I am suggesting a cosmology based on a metaphysics of organicism, holism, systems theory and Gaian democracy. This is an organic view of the universe in which, according to Bohm (1985) "the very nature of any part may be profoundly affected by changes of activity in other parts, and by the general state of the whole" (p. 3). The principles of process theory and systems thinking also inform the epistemological question: *How do we know?*

Epistemology

A relational epistemology emerges from a cosmology of organism. In the organic, holistic view of cosmology, an underlying understanding of the process of knowledge – or epistemology – is important to the description of ecological consciousness. An epistemology that aligns with organicism has roots in premodern knowing. In the Western premodern worldview, knowledge relied on the subjectivity of emotion, intuition, and faith. All human knowing was seen as a subset of God's knowing and consequently a

function of revelation[2]. Such knowledge, according to Palmer (1983, 1993) infused the whole of experience with "portent and meaning, and the knower [was] interwoven with it all" (p. 25). The Modern concept of knowing is characterized by objectivism, factual observations, and logical analysis, assuming a sharp distinction between the knower and the objects to be known. Truth is determined by evidence and reason. More recent perspectives based on quantum theory lead us to a critique of the classical idea of objective science. According to Polyani (1958), the data of scientific experiments is correlated psychologically and biologically within the person of the scientist, "a process that involves our personal histories as well as our senses and rational minds" (as cited in Palmer, 1993, pp. 28-29). *The Santiago Theory of Cognition*, a scientific theory that overcomes the Cartesian separation of mind and matter, indicates that cognition is immanent at all levels of life. In this work, Chilean biologists Maturana and Varela (1987) explain that epistemological processes are a "structural coupling between organism and environment" and that "conservation of autopoiesis [or self-reproduction] and conservation of adaptation are necessary conditions" (p. 103) of life.

The living entities' cognitive interactions imply a system-oriented view of the learner as a living organism which "responds to environmental influences with structural changes" (Capra, 2002, p. 35). These changes, in turn, trigger alterations in the organism's future behavior. Continual learning and development constitute an epistemological connection to, and a relationship with, the context of the learner's life

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[2] Western pre-modernity was characterized by a belief in the world as an intentional creation of God, the eternal, all-powerful, personal reality. All beings shared an interdependence with the Creator and everything was "metaphysically akin to everything else" (Ford, 2002, p. 56). Nature and value were deeply connected; human beings were fundamentally social and interdependent; community was the primary unit; the individual was subordinated to the whole; the economy was embedded in the social and cultural milieu; and feudalism provided a social structure.

and cultural understandings. A shift from the Modern ideas of objective, scientific, measurable truth to a view of the learner as inseparable from his/her environment leads to an understanding that knowledge is an evolving relationship between the knower and the known. Through engagement in this ever-changing relationship, knowledge is tentative and theories are limited and approximate. In the writing of Capra (2002) there is reference to the process of knowledge as also being the process of self-organization. Instead of understanding knowledge as independently-discrete facts, as in the model from classical physics, in systems thinking knowledge exists as a dialogue between subject and object. In the relationship between the knower and the known lies the potential for co-creativity; how the knower sees the world shapes the world and in turn, the world shapes the knower. Riley-Taylor (2002) calls this new framework "ecospiritual knowing" based on "an awareness of truth as contextual and the individual as an integrative being" (p. 6).

The relationship between the knower and the known is reinforced by Doll (1993) in what he calls an epistemology of experience. For Doll "the subject of study is both the knower and the known; really it is the interactive (or transactive) discourse between the two" (p. 126). In an explanation by Palmer (1993), truthful knowing is neither "infus[ing] the world with our subjectivity (as premodern knowing did) nor hold[ing] it at arm's length, manipulating it to suit our needs (as in the modern style)" (p. 32). The resulting interplay is one of interdependence of the knower and the known in which "both parties have their own integrity and otherness, and one party cannot be collapsed onto the other" (p. 32). Gregory Bateson (1972) called the interrelatedness of this epistemology the "pattern that connects" (as cited in Orr, 1992, p. 37) which always includes both

"observer and observed, subject and object" (p. 37). As the human being is a participant in the making of reality, our understandings will always be incomplete.

While epistemological discussions are played out in more detail in the work of contemporary philosophers and quantum physicists, a common understanding threads through the literature that is expressed by Hocking, Haskell, and Linds (2001) as a desire to move to a "way of being through which our embodied awareness unfolds through engaging/embracing our experiencing" (p. xviii). In this perspective, knowledge is firmly embedded in the experienced world. Common knowledge is based in a shared context and generated from the practice of living and working, not individually derived but generated within relationships with others. Seeing knowledge in relational terms sets the stage for the axiological question of value and ethics.

Axiology: Value and Ethics

Value: The question *What is of value?* is directly related to frameworks of cosmology and epistemology. Throughout history, as understandings of the nature of the universe, humanity's place in it, and realizations about the nature of knowledge have shifted, assignments of value have also been transformed. Prior to the Scientific Revolution each entity was assigned value that was interconnected to the purpose of the universe. The world was one of entities with intrinsic value; each was unique and purposeful in fulfilling God's will. The Greeks considered knowledge within ethical dimensions. For Socrates and Plato it was "meaningless to consider knowledge without virtue." Within their holistic worldview, separation of the two was impossible (Doll, 1993, p. 112). For Aristotle the knowledgeable person became virtuous through aiming at the mean "between the extremes of excess and deficit" (p. 112). The modernist view

separates knowledge from virtue. With the Scientific Revolution, as empiricism and mechanical measurement became the accepted determinants of truth, assignments of value were hierarchically categorized based on the object's alignment with scientific principles. Measurable quantities became of primary value. Subservient to the world of measurable items, the relational qualities of color, taste, sound, and brilliance that were associated with the experience of primary things had secondary value. What we consider values – those qualities such as honor, beauty, goodness, and truth – had next to no value (they were *tertiary*, according to Descartes) as they were completely out of the realm of measurability. Once tertiary experiences were subjectivized, values became relativized, and with opinion (and intuition), were relegated to the private, personal domain. The result was a world characterized by a dualism of mind-body, mind-matter, and fact-value. These separations stood in contrast to the unified, organic whole that represented the premodern worldview and are associated with the beginning of the period/worldview referred to as Modernism.

Newton reinforced Cartesian dualism, claiming that there is no internal power in nature. He saw God, omnipotent and external to the world, as setting the world in motion. Newton's view of the universe was a "homogeneity…[of] systemic, rational order" (Doll, 1993, p. 6). His application of mathematical principles to phenomena such as gravity, and the movement of the planets, validated Descartes' outlook that "the world is a vast machine of matter and motion obeying mathematical laws" (Berman, 1981, p. 42). Newton's stance was that he could make predictions based on the laws of gravity and, thus, humanity could exercise greater control over nature. The centerpiece of this scientific vision is cause-effect determinism, measured mathematically. Without the

inherent tie to measurability, axiological questions of beauty and value are of little concern. With the separation of God from creation, of mind from matter, and of mind from body, there is no explanatory cosmological framework that addresses the teleological and relational aspects of the interaction of these experiences. A response to this dualism has been the modernist tendencies toward materialism and atheism which deny the reality and the value of internal experience. Charlene Spretnak (1999) warns that, "[t]he mechanistic denial of relationship and process as constitutive to our being, not merely incidental to it, has delivered us to a point in the modern era at which only separateness seems real" (p. 8).

Against this backdrop of the modernist fact-value split, the worldview of organicism brings forward remnants of the holistic perspective of the premodern. Organicism promotes the idea that every member of all natural, biotic, and human systems has intrinsic value. This is in opposition to the mechanistic perspective that focuses on the instrumental value of the natural world (i.e. how it is useful to humans). In representing this shift from the premodern to the modern, Carolyn Merchant (1989) in *The Death of Nature* says, "nature was now viewed as a system of dead, inert particles moved by external, rather than inherent forces" (p. 193). With modernism, the value of nature was relegated to being seen as merely the object of human manipulation. Scientific validity was achieved through reductionism. Humans were placed at the epicenter of importance while all other species were considered in instrumental terms. A current example of how reductionism continues to displace non-human species is seen in genetic engineering, which reduces species diversity and interrupts the self-organizing ability of

biotic entities. This practice "pushes to extinction all species that have no or low instrumental value to humans" (Shiva, 1997, p. 25).

The role of Christianity in this demotion of nature is mentioned by John Cobb (1994). In writing from a Christian perspective, Cobb reinterprets the biblical story of Genesis and Noah's ark to make the point that the Church has neglected responsibility for the well-being of [non-human] creatures" (p. 19). He says that, "[t]he full community includes not only human beings but the biosphere as well" (p. 20). Organicism revitalizes respect for non-human entities in its notion that every member of every human, biotic, and natural system emerges within an environment and thus is innately related to all other beings and non-living entities. An aspect of organicism reiterated by Ford (2002) is that "our lives are deeply interconnected, and that human values, such as compassion, bravery, and selflessness, are grounded in a cosmic being and hence are not arbitrary" (p. 76). Organicism presents an alternative value system to the modern, mechanistic worldview. What we deem of value is implicit within ethical frames.

An ethical framework: The prioritizing of relationships within and among systems, and the notion of intrinsic value for all species, implies placing importance on a new ethical framework, one grounded in relationality, in respect for non-human entities, and in human consciousness of event-making and implications for future events.

The two most often quoted statements in sustainability literature come from Aldo Leopold (1949) and Alan Durning (1992). Leopold is best known as the author of *A Sand County Almanac* (1949), a volume of nature sketches and philosophical essays recognized as one of the enduring expressions of an ecological attitude. He tells us, "Think of each question in terms of what is ethically and aesthetically right, as well as

what is economically expedient. A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it does otherwise" (pp. 224-225). Durning, who founded Northwest Environment Watch in 1993, wrote an oft-quoted new *Golden Rule*: "Each generation should meet its needs without jeopardizing the prospects of future generations to meet their own needs" (p. 136). Leopold (1949) defines an "ethic" in ecological terms by saying that it "is a limitation on freedom of action in the struggle for existence" and in philosophical terms, it is the "differentiation of social from anti-social conduct" (p. 202). He further says that all ethics so far evolved rest upon a single premise: that the individual is a member of a community of interdependent parts. Human instincts prompt him/her to "compete for his[/her] place in the community, but this ethics prompt him[/her] also to cooperate…The land ethic simply enlarges the boundaries of the community to include soils, water, plants, animals, or collectively: the land" (p. 203). Leopold's vision from 56 years ago and Durning's future-oriented considerations are foundational to an ethic of ecological consciousness.

In considering where Leopold's (1949) and Durning's (1992) statements fall within a discussion of ethical frameworks in Western thought, I reference two perspectives: John Stuart Mill's *consequentialism*[3] and Nel Noddings *ethic of care*.[4] In speaking to and about future generations, Durning is consequentialist in his language; what makes an action right or wrong is its perceived effect on future generations to meet their needs. While this maxim appears to be a statement of utilitarianism, in the absence

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[3] Classical consequentialism held that an act is morally right if and only if that act causes "the greatest happiness for the greatest number." The many distinct claims about the moral rightness of acts under the theory of consequentialism are beyond this discussion.

[4] Noddings' (Nell Noddings, 1988) ethic of care assumes human beings are relational and are innately motivated to care. She says, "One who is concerned with behaving ethically strives always to preserve or convert a given relation into a caring relation" (pp. 218-219).

of care for future generations the motivation may fall short. Noddings (2002) says, "We have to embrace a way of being in the world that we will stand for devotedly even though we may make mistakes…I cannot be wrong in choosing a way of life characterized by care, and it is that sensibility that we must be courageous enough to develop in the young" (p. 47). The reinforcement of caring sensibilities in the young will naturally perpetuate a caring for the well-being of future generations.

Leopold's maxim has universalizable qualities and seen in relation to Kant, aligning with the land ethic could be interpreted as acting out of duty. Kant (Cahn, 1997) makes a relevant point in *Thoughts on Education* when he says, "One principle of education is…children ought to be educated not for the present, but for a possibly improved condition of man in the future; that is, in a manner which is adapted to the idea of humanity and the whole destiny of man" (p. 201). However, according to Noddings (1998), if natural human inclination is to care and "one calls on a sense of duty or special obligation only when love or inclination fails" (p. 219) then alignment to Kant is only secondary to alignment with Noddings. For Kant, to be counted as ethical an action must be inspired solely by unsentimental duty toward some abstract precept, some categorical imperative, issued by pure reason. For Noddings asking the question *What are you going through?* is a central question of moral life. This question "focuses our attention on the living other – not on a set of principles or our own righteousness" (Noddings, 2002, p. 40). From the position of ecological consciousness, asking a member of a non-human species the question *What are you going through?* is a natural extension of the ethic of care. Engaging non-human species in our ethical considerations may be seen as difficult,

but conversation with other species and focused attention on a response is not only possible, but necessary for the continued prosperity of a diverse biotic community.

The *Precautionary Principle* is an ethical framework instituted by the European Commission that considers the degree to which society has rights to determine the level of environmental or health protection it considers appropriate, what counts as acceptable risk and the well-being of future generations. Interpretations of the *Precautionary Principle*, according to Carr (2002), must "place as much emphasis on its ethical and value-based aspects as on its scientific justification" (p. 31). Precautionary measures that were gradually introduced into the European Union include labeling requirements of genetically-modified (GM) food sources, and the monitoring of the impacts of GM products on wildlife. The ethical dynamics of decision-making in regard to GM food sources point to a consequentialist framework in their concern for the future health of biotic species.

Other academicians also align consideration of consequences in reference to ecological consciousness. In discussing the role of ethics in environmental education, Plant (1995) references "intragenerational and intergenerational equity" (p. 256) as implicit in the definition of sustainability. Attfield (1983) focuses on the notion of sustaining a stock of natural resources, on minimizing pollutions, and on ensuring that the overall range of opportunities to successor generations should not be narrowed.

Riley-Taylor (2002) adds to this conversation in her call for an ecospiritual ethic; she effectively extends Noddings' ethic of care to the "human relationship within the ecological world" (p. 98). Riley-Taylor (2002) quotes Hallen's (1991) "ethic of

earthcare" as a "comprehensive vision for a new worldview with ecofeminism, feminist science, and process philosophy as its core components" (p. 206).

The relational base for an understanding of ethics here developed supports a worldview of organicism, and a relational epistemology. From an axiological perspective, this implies that members of the human community, as agents of problem-solving, and endowed with the propensity to care, have the responsibility to work with the natural and biotic systems to promote the survival of all species. The next section explores how an understanding of how the purposes of education are connected to questions of cosmology, epistemology, and axiology.

Role and Function of Education

Answers to the question *What is the role of education in society?* bring to the surface different underlying philosophies. Just as distinctions are made between intrinsic and instrumental value of living and material things, so can the role and function of education follow this division. Intrinsic value describes education as an end and a good in itself, as having inherent value and meaning. Instrumental value interprets education as a means to an end, whether to eradicate poverty or assist in international competitiveness. The intrinsic view stresses process, according to Sterling (2001), who says that "the quality of experience in teaching and learning,…is concerned with 'what education is' rather than what it might lead to or influence" (p. 26). An instrumental view stresses purpose and product. It is concerned with what education is for, rather than the nature of education.

Education in the Western modern world has followed three paradigmatic patterns in curriculum as defined by Schubert (1986): Perennial-Analytic, Critical/Emancipatory,

and Practical. Before describing the role of education in supporting an ecological consciousness, it will be useful to review the function of education inherent in these three curriculum paradigms. The perennial-analytic paradigm defined its instrumental value as service to the needs of the state for an enlightened and trained citizenry (socialization and vocational functions); the critical paradigm highlighted the instrumental and transformative stance of emancipation and exposure of hegemonic structures; the practical paradigm stressed intrinsic values, viewing education as an end in itself; the use to which the education is put is a secondary consideration with the belief that a liberal education will only have beneficial social consequences. The instrumental aspect stresses economic and political purposes, values fore-grounded in the modernist paradigm; the intrinsic focuses on process – the quality of experience of teaching and learning – and while highlighted in the progressive movement, it is dominated today by state and federal requirements and standards. Both are political and are grounded in significant value positions. Sustainable education is ultimately about reconciling process and purpose.

Bowers (2001a) and Sterling (2001), argue that the purpose of education is instrumental and transformative, both to the collective consciousness of society and to societal conditions and practices that reflect an awareness of the needs of the Earth and its species and the right of future generations to experience life in an uncontaminated environment. Numerous international statements and mandates have pointed to the key role of education as a change agent from creating "new patterns of behaviour of individuals, groups and society as a whole towards the environment" (UNESCO, 1977) to being "critical for promoting sustainable development and improving the capacity of the people to address environment and development issues" (UNCED, 1992).

The instrumental role reflected in these directives is clearly one of transformation of thought, practices, and agency in relation to ecological consciousness and sustainability. Bowers (2001) includes in the purpose of education the task of socializing the next generation to understand the nature of cultural changes decided upon through the political process and how these decisions impact natural systems. Gruenewald (2003) focuses on situationality and the connection between critical pedagogy and its relationship to the ecology and landscape and inhabitants of the place one lives. He writes, "The ecological challenge to critical pedagogy is to expand its socio-cultural analyses and agendas for transformation to include an examination of the interactions between cultures and ecosystems" (p. 5). The alignment with critical pedagogy is often discussed in terms of the ends that schools adopt within the overall purpose of transformation. Within the conversation on the development ecological consciousness, there is agreement that schools must be involved in the transformation of Western thought and practice toward the end of a deep consciousness around sustainability.

Orr (1992) suggests that the role of education is in teaching "ecological literacy: that quality of mind that seeks out connections" (p. 86). Ecological literacy requires the ability to "observe nature with insight, a merger of landscape and mindscape…driven by the sense of wonder" (p. 86). Orr goes on to say, "The ecologically literate person has the knowledge necessary to comprehend interrelatedness, and an attitude of stewardship" (p. 92). This practical competence is complemented by "a broad understanding of how people and societies relate to each other and natural systems, and how they might do so sustainably. [Ecological literacy] presumes both an awareness of the interrelatedness of life and knowledge of how the world works as a physical system" (p. 92).

Capra (2002) also describes the purposes of sustainable education in terms of ecoliteracy or "the understanding of the principles of organization [within] ecosystems… [that] sustain the web of life" (pp. 232-233). O'Sullivan (2004), offers another view of ecological consciousness when he says that "[w]e must become aware of the ontology that underlies our current course and recognize our immersion in it…And we must create an expansive, life-giving vision that has sufficient depth of meaning to engage the human spirit" (p. 3). Spretnak (1999) calls for "attentive engagement, cultivated awareness, and a taste for wisdom" (p. 183) in designing systems of educating humans for sustainable practices of living and being.

These statements of the function and role of an educational system that serves an ecological consciousness represent both intrinsic and instrumental purposes. They are intrinsic in that they require shifts of internal consciousness within participants' basic orientation to the world. They are instrumental in seeking to transform social systems toward developing conditions and practices that address the needs of the Earth and its species and the right of future generations to experience life in an uncontaminated environment. The purpose of transformation is reminiscent of Counts' *Dare the School Build a New Social Order* written in 1932. Counts was representative of the social reconstructionist wing of the progressive education movement and was accused of indoctrination of students based on his visionary beliefs that proved unsettling to the status quo. In these statements of function for sustainable education, Counts can be heard, as well as Dewey and Friere, in their call for links between what happens in schools and the larger social milieu.

Content: What Then of Subject Matter?

The content of learning must embrace interdisciplinary, systems thinking to address environmentally sustainable action on local, regional, and global scales over short, medium and intergenerational time periods. All students must understand that we are an integral part of nature and that we are co-evolving with all the other species in the biosphere. According to Cortese, (1999b) the new paradigm will require the subject matter to emphasize:

- How the natural world (including humans) evolved and works;
- The interdependence of humans and the environment, including the relationships among population, culture, social equity, health, economy, and the environment;
- How to assess and minimize the ecological footprint of human activity;
- The technical designs, scientific and institutional strategies and techniques that foster sustainable development including methods or ways to:
    - Remediate environmental damage and restore ecosystems;
    - Preserve biological and cultural diversity;
    - Achieve a five-to-ten-fold increase in energy and natural resource productivity;
    - Mirror and live within the limits of natural systems, e.g.,
        - Live off renewable energy;
        - Operate in a cyclical manner (where one's waste becomes raw materials or nutrient for other processes or activities;
        - Utilize renewable resources at a rate less than or equal to the natural environment's ability to regenerate the resource.

- Social, cultural, governmental, and economic frameworks for guiding just and sustainable development;
- Strategies to motivate environmentally sound and socially just behavior by individuals and institutions including non-material forms of meeting…needs. (p. 2)

While Cortese offers these recommendations for inclusion of subject matter at the university level, these concepts can serve as a foundational base for curriculum content at all levels. Doll's (1993) strategy of recursiveness allows for visiting and revisiting important conceptual areas repeatedly as appropriate for each age. In order to integrate these content goals throughout one's educational experience, other authors specify themes. Deloria and Wildcat (2001) promote the idea that "knowledge claims literally emerge from a place – an experience in the world" (p. 36) – and that the emphasis is on the particular, not on general laws and explanations. Sterling (2002) is in alignment with this perspective as his curricular reformulation includes an emphasis on local, personal, applied and firsthand knowledge with an honoring of provisional knowledge recognizing uncertainty and approximation. (p. 59). Riley-Taylor (2002) includes the promotion of agency, the "willingness to act toward the re-creation of the world around us, always in the local" (p. 145). Thomashow (2002) suggests that ecological identity is oriented around four central questions: *Where do the things I consume come from? What do I know about the place where I live? How am I connected to the earth and other living beings? What is my purpose and responsibility as a human being?* (p. 180). Cajete (2004) adds "How are we going to get along with each other?" and "How do we deal with our relationship with the natural world?" (p. 107). Content that is driven by these questions and considerations, together with Bowers (2001) question "What do we need to

conserve?" flow from our cosmological, epistemological, and axiological understandings thus far developed.

These questions that guide content, while promoting contextual understanding, are enhanced by the additional element of intergenerational knowledge forms. Asking the above-mentioned questions without considering the trans-generational coding of cultural understandings and ecological practices leaves the content bare of meaningful historical reference points. Elders and wisdom keepers who sustain intimate relationship with the biotic world must be seen as valuable knowledge sources. Modern ideologies and Western prioritization of scientific, technological, and print-based knowledge have de-legitimated the need for trans-generational communication and knowledge. Bowers (1995) emphasizes this point, advocating trans-generational communication for the purpose of "clarifying the difference between modern and ecologically-centered cultures" (p. 176) in order to inform students of "what the essential relationships are and how to live them" (p. 177). In indigenous traditions, according to Deloria and Wildcat (2001), education occurs by example, and "elders are the best living examples of what the end product of education and life experiences should be" (p. 45). Intrinsic to contextually embedded understanding based in *place*, elder knowledge is part of the concept of *habitude* – "an attitude or awareness of a deep system of experiential relations on which the world is building or living" (p. 34).

The overriding theme of content for ecological consciousness is one of *context.* This context includes relationship to local, personal, cultural, firsthand issues and experiences. In addition context involves past, present, and future relationships to humans and other living beings (in the classroom and community) and environmental issues

relevant to their welfare. Contextual knowledge implies that learning is meaningful and relevant to the learner. With a meaningful relationship to the subject matter, the knower engages in construction and negotiation of understanding with the known. Within this context, knowledge gained through experience of the particular is valued.

Within indigenous education, process theory, and systems theory, locally and personally relevant problems provide meaningful starting places for exploration of content. The content of a curriculum built in relationship to ecological consciousness can, according to Bowers (2001), be determined by "assessing what students already understand…about the characteristics of interdependent communities and the impact of those communities on natural systems" (p. 152). Given the relational nature of knowledge acquisition, solutions to contextual problems are always provisional, and approximate understandings satisfy the need for solutions which remain open to additional understandings.

Many authors (Bowers, 1995; Doll, 1993; Orr, 1994; Slattery, 1995; Sterling, 2002; and Thomashow, 2002) refer to process as being equally important to content in the development of a curriculum that contributes to ecological consciousness. The next section discusses recommendations.

Process

In this context, I refer to process as the ways that people share and use information, the relational milieu in which learning occurs, and the way in which information is represented. An oft-quoted statement by Orr (1994) is that "all education is environmental education" (p. 12). Students realize their connection to their environment – content, one another, and place – through intentional process. Key propositions that aid

in the implementation of the systems thinking of Gaian democracies (adapted from Madron and Jopling, 2003) are helpful in a discussion of processes that promote ecological consciousness.[5] These key propositions are:

1. *The Gaian system*: Human democratic systems (classrooms included) need to be reconfigured toward achieving ordered relationships between the self-organizing actions of the members of a particular democratic system, the democracy of which they are a part, and the Gaian system to which we all belong;

2. *Shared principles and purposes*: Shared purpose that gives meaning to people's lives and shared ethical values and beliefs about conduct in pursuit of this purpose are developed through participation in community; they cannot be the product of top-down management. Also implied here is the recognition that within an adaptive complex system the outcome is only speculative. This acceptance of provisional learning is in line with the indigenous perspective and with the "not-knowing" described by Riley-Taylor in which the language of "determinacy and absolutes" (2002, p. 70) is replaced by an acceptance of answers as always in a state of emerging. Participants in the process must be able to move from *right or wrong* to an acceptance of provisional understandings in order to work independently of inflexible anticipated outcomes;

3. *Purposeful human system (soft-system) concepts*: Modeled after properties of natural systems, purposeful human systems cannot be explained in terms of cause and effect as is true with mechanical (or engineered) systems. Natural systems cannot be explained fully by reducing them to their parts for examination. Purposeful human systems involve

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[5] Madron's and Jopling's (2003) seven principles of Gaian democracies have been modified here in light of concerns that the term *liberating* may be interpreted as the kind of freedom that implies breaking from cultural influences and sustainable traditions. Also, I caution the reader that the concept of *self-organization* is not to be misinterpreted to mean a self-organizing potential of a system that is separate from the context of the systems' relationships to other broader systems, cultural frames, and environment.

intentional purposes and values. Thinking of the educational environments in terms of purposeful human systems provides a context for understanding the following concepts. (a) Interdependence reflects the interconnections among all members; success of each member and the community is reciprocal; (b) cyclical processes and partnership involve pervasive cooperation and sharing of resources to meet the needs of all without excess or waste; (c) fluctuation within limits means that systems can be stable and yet variable in its key indicators; change in routine and relationship is not indicative of dissipation of the system; (d) diversity is an attribute of a resilient system and provides enhanced survival and re-organization; (e) self-organization refers to the ability of a purposeful human system to achieve an ordered state with regard to its environment (and culture) implying the active participation of its members.

4. *Paolo Friere's (1970, 1993) learning principles*: Based on the Brazilian educator's ideas of dialogue and culture circles, every member of the system (including the teacher) affirms every other member as having equal voice and legitimacy. Friere's ideas facilitate development of agency and involvement in the political process which are critical elements of a system or society that is truly participatory and democratic;

5. *Participatory change processes*: Self-organization is enhanced by the building of ever more precise levels of shared understanding; the building of trust, commitment, confidence, and optimism is enabled by participation in the change process. As scale is a critical issue in inviting authentic participation, work in small groups ensures that everyone's contribution is heard and respected. (pp. 110-123)

These propositions, based on systems theory, seem to align with many of the ideas that inform the conversation on sustainability from process theory and systems

thinking, as well as from the organicism and embeddedness of premodern thought. Sterling (Huckle & Sterling, 1996) state that from a system's point of view,

> strong sustainability necessitates a transition towards resilient social, political, economic, and ecological systems which are diverse and durable, and these have to be rooted firmly in the locality and region. A healthy global economic and political system would enhance and encourage self-reliance at the local level rather than erode it, because ultimately, it depends on these local systems' abilities to sustain themselves and any global system. (p. 4)

Applying Gaian democratic principles to previously described viewpoints on ecological consciousness depends on participative methods, respect for existing knowledge, and recognizing local conditions and culture. In the participative process, problems are reframed over time, informed by students and teachers alike. The learning process is democratic and integrated in an adaptive, critical, and creative learning environment. The guiding principles to the process are relationality and wholeness. Modeled after systems thinking, this process both conserves and develops inherent creative potential, assists in the development of self-reliance, self-realization, self-sustaining abilities and resilience. It requires the honoring of diversity in human and biotic communities, the careful building of communities to determine organic norms of practice, and the negotiation of meaning. It requires the practice of the ethic of care in relationships between teacher and students and among students. What can be seen as woven within the call for classrooms of community is the integration of participatory and democratic principles and an experiential base. Below is a summary of specific

recommendations from contemporary theorists on processes that promote ecological consciousness within classroom practices:

Doll (1993) sees curriculum as a process, not a package, and suggests that what students experience in the classroom should be "dialogic and transformative, based on the inter- or transactions peculiar to local situations" (p. 140). In Doll's view, this process is one of mutual exploration of alternatives, an environment in which reflection is "critical, public, and communal" (p. 142). For Orr (1994), education occurs as part of a dialogue with a place and has the characteristics of good conversation. Bowers (1995) models the classroom milieu after the energy flow of organic systems in which the learning is open, with everyone "moving in and out, finding their own niches in the system" (p. 207). In this environment, "the teaching does not flow from the top down, but there is a cyclical exchange of information" (p. 206). In addition, "daily schedules are fluid; each time there is a change of theme, the learning environment is recreated" (p. 207). Just as the stability of an ecosystem depends on its diversity, the learning milieu must "encourage diverse modes and strategies of learning" and cultural diversity is critical (p. 207). The learning process is grounded in interrelationship of experience for Slattery (1995) who advocates respect for experience and sees the classroom as a hermeneutic circle…where the discourse is shared, empowering, emerging, and tentative" (p. 253). Curriculum is viewed primarily as *currére* (Pinar & Grumet, 1976), which implies not the hard-copy plan for learning but the process or inward journey of moving through the experience. The curriculum "is the interpretation of lived experience" (Schubert, 1986, p. 33) and according to Pinar (Pinar and Grumet, 1976) is "temporal and conceptual in nature" (p. 57). Curriculum as *currére* "supports the context necessary to move from romance

through precision to generalization" (Whitehead, 1929, cited in Slattery, 1995, p. 255). This aligns with the indigenous educational practice of starting with the particular within one's context. Deloria and Wildcat (2001), indigenous theorists, foreground holism, relations, and process and integrate the ideas from quantum physics of emergence, complexity, self-organization, ecology, and evolution. From their indigenous perspective, context is the place to begin and the channel within which all developments occur (pp. 85-86). Sterling (2002) bases curricular reform similarly on local, personal, applied, and firsthand knowledge, with an honoring of provisional knowledge, recognizing uncertainty and approximation.

We can see common threads of thought in this conversation on process. Among them are (a) a shift in emphasis from transmission of a set body of knowledge towards interpretive learning (b) relationships are fore-grounded, both in interpretations of subject matter and within the educational environment, (c) the approach to learning is primarily experiential, (d) learning is contextual, grounded in a sense of place and culture, (e) the focus is on the richness of diversity and problematics that inspire solutions relevant to the context; (f) dialogue is the prevailing form of communication, which assumes equal voice and legitimacy of participants, and (g) the educational environment is organized through a fully participatory democratic decision-making process; this involves intentional community building and an organic development of community norms. These themes are readdressed in the concluding section of this chapter as I develop the description of ecological principles.

The Learner

Who is the learner, and whom does the worldview of sustainable education serve? The learner in this view is a whole person with a full range of needs and capacities. Lifelong learning is the proclivity we wish to cultivate. It is interesting to explore prevailing notions of self and identity in the discussion of who is this *self* who is becoming educated.

The notions of self and identity have been central to the language of international documents on education for decades. Stated in the UNESCO report of 2002, (UNESCO., 2002, March 25) "Governments and other actors are enjoined to foster freedom of expression as the *condito sine qua non* for the self-realization of and participation by citizens in a democratic setting, for promoting diversity, for a realization of the knowledge society, for scientific progress, for sustainable development and for the preservation of peace" (p. 20).

The language in these documents of world attention rests on the notion of self as an autonomous individualized being who needs to be realized. In Gergen (1991) there is reference to Sampson's (1978) argument (p. 98) about the truisms of modern culture that reflect our understanding of the self of individualism, "Each person possesses a set of basic personality traits that largely determine his or her actions in various situations; people's attitudes and values typically determine their choices: (p. 98). Gergen (1991) continues with descriptions of some of these traits – "the mature person bases his or her ethical decisions on deep-seated moral principles; the well-adjusted person possesses a sense of self-worth on which he or she can rely in times of stress" (p. 98). These propositions, says Gergen, are "derived from forms of discourse used by large segments

of the culture to support their institutions" (p. 98). These propositions speak to an individualized self that is founded in the separation and reductionism of the world of scientism and work against relationality and interconnectedness, two of the foundational concepts of a consciousness that fosters sustainability.

The self as autonomous and individualized is countered by the previous discussion of organicism and systems theory. Living systems are complex relationships of interaction. From an ecological point of view, members of the biotic community cannot be understood independently from their environment. Human beings must be included in this description. According to Maturana and Varela (1980), living systems have an organizational schema that "defines a domain of interactions in which it can act with relevance to the maintenance of itself" (p. 13). We hear in this a self who retains her/his identity through a circular process of interactions. Self realization does not mean finding the self that was there all along; nor does it mean abandoning self-maintenance in response to stimulus from the environment.

Riley-Taylor (2002) reminds us that how we know ourselves and our environment becomes rooted in the "in between" (p. 57); in between reason and emotion, in between person and person, in between person and place, in between mind and body. The self, then, is constantly in a reciprocal relationship with everything, constantly expanding and expressing, constantly within the availability of choice and action, fully valued and fully valuing, orienting oneself to place and according to value. In Whitehead's (1978) process philosophy, the whole of reality bears on the creativity of the world and the self in each moment. Everything that comes to be inherits feeling from the past and entertains possibilities. There are no vacuous actualities. Conversation, narrative, autobiography

become respected forms of recording and relating our evolving self. Warren's (1996) eco-feminist perspective echoes Riley-Taylor (2002) in defining a "self-in-relation" (Warren, 1996, p. 379). Quoting from Plumwood (1986) Warren stresses that "we need to recognize not only our human continuity with the natural world but also its distinctness and independence from us and the distinctness of the needs of things in nature from ours" (p. 380). This distinction serves the interconnectedness of a sustainable view of reality as well as establishes individual distinctness which is important in an ethical framework within which relationship, responsibility, and agency are valued (Nel Noddings, 2002).

A description of the learner, the self that is engaged in learning, has been approached from the perspectives of many contemporary authors. Findings imply identity as having both intuitive and cognitive dimensions. Ecological identity entails both an intuitive appreciation for one's own underlying integral connection with the biosphere, and an understanding of the ecological processes and a continuing awareness of how those processes operate in one's own life and surroundings. This two-dimensional approach to understanding identity parallels the epistemological and process/content discussion presented earlier.

In this section I have presented reference points from the literature for a description of ecological principles. This exploration has been focused on the philosophical issues of cosmology, epistemology, axiology (values and ethics), purpose, process, content, and identity (the learner). A synthesis of this discussion of these categories follows in the next section presented as ecological principles. These principles are then used as a philosophical context for the content analysis of the six textbooks.

Ecological Principles of Education for Sustainability

This exploration of the contemporary literature on education for sustainability and ecological consciousness suggest the following ecological principles as applied to an educational setting.

1. An ecological ***cosmology*** of organicism is represented – a broadly holistic, systemic view of the universe as an interconnected web of systems and subsystems. Inherent in this view are the systems properties of emergentism, self-organization, ability to adapt to changes, interdependence, and cyclical processes;
2. The common theme for how we access knowledge is a participative ***epistemology*** of relationality; we come to know through relationship. There is no separation between the knower and the known; internal and intuitive experience is valued as a form of knowing; common knowledge is based in a shared context and generated from the practice of living and working, not individually derived but generated within relationships with others. Learners are active participants in the construction of meaning. Learning is grounded in a sense of place through the study of knowledge possessed by local elders and the investigation of surrounding natural and human communities, and attentive to local ecological issues and problems.
3. An ***axiology*** of ecological consciousness stems from the philosophy of organicism. Value is not limited to humans alone – every member of all natural, biotic, and human systems has *intrinsic value; ethical frames* are based on the assumption that every member of the biotic community (present and future) has intrinsic value and thus educational practices should be informed by the relational ethic of care and the consideration of consequences. All relationships are guided by ethical caring and the

questions, *What are you going through?* as well as *What are the consequences of my actions in terms of the effects on future generations of the biotic community?*

4. ***The role or function*** of educational systems that serve an ecological consciousness represent both intrinsic and instrumental intentions. They are intrinsic in their ability to shift the internal consciousness of participants and their basic orientation to the world toward deeper contextual and relational dimensions. They are instrumental in the goal of transforming all social systems toward the development of conditions and practices that reflect an awareness of the needs of the Earth and its species and the right of future generations to experience life in an uncontaminated environment. The focus on diversity includes a goal of consciousness that is honoring of cultural differences and respect for all members of all species.

5. ***Content*** is informed by context which implies experiential relationship to local, personal, cultural, firsthand issues and interests. Contextual elements also include past, present, and future relationships to humans and other living beings in the classroom and community and environmental issues relevant to their welfare. Knowledge gained through authentic experience of the particular is valued; provisional and approximate understandings satisfy the need for knowledge acquisition. Responsibility and agency are content themes that promote community, empowerment, social justice, and ecological sustainability. Acquisition of practical skills necessary for regenerating human and natural environments is fore-grounded. Content also includes a recognition that the worldviews that govern our thinking contain unexamined assumptions, beliefs, and values and that this meta-learning furthers our ability to transform our systems to be more sustainable. Occupational

alternatives are introduced that contribute to the preservation of local cultures and the natural environment.

6. ***Process*** is informed by a shift in emphasis from education towards learning. Relationships are fore-grounded, both in interpretations of subject matter and within the educational environment. The approach to learning is primarily experiential with a non-linear approach to problem solving. Learning is contextual, grounded in a sense of place and culture. A focus on the richness of diversity and problematics inspire solutions relevant to the context. Lessons are presented in narrative form. The use of metaphors generates dialogue which is the prevailing form of communication and assumes equal value and legitimacy of each participant. The educational environment is organized through a fully participatory democratic decision-making fed by a process of intentional community building and an organic development of community norms where control and authority lie within situational parameters. This process fosters an understanding that the goals, plans, and purposes arise within action which implies conjoint planning and grounded knowing. Evaluation is a process of negotiation within a communal setting for the purpose of transformation and is used as feedback in an iterative loop.

7. The ***learner*** is seen in relationship to the environment and as interconnected with all that is. S*elf and identity* are viewed as transpersonal identification, with the associated trait of an awareness of the connectedness to the universe and everything in it – animate, inanimate, human and nonhuman. Intellect, intuition, and capability are valued in their diversity. Existing knowledge, beliefs, and feelings are valued; differentiated needs are recognized. Learners are seen as responsible agents in their

own learning.

Summary

These seven principles describe a view of ecological consciousness as applied to philosophical foundations of education for sustainability. An argument has been presented that a shift in consciousness along these lines is important as part of a solution toward a sustainable future. A case has also been made for the seating of this study within the research paradigms of interpretive and critical inquiry. Further, the selection of introduction-to-education textbooks within the milieu of teacher-education programs has been discussed as an appropriate venue for this study. The ecological principles that resulted from this exploration are applied in chapter 3 to develop categories of recording units for the content analysis and in chapter 5 to summarize the extent to which the authors of introduction-to-education textbooks integrate ecological consciousness into their prioritization of foundational content for education majors. In the next chapter I detail the method of content analysis as it applies to this research project.

The words of language, as they are written or spoken, do not seem to play any role in my mechanism of thought. The physical entities which seem to serve as elements in thought are certain signs and more or less clear images.
Albert Einstein

Language is the blood of the soul into which thoughts run and out of which they grow.
Oliver Wendell Holmes

Every individual is at once the beneficiary and the victim of the linguistic tradition into which he has been born - the beneficiary inasmuch as language gives access to the accumulated records of other people's experience, the victim in so far as it confirms him in the belief that reduced awareness is the only awareness and as it bedevils his sense of reality, so that he is all too apt to take his concepts for data, his words for actual things.
Aldous Huxley

Chapter 3: Methodology and Method

Restatement of the Intent of the Study

At this time in history, the earth's natural and biotic systems are being diminished and degraded at an alarming rate. There have been numerous calls by the international community to address these documented disruptions in ecological relationships through formal educational institutions. Despite these recommendations, in the United States initiatives are not comprehensive enough to shift educational priorities to include intentional consciousness-raising around issues of sustainability. There is a limited amount of research that focuses on implementation of principles of education for sustainability into formal curricula at all levels including that of teacher training. Teacher-education programs serve a role in the primary socialization of teachers into expectations and ideologies inherent in the profession, and thus provide a venue for exploration of possible leverage points for increasing awareness of principles and practices of sustainability. Language forms contain subliminal ideological messages and

metaphorical structures. Textbooks are artifacts that can be examined for cultural messages. It is the intent of this study to examine introduction-to-education textbooks for ideological messages that enable or constrain a worldview of sustainability. This intent is inherent in my research questions:

1. What are the ecological principles that characterize a foundation of education for sustainability?
2. How are these principles expressed in best-selling introduction-to-education textbooks in the United States?

Assumptions

This study applies the principles and ideologies of sustainability in the context of teacher-education textbooks. Ecological principles were developed in chapter 2 as a frame of reference within which to conduct the content analysis. This chapter follows with a conceptual content analysis of six textbooks in current use in introduction-to-education classes in teacher preparation programs in the United States. For purposes of this study, the content analysis falls within the research paradigms of interpretive and critical research and are carried out with the assumption that meaning is constructed through the relationship of the texts and the researcher.

Context of Content Analysis and the Interpretive Paradigm

Content analysis often falls within the parameters of communication studies. One could argue that given the textbook authors' intent of communicating legitimate knowledge to the student, textbook analyses might also fall within these bounds. Communication theorist T. R. Lindlof (1995) defines *understanding* as the primary focus of the interpretive inquiry paradigm and as the "wellspring" (p. 30) of the interpretive

methodology. According to Natanson (1968) “the intersubjective world is the epistemic context for human action, the significative horizon in terms of which individuals, events, and even things are understood” (p. 221).The origins of *understanding* as a methodological goal date back to the eighteenth century when opposition to Cartesian rationalism was growing in philosophical circles. In the late nineteenth century the pervasive intrusion of positivist science into the humanities bred competition among explanations of human behavior (p. 31).

The interpretive paradigm epistemologically rests on the assumption that the intersubjective world is the reality in which we explore connections, legitimate findings, and interpret our relationships to objects and events. Given this background in the interpretive research paradigm, some assumptions reflecting an interpretive lens on content analysis are put forward by Klaus Krippendorff (2004) and summarized here. The primary assumption is that texts have no objective, or reader-independent qualities; whatever messages are received from reading or analyzing a text is the result of conceptual engagement with it. Following from this idea, is the understanding that texts do not have single meanings that can be found, identified or described; rather they can be read from many and varied perspectives. Further, the meanings invoked by texts need not be shared for intersubjective agreement. Needing to find common ground in an analysis would restrict the interpretation of texts to the most manifest of content and limit the rich interpretation of latent messages. All of these assumptions link the reading of texts to something else, such as how readers use the texts, to particular contexts, discourses, or purposes, i.e., to the world within which the texts can answer the research question. This understanding of the contextual nature of the reading of a text makes certain kinds of

questions answerable and others meaningless. As a researcher, I am the reader through which the interpretation is accomplished. Additionally, texts never speak for themselves. The interpretive nature of text demands that content analysts draw specific inferences from a body of text to their chosen context (pp. 19-25). It is within this understanding of the interpretive and contextual nature of texts that I approach this content analysis.

Content Analysis

Content analysis has been defined by Holsti (1969) as a scientific approach to the analysis of written or spoken messages. Berelson (1952) defines content analysis as a method for objective, systematic, and quantitative description of the manifest content of a text. Krippendorff (2004) offers another definition, "content analysis is a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use" (p. 18). Ahuvia (2001) suggests a reconceptualization of the method more in line with Krippendorff, "we should view content analysis as a method for counting *interpretations* of content" (p.1). There is a difference in definitions between those of the mid 1900s and the current offerings by Krippendorff and Ahuvia. As social science has moved away from the limits set by the positivist research paradigm, other approaches to inquiry that are inclusive of context have provided challenges to quantitative epistemology. Both interpretive studies and critical inquiry have become increasingly common in research agendas where contextualization is deemed fruitful to understanding the phenomenon under examination.

The method of content analysis dates back to the eighteenth century when words in religious hymns and sermons were counted by Swedish authorities to prove or disprove heresy (Dovring, 1954-1955). Content analysis gained attention in the United

States as a way to examine propaganda during World War II with attempts to analyze German broadcasts and quasi-official documents to detect the plans, attitudes, thoughts, and internal conflicts of the Nazis (George, 1959). After World War II the use of content analysis spread to several disciplines in addition to its application of studying messages from the mass media. These included psychology, anthropology, historical documents, political analysis, literature, and linguistics (Berelson, 2004). While the early days of content analysis involved a preoccupation with counting words and columns in newspapers, the technique continually expands with new applications in a variety of disciplines. This method is now utilized in analysis of postage stamps, art, pottery, folklore, internet texts, psychology, history, and many other areas.

In the area of textbook content analysis, a wide range of explicit and implicit messages have been researched. These include studies of racial bias in textbooks (McDiarmid & Pratt, 1972; Sleeter & Grant, 1991); gender bias in textbooks (Burstyn & Corrigan, 1974; Rendel, 1982; Tuchman, 1978); bias in American history textbooks (Anyon, 1979; Fitzgerald, 1980; Taxel, 1980); ideology in social work texts (Ephross & Reich, 1982; Leighninger, 1972; Wilson, 1985); bias in texts (Green & Hurwitz, 1980); controversial issues in biology textbooks (Levin & Lindbeck, 1979); ideology in career education (Wagner, 1980); and texts as a means of political socialization (Fratczak, 1981). These examples provide precedent for this research project.

Besides the broad implications of the recent use of computers for content analysis, the other recent development is the shift mentioned above away from a strictly positivist understanding of the methodology. An example of this expanded thinking is Krippendorff's (2004) statement, "Ultimately, all reading of texts is qualitative, even

when certain characteristics of a text are later converted into numbers" (p. 16). Qualitative approaches to content analysis can be traced to their beginnings in literary theory, the social sciences, and critical scholarship. *Interpretive* is often used as the label for qualitative analysis. Ahuvia (2001) adds voice to Krippendorff's distinction between traditional and interpretive content analysis. Traditional content analysis has often labeled textual messages into two types: (a) manifest, denotative, or the obvious, straightforward, and quantifiable messages, and (b) latent, connotative, or the text's subtler meanings. While Laswell (1941) distinguishes between manifest and latent content by referring to latent content analysis as "an interpretation" (p. 2), Ahuvia (2001) agrees with Krippendorff (2004) that both kinds of analysis are interpretations. Ahuvia states, "Both manifest and latent content analyses are forms of 'semantic' analysis, which is to say they are both about the interpretation of meanings, not physical ink on paper" (p. 142). Garfinkel (1967) and Krippendorff (2004) agree that interpretation is completely context-dependent. Krippendorff says, "Although data enter a content analysis from outside, they become texts to the analyst within the context that the analyst has chosen to read them – that is from within the analysis" (p. 33). He continues, "The context specifies the world in which texts can be related to the analyst's research question" (p. 33). A context is always someone's construction and can be differentiated into the categories of (a) network of stable correlations and (b) contributing conditions which affect the network of stable correlations (pp. 33-34).

This study uses Krippendorff's (2004) recent book for a detailed and updated account of content analysis in preference over older texts such as Holsti (1969) and Berelson (1952). Krippendorff's (2004) text is recognized by the International

Communication Association with the *Fellows Book Award* for 2004 selected with the criteria that it is among the books that have made a "substantial contribution to the scholarship of the communication field as well as the broader rubric of the social sciences and have stood some test of time" (Evans, 2004). Krippendorff (2004) sets himself apart from Holsti (1969) and Berelson (1952) in his understanding of how to conceptualize content. Krippendorff (2004) aligns Berelson (1952) with definitions of content analysis that take content to be inherent in the text, and interprets Hosti's (1969) methodology as the idea that content is a property of the source of the text. In contrast, Krippendorff (2004) understands content as emerging in the process of a researcher analyzing a text relative to a particular context. This study proceeds in alignment with Krippendorff (2004) in its recognition of the analyst's own contribution to the contextual reading of the analyzed texts and the relationship of the analysis to the defined research questions.

Three Points of Entry into Content Analysis

Krippendorff (2004) distinguishes among three possible starting points that provide motivation for a content analysis research project: text-driven, problem-driven, and method-driven. Text-driven refer to the motivation of the researcher to explore rich texts, which by the nature of their content promise lively interest in the investigation. Problem-driven studies are motivated by the question; the impetus for the study is some "currently inaccessible phenomena, events, or processes" (p. 340) that the researcher thinks the texts can answer. Method-driven research projects are motivated by the desire to apply proven procedures to topics previously studied by other methods. This study is decidedly problem-driven; the starting point is a real-world problem to which textbooks

may provide a piece of the puzzle. The steps involved in a problem-driven research project are:

- Formulating the research questions
- Determining stable correlations
- Locating relevant texts
- Defining units of analysis
- Sampling the texts
- Developing categories and recording instructions
- Selecting an analytic procedure
- Adopting standards
- Allocating resources (Krippendorff, 2004, p. 343)

These steps will be explained in turn in reference to this study.

Formulating the Research Questions

Krippendorff (2004) defines three characteristics of research questions that frame content analyses: (a) "They concern currently unobserved phenomena in the problematized context of available texts; (b) They entail several possible answers; and (c) They provide for at least two ways of selecting from among these answers – if not in practice, then at least in principle" (p. 343). My research question for the content-analysis portion of this study is: *How are the ecological principles described in chapter 2 expressed in best-selling introduction-to-education textbooks in the United States?* What follows in the next three paragraphs is a delineation of the ways in which the study follows the guidelines for the characteristics of research questions.

Currently unobserved phenomena: The research question in this part of the study satisfies the first of the three criteria in that the relationship of introduction-to-education textbooks to ecological principles has yet to be studied. This content analysis seeks relational information within the described context that lies at the intersection of sustainability and teacher education. This is a process that Krippendorff (2004) calls abduction – "moving from particular texts, through context-sensitive explanations of these texts, to particular answers to the research question" (p. 344). On the surface, the content analysis part of this study appears to be a deductive process of applying the ecological principles to the selected texts. Rather, I see the development of ecological principles as serving a contextual function, and its use is in relationship to the texts (in Krippendorff's language), and not as the defined starting point.

Several possible answers: The research question for this portion of the study satisfies this criterion in that it has the potential to produce several conceivable answers – not an infinite field, nor a single predetermined answer. The answer (to the question of alignment of the texts with ecological principles) falls somewhere on a continuum from parallel alignment to no alignment.

Selecting among answers: In principle, the anticipated information that serves as findings to this research question could be obtained from other studies within teacher education. I make a case for studying the language-based artifact that is the textbook. Interviews, classroom observations, or content analyses of other language-based materials could provide rich data on the alignment of current teacher education and training with the principles of sustainability. Alternative studies of this nature could confirm or invalidate some of the findings of this study.

Determining Stable Conditions

Content analysts must create a well-substantiated path that connects the selected texts to the potential answers to the research question. These conditions that define the context must be reliable and be predicted to remain stable over the course of the study. The following description of the context within which this study is conducted reference many stable conditions that form the network of relatively predictable phenomena.

Context

For purposes of this study, the network of stable correlations defines the context of *teacher-education programs* within *colleges of education* in the United States, and the use of the artifact of *teacher-education textbooks* in the curriculum to contribute to the *primary socialization and ideological orientation* of public school teachers and educational professionals. These phenomena are assumed to be stable in their function and role in the preparation of teachers in the United States.

Contributing Conditions

Contributing conditions that affect the network of stable correlations in this study are many. They are back-grounded by the contextual elements of currently unsustainable environmental, economic, and social ecologies in this country and on the planet. The lack of attention to issues of sustainability in the milieu of teacher training reinforces the problematic aspects of the context. In terms of the researcher's involvement, interest in education for sustainability is, for purposes of this study, considered a contextual element. The description of ecological principles of education for sustainability, and the intent to indicate the presence or absence of these principles in selected textbooks both contribute

structural building blocks to the study. Explicating this conscious connection to the context of the content analysis adds clarity to the findings of the study.

Analytical Constructs

So far I have used Krippendorff's (2004) structure to establish the contextual framework of the content analysis. As the ecological principles have been described in chapter 2, the work of the study will now be to operationalize that interpretation in order to make them useful in the content analysis. According to Krippendorff (2004) analytical constructs "operationalize what the content analyst knows about the context, specifically the network of correlations that are assumed to explain how available texts are connected to the possible answers to the analyst's questions" (pp. 34-35). In other words, an analytical construct builds a relationship between the contextual aspects of the research, the objects under study, and the form that potential inferences might take. Krippendorff (2004) offers a helpful explanation: "In its simplest form, an analytical construct is a function, a collection of 'if-then' statements…that defines at least one path from available text to the answers sought" (p. 171).

For example, if one intent of the research is to make an inference about the extent to which the textbook reflects sustainability as a current social issue, the related analytical construct might be worded as: "*If* the research reveals evidence of the inclusion of sustainability among the list of social issues that affect schools and students, *then*, as an inference, the research indicates a view that sustainability is seen as a significant social force to which teachers have a responsibility to respond." This particular piece of the analytical construct provides a link from the context of sustainability and education, through the description of social issues in the content of an introduction-to-education

textbook, to one of many possible interpretations of the relationship between the text and the context. In addressing this function of the construct, Krippendorff writes, "For a content analysis to proceed relative to a context, its analytical construct must also be a model of the relationships between the texts and the target of intended inferences, what the analyst wants to know about that context" (p. 172). The analytical constructs must be clear in defining the links so that multiple coders can apply them repeatedly and reliably.

Locating Relevant Texts

The criteria for selection of textbooks for this study are: (a) They are currently in use in the United States in entry-level classes in teacher-education programs; (b) they are among the best-selling textbooks (in terms of numbers of copies sold) for adoption in these classes as determined by the publishers; and (c) they are in at least third edition, displaying evidence of use over time. These criteria for text selection are justified by the context within which the research question is asked. The texts are identified through marketing data bases available through on-line faculty information websites. Additionally, confirmation of the best-selling texts is obtained from representatives of the publishers. Information about the specific texts used in the content analysis is included along with biographical information about the authors and the extent to which they represent a variety of publishers and institutions of teacher education (See *Appendix D*). A list of texts (in order of copies sold in the 2003-2004 academic year) from which the textbooks included in this study are selected is included in *Figure 3*.

Defining Units of Analysis

Sampling units: Sampling units are units of text that are distinguished for selective inclusion in an analysis. According to Krippendorff (2004) these units must be

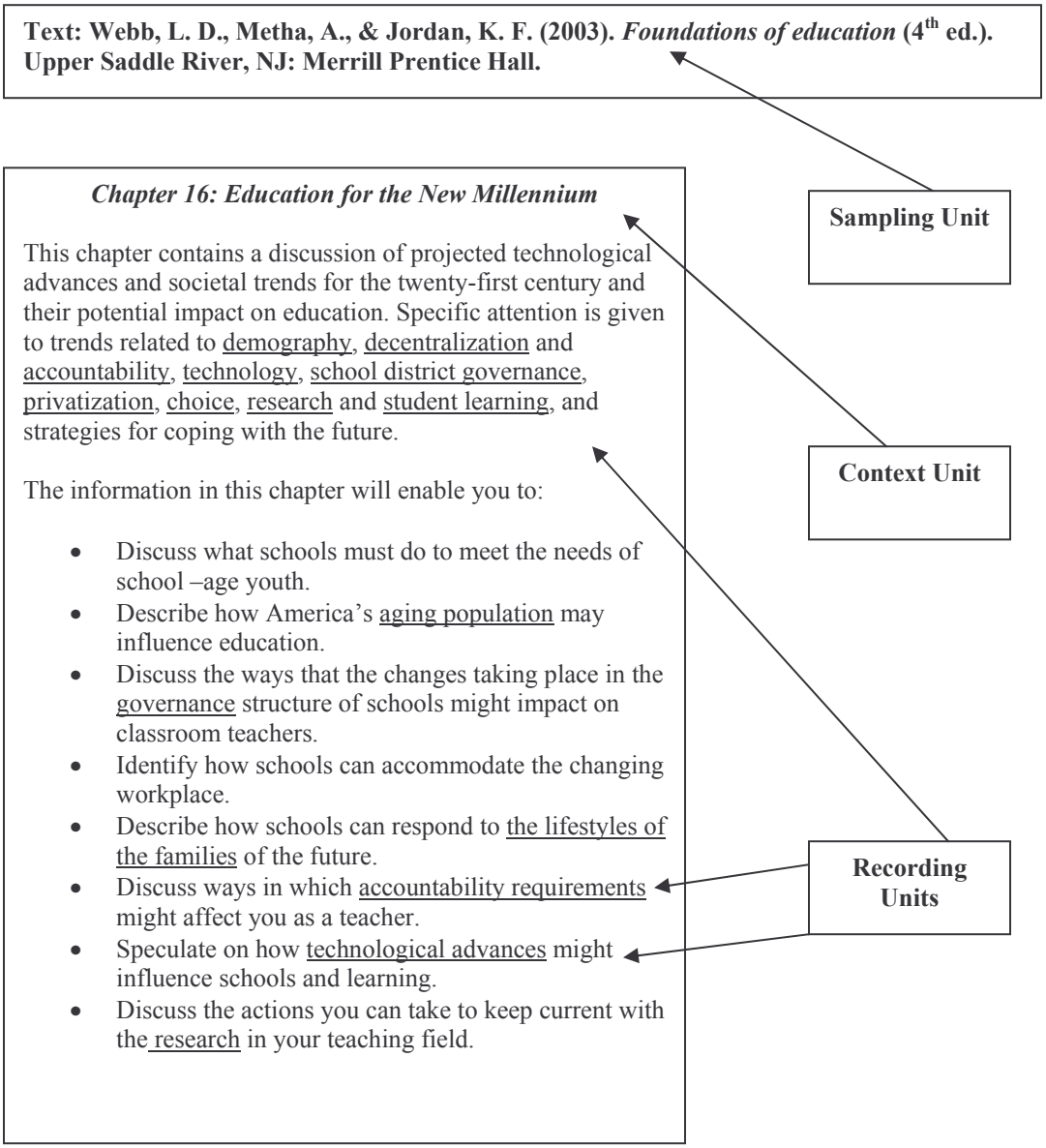
defined so that "(a) connections across sampling units, if they exist, do not bias the analysis; and (b) all relevant information is contained in individual sampling units, or, if it is not, the omissions do not impoverish the analysis" (p. 99). For purposes of this study, the sampling units are the six textbooks selected according to the above criteria. Connections between the selected texts (or their authors or publishers) that may exist are unknown to the researcher and an effort is made to select texts from more than one publisher to help prevent bias. In addition, an attempt is made to represent many different institutions of higher education in terms of the authors' professional associations. See *Appendix D* for identification of affiliate universities, organizations, and publishers represented by the sampling units.

Recording units: Recording units are "units that are distinguished for separate description, transcription, recording, or coding" (Krippendorff, 2004, p. 99). Recording units are typically contained within sampling units. For purposes of this study, this label refers to specific words or phrases of the six sample textbooks that contain relevant data. These recording units are defined as sections of the chosen texts that have the potential to reveal evidence of the ecological principles described in chapter 2. To review, these seven ecological principles are descriptions of an ecological worldview related to cosmology, epistemology, axiology, purpose, process, content, and the learner. Recording units may be single words, longer text segments, or photographic images. The information about these recording units may be distributed throughout the text.

Context units: Context units "set limits on the amount of text to be consulted in determining what a recording unit means" (Krippendorff, 2004, p. 349). Context units are intended to preserve at least some of the information that surrounds the recording units.

For example, if the recording unit is defined as a word, then the context unit might be a sentence, or it might be a paragraph, however much text is needed to provide the context for the recording unit. Context units might also be located elsewhere, such as in "footnotes, indices, glossaries, headlines, or introductions" (p. 101). In this study, an example in McNergney & McNergney (2004) is explanatory. The context unit is a chapter heading that reads, *Challenges Teachers and Schools Face* (p. 29) and refers to social issues that effect schools. This unit is separate from the recording units that may or may not indicate sustainability as important to the social milieu of schools. Unlike sampling units and recording units, context units are not counted, need not be independent of each other, and can be used in the description of several recording units. The context units are listed in the recording chart, by page number, for each recording unit. An example of a title page of a chapter in a sample text follows as a visual representation of the differences between the three types of units. Distinctions between sampling units, context units, and recording units are indicated.

Figure 2: **Distinctions among sampling units, context units, and recording units in sample chapter title page[6]**



[6] Revised from title page of chapter 16 of: Webb, L. D., Metha, A. & Johnson, K. F. (2003). Foundations of education (4th ed.). Upper Saddle River, NJ: Merrill Prentice Hall.

Sampling the Texts

Purposeful sampling applies to this content analysis. Krippendorff's (2004) suggestions align with this method in his suggestion that the texts be chosen with the context in mind so the relationships to stable correlations and the potential answers to the research question are maintained.

Developing Categories and Recording Instructions

Formulation of clear coding instructions, appropriate background, and adequate training of potential recorders increase the possibility that the textual units are described in the same analytical terms and thus, enhance the reliability of the study. Requirements for recorders and analysts for the content analysis include: (a) graduate-level training in education so that the content of the textbooks is not new territory; (b) familiarity with and affinity for the integration of principles of sustainability in education; (c) a thorough reading of the first three chapters of this study; and (d) dialogue with the principle researcher for common understanding of the ecological principles and categories of recording units. Adequate step-by-step instructional materials are included in this chapter for use in replication of recording along with the recording form in *Figure 4*. Operational definitions of the recording and context units, and a description of how to distinguish them appear in the section *Step by Step Procedure for Content Analysis*.

Krippendorff (2004) offers several suggestions for developing suitable category development and recording instructions. One of them recommends that if the "descriptive accounts or theories about the context can be operationalized into categories for coding texts, then analysts can gain immediate access to what the literature suggests the stable correlations are" (p. 352). This is an important preface to this study as the context of

ecological principles does not provide an intentional framework for the authors of the selected texts. Therefore, no alignment with them, either in substance or form, is anticipated. Therefore, the operational categories described as recording units provide structure to the coding for the study and are directly related to the stable correlations outlined above.

Selecting an Analytic Procedure

Identification of the research questions, the list of principles representative of ecological consciousness, and the recording and context units, set the stage for the specific analysis of the texts. The procedure employs a model which moves toward inferences through identification of implicit and explicit messages regarding the identified principles contained in the context units. Structural correspondences between the context units and the recording units form an analytical construct which operationalizes what the content analyst suspects or assumes about the context of the text in reference to the research questions. Analytical constructs, having been defined above as a series of if-then statements, provide critical links from the context of the study, through the texts to potential inferences. These are delineated in chapter 4 in the discussion of the findings of the content analysis of the individual textbooks. In chapter 5 the findings are interpreted within the context of the ecological principles and the research agenda developed in chapter 2, and within the other elements of the context of the study described in chapter 1.

Adopting Standards for the Hypothetical Validity of Research Findings

Content analysis is valid, according to Krippendorff (2004) if "the inferences drawn from the available texts withstand the test of independently available evidence, of

new observations, or competing theories or interpretations, or of being able to inform successful actions" (p. 313). Uncertainty about the validity of the answers to the research questions is always a factor given the not-yet-observed phenomena under study. According to Krippendorff (2004), the degree of uncertainty depends on three factors: (a) "the nature of the context of the texts being analyzed; (b) the extent of the analysts' knowledge of the text-context correlations; and (c) the care with which the analysis is conducted" (p. 353). These factors are taken into account through my procedures.

While the context of teacher education provides a relatively stable correlation, the context of ecological consciousness, given the lack of implementation of these concepts in the sphere of public education in the United States, is new territory and the stability of this can be questioned. In order to accommodate the intensity and the newness of this area of study, chapter 2, the development of ecological principles, has been a thorough review of the relevant philosophical conversation on education and sustainability. The synthesis of that investigation, therefore, represents a contextual footing for the textual analysis.

The third source of uncertainty that has the potential to influence the findings of the study is carelessness in establishing the process of moving from questions to inferences. As outlined above, the research process described is designed with the goal of internal validity in mind. The question of validity has to do with the truth of the observations: whether the research instrument is accurately reporting on the object of interest. Face validity, is defined by Krippendorff (2004) as obvious or common truth, and is one of the primary considerations. It is fundamentally an individual's judgment with the assumption that everyone else would agree with it (pp. 313-314). Content

analysts rely on face validity more than other researchers as content analysis is concerned with the reading of texts, with what symbols mean, and with how images are seen, all of which are largely rooted in common sense in the shared culture in which interpretations are made. The research design of this study clearly links the research question to the ecological principles and the rich contextual structure of the analytical construct. This tightly-defined foundation for the analysis provides adequate face validity and internal consistency.

Reliability

In content analysis, techniques are expected to be reliable and should result in findings that are replicable. Replication is sometimes accomplished through multiple coders. In interpretive content analysis, according to Ahuvia (2001), "multiple coders are recommended because collaborative work is likely to be of higher quality, but in principle a single coder is sufficient" (p. 145). While I have included requirements for the background and preparation of additional coders, I have chosen to not implement replication within the confines of this study. In lieu of additional coders, I have adopted the reliability standard of stability. Stability indicates the extent to which a coding procedure reveals the same results on repeated trials. In order to provide stability in this study, I re-read the texts after a period of three weeks had elapsed. My second recording revealed very similar results. In addition, I am including a recording sheet for one of the focal texts in *Appendix E* so that the reader can assess my representation of the recording units. Clear step-by-step procedures of my process in this research follow in this chapter. These directions will allow the study to be duplicated by other recorders.

Allocating Resources

As this project is small and exploratory, the allocation of resources requires little organization beyond the time constraints of the principle investigator.

Narrative Form

The findings are reported in a narrative presentation in chapter 4 that includes examples of representative statements from the textbooks examined. The narrative provides a description of the attention given to subject categories and includes the investigator's assessment of the perspectives reflected in that attention. The assessment is guided by the congruity between the authors' textual data and the elements identified as characteristic of the perspective.

Step by Step Procedure for Content Analysis

Selection of Sample Textbooks

The criteria for selection of textbooks for this study are: (a) They are currently in use in the United States in entry-level classes in teacher-education programs; (b) they are among the best-selling textbooks (in terms of numbers of copies sold) for adoption in these classes as determined by the publishers; and (c) they are in at least third edition, displaying evidence of use over time. After consultation with the bookstore manager and reference librarians at Northern Arizona University, as well as on-line conversations with campus representatives of textbook publishers, it became clear that marketing data that would give specific sales numbers for current texts was not accessible without a large fee. I then turned to two websites available to faculty for their use in the textbook adoption process. They are: http://www.facultycenter.net/ and http://www.facultyonline.com/ . The first site is offered through the campus bookstore; the second site is available through the

Chronicle of Higher Education and the campus bookstore. Both sites rank textbook titles according to number of adoptions in the previous twelve months. At the Faculty Center, the data used to generate the ranking is a reflection of demand history for 3,600 active wholesale accounts at MBS Textbook Exchange. Identification of the popularity of a text within its subject category is through tabulation of the largest quantity textbook orders within each subject category. Then, each textbook order within that subject category is divided by the largest order to determine the percentile demand. The rating system is zero-to-five with five being the highest. For example, a five-rated book is in or above the top 98.7 percentile in terms of demand. Twelve titles are appropriate for introductory education classes, have a publication date of 2001 or later and are in at least the third edition.

At Faculty Online textbook sales data from college bookstores is analyzed by Monument Information Resources (MIR) to determine market share. MIR identified 32 top-selling titles in Educational Foundations: Introductory and 23 top-selling titles in Foundations of Education. Twelve of these titles are specific to introductory education classes, have a publication date of at least 2001 and are in at least the third edition. The chart that follows identifies the rankings of these twelve books by the two faculty databanks. Titles that were only identified by one of the sites were eliminated from consideration. In addition the Faculty Center rates books according to the percentage of colleges and universities that adopted the text. These rankings include percentage of doctoral programs at research universities, percentage of master's colleges and universities, percentage of baccalaureate colleges and universities, and percentage of associate's colleges. For purposes of this study, these percentages were summed to

provide additional reference points for the selection of sample texts. Cross-referencing this data with information from representatives from publishers resulted in the final selection of the six textbooks.

***Figure 3*: Chart of textbook ranking: Population that meet the criteria.**

Chart of Textbook Ranking: Population That Meet the Criteria

Title	Ranking from MIR and Faculty Online	Ranking from MBS and Faculty Center	Sum of Percentages of B. A. through Ph. D. Colleges and Universities that Adopted This Text
Armstrong, D., Henson, K. T. & Savage, T. V. (2005) *An introduction to education* (7th ed.). Boston: Pearson.	Top	3 out of 5	11%
Cruickshank, D. R., Jenkins, D. B. & Metcalf, K. K. (2003). *Act of teaching* (3rd ed.). Boston: McGraw-Hill.	Top	2 out of 5	20%
Johnson, J. A., Musial, D., Hall, G. E., Gollnick, D. M. & Dupuis, V. L. (2005). *Introduction to the foundations of American education* (13th ed.). Boston: Pearson.	Top	3 out of 5	33%
McNergney, R. F. & Bernhard, T. M. (2004). *Foundations of education: The challenge of professional practice* (4th ed.). Boston: Pearson.	Top	2 out of 5	7%
Morrison, G. S. (2003). *Teaching in America* (3rd ed.). Boston: Pearson	Top	4 out of 5	12%
Newman, J. W. (2002). *America's teachers: An introduction to education* (4th ed.). Boston: Pearson	Top	2 out of 5	9%
Ornstein, A. C., Levine, D. U. & Gutek, G. (2003). *Foundations of education* (8th ed.). Boston: Houghton Mifflin.	Top	3 out of 5	29%
Parkay, F. & Stanford, B. (2004). *Becoming a teacher* (6th ed.). Boston: Pearson.	Top	3 out of 5	24%
Ryan, K. & Cooper, J. (2004). *Those who can, teach* (10th ed.). Boston: Houghton Mifflin.	Top	4 out of 5	19%
Sadker, D. M. & Sadker, M. P. (2005). *Teachers, schools, and society* (7th ed.). Boston: McGraw-Hill.	Top	5 out of 5	21%
Spring, J. (2002). *American education* (10th ed.). Boston: McGraw-Hill.	Top	5 out of 5	39%
Webb, L. D., Metha, A. & Jordan, K. F. (2003). *Foundations of American education* (4th ed.). Boston: Pearson.	Top	3 out of 5	27%

Textbooks Chosen as Sampling Units

After applying the criteria for selection, the following textbooks were chosen:

1. Spring, J. (2002). *American education* (10th ed.). Boston: McGraw-Hill.
2. Sadker, D. M. & Sadker, M. P. (2005). *Teachers, schools, and society* (7th ed.). Boston: McGraw-Hill.
3. Johnson, J. A., Musial, D., Hall, G. E., Gollnick, D. M. & Dupuis, V. L. (2005). *Introduction to the foundations of American education* (13th ed.). Boston: Pearson.
4. Ryan, K. & Cooper, J. (2004). *Those who can, teach* (10th ed.). Boston: Houghton Mifflin.
5. Parkay, F. & Stanford, B. (2004). *Becoming a teacher* (6th ed.). Boston: Pearson.
6. Ornstein, A. C., Levine, D. U. & Gutek, G. (2003). *Foundations of education* (8th ed.). Boston: Houghton Mifflin.

Categories of Recording Units

This method of assigning categories is an attempt to organize the content analysis and to create some alignment between the ecological principles and the recording units. According to Krippendorff (2004) once these recording units have been described and assigned to categories, they are used later for comparisons, summaries and rationale for intended inferences. In order to assess introductory education textbooks for their potential to reveal the ecological principles developed in chapter 2, I borrowed a preview sample of ten introduction-to-education textbooks from education faculty at Northern Arizona University. In an examination of these ten textbooks it became apparent that a content analysis based on the seven ecological principles derived in chapter 2 was not possible due to the lack of alignment of topics in the *Tables of Contents* and the *Indices*. Based on

the T*ables of Content* I then made a chart consisting of the chapter headings of the ten preview texts and the major sectional divisions of the books. I analyzed the chart for common points of reference and listed these. I then examined the list of commonly addressed topics and issues for their perceived relationship to the seven ecological principles. My intent was to select common reference points based on their potential to reveal evidence of ecological consciousness. Following this examination, I selected 13 categories of recording units that my review of literature led me to believe had the most potential to operationalize the philosophical understandings into a useful structure for analyzing the content of my final sample of texts. These relevant sections include:

1. assumptions about the context with respect to a cosmological framework;
2. descriptions of social issues that affect schools;
3. references to predicted issues in the future to which educators will have to pay attention;
4. criteria for reform of schools;
5. how content (subject matter) is prioritized;
6. inclusion of historical dates of federal and international legislation and directives that affect schools;
7. definitions of *effective schools*, *effective leaders*, and *effective instruction*;
8. descriptions of the school *environment*;
9. definitions of national goals of education, and
10. epistemological assumptions;
11. how values and ethics are discussed;
12. how the student/learner is described; and

13. direct references to the words *environment, ecological or ecology*, and *sustainability*.

What follows is a description of these thirteen content areas operationalized as categories within which a coder might discover recording units. An explanation for the choice of these categories as a reference for recording data is included.

Assumptions about the context with respect to a cosmological framework: As ecological consciousness is grounded in the view that the universe is an interconnected web of systems and subsystems, it is relevant to this study to look for evidence of this worldview in the textbooks. References to descriptions of the universe are noted, and statements of a cosmological framework are recorded, without regard to whether or not they are in alignment.

Descriptions of social issues that affect schools*:* The analyst looks for the identification of environmental or community degradation as social issues. The presence of these explicitly defined issues indicates awareness of sustainability as important to the educational milieu; absence of these issues indicates a lack of acceptance of these issues as important. All references to social issues that are said to affect schools are recorded.

Predicted issues in the future to which educators will have to pay attention: In the preview of texts, all authors identify issues and circumstances that may present as potential change agents for public education in the future. The analyst looks for evidence of concern for the environment, awareness of community-oriented factors of sustainability and economic factors of sustainability. The presence of these issues indicates recognition of the relationship between education and sustainability. All

references to future issues are recorded without regard to their alignment with ecological principles.

Criteria for reform of schools*:* In this context unit the analyst examines the inclusion or exclusion of principles of sustainability as recognized criteria on which recommendations for reform are founded. If these principles are identified as a factor in school reform then the analyst infers alignment with the intent of education for sustainability. If these principles are absent, either a lack of awareness or intent to align school reform with different factors is indicated. All references to criteria on which reform is recommended are recorded without regard to their alignment with ecological principles.

How content is prioritized: What the authors include as prioritization of subject matter provides evidence of the inclusion or lack of inclusion of ecological principles. The researcher looks for all references to content areas that are seen as important to contemporary learners. This data is analyzed in terms of the previously-defined priorities for content that is said to promote ecological consciousness. All references to prioritization of subject matter are recorded.

Inclusion of historical dates of federal and international legislation and directives that affect schools*:* A common inclusion in introduction-to-education textbooks is a list or a reference to federal and international mandates written as policy or recommendations for public education. In chapter 1, a substantial list of recommendations and directives for inclusion of sustainability in the education agenda is presented. Presence or absence of these documents indicates their priority in the minds of

the authors and publishers of the textbooks. All references to court cases, federal legislation or directives, or international recommendations are recorded.

Definitions of effective schools, effective leaders, and effective instruction*:* The list of principles of ecological consciousness which were developed in chapter 2 provides a paradigmatic view of what is meant by *effective,* in terms of schools, leadership, and instruction from the view of ecological consciousness. Effectiveness is typically described in terms of the ability to meet stated goals and priorities of an educational system. All references to *effectiveness* in these areas are recorded. The analysis evaluates the extent to which these recording units integrate ecological thinking, goals, and markers.

Descriptions of the school environment*:* The school *environment* is characterized by factors and situations to which the school is interrelated. These factors may include the physicality of the surrounding community, the architectural design of the school, particular ethnic and socioeconomic cultural issues, political, budgetary and management issues, and school personnel. If the description of the school environment includes the flora, fauna, and ecology of the landscape in addition to cultural, community, and physical aspects, then an awareness of a human-biotic relationship is deemed evident. All references to the *environment* of the school and the classroom are recorded.

Definitions of the goals of education*:* References are commonly made in textbooks at this level to the purposes of education as defined by the federal government, associated federal agencies, and state and local decision makers. If the analysis provides evidence that these goals are in keeping with the purposes of education for ecological consciousness, then alignment can be inferred. All references to stated goals and purposes

are recorded without regard to their alignment with ecological principles or goals of sustainability.

Epistemological assumptions: *How we come to know?* is a question commonly addressed in education textbooks, either directly in summaries of philosophical contributions to the field, or indirectly in descriptions of the process of learning and instruction. Any reference to a relational epistemology is considered as an indication that the author is including ecological principles. All evidence of direct or indirect epistemological reference points are recorded.

How values and ethics are discussed: A preview of textbooks shows that axiological statements are commonly included in discussion of trends such as character education and issues classroom management. Summaries of philosophical and historical theoretical frameworks also include statements of values and ethics. The researcher looks for evidence of the principles of consequentialism and the ethic of care in the textbooks. All references to values and ethics are recorded regardless of their ability to provide evidence of ecological principles.

How the student/learner is described: Questions of whether the learner is seen as a discrete *self* to be developed, as human capital, or as an entity in relationship to all that is, are important to an assessing the extent to which the author is integrating an understanding of ecological consciousness. All references to self and identity, as well as descriptions of the learner are recorded.

Direct references to the words "environment," "ecological," "ecology," and "sustainability": The terms *environment*, *ecological*, *ecology*, and *sustainability* may provide evidence that the author is including ecological principles either in descriptions

of instruction, school environment, or examples of social or community issues. All references to these words are recorded regardless of their reason for inclusion. Context units are examined to determine the relationship of these terms to their placement in the text and their significance to the findings of the study.

Procedure for Recording

Each of the sample textbooks is read line-by-line in its entirety. I read each chapter of the book while looking for specific references to the thirteen categories of recording units just described. The following example represents the chart that is used to keep track of recording units and their context units as they are found. A separate chart is utilized for each of the six sampling units.

***Figure 4*: Example chart for displaying recording units.**

Sampling Unit 1: Spring, Joel. (2004). *American education*. Boston: McGraw-Hill.

Category of Recording Units	**Textbook Reference** **Page #, Specific text**	**Context Unit** **Section of text**
(a) assumptions about the context with respect to a cosmological framework		
(b) descriptions of social issues that affect schools		
(c) references to predicted issues in the future to which educators will have to pay attention		
(d) criteria for reform of schools		
(e) how content is prioritized		
(f) inclusion of historical dates of federal and international legislation and directives that affect schools		
(g) definitions of *effective schools, effective leaders*, and *effective instruction*		
(h) descriptions of the school *environment*		
(i) definitions of the goals of education		
(j) epistemological assumptions		
(k) how values and ethics are discussed		
(l) how the student/learner is described		
(m) direct references to the words *environment, ecological* or *ecology*, and *sustainability*		

The textbooks are read twice for the purpose of gathering data that may have been missed in the first reading and for enhancing the reliability of the study. Data gathered on the second reading is incorporated into the recording chart used for the first reading.

Once the reading and recording is accomplished the researcher analyzes the recording units for the ways in which the authors address the 13 operationalized categories described above. Findings of the analysis are summarized for each category, with representative recording units from the textbooks quoted to add interpretive explanation. In addition to this analysis, a scan of the indices at the back of each of the textbook is undertaken to look for evidence of the key words, *biotic, ecology, environment, environmental education, interconnected, nature, natural world, pollution, relationality, sustainability, and system*. Then, the findings are reported as a comparison across textbooks to identify the range of perspectives articulated in the six texts. The analysis is represented as a narrative presentation that includes examples of representative statements from the textbooks examined. The narrative provides a description of the attention given to categories and includes the researcher's assessment of the perspectives reflected in that attention. The assessment is guided by the congruity between the authors' textual data and the principles identified as characteristic of an ecological perspective. In the final chapter the findings are discussed in relationship to the ecological principles revealed in chapter 2, the context of the use of textbooks in teacher education, the context of the statistical information on the ecology of the planet, and the international directives and recommendations relevant to this study.

Conclusion

This chapter has described the methodology and the method of content analysis, contextualized with respect to research paradigm and historical implementation. I have also detailed the research design of the content analysis of the six selected textbooks. This research relies on interpretive content analysis as described by Krippendorff (2004) and on a synthesis of the philosophic inquiry on sustainability. The assumptions underlying the development of the step-by-step process of the content analysis have been described here. Chapter 4 reports the findings of the content analysis and chapter 5 discusses the inferences and implications of the study.

We live in a mechanistic world that has taught us to think
in terms of separation: inner self from outer self;
self from others, self from nature and the planet. We have
replaced inner rhythms with routines in many ways.
We wake to an "alarm," live our lives according to the
hands on a clock, spend most of every week at a job that,
in many cases, is disconnected from an internal desire to create
or to engage in a task for its own sake.
So often, the meaning within our work is disconnected from
the immediacy of experience, or is even unknown to us.
Intrinsic motivation is replaced by extrinsic motivators such as
output requirements and job security.
Elaine Riley-Taylor

Chapter 4: Findings of the Content Analysis

Introduction

In chapter 3, I outlined the method for the content analysis of the sample textbooks following Krippendorff's (2004) interpretive methodology. The analysis of the six selected texts is within the context of the research question, *How are ecological principles (as developed in chapter 2) expressed in best-selling introduction-to-education textbooks in the United States?* These ecological principles were operationalized into 13 categories of recording units through a preview of the *Tables of Contents* of ten non-sample introductory textbooks. The six sampling units were then selected according to the criteria that (a) They are currently in use in the United States in entry-level classes in teacher-education programs; (b) they are among the best-selling textbooks (in terms of numbers of copies sold) for adoption in these classes as determined by the publishers; and (c) they are in at least third edition, displaying evidence of use over time. A line-by-line reading was undertaken to record textual references to the 13 categories. A sample of the recording units for Spring (2002) is included in the *Appendix E*.

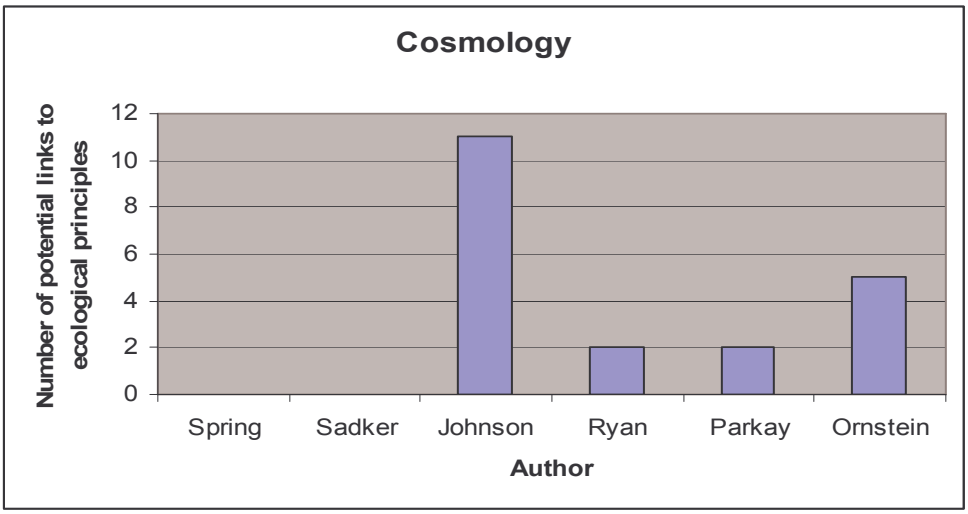
Chapter 4 presents the findings that emerged from the analysis, and reports on how the 13 categories that were used deductively as a framework for the content analysis are addressed in the texts. Each category is summarized in narrative form in reference to the six texts, with a unit analysis that reflects the alignment of each sampling unit with ecological principles. In instances where recording units repeat a particular view or representation of a category within a text, repetitive statements are not reported. Quotes representing the ecological perspective or focus areas of the authors are offered. In addition, a cross-textual comparison of the findings is represented as a graph within the narrative of each category. The intent of these graphs is to indicate the prevalence of the inclusion of ecological principles within the text. However, there are so few textual references directly related to ecological consciousness, these graphs will instead compare the number of pieces of data that offer the *potential to link* the ideas in the text to issues and topics inherent in education for sustainability. I also add a section that summarizes a scan of the indices at the back of each of the textbooks. This was undertaken to look for evidence of the key words, *biotic, ecology, environment, environmental education, interconnected, nature, natural world, pollution, relationality, sustainability, and system*. These findings are reported after the summary of each of the 13 categories.

There is no assumption being made that representations of particular points of view within a category reflect the opinions of the author of the textbook. The inclusion or exclusion of a point of view, together with their frequency, will be interpreted as evidence of ecological principles. The six sample textbooks for which findings are reported here are: (a) Spring, J. (2002) *American education* (10th ed.). Boston: McGraw-Hill; (b) Sadker, D. M. & Sadker, M. P. (2005). *Teachers, schools, and society* (7th ed.).

Boston: McGraw-Hill; (c) Johnson, J. A., Musial, D., Hall, G. E., Gollnick, D. M. & Dupuis, V. L. (2005). *Introduction to the foundations of American education* (13th ed.). Boston: Pearson; (d) Ryan, K. & Cooper, J. (2004). *Those who can, teach* (10th ed.). Boston: Houghton Mifflin; (e) Parkay, F. & Stanford, B. (2004). *Becoming a teacher* (6th ed.). Boston: Pearson; and (f) Ornstein, A. C., Levine, D. U. & Gutek, G. (2003). *Foundations of education* (8th ed.). Boston: Houghton Mifflin.

Category 1: Cosmology

All but one reference to cosmology are unrelated by the authors to the current state of education, and even that one is not linked to the environmental crisis but to the need for preparation of future workers for a global economy and a multicultural social network. Some Eastern philosophical and Native American cosmological views as presented are in alignment with a holistic, interconnected universe of which human beings and all biotic species are a part. There are some references such as these to cosmological perspectives that could provide openings for discussion of ecological principles in relationship to a foundation of education for sustainability yet, there is no conceptual tie made between any of these views and an ecological framework. Findings from the individual texts will be reported in order. The following graph represents a comparison of the number of potential links to ecological consciousness within the category of cosmology.



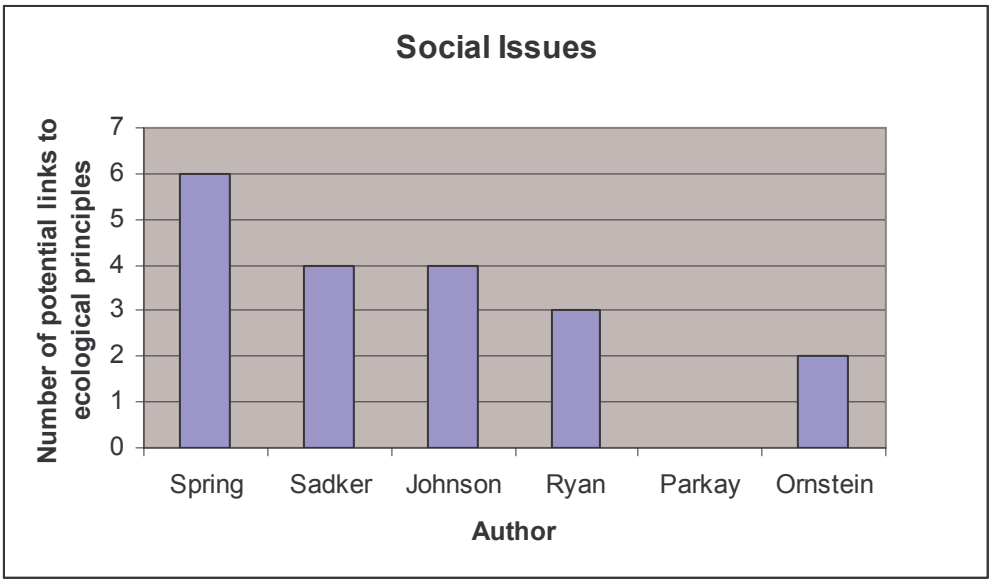
In Spring (2002) there are no recording units that refer to a philosophical view of the universe. Sadker and Sadker (2005) also offered no references to cosmology. An array of cosmological perspectives is offered in Johnson, et al. (2005) as they summarize contributing philosophical understandings. Among the ten represented views of the universe is that of pragmatism which supports the idea of an open universe that is dynamic, evolving and in a state of becoming (p. 320), and that of Buddhism which emphasized a universal state of harmony (p. 326). Judaic thought is referenced as contributing the belief that God created the world and cares for the world and all its creatures (p. 327); Jains believe that the universe has existed from all eternity, undergoing an infinite number of revolutions produced by the power of nature (p. 326). The contribution of Native North Americans comes closest to the ecological principle of holism wherein there is an all-inclusive unity viewed as an orderly system of interrelated elements (p. 329) and for the Lakota, the culture is based on "mystical participation with the environment; all aspects of the ecosystem…are elements of the oneness within which life was undertaken" (p. 329).

Ryan and Cooper (2004) contemporize a cosmological viewpoint and connect it to the needs of twenty-first century students. They say, “As we gingerly enter the new millennium, a relatively new concept of the world as a highly interrelated and interdependent community is emerging; increasingly our students need to be educated in terms of this global interconnectivity” (p. 19). The context for this remark, however, is in terms of social and economic issues of our time and not within the framework of sustainability or environmental concerns. Metaphysical questions are given priority briefly by Parkay and Stanford (2004) as they mention their place at the “heart of educational philosophy” (p. 82). There is no integrated follow-up on this however; the only specific mention of a metaphysical viewpoint is in their representation of Native American children who develop a view of the world that is, “holistic, intimate, and shared” (p. 259). Ornstein et al. (2003) mention five cosmological references, all of which are in respect to historical or philosophic roots of American education. The only one that is at all reflective of the universe as an organism is a statement that Comenius “emphasized that all creatures and objects are part of the whole universe” (p. 133).

Category 2: Social Issues

It is within this second category that I analyze textual markers referring to social issues that affect contemporary education. Across the six texts, there is not one reference to environmental degradation, pollution, or diminishment of biotic species as important or relevant to foundational understanding of future generations of teachers. Instead the texts are dominated by the concerns of social and economic inequality, sexuality, family relationships, violence, terrorism, and health problems. There are some references such as individualism, global interdependence, and loss of native languages that could provide

openings for discussion of ecological principles in relationship to a foundation of education for sustainability yet, there is no conceptual tie made between any of these views and an ecological framework. Findings from the individual texts are reported in order. The following graph represents a comparison of the number of potential links to ecological consciousness within the category of social issues that are reported to affect education.



Spring (2002) mentions 16 social issues in five different chapters that affect the current state of education in the United States. This list includes social and economic inequality, poverty, inequality of educational opportunity, racial issues, desegregation, gender inequality, sexism, special-needs children, issues of inclusion, diversity, immigrants, language diversity, Indian rights, cultural preservation, dominated cultures, and religious issues of school prayer, Bible reading and meditation. Of these, the issues of diversity and cultural preservation have the most significance to sustainability, except diversity in Spring's context only applies to human cultural, racial, and ethnic groups,

and not to the diversity of biotic species. Cultural preservation is described only in terms of an issue of human rights and self-determination and not in relationship to how preservation of indigenous practices can further the cause of ecological consciousness. Sadker and Sadker (2005) add to Spring's list of social issues the growing number of homeless and latchkey children, teen pregnancy, HIV-AIDS, substance abuse, youth suicide, interracial union, stepfamilies, homosexuality, and adolescent relationships. They address the social issue of diversity and the English-only movement by saying, "Americans find themselves locked in a monolingual society" (p. 56). Diversity of other biotic species, and environmental, economic or community instability are not on their lists of social issues to which education might respond.

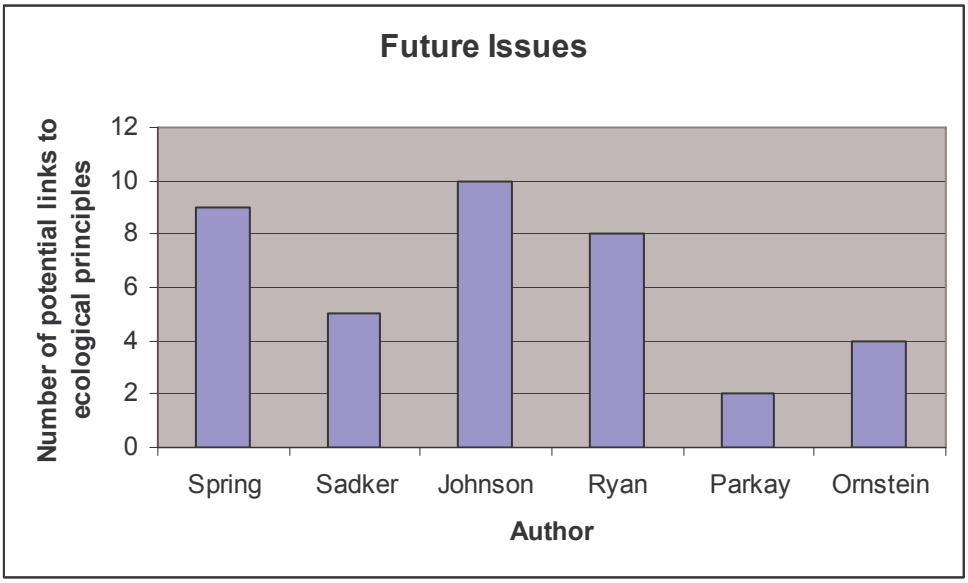
Johnson et al. (2005) add gun violence, social stratification, child abuse, dropping out, and gangs to the above-mentioned issues. They recognize that assimilation of immigrant groups presents a significant social issue that affects education. They make the point that native languages can be lost within a few generations if children are required to learn English at the expense of not practicing the language of their parents. While this can be interpreted as significant to the maintenance of diversity of cultural practices that serve sustainability, the authors make no connection between the issues. Ryan and Cooper (2004) additionally recognize hunger, suffering, international terrorism, nuclear weapons, and a highly interdependent world economy as trends that are not separate from what happens in the classroom. Once again, there is no mention of diminishing animal and plant species, environmental pollution, or loss of community on their list of social issues that are important to consider.

Health problems, lack of discipline, unemployment, poor nutrition, and lack of family structure are added to Parkay and Stanford's (2004) consideration of social ills. A "toxic environment" (p. 131) is described in their text as one involving extreme stress, chronic poverty, crime, lack of adult guidance, gang violence, promiscuous sex, and substance abuse. Ornstein et al. (2003) yet add more issues including: working mothers, hurried children, overindulged children, foster care, increased individualism, overloaded social agencies, influence of the mass media to encourage aggressive or violent behavior, polarization of the African American population, and the collapse of the law enforcement system in urban areas.

Category 3: Future Issues

In this category of recording, references to the author's recognition of issues predicted to influence the American educational system in the years to come are detailed. While there may be some overlap with the list of social issues from category two, *Social Issues*, all references to twenty-first century concerns are included here. Of the six textbooks, two of them provide evidence of an acknowledgment that issues of planetary survival are important to the future of education in the United States. No relationship is drawn, however, from this concern to any of the other recognized social issues or twenty-first century trends to which education must pay attention. Recording units in this category are dominated by future concerns of the global economy, a shift to knowledge-based industries, immigration and equality of access, trends toward a national curriculum, and tracking. References to issues such as planetary survival could provide openings for discussion of ecological principles in relationship to a foundation of education for sustainability yet, there is no conceptual tie made between any of these views and an

ecological framework. Findings from the individual texts will be reported in order. The following graph represents a comparison of the number of potential links to ecological consciousness within the category of cosmology.



In Spring (2002) these issues are scattered about in eleven chapters. Spring portrays the future school as a sorting machine for positions in the global economy (p. 16), and the goals of teacher education determined by the needs of the global labor market (p. 19). Future issues include: socialization of future workers (p. 16), linking of teacher professionalism to the global economy (p. 28), the potential for national teacher licensing and certification to determine the content of teacher-education programs and a strong focus on the teacher as scholar (p. 37). Also included are: an economic shift to emphasize knowledge-based industries (p. 32); increased competition for funds for public education; continued challenge to provide equal educational opportunities for all children; diversity in the classroom, adequate English instruction (p. 107); making sure girls are prepared equally with boys for twenty-first century jobs (p. 119); increase in number of students from minority groups (p. 130); increase in the variety of immigrant languages (p.

134); preservation of culture of immigrants, Native American, and Mexican-American students (p. 152); home schooling, vouchers and school choice (pp. 187-196); in-school marketing and commercialization (p. 196); accountability and high-stakes testing (pp. 203-205); the role of private foundations in nationalizing educational policies and practices (p. 217); question of limits to the involvement of politics in public schooling (p. 219); questions of who decides what knowledge is of most worth in terms of textbooks, curriculum, and e-learning (pp. 228-235); religious practices in schools (pp. 261-264); government aid to private schools (pp. 266-267); questions of the continuing role of the courts in public education (pp. 256-289); and the issue of the rights of teachers to decisions of conscience and freedom of speech (pp. 273-277). Spring summarized much of this list with the comment that "twenty-first century curriculum could be called humanistic social efficiency, in which meaning and content of a humanistic curriculum is determined by economic needs" (p. 243). He does acknowledge the importance of a central cultural conflict – the continuing rift between those who want to "maintain the supremacy of English and European traditions, and dominated cultures whose members want to protect and maintain their cultural traditions" (p. 172). While this last point could be indicative of an ecological awareness, there is no connection made between the preservation of language and culture and the future concerns that need to be addressed toward the goal of sustainability.

This list of issues referenced by Spring (2002) are reiterated in other texts. Although Sadker and Sadker (2005) include a statement by other theorists (Ovando & Collier, 1998) indicating the vision of "a society built on the strengths of its diverse population" (p. 58), their predictions for schools are in keeping with the economic needs

of a postindustrial society. Future needs include a workforce trained in higher-order thinking skills, universal values, global understanding, excellence in all things, and service to humanity (p. 337). In addition to the issues mentioned by Spring (2002), Sadker and Sadker (2005) reference tracking as "the most professionally divisive issue in the field" (p. 174). They list seven reasons why standardized tests are not working – at risk students placed at greater risk, lower graduation rates, higher test scores being interpreted as more learning, standardized testing shrinking the curriculum, greater teacher stress when tests fail, and failure to address the question, "What is worth knowing?" (pp. 245-249). A growing influence of technology is also seen as a factor with which schools have to deal (p. 504), as well as the prediction that two million teachers will be needed over the next decade (p. 250). These teachers will be expected to deal with the underserved exceptional learners, increasing numbers of students whose native language is other than English (p. 34), and the prediction that by 2012 residents of the western United States will become the minority majority, with "no single racial or ethnic group having a majority" (p. 43). Sadker and Sadker make no mention of environmental issues, ecological concern, or sustainability as future issues that may have an impact on what happens in the classroom, or on educational decisions made at any level.

Johnson et al. (2005) highlight the challenge of twenty-first century education to prepare all students for world-class competition, especially the need for proficiency in the competitor's language and culture (p.58). In addition to the issues Spring (2002) mentions, i.e. increase of disabled student population, increasing religious pluralism, information technology, school choice, local politics, national exams and a national curriculum, and diversity in the workplace, Johnson et al. (2005) also include in their lists

the growing expectation of data-driven results and the transformation of schools from single-purpose to full-service centers (pp. 470-471). They foresee an increase in the implementation of character education (pp. 471-472) and see the world as unfinished, the future as open-ended, and the potential for teachers to make a difference as significant (p. 314). There is some recognition that an increased awareness of global interdependence, and the resultant enmeshing of different thinking schemes, shifts the emphasis from Western-style, categorical thinking, to the consideration of different categories of thought (p. 356). Johnson et al. state that one of the biggest challenges of twenty-first century teachers is to "respond to societal change intelligently" (p. 467), and this includes focusing on "how to live and protect our world," consideration of "what values will enhance all people's lives," and "what ecological issues and practices must [be adopted] if the planet is to survive" (pp. 466-467). This last recording unit is the only reference to concern for the future of the planet and the requirements of a sustainable existence.

As quoted in the category of cosmology, Ryan and Cooper (2004) favor educating students in terms of increasing global connectivity (p. 19). They repeat a list of future concerns similar to what we have heard from the other authors with additional issues of lack of parental involvement, and inadequate instructional technology. They pose the question, "Is the existing curriculum relevant to today's society?" (p. 137) and then continue with a concern:

> The twentieth century saw great advances in manufacturing, agriculture, technology, and the growth of information. However these advances have not been without costs. Acid rain, for example, polluted our vegetation, wildlife, and the very bodies of millions of people. Together, we and the rest of the world need

to stop the systematic despoiling of our planet. (p. 137)

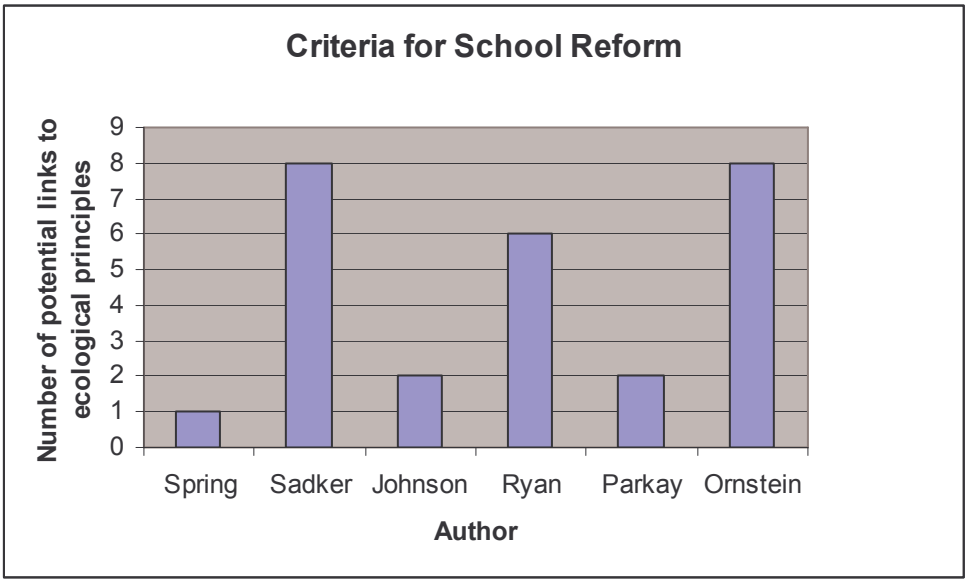
The issue of global survival is brought to our attention here as an endnote to a chapter on educational content that once again posits the question, "What knowledge is most worth knowing?" (p. 107), this time as an introductory sentence to the chapter. Their reference to "despoiling the planet" (p. 137) is the only place in the text that Ryan and Cooper suggest that we may be on a collision course with technology and progress in our path toward survival.

Parkay and Stanford (2004) add the issues of war, economic depression, international terrorism, hunger, and inflation to the growing list of registered concerns for education in the future (p. 88). Ornstein et al. (2003) focus heavily on the challenges of multiculturalism (p. 192) and the need for education to become effective with respect to higher order thinking skills among all segments of the population (p. 520), especially among disadvantaged students. Trends for the future include: lifelong learning, health education and fitness, and immigrant education (pp. 450-452). In neither of these texts is there an expressed concern for environmental sustainability or the development of ecological consciousness within the twenty-first century.

Category 4: Criteria for Reform of Schools

None of the textbooks contain any references to ecological consciousness or sustainability as criteria that are relevant to school reform or restructuring. Issues that are considered in the listing of criteria for the reform of schools involve many references to the needs of the American labor pool in order to remain competitive in the global marketplace as well as: multiculturalism and equal opportunity, technology, organizational restructuring, and national standards. References to issues such as small

schools and class size, community-based decision making, and preparation for science-based issues such as environmental pollution and energy sources could provide openings for discussion of ecological principles in relationship to a foundation of education for sustainability yet, there is no conceptual tie made between any of these views and an ecological framework of teacher education. Findings from the individual texts will be reported in order. The following graph represents a comparison of the number of potential openings to a discussion of ecological consciousness within the category of criteria for school reform.



Spring (2002) offers the additional transformation of classroom instruction through what he calls “e-learning” (p. 244) and anticipates continued technological reform despite difficulties of teacher training, cost, questions of worth, censorship, and the increased arena for profit-based corporations (pp. 245-246). Sadker and Sadker (2005) suggest that multicultural issues should forefront the reform movement and focus on equal opportunity (p. 49). They also include the reform criteria of making the schools more student-and teacher-centered (p. 149); enhancing the social and affective side of

school to make it more explicit (p. 185); provide alternatives to high-stakes testing (p. 254); increased cultural pluralism in books and instructional materials (p. 267); and creation of more intimate and goal-oriented environments (p. 520).

In Johnson et al. (2005) goals of school reform involve stricter rules and more effective discipline, provision of more teachers, smaller class size, more parent involvement, and better teacher preparation (p. 8). Past models of school reform have been organized around the expressed interest of raising student test scores and have included accelerated schools and teaching for multiple intelligences (pp. 445-449). Ryan and Cooper (2004) mention three goals of school reform: developing a democratic citizen, developing a good worker, and developing the good person (p. 365). Other references to reform initiatives include: better linking of subject matter to the real world (p. 343); identification of essential learnings; development of plans for technology use; integration of multicultural education; revolutionizing the way education is organized; responding to pressure for global competition; focusing on lifelong learning; attention to national standards; more academic learning time; standards-based education; higher expectations for teachers; assessment accountability; and national voluntary networks (pp. 380-389). In one recording unit Ryan and Cooper lay out two questions that drive science education reform: “Where will the next generation of scientists come from?” and “How can all students be prepared to make informed judgments about such critical and science-based issues as environmental pollution, energy sources, and biotechnology?” (p. 115). Clearly, the authors here are delegating environmental issues to the duty of the science educators. In another sentence they refer to *the arts* as an “endangered species” (p. 118). It is

interesting to note that their use of the word *endangered* does not apply to natural systems or biotic species.

Parkay and Stanford (2004) also report reform criteria based on the 1983 report *A Nation at Risk*. These include increased academic performance, expanded roles for schools, and state standards boards (p. 47). They refer to restructuring as a way to enhance a school's professional community and increase student learning through shared governance, interdependent work teams, staff development around technological skills, deregulation for autonomy, small school size, and more parent involvement (p. 167). While some of these goals of restructuring, such as shared governance and small school size, may facilitate ecological consciousness, the authors make no connection to this as a goal.

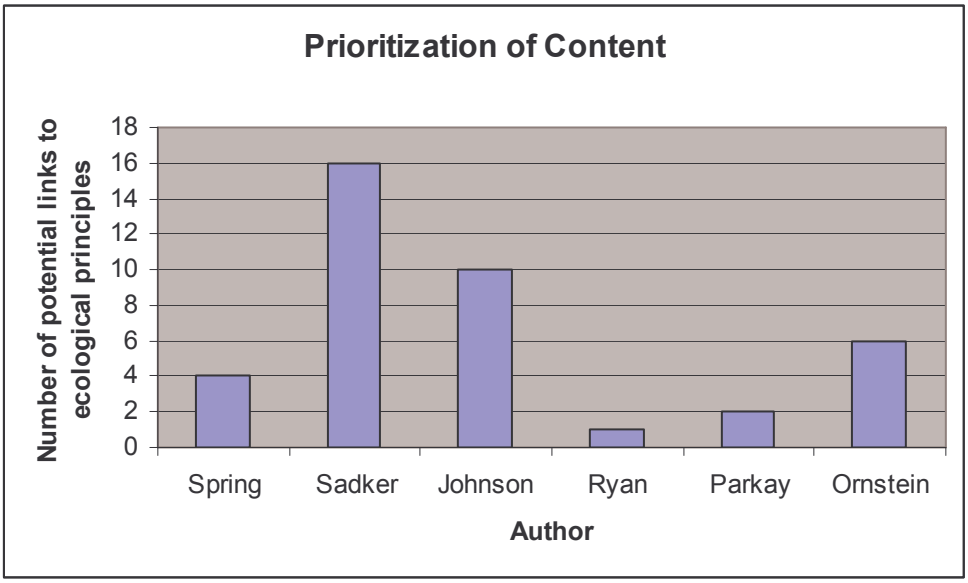
Ornstein et al. (2003) offer a variety of reasons and goals of school reform that range from modernization of older buildings (p. 246) to management issues of greater teacher empowerment (p. 24) to classroom issues of individualized instruction, cooperative learning (p. 394), classroom management and questioning skills (p. 491), adaptive problem solving, and an increased emphasis on teaching skills that are needed for the nation's international economic competitiveness (pp. 494-496). In reference to reform of the physical structure of schools there is one recording unit that includes streamlining budgets through "energy economics" (p. 246). While the authors summarize the critical theorists' desires for schools to be democratic public spheres where young people become conscious of the need to create a more equitable society for all, there is no relationship made between basing reform on democratic principles, on the one hand, and systems theory or the goal of educating for sustainability, on the other.

Category 5: Prioritization of Content

Content, as is described in the ecological principles developed in chapter 2, that is reflective of an ecological consciousness would include an authentic relationship to local, personal, and cultural issues and interests; references to relationships concerning humans and other living beings; practical skills necessary for regenerating human and natural environments; occupational alternatives that contribute to the preservation of local cultures and the natural environment; a recognition of the unexamined assumptions, beliefs, and values inherent in instructional materials, and a focus on responsibility and agency. References to these themes will be noted in this section of the analysis.

Not one of the six textbooks makes any explicit reference to ecological principles or sustainable practices as content. Among the six texts there is one reference to the advantages of acknowledging and building on the life histories and experiences of micro-cultural memberships; there is one reference to the value of understanding our roots and one to the value of cultural self-awareness; there are two references to the importance of critically understanding the political nature of knowledge and exposing the methods of cultural domination; and there are two references to including the preparation of students for involvement in democratic social action. While these content areas are relevant to the development of ecological consciousness and could provide potential links to education for sustainability, there is no deliberate attempt on the part of any of the authors to make this connection. Recording units in the content category are dominated by references to culturally relevant teaching, alignment with standards, discipline-based curricula, basic skills, and values. The following graph represents a comparison of the number of

potential links to a discussion of ecological consciousness within the category of criteria for school reform.



Spring (2002) provides evidence for a critical-theory focus delineating the political nature of knowledge and exposing methods of cultural domination (p. 158). Content that is representative of twenty-first century priorities focuses on academic skills to fulfill the needs of the global economy (p. 242). The meaning and content of a humanistic social efficiency curriculum is determined by economic needs (p. 243). Sadker and Sadker (2005) state that by the second Bush administration the curriculum "had become a state-regulated and tested vehicle to ensure that a fixed body of skills and knowledge were acquired by all students" (p. 218). Subjects taught in the formal curriculum include [in order of their appearance] language arts and English, social studies, mathematics, science, foreign languages, the arts, physical education, health, career technical education (pp. 218-226). Science instruction is referred to as often relying on rote memorization and including animal and plant studies, astronomy, weather, light, heat,

sound, earth science, life science, physical science, biology, chemistry, physics (p. 222). Sadker and Sadker warn educators of the need to avoid a curriculum "out of touch with the reality of today's students and thoughtlessly programmed for adolescence" (p. 230). The current reality they highlight is the "debate over curricula for various ethnic groups versus a common, Eurocentric core" (p. 230). The curriculum they question as perhaps extinct is the "ancient history of the Romans and Greeks" (p. 230). They attribute two trends that are pushing schools toward a common curriculum: "the indomitable textbook and the recent emphasis on state standards and testing" (p. 235). The curriculum is additionally controlled and shaped by teachers, parental or community groups, students, administrators, state government, local government, colleges and universities, standardized tests, education commissions and committees, professional organizations, special interest groups, publishers, and the federal government (pp. 237-239). In response to a world "marked by hatred and misunderstanding, cultural and religious warfare, massive poverty, physical deprivation, and interpersonal conflicts" (p. 252) they offer a sample of an alternative meaningful curriculum based on understanding our roots, celebrating others, encouraging individual talents and contributions, and promoting purposeful lives (p. 252). They also suggest that the practices and beliefs of cultures outside the United States may offer useful insights for enhancing and questioning our educational practices, but note that they are too rarely considered (p. 348). Some of the practices they offer for consideration are: learning for knowledge and mastery rather than documentation; learning adult roles through observation, conversation, assisting and imitating, while absorbing moral, intellectual and vocational lessons (p. 347). In addition, they mention the oral traditions as offering a model for spoken language as a primary

mode of instruction in which word problems teach reasoning skills; proverbs teach wisdom; and stories, anecdotes, and rhymes teach lessons about nature, history, religion, and social customs (p. 348). While studying practices and traditions outside of the Western dominant culture may have much to contribute to content oriented toward sustainability, the authors of this text do not make this connection.

For Johnson et al. (2005) the priorities for content focus on culturally relevant education that places the student at the center of the teaching and learning process. The authors' stance includes promoting human rights and respect for cultural differences; believing that all students can learn; acknowledging and building on the life histories and experiences of micro-cultural memberships; critically analyzing oppression and power relationships; critique of society in the interest of social justice and equality; and participation in collective social action toward a goal of a democratic society (p. 113). In culturally-relevant teaching students learn to apply knowledge and skills to local, regional, or global issues, making the learning authentic as it relates to the student's world (p. 133). No linkage is made to issues of sustainable communities, sustainable economic practices, or sustainable environmental practices as being culturally relevant.

The standards movement, according to Johnson et al. (2005), influences content priorities in favor of high student achievement, an increased demand for accountability from policymakers and the public, an emphasis on authentic assessment of learning, and a systemic approach to the entire teaching and learning process (p. 389). The conception of standards varies across three categories – world-class standards based on the performance of outstanding individuals, real-world standards placing emphasis on the necessary knowledge and skills that will make students employable, and discipline-based

or content standards which emphasize the core components or big ideas of the discipline that should be known at a certain age or grade level (pp. 390-391). Despite the large number of references to content and prioritization of subject matter from different perspectives, Johnson et al. (2005) make no mention of ecological issues, environmental concerns, or sustainability as criteria for content standards.

In a review of the courses of study prescribed by fifty states, Ryan and Cooper (2004) note that at both the elementary and secondary levels the curriculum is organized into subject matter areas of: language arts and English, mathematics, science, social studies, foreign languages, fine arts, physical education and recreation, vocational education, and electives (p. 111). They tell us that today's teachers are more likely to choose literature that is relevant to student interests, and that balances literary traditions and cultural groups in their choices. In addition, language arts students are today more likely to be instructed in critical thinking and find their lessons linked to other content areas (p. 113). Mathematical reasoning and multiple approaches to problem solving rather than the teacher's authority and the textbook are being urged (p. 114). Course designers have begun to integrate a variety of mathematical skills across several courses. Science education is shifting toward helping students develop a cogent view of the world by including concepts such as "the structure and evolution of the universe; basic concepts related to matter, energy, force, and motion; the human life cycle; medical techniques; social change and conflict; and the mathematics of symbols" (p. 116). Leaders in the field of foreign language instruction emphasize cultural foundations of language and proficiency-oriented instruction. Vocational education remains under pressure to prepare workers for the changing workplace. Some educators and labor officials call for more

applied learning experiences for all students (p. 121). In order to remain competitive on international tests such as the Third International Mathematics and Science Study (TIMMS) (1995), the authors recommend clear, high expectations and standards in math and science, and aligning "everything else we do to those standards: initial preparation of teachers, selection of texts and other curriculum materials, design of assessments, and the continuing professional development of teachers" (p. 124). Despite their previous reference to their perceived need for reform of the science curriculum, Ryan and Cooper's content priorities for a "cogent view of the world" (p. 116) do not include any references to ecological priorities, environmental issues, or sustainability.

Parkay and Stanford (2004) relay that the public believes that the basics of reading, writing, and mathematics, plus the development of good work habits should be the heart of the curriculum and that additional support for these goals come from college professors and employers (p. 348). Values that affect curriculum planning include prevailing educational theories, teachers' educational philosophies, social issues, and changing values in the wider society. In addition, school curricula should meet the standard of being personally relevant, interesting, and meaningful (p. 359).

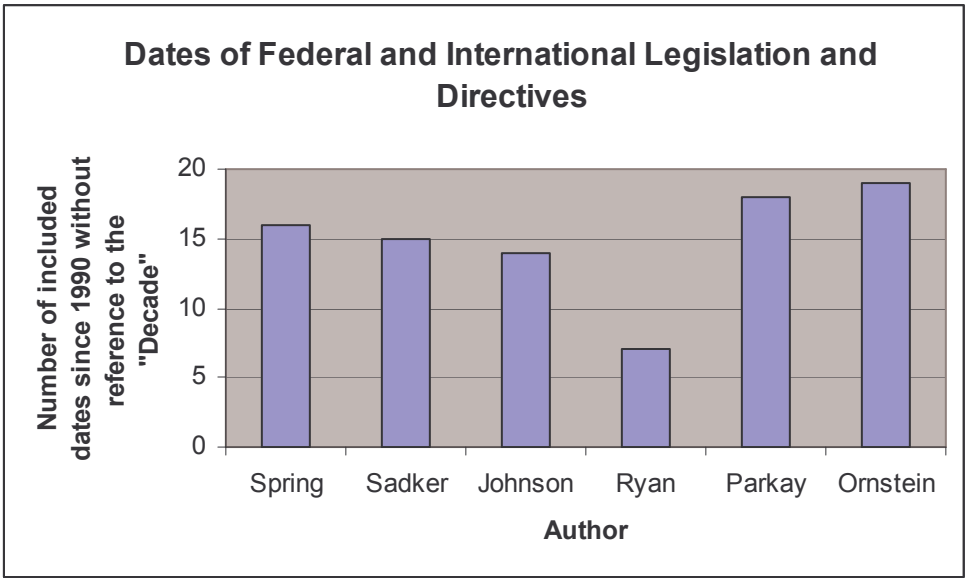
Ornstein et al. (2003) references many different perspectives on what content should be delivered. One point made is that many scholars believe that bilingual education should be provided for all students. They relate bilingualism to "economic advantages" (p. 385) in international markets both for individuals and for the nation. Expressing that recent attention has been given to ensuring that curricula are not overwhelmingly Eurocentric, Ornstein et al. mention that components for building multicultural understanding are emphasized which include: human-relations skills,

cultural self-awareness, multicultural awareness, and cross-cultural experiences (p. 386). New core-curriculum advocates suggest that 80 percent of the curriculum be designed around the areas of: humanities, communication and language skills, science, math, and technology (p. 429). Other curricular models are offered including: subject-centered (of which the core curriculum is an example); student-centered (including activity-centered and humanistic approaches, alternative or free-school approaches, relevant-curriculum, and values-centered curriculum) (pp. 424-436).

Category 6: Inclusion of Historical Dates and Federal and International Legislation and Directives

In chapter 1 of this study, a summary of international directives that have specifically targeted higher education for its increasing responsibility to promote ecological consciousness was presented. Since 1990 this list includes at least seven major international platforms. After the Johannesburg Summit (World Summit on Sustainable Development) in May of 2003, education for sustainability became a watchword on the agendas of all modalities of education. The United Nations General Assembly at its 57th session adopted the prospect of a decade of education for sustainable development, starting in 2005. If the sample authors in this study were holding sustainability as a priority, references to these major initiatives would be included. In fact, none of the authors include any court cases, events, statements by national organizations, or federal or international directives that relate education to ecology, the environment, or sustainability. All references to federal and international mandates written as policy or recommendations, as well as all court decisions affecting public education (regardless of their alignment with ecological or environmental issues) have been listed as recording

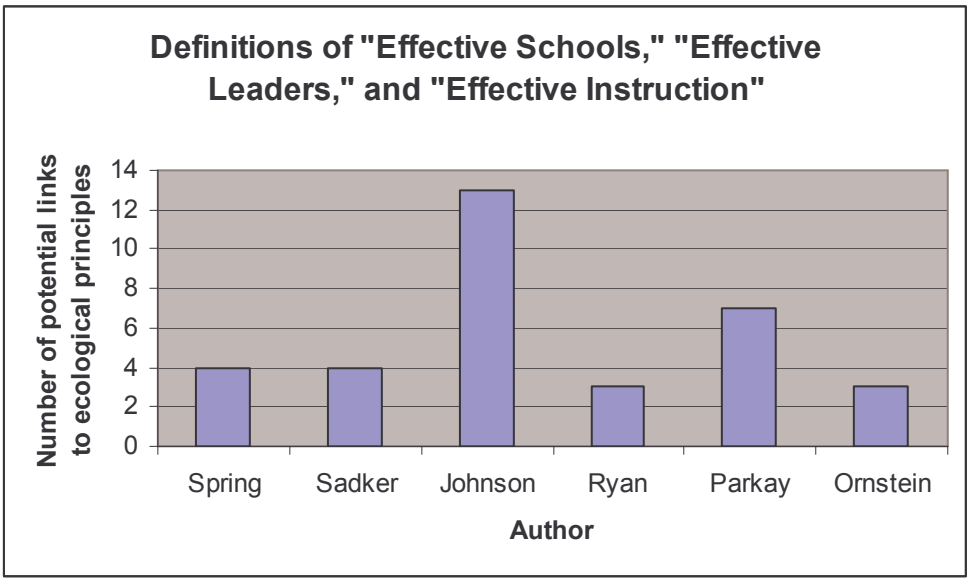
units in this category. A summary of such included dates is listed here with frequency given in terms of numbers since 1990. Spring (2002) includes 16 dates since 1990; Sadker and Sadker (2005) referenced 15 since 1990; Johnson et al. (2005) highlights 14 since 1990; Ryan and Cooper (2004) include 7 since 1990; Parkay and Stanford (2004) reference 18 dates since 1990; and Ornstein et al. (2003) tells us of 19 events, cases and directives since 1990. Not one of these relates to education and sustainability in either a national or international context. The chart, in this case, represents the number of dates since 1990 included by the author *without mention* of UNESCO's Decade of Education for Sustainable Development or any other initiative that links education to sustainability.



Category 7: Definitions of "Effective Schools," "Effective Leaders," and "Effective Instruction"

There are no references in any of the texts to environmental, ecological, or community sustainability in the discussion of effective schools, effective leaders, or effective instruction. Johnson et al. (2005) include the understanding of the influence of culture, language, and socioeconomic conditions on learning; the ability to foster

relationships with school colleagues, parents, and agencies in the larger community; the validation of the cultures of students and communities; and the ability to challenge the philosophy and practices of the dominant society. While these criteria would also work toward promoting ecological consciousness and could provide potential links to education for sustainability, there is no deliberate attempt on the part of any of the authors to make this connection. Instead, effectiveness is described in terms of efficiency, subject-matter knowledge, instructional skills, high expectations, a safe and orderly environment, reflection, facility with technology, collegiality, and an understanding of the cultural backgrounds of students. The following graph represents a comparison across textbooks of the number of potential links to a discussion of ecological consciousness within the category of criteria for school reform.



Spring (2002) lists ten characteristics of accomplished teaching: commitment to students and learning; knowledge of the subject and links to other disciplines; managing and monitoring student learning; ability to create, enrich, maintain and alter instructional settings; ability to capture the interest of students; ability to make effective use of time;

ability to think systematically about their practice; ability to learn from experience, appreciation of cultural differences; and the ability to model curiosity, tolerance, honesty, fairness, and respect for diversity (p. 33). Also included are the teacher's ability to convey knowledge to students, the ability to prepare students to pass standardized tests, and preparation and planning of curriculum. Sadker and Sadker (2005) reference reports by classroom teachers that say that schools should focus more on control and discipline (p. 19). These authors also state that effective teaching requires the following competencies: knowledge of the subject, instructional skills, high expectations of learners, being well-versed in theories of child development, pragmatic issues of running a classroom, responsiveness to cultural norms, effective questioning, ability to keep the momentum going, ability to manage student anger and aggression, attentiveness to wait time, provision of specific, productive feedback, offers variety in content and process, strong leadership, clear academic focus, and appropriate use of models of instruction (pp. 19-152). Effective schools are defined as those that enhance both psychological well-being and academic success. Achievement of students of color and of poverty is also considered evidence of effective schools, as well as strong leadership, a clear school mission, a safe and orderly climate, monitoring of student progress, and high expectations (pp. 187-193).

Johnson et al. (2005) reiterate many of the same markers for effectiveness. In terms of successful teachers they list the criteria of knowledge of subjects, understanding of discipline, ability to relate a concept or skill to the experiences of students, reflection, ability to draw on one's knowledge base for examples and presentations, understanding of the influence of culture, language, and socioeconomic conditions on learning,

classroom management, motivation of students, development of lesson plans and ability to assess learning (pp. 4-16). An effective teacher also is able to foster relationships with school colleagues, parents, and agencies in the larger community. Advantageous dispositions include enthusiasm for the discipline, commitment to continuous learning, belief that all children can learn at high levels, and valuing of many modes of communication (pp. 21-23). Culturally relevant teaching validates the cultures of students and communities. Teachers who think critically are "able to challenge the philosophy and practices of the dominant society that are not supportive of equity, democracy, and social justice" (p. 131). Culturally relevant teaching helps students deal with social problems in their lives outside of school. Effective teachers are also now expected to monitor student interactions around culture and gender, employ structured, carefully delineated lessons, check prerequisite skills before introducing new concepts, and use prompts and cues to assist students in acquisition. Teachers also have a major responsibility to seeing that all forms of technology are used for enhancing teaching and learning (p. 449).

Ryan and Cooper (2004) present a similar list of characteristics of effective teachers: high expectations, high degree of colleagueship, serious attitude, academic engaged time, classroom order, parent involvement, and ability to construct an environment conducive to learning (pp. 28-30). Teachers need to differentiate instruction to address academic diversity (p. 46) and must have both theoretical knowledge about learning and human behavior and specific knowledge about subject matter (p. 143). Effective principals serve as instructional leaders and promote a productive working and learning environment. In order to be effective they must understand the mission of the

school, must be able to communicate it to staff and students and reward excellent performance (p. 339).

In addition to the repetitious attributes of effective teachers, Parkay and Stanford (2004) include the need for a teacher to be concerned with developing himself or herself as a person. They should develop their powers of observation and reflection and demonstrate competence in planning, management of student conduct, instructional organization and development, presentation of subject matter, verbal and nonverbal communication, and testing (p. 43). A job-analysis approach presents thirteen dimensions for successful teachers of low-income urban students: persistence, protecting learners and learning, application of generalizations, approach to students at risk, professional v. personal orientation to students, burnout causes and cures, fallibility, organizational ability, physical/emotional stamina, teaching style, explanation of success, rapport with students, and readiness to believe in students (p. 44). School effectiveness is represented in terms of strong leadership, high expectations, emphasis on basic skills, orderly school environment, frequent evaluation of student learning, sense of purpose, collegiality and a sense of community, focus on student learning, emphasis on authentic pedagogy, school organizational capacity and external support (p. 130).

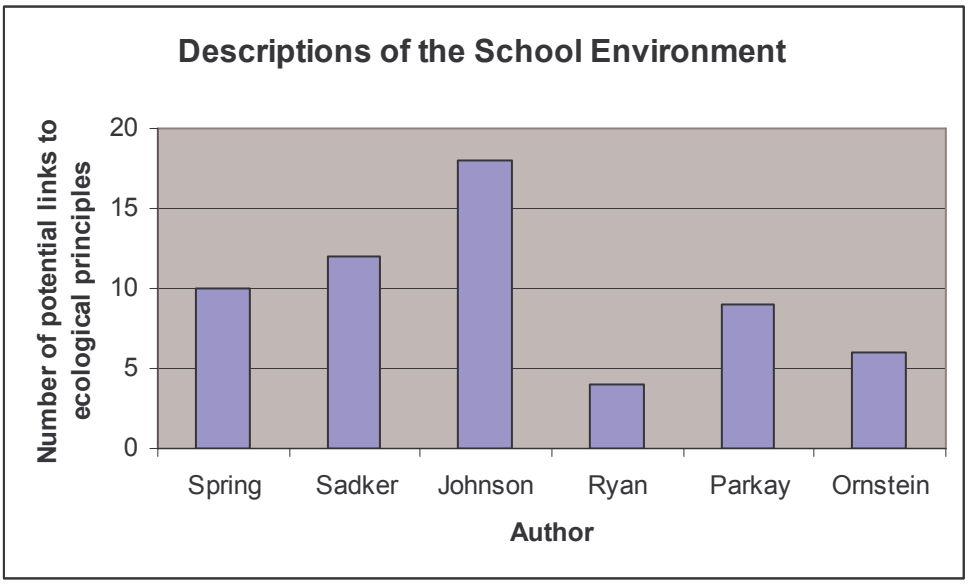
For Ornstein et al. (2003) much of the effective schools movement is based on the way essentialists define effectiveness. School effectiveness is also related to a community's reputation, the value of property, and the willingness of businesses to locate nearby (p. 204). Effective delivery of instruction includes: making sure the student knows what the teacher expects; letting students know how to obtain help; following through with reminders and rewards to enforce rules; providing a smooth transition between

activities; giving students assignments of sufficient variety to maintain interest; monitoring the class for signs of confusion and inattention; avoiding embarrassment; responding flexibly to unexpected developments; designing tasks that draw on student's prior knowledge; helping students develop self-management skills; ensure that all students are part of a classroom learning community; maintaining high student time on task; and asking appropriate questions (pp. 489-491).

Category 8: Descriptions of the School Environment

School environments that foster ecological consciousness are marked by an awareness of the relationships between the learning environment inside the school and classroom and the surrounding landscape, neighborhood, flora, and fauna. Lessons built around the student's interconnection to his/her place of habitation on the planet are considered reflective of an ecological awareness. Descriptions of the school environment in these relational terms will be seen as providing evidence of ecological principles. Few references were made in any of the textbooks to a relationship between the learning environment of the classroom and the surrounding outdoor environment. In two instances the authors referred to the relationship of the school with the social environment of the locale, i.e. urban, suburban, or rural, or the potential for the surrounding community and the history of the school to influence the development of school culture and lasting traditions that are transferred from generation to generation. There are also a few references to the practices of democratic principles including validation of diverse cultures, participation of students in rule-building, and maintaining an open-ended attitude around results of student work. Systems theory is applied in one case to the classroom and the interrelated aspects of that environment. None of the authors relates

these environmental aspects to the goal of ecological consciousness or sustainability. The following chart compares the number of potential openings for discussion of ecological consciousness within the category of the school environment across the six textbooks.



Spring (2002) keeps within the walls of the school in his descriptions of school culture and writes of the lack of change in methods of instruction during the twentieth century (p. 246). He attributes this to the goal of schools to instill behaviors required by the prevailing economic system which call for teaching practices of uniformity, authority, and bureaucracy. Teachers are still expected to maintain control, use a textbook, and teach from a prescribed curriculum. Class size and structure inhibit the integration of student-centered instruction. In addition, the climate has not undergone significant change due to the socialization of teachers to be conservative and resistant to change (pp. 248-249). Extending discussions beyond the walls of the classroom is facilitated through the use of e-learning which provides unlimited access to the world's knowledge (p. 245). Spring references critical theory for its emphasis on the use of generative words and

reflection to help participants break with their culture of silence, expel oppressive forces from their consciousness and transform the person's future action (p. 252).

Sadker and Sadker (2005) also limit their discussion of school environments to the culture inside the school walls. They reference the forces (including the actions of teachers) on social relationships among students, the variation of the efficiency with which schools use time, and the requirement of creating a safe environment that is conducive to learning (pp. 167-189). Sadker and Sadker also include discussion on how the classroom environment changes depending on the philosophical framework of the school or teacher. Jane Roland Martin's idea of a schoolhome that mirrors the domestic environment of "safety, security, nurturance, and love" (p. 338) is included. Classrooms that explore ethical issues are reflective of respect, sharing of diverse opinions, and participation of students in rule formulations (p. 421).

Johnson et al. (2005) address student diversity in classroom environments in the United States. Assimilation and acculturation dominate the strategies used to deal with this diversity (p. 48). These authors make some reference to the affect of the surrounding community in their description of school culture. Elements of the school culture may be influenced by: the social structure of the community, whether the school is located in a rural, urban, or suburban area, the religion of the children's families, or the presence of military establishments or large businesses (p. 119). Regional interests may influence the sports activities that are fueled through school spirit. Schools with long histories have developed lasting traditions that are transferred from generation to generation (p. 119). Johnson et al. reference the informal curriculum as an environmental aspect that defines the behaviors and attitudes expected of both students and teachers and may promote the

cultural values and patterns of the dominant group (p. 120). Teachers have a role in the validation of diverse cultures; in a democratic classroom all participants have voice and teachers do not dominate the dialogue. In culturally relevant teaching respect for difference is the key (pp. 121-124). Johnson et al. pay more attention to the aspects of the physical environment of schools. They state, "To an amazing extent schools are organized in the same way in each state" (p. 143). This design is frequently criticized for resembling an egg crate and tends to promotes isolation (p. 144). Suggestions are offered for arranging the physical environment to match the teacher's educational philosophy and understanding of where power should lie. A successful learning climate is described as one in which students have time to explore topics of personal interest and participate in activities that matter and that teachers are passionate about their work and encourage different forms of expression. Also, in this climate "students sense that the results of their work are not predetermined" (p. 374). In a reflective learning environment, the student becomes partners with the teacher in his or her vision, in planning, and in creation of the learning environment (p. 379). This sense of partnership and an open attitude to outcomes is reflective of the process of emergentism and speculation spoken of in chapter 2 of this study.

Ryan and Cooper (2004) relate environments that are calm, safe, pleasant and orderly as being conducive to learning (p. 30). They credit the environment with promoting informal learning and note that teachers influence students ethically by creating an environment of safety and trust and establish an ethical dialogue in which core ethical values are discussed (p. 221).

Parkay and Stanford (2004) reference schools as being reflective of their location and environment: urban schools reflect the social problems of the surrounding area; rural schools are often the focal point for community life and reflect values and beliefs that tend to be more conservative (p. 125). The physical environment of the school both reflects and helps create the school's overall culture (p. 127). Parkay and Stanford recognize the relationship between the environment of the classroom and the inhabitants of that environment. Each aspect of the system that is defined as the classroom affects all others. They say that "[t]eachers who appreciate the importance of these salient elements of classroom culture [use of space, materials, resources, norms, rules, expectations, cohesiveness, and distribution of power and influence] are more likely to create environments that they and their students find satisfying and growth-promoting" (p. 128). A socially toxic environment is described in terms of one wherein extreme stress, chronic poverty, crime, lack of adult guidance, gang violence, promiscuous sex, and substance abuse exist. Schools are influenced by several out of school factors that are referred to by sociologists as "environmental press" (p. 160). These factors include political agendas of parents, students, taxpayers, minorities, teachers, and federal and state agents. This text also gives suggestions for how to create an effective learning environment in the classroom and relates models of teaching to descriptions of learning environments.

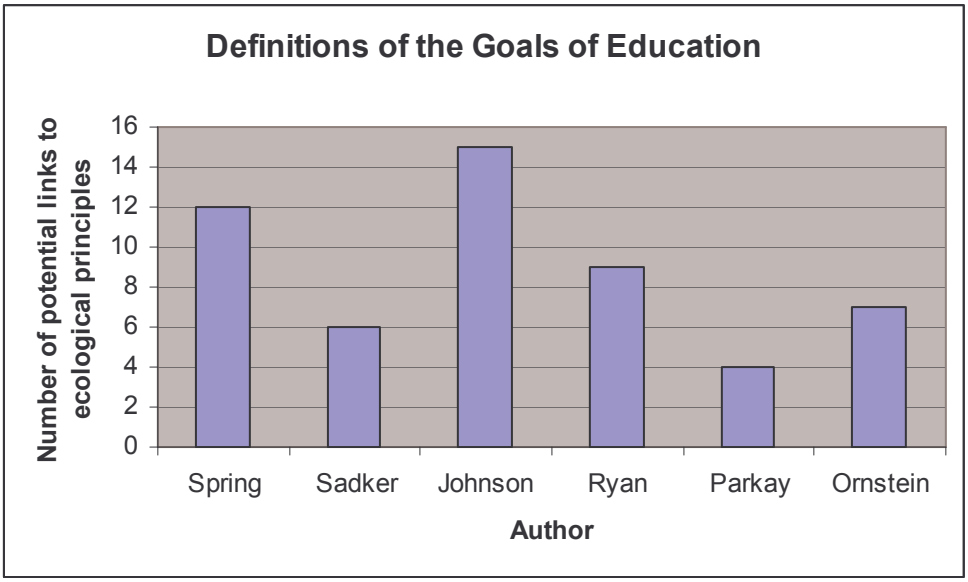
Ornstein et al. (2003) address the different learning environments associated with different philosophical expressions. Pragmatism is associated with an interaction between the learner and the environment (p. 105); perennialists use the classroom to promote intellectual growth (p. 121); Dewey emphasized activities through which children would interact with their environment (p. 147); and Addams fostered social relationships toward

a true democratic community. She wanted schools to include the history, customs, songs, crafts, and stories of various ethnic and racial groups in the curriculum and believed in reducing the separation of schools from society. She worked to make technology relevant to social purposes (p. 150). Other theorists are associated with environmental aspects of school. Piaget saw the environment as stimulating and interactive; and Montessori fashioned a specially prepared environment of methods, materials, and activities (pp. 151-152). Ornstein et al. also look at the student's home environment and its effect on educational performance. The home environment is reflected in the student's knowledge and understanding, cognitive and verbal skills, and values and attitudes (p. 340). The environmental disadvantage theory relates working-class home environments as being less conducive to intellectual development in many cases (p. 341) and that "as a society we should use more of our resources to address early environmental problems and disadvantages" (p. 342). An environmentalist view of intelligence emphasizes the need for compensatory programs on a continual basis beginning in infancy to promote IQ in developing children (p. 343). International studies demonstrate that the family and home environment of low-income students in other countries generate the same kinds of educational disadvantages as in the United States (p. 460).

Category 9: Definitions of the Goals of Education

If one were to draw together various goals scattered throughout the six texts into a list of those that are more geared toward sustainability, the list would include: saving the environment, teaching the importance of community, increasing the survival chances of the human community, preservation of culture, protecting linguistic rights, understanding how to live with nature, developing an attitude that shows respect for nature and a desire

for its preservation, teaching people to understand the economic and political forces determining the structure of society, and preparing students to work for social change. These are all goals that are relevant to sustainability and ecological consciousness. While they appear in places within the textbooks analyzed, no relationship is made either among them or to ecological consciousness. The concepts are referenced either in terms of Native American traditions and contributions or in terms of just one more goal among a "staggering list" (Spring, 2004, p. 4) of goals that education could address. The inclusion of these goals does provide openings through which a discussion of ecological consciousness could ensue. They are charted comparatively here.



What is referenced instead of purposes that are directly linked to ecological principles are predominantly goals of: active democratic citizenship, socialization, economic equity, preparation for participation in the global economy, reducing prejudice, development of workers for a knowledge society, career success, intellectual rationality, equal opportunity, and self-realization. All references to stated goals and purposes were

recorded without regard to their alignment with ecological principles or goals of sustainability.

Spring (2002) refers to a "staggering list of public school goals that includes…saving the environment" (p. 4). He goes on to identify potential goals as: exemplifying democratic leadership (p. 6), training good citizens (p. 7), socialization and obedience to the rules of government (p. 8), teaching patriotism (p. 9), teaching the importance of community (p. 9), instilling internal values (p. 10), planning for social improvement (p. 12), promoting economic equity (p. 12), teaching moral values (p. 14), increasing national wealth (p. 16), socializing future workers (p. 16), preparation for participation in the global economy (p. 17), promoting the development of human capital (p. 17), making United States' workers more competitive in the world labor markets (p. 18), teaching students how to learn (p. 19), preparing students for a career (p. 20), offering a broad liberal education (p. 20), fostering social justice and social action (p. 159), reducing prejudice and eliminating sexism (p. 158), educating for economic power (p. 160), building self-esteem (p. 162), breaking cultural stereotypes (p. 163), preparing students intellectually to deal with a non-routine world and unexpected events (p. 32), and improving the ability of United States companies to compete in world markets (p. 55). In the context of Native American education, Spring includes preserving culture (p. 161), protecting linguistic rights (p. 170), and understanding how to live with nature and developing an attitude that shows respect for nature and a desire for its preservation (p. 161). In the context of critical theory Spring advocates teaching people to understand the economic and political forces determining the structure of society and preparing them to work for social change (p. 249). While the goals attributed to Native Americans and the

goals of working toward social change could be applied to ecological consciousness, he makes no explicit relationship.

According to Sadker and Sadker (2005), the formal curriculum stresses the importance of preparing students to become active citizens in a democracy (p. 209). Among the questioned goals of schools are: preparing students for college, for vocation, or to achieve high scores on standardized tests; development of good interpersonal relationships; development of a national loyalty; preparing students to adjust to society or to equip them to change and improve society (p. 126). Should schools transmit society's knowledge and values or reconstruct society (p. 132-133)? In a list of twenty more specific goals of education there is no mention of environment, ecology, or sustainability in spite of their statement: "We believe that schools should promote creative thinking, reflection, care for others, and a commitment to improve the quality of life on this planet" (p. 156). They raise the question of who should have the final authority to determine a school's purpose. An activist court in Kentucky defined efficient education as one that provides students with oral and written communication skills, knowledge of economics and history, social systems, and sufficient preparation for academic and career success (p. 362). For a state commission in Maryland, adequate education was defined as schooling with at least 94 percent student attendance, less than a four percent dropout rate, and 70 percent or more of the students passing state achievement tests (p. 363).

Johnson et al. (2005) also state that schools in a democratic society should prepare students to engage in and promote the ideals of democracy (p. 78). A frequent paradox within American mainstream beliefs, according to a number of authors, is the simultaneous existence of the democratic call for equality along with a capitalistic

adaptation to inequality. Many write that, "[a] liberal education for all is the goal of democracy…[while] preparation for work is the goal of capitalism. Public schools tend to heed both sides and…promote some of both" (p. 97). The choices they present are for schools to support democratic equality, social efficiency, or social mobility (p. 97). Goals for democratic schooling from a social reconstructionist perspective would include promoting the values of social justice, human rights, human dignity, and equity (p. 98) in the face of great crises such as war, rapid technological changes, and depression (p. 350). Rather than prepare students for tomorrow's job market, one teacher suggests that educators shift priorities noting the importance of "the beauty of the natural world…and …the immense pleasure of learning for its own sake" (p. 342). The role that schools play in the larger society is determined by the expectations of society's leaders, economic conditions, the ideologies of powerful lobbying groups, and the philosophies of teachers (p. 377).

Ryan and Cooper (2004) list four basic purposes of school: intellectual, political and civic, economic (including the global marketplace), social skills, and a healthy society (pp. 5-9). Descriptive models of schools include such metaphors as: school as a trainer of the good worker, school as a social escalator, school as a preparer for college, school as a shopping mall in competition for the business of student-customers, school as a developer of human potential, school as a family, school as a social panacea, school as an acculturator (pp. 10-12). Ryan and Cooper also reference the view that "people who view schools as transmitting culture talk about society as an organism, a living thing that can thrive or deteriorate based on how well different elements of society function together" (p. 16). (I find this a contradictory statement, as transmitting does not suggest

the reciprocity of interactive, co-constructed learning within a relationship.) Many people have promulgated cultural pluralism as a desirable goal, but it does not currently exist in the United States (p. 39). Ryan and Cooper do make a reference to one ecologically-oriented goal as being primary within education in the United States: "Perhaps the most basic function of all education is to increase the survival chances of the human community" (p. 137).

Parkay and Stanford (2004) relate that the public agrees that schools should teach prosocial values such as honesty, patriotism, fairness, and civility, and should promote the democratic ideal of equality for all (pp. 120- 121). Other goals reflected in this text include: preparation for responsible citizenship, further learning, and productive employment; assimilation of persons from different ethnic, racial, religious, and cultural backgrounds; passing on the values and customs of the majority; providing students with the knowledge and skills to improve society and the quality of life and to adapt to rapid social change; providing equal educational opportunity for all; reproducing the existing society by presenting alternative curricula to different socioeconomic classes (pp. 121-125); and preparation of students to live in a pluralistic world (pp. 246).

Ornstein et al. (2003) ask, "Should American public education transmit a distinctively American culture?" (p. 167). They respond to their own question by saying that schools: reflect the society that supports and sustains them; serve as the major institution (other than family) devised by the adult generation for maintaining and perpetuating the culture; and supply the necessary tools for survival and ensure the transmission of knowledge and values to future generations (p. 296). Social forces and philosophies are seen to shape the goals of education in such areas as: society,

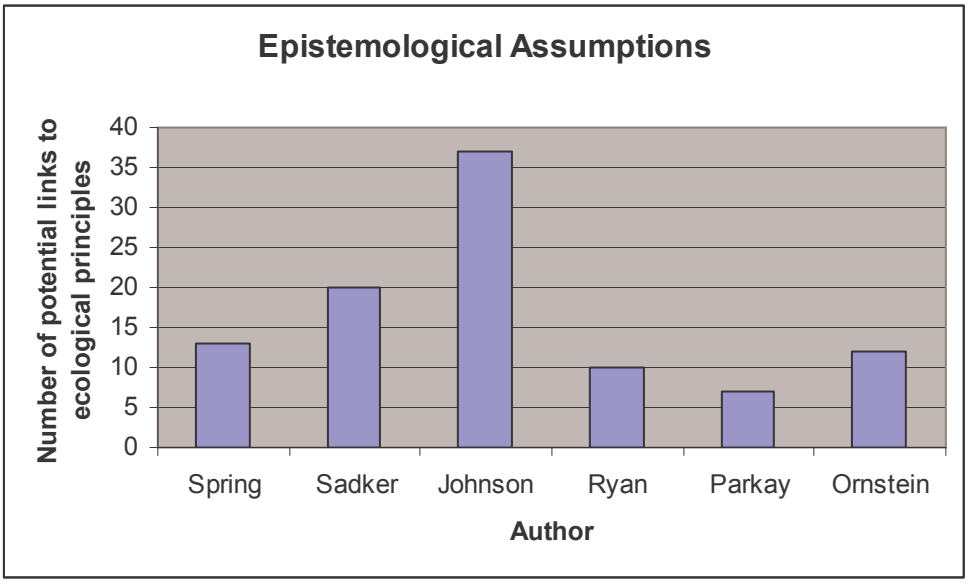
developments in knowledge, and beliefs about the nature of the learner (p. 404). For these authors the 12 major goals of American education are: mastery of basic skills, career or vocational education, intellectual development, enculturation, interpersonal relations, autonomy, citizenship, creativity and aesthetic perception, self-concept, emotional and physical well-being, moral and ethical character development, and self-realization (p. 409). The 1994 congressional document Goals 2000 (Education, 2000) include eight goals: school readiness; school completion; student achievement and citizenship; teacher education and professional development; mathematics and science; adult literacy and lifelong learning; safe, disciplined and alcohol- and drug-free schools; and parental participation. Ornstein et al. question whether these goals are realistic in the face of "aging cities, the effects of centuries of racial and sexual discrimination, an aging population, economic dislocations, and the pollution of the physical environment" (p. 419).

Category 10: Epistemological Assumptions

How do we come to know? is a question commonly addressed in education textbooks, either directly in summaries of philosophical contributions to the field, or indirectly in descriptions of the process of learning and instruction. Any reference to a relational epistemology is considered an indication that the author is including ecological principles. All evidence of direct or indirect epistemological reference points is recorded.

In the sample texts, ways of knowing are described as being relevant to a number of things including: dialog, connection to prior learning or perception, reinforcement, problem-solving, and the teacher. In a truly relational epistemology one comes to know through interaction with learning. There is no separation between the knower and the

known; internal and intuitive experience is valued as a form of knowing; common knowledge is based in a shared context and generated from the practice of living and working, not individually derived but generated within relationships with others. Intuition is valued in relational knowing as are "emotions…imagination and dreams" (Riley-Taylor, 2002, p. 66). In the six texts intuition is mentioned in several instances as one of many ways of knowing, but is not connected to ecological consciousness. Only in reference to North American indigenous knowing is the connection made as to the relationship of humans to all of nature. In this context it is difficult to separate knowing from a way of life. In fact, to understand is to live and to develop an ever closer, more profound human-to-nature relationship. To know, in this view, is to understand one's place in the natural order of things. This holistic, intimate, shared, and attentive epistemology is only referenced through descriptions of Native American thought and not as relevant to a sustainable future for all species. References, such as this one, that provide a potential opening for discussion of the integration of ecological principles into the foundation of education are graphed here in a comparison among textbooks.



Spring (2002) asks the questions, “What knowledge is of most worth in terms of textbooks, curriculum, and e-learning” (pp. 228-235) and “Who should control knowledge in a democratic society?” (p. 253). He recognizes the political nature of knowledge (p. 232) and he writes that “truth” is often relative to the political beliefs of a particular instructor (p. 233). The world’s knowledge is also described as being available through e-learning (p. 245). Spring gives some credence to problem-posing and dialogue (in the tradition of Friere (1970, 1993)) as a way of learning and thinking about the world (pp. 250-251). Reflections on past perceptions, actions or knowledge, or the process of “perception of the previous perception” (p. 251), are offered as an alternative to teacher-centered instruction.

Sadker and Sadker (2005) place epistemological assumptions on a continuum related to educational philosophies (essentialism, perennialism, progressivism, social reconstruction, and existentialism) and their alignment with teacher-centered v. student-centered knowledge acquisition (pp. 329-339). Teacher-centered approaches emphasize the central role of knowledge, information and skills to be transferred; student-centered philosophies are focused on individual needs and students work with teachers to determine what should be learned and how to best learn it (pp. 330-333). Epistemological stances are also given for the major psychological understandings of learning, i.e. constructivism and behaviorism. Constructivism asserts that knowledge must be constructed by each learner in interaction with the teacher or facilitator; behaviorism believes that human beings are shaped by their environment and learning occurs through reinforcement (pp. 343-346). Epistemology is defined at the end of the chapter on Philosophy of Education with specific references to *how we know* given from the

perspectives of materialism, idealism, Cartesian dualism, empiricism, and rationalism (pp. 350-352).

Deciding epistemological priorities, according to Johnson et al. (2005), is partly the responsibility of the teachers. This plays out in the teacher's assessment of answers to the question W*hat is knowledge?* in order to determine whether a particular piece of information should be included in the curriculum (p. 308). Johnson et al. then provide the structure of four philosophic frames through which to make this decision: idealism, realism, pragmatism, and existentialism (p. 314). Idealists are said to believe in the power of reasoning and de-emphasize the scientific method and sense perception (p. 315); realists are represented as critically reasoning through observation and experimentation (p. 318); and pragmatism is said to be a "process philosophy, which stresses becoming rather than being" (p. 320). Pragmatists focus on experience and application, using ideas as instruments in problem solving (p. 320). Rorty (1982) is referenced as a pragmatist and is said to argue that "reality is the outcome of inquiry and as human inquiry shifts so too will shift the nature of the real" (cited in Johnson et al., 2005, p. 321). Existentialism is said to support the notion that reality is "lived existence" (p. 322) and the definition of one's life lies in the quest for meaning (p. 322). In a context unit entitled, *Eastern Ways of Knowing*, Johnson et al. include references to the epistemological stances of philosophic thought from India, China, Japan, and the Middle East. Eastern ways of knowing stress the inner world of intuition, and "emphasize order, regularity, and patience that is proportional to and in harmony with the laws of nature" (p. 326). Eastern education places great emphasis on the teacher-student relationship; the student is changed through contact with the guru. Transformation is emphasized; the individual

must be transformed to face life (p. 328). In a section entitled *North American Ways of Knowing*, the authors relate epistemological preferences of the Navajo, Hopi, and Lakota tribes. They say that "Native North American knowing centers on the relationship of humans to all of nature" (p. 329) and thus it is "difficult to separate knowing from a way of life. In fact, to understand is to live and to develop an ever closer, more profound human-to-nature relationship" (p. 329). Ways of knowing are orally developed and include traditional stories and beliefs that dictate a way of knowing and living – all include a reverence for nature and a sense of human's responsibility to nature (p. 329). In the final paragraph of this section Johnson et al. say that "Native American thought emphasizes the importance of nature; the pursuit of knowledge and happiness must be subordinate to a respect for the whole universe. To know is to understand one's place in the natural order of things" (p. 330). This philosophy translates into instructional practices that "study the physical and social world by examining the natural relationships that exist among things, animals, and humans" (p. 330). Johnson et al. also reference eight learning theories: perennialism, essentialism, behaviorism, positivism, progressivism, reconstructionism, humanism, and constructivism, and offer epistemological frameworks of each (pp. 338-355).

Ryan and Cooper (2004) reference six ways of knowing: by divine revelation, by authority, through personal intuition, from the five human senses, from human powers of reasoning, and through experimentation (p. 267). In close alignment with the other authors, Ryan and Cooper summarize the epistemological standings of perennialism, essentialism, romanticism, and progressivism. Romanticism considers education to be a natural process that grows out of the child's innate curiosity therefore children's interests

and curiosity should drive learning (p. 278). These authors reference the theory of multiple intelligences and write that Gardner (1985) suggests learning in context, particularly through apprenticeships (cited in Ryan and Cooper, 2004, p. 43).

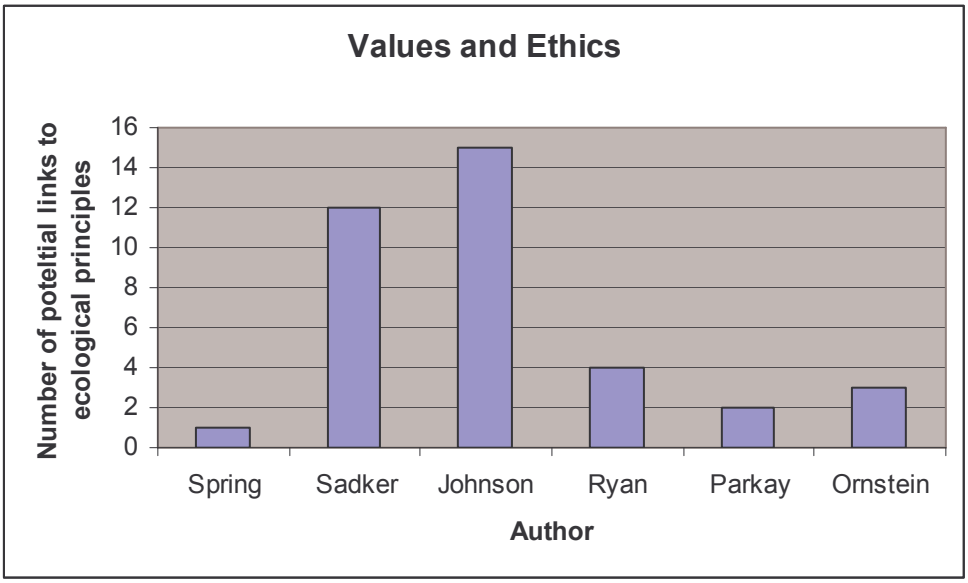
Parkay and Stanford (2004) tease out categories of *knowing*: knowledge as being the sum of small bits of matter or discrete facts; knowledge as consisting of the big ideas that enable people to understand and to influence their environment; knowledge as students' understanding of their own experience; knowing based on authority; knowing based on divine revelation; knowing based on empiricism; knowing based on reason and logical analysis, and knowing based on intuition (pp. 82-83). In the chapter entitled *Ideas and Events that Have Shaped Education in the United States*, the authors also review what they consider to be the five modern philosophical orientations to teaching: perennialism, essentialism, progressivism, existentialism, and social reconstruction (pp. 84-90). In a chapter called *Teaching Diverse Learners*, Parkay and Stanford reference the traditional upbringing of Native American children which encourages them to develop a worldview that is holistic, intimate and shared; that presents tasks visually; that is attentive to cultural preferences of learning by careful observation as preceding performance; and that offer experiential lessons in their natural setting (p. 259).

Ornstein et al. (2003) trace epistemology from the Greeks to set the stage for the summaries of idealism, realism, pragmatism, existentialism, perennialism, essentialism, progressivism, social reconstruction, and critical theory (pp. 69-119). These authors then summarize major historical theorists including Comenius, Locke, Rousseau, Pestalozzi, Froebel, Spencer, Dewey, and Piaget (pp. 133-152).

Category 11: Values and Ethics

An axiology of ecological consciousness stems from the philosophy of organicism. Value is not limited to humans alone – every member of all natural, biotic, and human systems has intrinsic value. All relationships are guided by ethical caring and questions of consequences for future generations of the biotic community. The researcher has explored the texts for evidence of the principles of consequentialism (determining what is ethical by the perceived consequences of the action) and an ethic of care. All references to values and ethics are recorded regardless of their ability to provide evidence of ecological principles.

Axiological questions are dealt with in a similar way to the treatment of epistemological questions. In the six texts, the teaching of respect for, and avoidance of injury to, all life is depicted as either an Eastern viewpoint or a Native American framework for consideration of values and ethics. References to caring and responsibility within Western educational settings apply only to human beings and not other biotic species. Ethical decision-making is related in only one recording unit to the use of technologies, such as nuclear energy and fossil fuels. Consequences of decision-making for future generations are not considered in these texts. Discussion of values and ethics is mostly within the context of the transmission of values of the dominant culture and a democratic society through character education. The number of recording units that provide the potential to link the text to the context of education for sustainability is represented in the following graph as a comparison among textbooks.



Spring (2002) asks questions about the role of schools in teaching moral values, as well as the larger question of who should decide what moral values will be taught in public schools (pp. 10-11). He also mentions the 1990s debate over AIDS education and sex-education (pp. 14-15). Sadker and Sadker (2005) relate axiological frameworks inherent in some philosophical understandings. They speak to humanism as transferring a non-religious ethical base through teaching the great works, in order to establish a shared understanding (pp. 263-267). In essentialist and perennialist classrooms, the teacher serves as a moral role model (pp. 331-333). For Dewey (1938, 1998) human dignity is experienced in democratic classrooms (cited in Sadker and Sadker, 2005, p. 335). In writing about the censorship attacks on instructional materials of religious fundamentalists, Sadker and Sadker note that categories considered offensive include references to the idea that "animals are equal to humans" (p. 262). Elsewhere, ethics is defined in terms of what is "good" and "bad" in human behavior, thoughts, and feelings (p. 352). In describing the influence of business on school practices, these authors note that contemporary school values often mirror those of business: hard work, competition,

dependability, punctuality, neatness, conformity, and loyalty (p. 383). In the hidden curriculum students learn about winning and losing, competition, and the feelings that accompany success and failure; they learn about group support and recognition; they learn about embarrassment and rejection (pp. 208-209). In the chapter entitled *School Law and Ethics*, Sadker and Sadker summarize major approaches to teaching morals and ethics with the introductory statement that some citizens believe that "teachers will need to teach more enduring and pervasive moral lessons" and yet the public is "concerned about promoting a narrow set of beliefs" (p. 417). Authors describe seven approaches. Traditional inculcation transfers a common set of values of diligence, hard work, punctuality, neatness, conformity, and respect for authority (p. 417). Individual analysis asks students to consider the moral implications of past and present events and formulate a set of values based on their analysis (p. 418). Values clarification asks that students bring their own issues forward for analysis (p. 418). Character education, which is now legislated in more than half of the states, assumes that there are core attributes of a moral individual that should be taught (p. 419). Kohlberg's (2000) theory of moral stages of development is based on the belief that teachers can facilitate student growth to higher stages of morality (cited n Sadker and Sadker, 2005, p. 420). Students are asked to analyze moral dilemmas in brief scenarios. Gilligan's (1987) work with gender differences as to moral reasoning is mentioned in that females make moral decisions based on relationships and caring (cited in Sadker and Sadker, 2005, p. 420). Comprehensive values education is a hybrid approach that combines direct instruction of values such as honesty, caring, and responsibility, and analysis is applied to other moral and ethical decisions (p. 420). As part of a summary statement the authors suggest,

"Many teachers go further and ask students to participate in formulating the rules they will live by" (p. 421).

Johnson et al. (2005) review the code of ethics of the National Education Association (pp. 486-487). In chapter 2, *Diversity in Society*, they reference dominant cultural values of American society: individualism and freedom, achievement and success, associations of common interests rather than kinship ties, and absolute values of right and wrong rather than degrees of rightness (p. 46). Pluralism is referred to as existing in societies that value the maintenance of distinct cultural patterns and languages. The public schools in the United States generally teach only the dominant culture, but ideally we could choose to assimilate, maintain our native culture, or become bicultural and function effectively in more than one culture (pp. 49-50). Social mobility is referred to as one of the core values of the dominant culture (p. 51). Every major religion is said to endorse the virtues of justice, love, and compassion, with regard to virtues that most individuals and nations are trying to achieve (p. 68). Most Western religions are said to be compatible with the values of the dominant culture – they usually promote patriotism and emphasize individual control of life (p. 68). Families are portrayed as satisfied with schools when the schools reflect the values that are important in their religion, but as attacking schools when practices are perceived to be in conflict with their religious values (p. 69). Schools reflect conservative values and are usually in line with those of the current ideological, political, and economic order, i.e. individualism, a Protestant work ethic, and competition (p. 104). Johnson et al. make the point that democratic schools support equity, equal access, and equal opportunity and work toward the elimination of inequities in the broader community as well as the school (p. 105). They reference

Montessori schools as teaching values rooted in the world's religions integrated with excellence, global understanding, and service (p. 104). They note that the ethic of social justice is essential to the profession of teaching (p. 114), and yet major questions to be examined are, "When does the end justify any means of achieving?" and "Which system of ethics should be taught?" (p. 309). In the chapter entitled *Philosophy: The Passion to Understand*, there is a section on prophetic thinking which has four basic components, said to be discernment, connection, tracking hypocrisy, and hope (p. 311). The characteristic of connection referred to here is to be able to "value and have empathy for other human beings" (p. 312). Tracking hypocrisy involves identifying the "gap between principles and practice, between promise and performance, between rhetoric and reality" (p. 312). Axiological perspectives of Hinduism, Jainism, and Confucianism are summarized. Adherents of Jainism are said to "give great respect for all life and take vows to avoid injury to any form of life" (p. 327). The way of the Tao is perfection and harmony with nature. At the basis of the Navajo teachings is the "value of life lived in harmony with the natural world. Such a view enables one to 'walk in beauty'" (p. 329).

Ryan and Cooper (2004) refer to the teacher as being responsible for conveying to the young the fundamental moral message that we are all legally and ethically bound to one another; much of this message is embedded in the content of the curricula (p. 216). For these authors, teachers need to exhibit six characteristics: appreciation for moral deliberation, empathy, knowledge of the facts, thinking systematically, confronting rather than evading problems, and interpersonal skills (pp. 218-219). Teachers ethically influence students in three ways: by setting a personal example, by establishing a beneficial classroom that is an environment of safety and trust, and by establishing an

ethical dialogue in their classrooms (p. 221). Character education is presented as helping students know the good, love the good, and do the good (p. 374). Civic virtues are said to be necessary for life in a democratic society: respect, courage, tolerance, kindness, and concern for the underdog (p. 375). In a chapter on educational reform Ryan and Cooper reference teaching positive moral values through character education. One example confronts students with embedded cultural values in science. They write:

> Instead of merely teaching scientific methodologies and findings, the teacher can have students examine the implications of applied science, such as genetic manipulation. They will see that the use of science and technologies, such as nuclear energy, fossil fuels, and high-speed computers, is not neutral but has ethical implications. (p. 376)

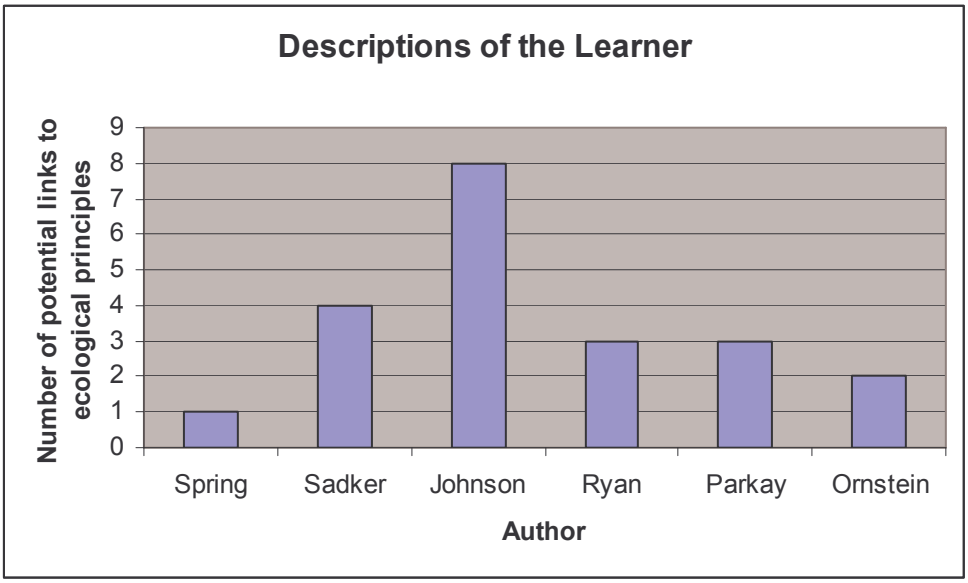
Parkay and Stanford (2004) state that 90 percent of the public believe that the following values should be taught in public schools: respect for others, industry or hard work, persistence or the ability to follow through, fairness in dealing with others, compassion for others, and civility and politeness (p. 121). They state that teaching is an ethical enterprise and does not have a uniform code of ethics. Ethics, for them, means acting in a way that promotes the learning and growth of students and helps them realize their potential (p. 195).

Ornstein et al. (2003) review principles of values and ethics promoted by Confucianism, Hinduism, Socrates, idealism, realism, and Comenius (pp. 59-133). Hindu philosophy is said to encourage respect for all life and a search for the truth (p. 65). Realism touts that values are universal (p. 103); Comenius emphasized values that could promote international understanding and peace (p. 133). They note that a large proportion

of children and youth believe that the values of their peers are significantly influenced by what they see in the media (p. 312). Common core values of the Baltimore public schools are referenced as follows: compassion, due process procedures, freedoms, human worth and dignity, knowledge, patriotism, reasoned argument, responsibility, tolerance, courtesy, critical inquiry, honesty, justice, loyalty, rational consent, respect for rights of others, responsible citizenship, peaceful resolution of conflict (p. 435).

Category 12: How the Student/Learner Is Described

From the perspective of ecological consciousness, the learner is seen in relationship to the environment and as connected with all that is. Self and identity are viewed as transpersonal identification, with the associated trait of an awareness of the individual's connectedness to the universe and with everything in it. Learners are seen as responsible agents in their own learning. None of the authors reflect the learner in terms of a perspective of identity or self that is compatible with transpersonal identification. While some references are made to the individual as an agent of responsibility in the learning process, none of the authors relates this agency to sustainability or ecological consciousness. Rather, the learner is seen as a human resource, an individualized entity to be self-realized, a product of culture, and a socially-active being who progresses through stages of physical, intellectual, social, and emotional development in the context of schooling. Some of these references provide the potential to link the discussion to the context of education for sustainability. Those references are counted and represented in the following graph that compares these openings across the six textbooks.



Spring (2002) has few references to descriptions of students. They are: students as human resources (p. 21); students as future workers (p. 16); students as human capital (p. 17); and students as future citizens (p. 8). In Sadker and Sadker (2005) students are described in terms of factors that contribute to their learning style: cognitive domain, affective domain, and physiology (p. 36). Students are said to be shaped by their geography, ethnicity, exceptionality, social class, race, and gender (p. 66). Students are referred to as being "pinched into passive roles" in current school culture (p. 163), to think quickly, rely on memory, and be dependent on the teacher (p. 170). Children are said to "organize their own intense seething little world with its own frontiers, its own struggles, its own winners and losers" (p. 181). Children are referred to as looking to adults for answers and for emotional support (p. 174).

Johnson et al. (2005) portray culture as providing a blueprint for how people think, feel, and behave in society (p. 45). Within this culture, students move back and forth across stages of black or white racial identity in their struggle to know themselves (p. 82). Teenagers are described as having complex identities that are influenced by their peers,

family, neighborhoods, teachers, and other adults, ethnic membership and the interaction of that membership with the dominant society (p. 89). Adults are said to regard teenagers as too young to have the benefits of adulthood (p. 90). Resilient students are described as social, optimistic, energetic, cooperative, inquisitive, attentive, helpful, punctual, and on-task (p. 90). The idealist is said to believe that knowledge is directed toward self-consciousness and self-direction and that learning comes from within the individual (p. 315). Johnson et al. refer to Jane Roland Martin's (1985) idea of education as the conversation or place where one learns what it is to be a person (cited in Johnson et al., 2005, p. 318). Realism is said to hold that reality, knowledge, and value exist independently from the human mind (p. 318). Whitehead (1929, 1957) is referred to as blending idealism and realism wherein objective reality and subjective reality are an organic unity within the individual (cited in Johnson et al., 2005, p. 319). Existentialists are said to argue that we define ourselves; we make meaning in our world by the choices we make; we are what we choose (p. 322). Proper education, for them, starts with the human self and progress toward the goal of self-actualization (p. 322). Sartre (1957) is said to have seen no difference in being free and being human (cited in Johnson et al., 2005, p. 323). The process of "who are we?" starts with a crucial event called the existential moment (p. 323). For Nietzsche (1910) human beings are referred to as victims of social dynamics rather than inferior or superior beings (cited in Johnson et al., 2005, p. 323). Greene (1988) is said to assert that schools must be authentic places where "diverse human beings can appear before one another as best they know how to be" (cited in Johnson et al., 2005, p. 324). For Greene education is the vehicle for individuals to reach beyond themselves into an intersubjective space in which they are "empowered

to think about what they are doing, to become mindful, to share meanings, to conceptualize, and to make varied sense of their lived worlds" (p. 326).

Ryan and Cooper (2004) refer to children as having basic needs: love, needs for survival, belonging, power, freedom, and fun (p. 40). They present students as having highly individualized processes of learning (p. 43). They generalize that from most metaphysical perspectives the true nature of a person cannot be captured by measuring or counting alone (p. 266), and that humans naturally search for the correct and most effective way to live (p. 267). They summarize several philosophic views of the individual. In perennialism human nature is constant, objective, and unchanging (p. 272). In essentialism students are seen as deficient and needing discipline and pressure to keep learning (p. 276). Romanticists believe that children are born good and pure so we must let student interests drive their learning (p. 278). Progressivists believe that people are naturally exploring, inquiring entities (p. 281). Behaviorists view humans as learning to act in specific ways based on the response they receive for their actions (p. 285). Constructivists view individuals as having an aversion to disorder, that it is human nature to want to sort things out and make sense of the world around us (p. 286).

Parkay and Stanford (2004) also summarize views of the individual from different philosophical and theoretical perspectives. Humanism is said to hold that individuals are in control of their own destinies through the application of their intelligence and learning; people make themselves (p. 89). Behaviorism teaches that forces in the environment shape behavior (p. 89). For Piaget (Ripple & Rockcastle, 1964) children learn through actively interacting with their environment and progress through four stages (cited in Parkay and Stanford, 2004, p. 279). Erikson (1997) delineates eight stages of

psychosocial development (cited in Parkay and Stanford, 2005, p. 280). Kohlberg (2000) defines student growth in terms of stages of moral development (cited in Parkay and Stanford, 2005, pp. 281-283). Maslow's (1999) hierarchy of needs suggests that basic needs must be met first (cited in Parkay and Stanford, 2005, p. 287). Parkay and Stanford offer that many theorists believe that intelligence is a basic ability that enables one to perform mental operations in logical reasoning, spatial reasoning, number ability, and verbal meaning (p. 291). Gardner (1983) believes that human beings possess at least eight separate forms of intelligence (cited in Parkay and Stanfor, 2005, p. 291). The authors generalize that students' learning styles are determined by a combination of hereditary and environmental influences (p. 293).

Ornstein et al. (2003) reference theorists, philosophers and non-Western traditions in their summary of the self. For Plato and Chinese philosophy only intellectuals were capable of ruling (p. 59). Hinduism emphasizes the transmigration of souls (p. 64). Existentialism teaches that each person has the potential for loving, creating and being (p. 108). Locke (1959) believed that children are born as blank slates and that all ideas were based on sensation (cited in Ornstein et al., 2003, p. 134). Rousseau (1992) saw children as noble savages – innocent, free, and uncorrupted (cited in Ornstein et al., 2003, p. 135). Froebel (Downs, 1978) believed that every child's inner self contained a spiritual essence that stimulated self-active learning (cited in Ornstein et al., 2003, p. 143). Darwin (Howard, 1982) taught that the fittest of individuals of each generation would survive because of their skill, intelligence, and adaptability (cited in Ornstein et al., 2003, pp. 144-145). Dewey (1902) believed that children are socially active human beings who are eager to explore and gain control over their environment (cited in Ornstein et al., 2003, p.

146). Montessori (1972) emphasized that children have an inner need to work at what interests them, are capable of sustained concentration and work, enjoy structure and prefer to play and, like to repeat actions until they master a given activity (cited in Ornstein et al., 2003, p. 151). Piaget (1952) taught that children become creative actors in their own cognitive development (cited in Ornstein et al., 2003, p. 152). In reference to underrepresented groups, Ornstein et al. write that Native American students suffered a loss of cultural identity and that Hispanic Americanization resulted in a kind of dual identity in students (p. 189). At the beginning of the chapter on *Culture, Socialization, and Education* these authors state that acculturation and socialization are necessary to the transmission of culture and the satisfactory functioning of society (p. 296).

Category 13: Direct References to the Words "Environment," "Ecological or Ecology," and "Sustainability"

In this section all of the recording units containing these words in the context of their meaning to this study are listed. In 2,950 pages of text, the following five pages are the only recording units that are directly related to the building of ecological consciousness or the recognition that the degradation of the planetary systems is an important issue related to education in the United States. The word *sustainable* appears only once, and then in a description of a "positive information society" (Johnson et al., 2005, p. 125). An informal ratio of relevant text-to-total-text reveals a percentage of .09 percent or less than one-tenth of one percent of the text in the six books is devoted to issues of central importance to this study. In the following recording units, italics are added to all relevant words for ease of recognition.

Spring (2002) has two references in this category. In the chapter on the purposes of public schooling he writes, (emphasis is mine)

> Saving marriages joins a staggering list of public school goals that include saving lives on highways through driver education, preventing alcohol and drug abuse, stopping the spread of AIDS, reducing crime, eliminating poverty, eradicating racism, building cultural tolerance, educating good citizens, decreasing unemployment, increasing national economic growth, *saving the environment*, and preparing students for the global economy. The list is impressive. But, is it realistic? (p. 4)

Spring's (2002) other reference is in the conclusion of the chapter entitled *Power and Control in American Education* in which he says, "Those supporting or attacking differing political causes, such as *environmental regulations* and national health plans, are concerned how these issues are treated" [in textbooks, curriculum and the Internet] (p. 252).

Sadker and Sadker (2005) refer to Gardner's most recently defined intelligence as *naturalist*, or the "ability to discriminate among living things, to classify plants, animals, and minerals, [and] a *sensitivity to the natural world"* (p. 40). In two examples of the influence of business on schools, they cite the industry group Pacific Logging Congress as providing photos and brochures explaining why clear-cutting of forests is environmentally sound, and they also reference marketing by Exxon that teaches children that the Valdez oil spill was an example of *environmental protection* (p. 153). In their summary of the social relevance of the decades of the 1960s and 1970s they write, "The 1970s ushered in an invigorated concern for the *environment.* Programs in *ecology* and

environmental education stressed our planet's delicate *environmental balance*, and they continue to influence today's curricular materials" (p. 215). In a discussion of conservative influences on education, they quote Glanzer (1998) in saying that, "Critics charge that secular humanisms are pseudoreligious, and promote agnosticism, various forms of feminism, *environmentalism*, political liberalism and conservatism, [and] various ethnic or sexual identities…" (in Sadker and Sadker, p. 263). In writing about social reconstruction, these authors reference *environmental pollution* as one of nine social challenges and problems that they believe are "are rooted in misinformation and thrive in ignorance" and "provide a natural and moral direction for curricular and instructional activities" (p. 337). In Chapter 13: *Technology in Education*, Sadker and Sadker refer to global education as a world-based curriculum through which the teacher might "tack[le] *ecological issues* such as *global warming, deforestation, and toxic waste disposal*" (p. 494) Two of the four domains for global inquiry are: global systems, which includes an "emphasis on global systems and an interdependent world, including economy, ecology, politics and technology" and global issues and problems, which includes "worldwide concerns and challenges, including peace and security, *environmental issues*, and human rights" (p. 494). As an example of global education, a Massachusetts middle school is said to have offered a unit on *environmental science* through a teleconference with students in Germany (p. 495). In another example six thousand students from Mexico, the United States, and Canada "participate in wildlife migration studies by recording sightings in their area" and discussing how they can "*protect wildlife* by creating or protecting habitats" (pp. 495-496). In a profile of two women astronauts, the authors reference an international program involving middle

school students in which satellite photos display information about "*deforestation* in the Amazon, dust storms in Africa, or volcanoes in Hawaii" (p. 498). At the end of this chapter Sadker and Sadker ask, "What are some of the dangers inherent in a global education curriculum?" (p. 508). This last question, out of context, is confusing. In this chapter, global education is interpreted in terms of internet use and distance education. The authors caution teachers about six "e-pitfalls" (p. 495) of internet instruction. They are: unsound software, stereotypes and violence, potential of computer screens to mesmerize students, information overload, internet junk, and internet cheating. I think these potential threats to the use of technology in global education must be some of the "dangers" to which the authors are referring in the quote on page 508.

Johnson et al. (2005) use the word "sustainable" in the context of five characteristics of a positive information society: "community driven and meets real community needs, overcomes major content barriers facing the underserved, provides people to help [they don't say with what], offers on-line content that is easy to use, and is *sustainable*" (p. 125). In the beginning of the chapter entitled *Education in the Twenty-First Century*, they write, "Schools, which once had the primary purpose of educating the masses in the fundamentals of learning – namely the three R's – now additionally must focus on how to live in and protect our world" (pp. 466-467).

Ryan and Cooper (2004) in writing about active programs of social reconstruction cite a project where "students actually select, study, and work on a community environmental problem, such as the polluting of landfills with unrecycled garbage" (p. 18). In summarizing Friere's (1970, 1993) work they use an example of teaching literacy by helping peasants to: "(1) name their problem (a polluted water supply), (2) analyze the

problem (sewage contamination of the springs), and (3) collectively take action (design and build a new sewage system) to solve the problem" (p. 18). As indicated in Category 4, one of two major questions is said to drive science education, "How can all students be prepared to make informed judgments about such critical and science-based issues as *environmental pollution, energy sources, and biotechnology?*" (p. 115). In asking the question of whether the existing curriculum is relevant to today's society, they write, "Together, we and the rest of the world need to stop the systemic despoiling of our planet" (p. 137). In an example of the integration of technology Ryan and Cooper reference an eighth-grade class who use GIS software to monitor a local landfill and help answer the question, "Where should the next landfill be built?" (p. 178). With the use of technology "science students today do things like measure ozone and sulfur levels from the air near their schools" (p. 188). Students can also "telecommunicate with students and scientists around the world to examine the effect of acid rain or waste disposal on the earth's water quality" and "help students place their measurements in the broader context of *global environmental issues*" (p. 189).

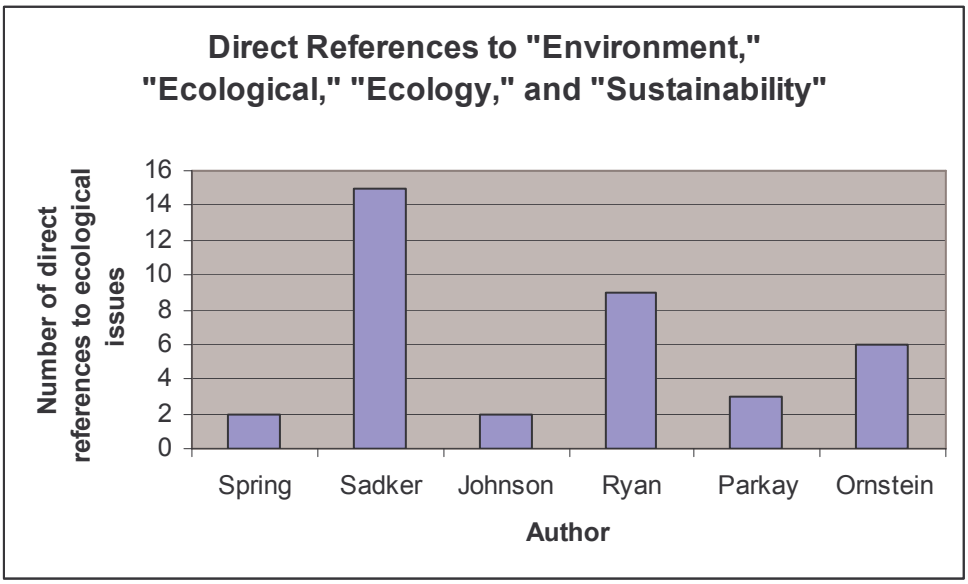
Parkay and Stanford (2004) reference the mission statement of an award-winning school in this quote, "The Ganado Primary School's mission is to provide opportunities for children to make sense of their world, to respect themselves and others, to respect their *environment*, and to appreciate and understand their cultural and linguistic heritage" (p. 126). In a quote by Noddings (2002) reflective of a positive learning environment, she writes, "all students should be engaged in a general education that guides them in caring for self, intimate others, global others, plants, animals, the *environment*, objects and instruments, and ideas" (cited in Parkay and Stanford, 2004, p. 323). In a chapter called

Teaching with Technology, a reference is made to an interactive simulator that calculates a family's water usage and compares it with national averages. "Students then implement various water-saving strategies…and rerun the simulation to determine the amount of water saved" (p. 399).

In an example from social reconstructionism, Ornstein et al. (2003) reference the "technological era as one of tremendous interdependence" in which "events in one area of the globe will have an impact on other areas. The depletion of the ozone layer, for example, is not restricted to a single place but endangers the entire planet" (p. 114). They add that "reconstructionist teachers encourage students to diagnose the major problems confronting human beings on Earth: *pollution of the environment*, warfare, famine, terrorism and violence, and the spread of epidemic diseases such as AIDS" (p. 115). In the chapter entitled *Financing Public Education,* one strategy for eliminating unnecessary spending is economics in the name of efficiency – "dial down temperatures, delay warming up the school each morning, reduce heat in the hallways, and buy energy directly from gas and oil companies" (p. 246). In the same chapter they reference the budgetary problem of *environmental hazards* in school buildings and relate the EPA's order to "clean up buildings laden with asbestos" (p. 247). Additional environmental hazards include "radon gas, lead paint, and seismic upgrades" (p. 247). In the chapter entitled *Providing Equal Educational Opportunity,* ecological intervention is described as "improving the family environment of very young children" (p. 374). And, in a chapter on the *Purposes of Education*, as stated earlier, Ornstein et al. refer to *pollution of the physical environment* as a "pressing social and economic problem" along with aging cities, racial and sexual discrimination, an aging population, and economic dislocations (p.

419). In their chapter on *Curriculum and Instruction* there is a note that geography instruction is "undergoing a renaissance" and is being linked with "back-to-basics, multicultural education, *environmental education*, and global education" (p. 450).

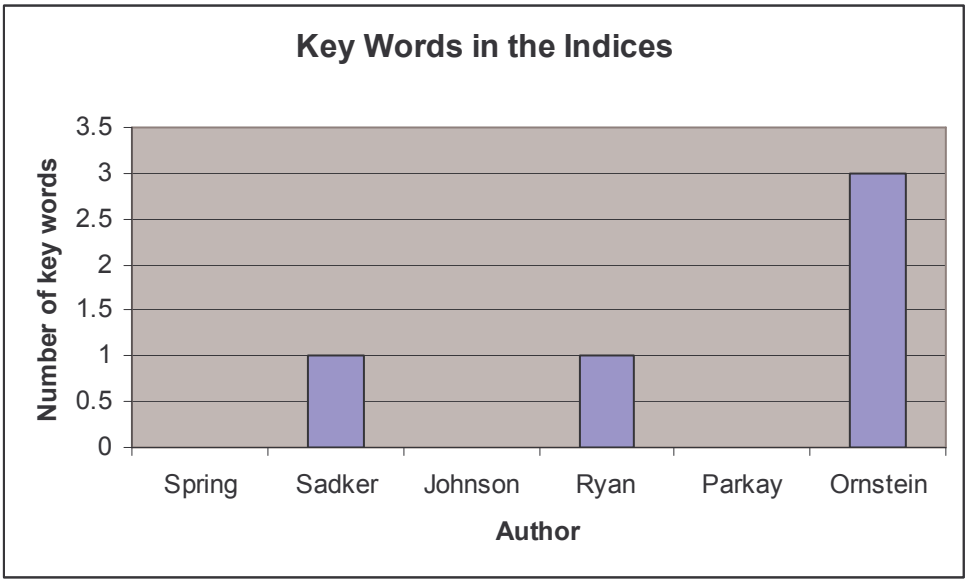
The following graph represents a comparison across the six texts of the number of direct references to ecological issues.



Scan for Key Words in the Indices

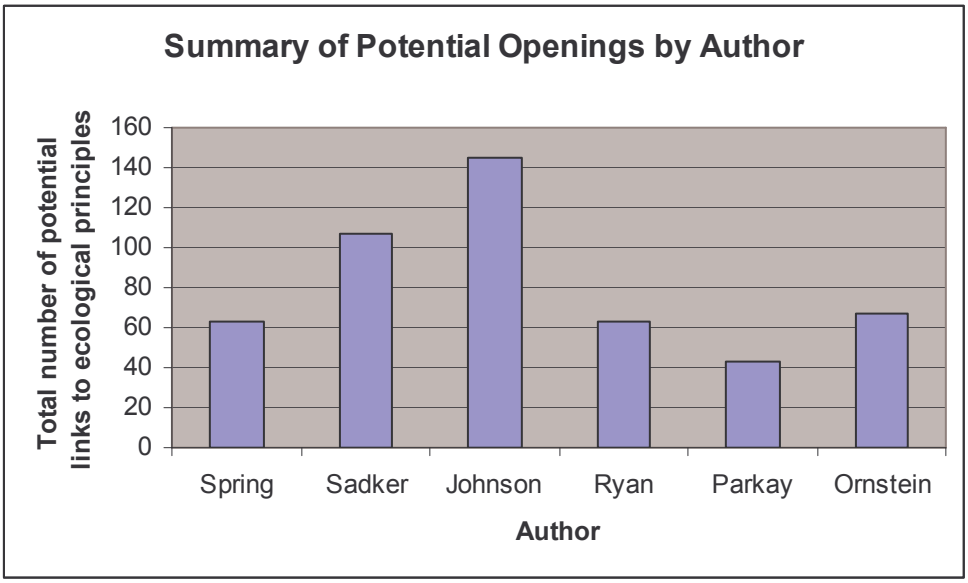
In addition to this summary, it is interesting to note that a scan of the indices at the back of each of the textbook was undertaken to look for evidence of the key words, *biotic, ecology, environment, environmental education, interconnected, nature, natural world, pollution, relationality, sustainability,* and *system*. Spring (2002) lists none of these words in his Index; Sadker and Sadker (2005) list one reference to "environmental education" (p. I-5); Johnson et al. (2005) list none of these words in their Index; Ryan and Cooper (2004) list one reference to "environment in effective schools" (p. 541); Parkay and Stanford (2004) list no references to any of these key words, and Ornstein et al. (2003) list one reference to "ecological intervention" [efforts to improve family

environment] (p. I-6), one listing for "environmentalist view of intelligence" [compensatory programs in infancy] (p. I-8), and one listing for "Environmental Protection Agency" [hazards in school buildings] (p. I-8).



Summary of the Findings

Thirteen categories of recording units that serve as a framework for the content analysis grew out of seven ecological principles of education for sustainability as developed in chapter 2. The categories were chosen from a preview of textbooks for their potential to reveal evidence of an underlying ecological consciousness within the context of education. In this chapter, the recording units from each category have been reported for each textbook individually with some recording units omitted due to their repetitious nature. In addition, direct references to key words found in the *Index* of each text were listed. Graphs of the potential for the recording units to provide openings for discussion that links them to ecological principles have been included within the discussion of each category. A summary graph that represents the overall total of these openings in each textbook follows.



Summarizing the potential of each textbook to provide links to an ecological framework enables and constrains certain interpretations. On the surface, the graph appears to rank the alignment of the author's intent to integrate ecological principles into the sample introductory teacher-education text. However, the reader is cautioned to not be overly simplistic in this perception. I have made it clear throughout the reporting of the recording units that none of the authors treat the integration of ecological principles in any central way, or are intentional about relating the issue of sustainability to teacher education. The summary graphs are based on my interpretation of the potential of the recording units to provide openings for discussion of sustainability and education, and are not intended to validate any text more than any other, or to prioritize the alignment of textbooks with ecological thought.

An informal and conservatively-calculated ratio of relevant text to total text reveals a percentage of .09 percent or less than one-tenth of one percent of the text of the six books devoted to issues of central importance to this study. The last chapter reflects inferences and implications of this study.

Identification is the best way to gain knowledge.
If you wish to really wash dishes, you must identify with the dishes,
know each nook and cranny, the crevices and the free spaces.
If you wish to true-ly wash dishes, you must know your dishes.
Identification is the best way to gain knowledge.

Systemic merge is wisdom.

Non-acknowledgement of systems
is called ignore-ance.
One is all a part.

Knowing that the system with which you are identifying
is a subsystem (a system within a system,
which contains or is made up of systems)
is also wisdom.

Non-systems thinking and a non-system approach to life produces war.
Example: Not acknowledging our part in bringing out the 9/11 event
Makes ***them*** *the enemy and* ***us*** *the good guys*
(always a prerequisite of war).

Systems thinking/approach produces relationship.
Relationship, a more accurate description of reality, will "save" us.
"Parts" thinking is a dinosaur of extinction.
George Breed*, from* ***Notes in the Nite***

Chapter 5: Inferences and Implications

Introduction

Introduction-to-education textbooks, in the context of a world culture where dialogue on the topic of sustainability has risen to an imperative, have the potential to make a strong connection between what happens in the public-school classroom and the degradation of environmental and social systems. Through the author's recognition of sustainability as a current and future issue related to education, and through the prioritization or inclusion of ecological consciousness as a goal of public education,

understandings, attitudes, ethical frames, and practices that promote this awareness may be fostered. In chapter 4, I reported the findings of a content analysis of six introduction-to-education textbooks across 13 categories of recording units. A significant aspect of that analysis is that in an informal, conservative calculation of the ratio of pages of text relevant to ecological consciousness to total text reveals that .09 percent, or less than one-tenth of one percent, of text has any direct reference to the long-term health and sustainability of the biotic and natural systems of the planet. In those references to cultural aspects of ecological principles, such as preservation of language forms, there is no relationship drawn to the role that this issue plays in the sustainability of human and natural systems. Recording units that reference student involvement in environmental problems do so in the context of science education, the geography curriculum, or reconstructionist thinking. Philosophical frames that integrate ecological principles are presented as contributions of Eastern religions or Native American practices and beliefs. It is said that programs of ecology and environmental education continue to influence today's curricular materials and yet this is nowhere presented as central to teacher education. In the next section, I would like to revisit the literature review and elements of the context of the research to draw relationships to these findings.

Relationships of Findings to Context

Relationship to International and United States Directives

In a demonstration project of the President's Council on Sustainable Development, a report entitled *Education for Sustainability: An Agenda for Action* (1994a) called on educators to take a leadership role in preparing a citizenry with increased knowledge of the environment and the integrative skills needed for understanding the interdependent

relationships between the environment and the economy. In addition, the United Nations General Assembly has declared the ten-year period beginning in January of 2005 to be the Decade of Education for Sustainable Development with an initial focus on teacher-education institutions. It is interesting to note that despite this national and international attention, the textbooks in the study – even those with a copyright date of 2005 – make no reference to these initiatives.

Relationship to Ideological Messages

As the study indicates, textbooks are vehicles for the transmission of manifest and latent ideological messages about the organized knowledge system of society. They also participate in the construction of the student's view of reality. The underlying philosophical framework of the text is integral to the way in which the reader interprets priorities and validates forms of knowledge. These philosophical underpinnings, however, are often not explicit and must be uncovered through a linkage to operationalized categories, as in this study. In comparing the findings of the categorical analysis to the ecological principles described in chapter 2, I notice very little alignment. With such a small percentage of text relating education to issues of sustainability, it is challenging to synthesize the recording units according to the ecological principles. This study bears witness to the reinforcement by introduction-to-education textbooks of a mechanistic framework rather than an ecological one. I now summarize elements of the mechanistic worldview that are foundational to these texts with a comparison to the ecological principles and sample quotes from the textbooks to illustrate this alignment.

Across the sample of textbooks, there is no underlying cosmological assumption that the dynamics of the universe represent a holistic, systemic, and interconnected web.

Except for references to Eastern thought, or Native American beliefs there is no relationship drawn between human beings and the biotic and natural world. Instead, an anthropocentric view that humans are separate from nature dominates. Sadker and Sadker (2005) ask, "Is it really possible that the purpose of U. S. schools impacts the world?" and "Are we merely a global economy when it comes to coffee beans or gasoline?" (p. 132). This disconnect is also found in the text of Johnson et al. (2005) when they write that the conception of real-world standards "places primary emphasis on the necessary knowledge and skills that will make students employable and enable them to live independent lives" (p. 390). From an ecological perspective, the goal of living independent lives is a deceptive myth.

An ecological epistemology is one of relational knowing. The sample texts reference different kinds of knowledge acquisition and prioritization. A range of alternatives offered by Parkay and Stanford (2004) is representative of other authors – knowing based on authority, knowing based on divine revelation, knowing based on empiricism, knowing based on reason and logical analysis, and knowing based on intuition (pp. 82-83). Knowing as "holistic, intimate and shared…[within] natural settings experientially," while in accord with ecological principles, is shown as resonant with traditional Native American worldviews (p. 259). There is no relationship drawn, across the six textbooks, between a holistic, relational epistemology and issues of sustainability.

An ecological axiology extends value and questions of ethics to every member of all natural, biotic, and human system. Discussions of values and ethics are scattered throughout the six texts. This discussion represents many approaches to teaching values and ethics in the schools but limits the milieu to what happens within the confines of the

school and does not extend it to natural and biotic systems or to future generations. Ecological ethical frames are guided by caring and potential consequences. Values within a global context are referred to a few times in the texts, as in Sadker and Sadker (2005), in their listing of human values as a "domain for global inquiry" (p. 494). While environmental issues and ecology are also mentioned in this list of domains there is no offer of an approach to training learners in values or ethics that would promote sustainability thinking.

An educational system oriented toward ecological consciousness is intentional about the development of conditions and practices that reflect an awareness of the needs of the natural and biotic systems of the planet and the rights of future generations. Roles and functions of education that were mentioned by the authors have been summarized in the findings under category 9 of chapter 4. An ecological function requires educating students toward greater participation and transformational agency, honoring the diversity of all species, and a contextual understanding of ecological decision-making. All authors in the sample reference democratic participation as a goal for students. The critical theory goals of preparing people to work for social change, and teaching people to understand the economic and political forces dominating society, are referenced, but not in terms of the overarching goal of sustainability. Honoring diversity is also mentioned as a goal, but again, is limited to a discussion of multicultural issues and does not extend to non-human species. References to relevant ecological goals such as *saving the environment*, *preserving culture, protecting linguistic rights,* and *teaching the importance of community* are found intermittently in the texts but no connection is made among them; nor are they central in the treatment of purposes. The goals of preparing students for

"participation in the global economy" (Spring, 2002, p. 17) and for "promoting a healthy social order" (Ryan and Cooper, 2004, p. 9) reflect a mechanistic orientation toward the myth that progress, technology, and "getting along with each other" will save us.

An ecological view of content is informed by context. This implies a focus on an authentic relationship between what is being learned and local, personal, cultural issues and interests. Contextual elements also include past, present, and future relationships to humans and other living beings. Provisional and approximate understandings satisfy the need for knowledge acquisition, and practical skill development applied to environmental issues is fore-grounded. No explicit references to priorities for ecological contextual content were found in the texts. Some content areas are relevant to ecological consciousness such as "understanding our roots" (Sadker and Sadker, 2005, p. 252), and "building on the life-histories and experiences of micro-cultural memberships" (Johnson et al., 2005, p. 113). However, there is no linkage made between these content areas and ecological consciousness. Rather, the treatment of content priorities is dominated by references to discipline-based instruction, basic skills, requirements of standards and testing, and responding to the needs of the global economy.

Ecological learning processes foreground relationship, within content applications, place and culture, and within the classroom milieu. Learning is primarily experiential with local contextual problems serving inspiration and motivation. Dialogue is the prevailing form of communication. Participatory decision-making and an organic process of community building inform the social organization. There is no recording unit labeled *process* in the content analysis. Recording units that reflect the textbook's reference to process are included in the categories of epistemological assumptions,

definitions of effective schools, and descriptions of the school environment. Descriptions of process vary in the texts from unchanging practices of "uniformity, authority, and other traits required by bureaucratic organizations" (Spring, 2002, p. 248), to a schoolhome reflecting "safety, security, nurturance, and love" (Sadker and Sadker, 2005, p. 338), and a reflective learning environment where the student becomes partners with the teacher and "sense that the results of their work are not predetermined" (Johnson et al., 2005, p. 374). While elements of ecological process are inherent in many of the descriptions offered by the authors, there is no coherent view of how process relates to the promotion of an ecological consciousness.

From an ecological perspective the learner is seen in relationship to the environment and interconnected with all that is. *Self* and *identity* are viewed as transpersonal identification implying an awareness of this interconnection. Learners are viewed as responsible agents in their own learning; existing knowledge, beliefs, and feelings are valued. Category 12 has been devoted to recording the units of texts that reflect references to the identity of the learner. In the six textbooks, most of the references to the identity of the learner are in regard to philosophical and theoretical views. There is a dominant tendency to describe the individual in autonomous terms reflective of mechanism, rather than as relational beings. There is no reference to the transpersonal identity of an ecological consciousness.

Ideological messages in the six texts reflect values of the dominant Western capitalist culture. We find the content of education represented as driven by economic needs of the global economy; the relegation of environmental education to the science curriculum; the individual as an autonomous agent engaged in social and technological

activities; values and ethics in the classroom dominated by transmission of values through character education; the prioritization of print-based knowledge sources over oral histories and traditional ways of knowing; diversity as an issue bound by human cultural relationships; future concerns oriented toward economic forces of the global labor market, demands of a knowledge-based society, accountability and national standards, and accommodation of immigrants and non-Western cultural groups; and process dominated by uniformity, authority, and bureaucracy.

This represents an ideology of denial (or perhaps ignorance) in reference to a now limited habitat and diminishment of species, and a false sense of a manageable future secured through technology and progress. This denial is not surprising in light of the priorities of the United States government. In one example, the White House continues in its refusal to comply with the Kyoto global warming pact that calls on countries responsible for 55 percent of the world's emissions of carbon dioxide and five other gases to limit their release. The White House contends, according to Coleman of the Associated Press (2005) that "complying with the treaty's requirement could cost millions of jobs, many of them to places like India and China" (p. A7). This prioritization of economic concerns over environmental concerns parallels the twenty-first century goals of education whose focus is on preparation for a global economy, as evidenced by texts that were sampled, rather than fostering ecological consciousness in young people.

Relationship to Previous Studies of Textbooks

Sleeter and Grant (1991) brought attention to the need for inclusion of multicultural factors in textbooks, and Sadker and Sadker (1980) brought awareness to the inattention to gender equality. In the 1980 study Sadker and Sadker found that less

than one percent of teacher-education texts were devoted to the contributions and experiences of women. In Zittleman and Sadker's (2002/2003) follow-up study on gender, the seven introductory/foundations teacher-education books that were analyzed revealed 7.4 percent of content focused on gender issues. It is interesting that in Sadker and Zittleman's follow-up study on gender, a gain of almost seven percentage points in gender content was noted between the years of 1980 and 2001. My study highlights the current disconnect of teacher education from the international issue of sustainability and the development of ecological consciousness (at least in the texts studied). Five of the seven introductory/foundations books that Sadker and Zittleman (2002/2003) analyzed are earlier editions of five of the six textbooks in the sample of this content analysis. I wonder, within this context of bringing education texts in line with current social issues, why sustainability and ecological consciousness are not centrally addressed. Continuing to prepare public school teachers under the illusion that the environmental crisis is not a core issue for educators perpetuates the lack of connection between what happens in the classroom and the balance of health vs. destruction of the natural systems of the planet. In a study of undergraduate teacher training, Williams (1994) found very little in the education of teachers that would allow them to instruct in anything but an anthropocentric, pro-growth, mechanistic worldview. This is still the case for the sample textbooks of my research project.

Relationship to Other Studies on Sustainability and Education

This is the first known study to address evidence of ecological consciousness in introduction-to-education textbooks. As such, it is valuable in its connection of textbook ideology to principles of sustainability. It also brings attention to the lack of relationship

of teacher-education textbooks to the focus on teacher preparation established by the Decade of Education for Sustainable Development. Within the sphere of other studies on sustainability, ecological consciousness, or change-of-mind that were referenced in chapter 2, this study can be considered to have an interpretive approach. It provides a link between the philosophic framework of ecological principles and the tangible, although intersubjective, recording of relevant content in teacher-education textbooks. As an interpretive study, the emphasis is on a description of the findings. This description of the lack of attention to ecological principles has the potential to lay the groundwork for a reorientation of foundation texts in teacher education. The main emphasis of the study is not to focus on the dynamics of that change process and the accompanying political implications (as it would with a critical theory approach). While it is my intent to raise critical consciousness about the misalignment of teacher-education textbooks and education for sustainability, I have not set out to break down the institutional structures and arrangements which reproduce the dominant mechanistic ideologies. However, the study does bring a critical theory lens to the effort of exposing the alignment of the content of these texts with dominant Western economic and cultural frames, and it forefronts the underrepresented context of the at-risk future of the planet. Other research projects that examine taken-for-granted statements of reality for the purpose of promoting ecological consciousness and/or also bring a critical theory perspective to the promotion of education for sustainability are deemed valuable by this investigator.

Limitations of this Study

This study is limited to the content of six introductory/foundations teacher-education textbooks. There is no assumption being made that the findings here are

representative of a larger sample. In addition, despite the best-selling ranking of these texts, there is no claim being made that the instructors who adopt these texts use them in their curricula without a balance of other perspectives. The findings of this study also reveal no information about the textbooks used at this level that are not on the list of best sellers. As researcher, I made a conscious choice to forefront the development of a philosophical framework as preliminary to the content analysis. It could be that a literature review that focuses on the life-style characteristics of an ecologically sustainable culture, rather than philosophical underpinnings, might facilitate a closer correlation between the synthesis of the literature review and the categories of recording units.

An additional limitation lies in the potential for researcher bias in the recording and interpretation of the data. The tasks of developing ecological principles, choosing the recording units, selecting the textbooks, recording the data, and interpreting the findings were all done by a single researcher. The choice to not involve a second recorder and interpreter was intentional due to both the complexity of the study and the reliability standards of content analysis. The interpretation of the alignment of textual data with ecological principles, and the reading of potential openings in the recording units, are both areas of research where a deep understanding of the philosophical principles of ecological consciousness is required. Given this context, content validity and the reliability standard of stability were both employed. The concern that remains involves the potential for a single researcher with stated bias to influence the findings and interpretations. An eventual recording and interpretation by a second researcher would add to the study.

In the process of summarizing the findings of my study, I found the 11th edition of Spring's (2004) textbook. Spring's (2002) tenth edition was one of the textbooks in the sample for the content analysis. In a scan of the *Index* of the 11th edition, I notice that he includes two references to environmental science textbooks and uses them as examples of demands for censorship by the Texas State School Board in 2002. In one text, in which climate change due to global warming was referenced as an issue around which there was scientific consensus, the Board required a change of wording. Jane L. Person's *Environmental Science: How the World Works and Your Place in It,* was rejected due to the wording, "Destruction of the rain forest could affect weather over the entire planet" and "Most experts on global warming feel that immediate action should be taken to curb global warming." The Texas Board, in claiming that this was "anti-technology," "anti-Christian," and "anti-American" required a change to: "Tropical rain forest ecosystems impact weather over the entire planet," and "In the past, the earth has been much warmer than it is right now, and fossils of sea creatures show us that the sea level was much higher than it is today. So does it really matter if the world gets warmer?" (p. 247).

Spring (2004) also references a 2001 Texas Board censorship decision that singled out Daniel Chiras' *Environmental Science: Creating a Sustainable Future*. The Board attacked the text for using the "oft-used falsehood that over 100 million Americans are breathing unhealthy air" (p. 248). Spring also references support by the Texas Board for a textbook entitled *Global Science: Energy, Resources, Environment,* which, according to the Chair, represents the idea that "oil and gas companies always get a raw deal" (p. 248) in environmental science textbooks.

Spring's (2004) references to these three books are included in the context of the political forces at play in the adoption of textbooks and curricular materials. In Spring's (2002) previous edition, in representing the same topic, examples of censorship by the religious right and others involved the topics of homosexuality, lack of basic skills and drill in mathematics, and the treatment of African-Americans, Hispanics, and Asian-Americans (pp. 228-229). In 2002 there was no mention of environmental science as a target of censorship. It is interesting that Spring (2004) is now including these references. This may be a sign of hope, a representation of the early stages of a shift toward ecological consciousness. It could be that more recent editions of other texts will go further in addressing education for sustainability.

Implications for Further Research

It is possible that a larger selection of textbooks would yield a stronger basis for generalizing about conclusions. Also, an analysis of supplemental educational materials might assist in determining the range of ecological perspectives to which students are exposed. A cross-cultural content analysis of introductory/foundational textbooks would be an interesting extension of this study. Ideological perspectives in relation to ecological consciousness may be represented differently in the teacher preparation materials of other countries.

Recommendations for Implementation of the Findings of this Study

My study raises questions about the conceptual building blocks of Western culture that are reinforced through teacher-education textbooks. The ecological principles developed in this research present a framework for the transformation of teacher preparation curricula guided by ecological principles. This would include attention to the

implementation of a systems approach to curriculum design, realignment of course content guided by the question, *What do we need to conserve?,* and explicit relationships drawn between issues of economics and societal and environmental health. The work in content analysis by Sleeter and Grant (1991) in regard to multicultural issues in textbooks, and the research by Sadker and Sadker (1980) addressing gender, seems to have been incorporated into the sample texts as add-ons – language and image representation that does not ultimately change the ideological orientation of the text. What I am suggesting is a fundamental philosophical, epistemological, and axiological transformation in how the texts are structured, how language is aligned, and how education is portrayed as a *system* in relationship to other human, natural, and biotic *systems*. Sterling (2004) references the inability of a mechanistic structure to incorporate sustainability:

> [S]ustainability does not simply require an 'add-on' to existing structures and curricula, but implies a change of fundamental epistemology in our culture and hence also in our educational thinking and practice. Seen in this light, sustainability is not just another issue to be added to an overcrowded curriculum, but a gateway to a different view of curriculum, of pedagogy, of organisational change, of policy and particularly of ethos. (p. 50)

This is not an adaptive strategy, but rather requires a full response and co-participation by all members of the system. Transformation of textbooks is one piece. Deans of colleges of education and faculty must recognize that education for sustainability implies a joining of forces with policy makers in the areas of commerce, environment, health, and social issues. It is interesting that at one university with both a reputation for a *Campus-Wide Sustainability Plan* designed to integrate principles of

sustainability into community decision-making, and an excellent college of education, there is no coordinated effort within the teacher-preparation program to include ecological consciousness as a focus of its curriculum. Plans for green building designs, the recycling of food wastes from the dining halls, use of low-emissions vehicles, recycling of paper, glass, and plastics, and separate programs in environmental education are only one side of education for sustainability. If teacher-education programs are not fundamentally reoriented using ecological principles as criteria, future generations of public school students will not be as likely to develop beliefs and practices that support a sustainable future.

The ecological principles here defined from a philosophical perspective are not only applicable to the writing and publishing of textbooks. Educational systems have many venues for implementation and transformation based on these principles. I recommend that ecological consciousness together with the question, *What do we need to conserve?*, be adopted as the centrifugal forces around which decisions about teacher-education curricula are designed. The framework should be comprehensive enough to also encompass issues of diversity, culturally responsive teaching, high academic standards, global issues of economics and social justice, authentic instruction, democratic participatory classrooms of intentional community and shared leadership, integration of a relational epistemology, and the development of content reflective of relational values and ethics. An ecological framework does not have to be seen in conflict with the preparation of workers for a global economy but has the potential to work in partnership with international markets to retrofit manufacturing, technology, and social systems toward a sustainable path.

Implementation of ecological principles into the design of curricula and the composition of textbooks is not without challenges. It was not the intent of this study to explore the political dynamics of the textbook publishing industry. However, as Michael Apple (1993) reminds us, textbooks "are published with the political and economic constraints of markets, resources, and power" (p. 46). The selection and organization of topics within texts is an ideological process, one that serves the interests of particular classes and interest groups. Textbook publishers are under pressure to continually include *more* in the content of their books. Items of a progressive nature "are perhaps mentioned,…,but are not developed in depth" (Apple, 1993, p. 56). *Mentioning* is evident in this study in the treatment of topics that have the potential to be linked to principles of ecological consciousness; they are brief, scattered, and unrelated to each other or to a framework of education for sustainability.

Perhaps it is not realistic to think that the major publishing companies represented by the textbooks in this study would consider a text that replaces the Western mechanistic framework of education with one of ecological consciousness. This endeavor would require asking those who comprise the mechanistic system to change the mechanistic system. Perhaps the role of transformation to education for sustainability through print is left to trade books and journals. On the other hand, perhaps the openings that are *mentioned* in the textbooks and referred to in this study would provide opportunities for building relationships to an ecological framework. For example, all authors in the sample reference democratic participation as a goal for students in the United States. Likewise, honoring diversity is included in the discussion of multicultural education. Both of these topics could be discussed in terms of their relationship to ecological consciousness and a

connection could be drawn between them. Other potential links to principles of sustainability could be made in relation to the topics of preserving cultural traditions and protecting linguistic rights which are found intermittently in the texts. These two issues, mentioned in reference to goals, social issues, and future issues could be conceptually connected to the importance of understanding language forms and customs that encode sustainable practices and ecological forms of knowing. Epistemological, axiological, and cosmological references that *mention* philosophical or ethical frameworks based in a reality of relationship, systems thinking, and interconnectedness could serve as openings to discussion of ecological principles. Instructors who use the sample textbooks could interpret these identified recording units as opportunities for moving out of the text into the context of social, economic, and environmental sustainability.

Conclusions

Sustainability is about imagining and intentionally designing the conditions of survival, well-being, and security for all. Inherent in this effort is an understanding of the relationship of humans to the whole of creation, and an awareness of how environmental, social, and economic priorities and decision-making are relevant to the health of future generations of life on this planet. I have referenced international leadership in this effort; I hope that those of us working in institutions of Western education choose to follow these efforts. My venue for bringing attention to the issue of ecological consciousness is teacher-education textbooks. This is one of many leverage points for change in this direction. It is my hope that the systemic integration of ecological principles into teacher-education programs will eventually orient the attitudes, beliefs, practices, and ideological reference points of public school teachers in the United States. Articulation of ecological

consciousness throughout the curricula of schools of education has the potential to lay a new foundation, one that will prepare stewards of the earth.

It is my hope that ecological consciousness will be integrated into the writing and publication of teacher-education textbooks. I see sustainability not just as a feature to be added to the list of social issues or educational goals, but as a framework within which to re-orient the entire text. The transformation of which I speak requires a contextual view of education that extends to not only the multicultural richness of the community that is the school but to the relationship of students, teachers, parents and administrators to the place where they reside, to the daily decisions around purchasing and energy use, and to processes by which learning is negotiated. Teacher-education textbooks that focus on ecological consciousness would also be written with an awareness of the problematic nature of language and its inherent tendency to organize schema in terms of culturally dominant and unexamined metaphors. For example, the wording of the role of education as *preparation for participation in the global economy* is never explicitly connected to root metaphors of progress, individualism, capitalism, and commodification. An ecologically-oriented text would bring consciousness to word choice and to taken-for-granted cultural assumptions that work against ecological awareness. A relational, contextual, and ecological approach implies seeing a connection to all species whose habitat teachers and students share. It also includes a relationship to past and future generations, as well as to the workers in foreign countries who grow the food that citizens of the United States eat, and who manufacture shoes that Westerners wear.

As I examined the sample textbooks it was clear that the material I was reading was not reflective of an ecological consciousness. Instead, these texts are representative

of an educational system bound by the Western model of a progressive global economy and an industrial model of the classroom. Despite rhetoric of democratic principles and preservation of native language forms, the textbooks overwhelmingly present the motivating forces behind the educational system in the United States as the development of human capital to satisfy the needs of an international marketplace. As the now abolished President's Council on Sustainable Development reported in 1994, "Education about the environment and sustainability should be an integral part of every student's schooling" (p. 8). For teacher-education textbooks this means moving beyond the focus of culturally-responsive teaching and the global marketplace to a contextual and ecological orientation to curriculum and process. The task of orienting pre-service teachers to the profession must facilitate ecological consciousness. Textbook authors and publishers cannot remain tangential to this effort.

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Appendix A: United Nations Department of Economic and Social Affairs Division for Sustainable Development: Indicators of Sustainable Development

Table 4: CSD Theme Indicator Frameworks
Social Indicators

Theme	Sub-theme	Indicator
Equity	Poverty	Percent of population living below the poverty line Gini index of income inequality
	Gender equality	Unemployment rate Ratio of average female wage to male wage
Health	Nutritional status	Nutritional status of children
	Mortality	Mortality rate under 5 years old Life expectancy at birth
	Sanitation	Percent of population with adequate sewage disposal facilities
	Drinking water	Population with access to safe drinking water
	Healthcare delivery	Percent of population with access to primary health care facilities Immunization against infectious childhood diseases Contraceptive prevalence rate
Education	Education level	Children reaching grade 5 of primary education Adult secondary education achievement level
	Literacy	Adult literacy rate
Housing	Living conditions	Floor area per person
Security	Crime	Number of recorded crimes per 100,000 population
Population	Population change	Population growth rate Population of urban formal and informal settlements

Environmental Indicators

Theme	Sub-theme	Indicator
Atmosphere	Climate change	Emissions of greenhouse gases
	Ozone layer depletion	Consumption of ozone depleting substances
	Air quality	Ambient concentration of air pollutants in urban areas
Land	Agriculture	Arable and permanent crop land area Use of fertilizers Use of agricultural pesticides
	Forests	Forest area as a percent of land area Wood harvesting intensity
	Desertification	Land affected by desertification
	Urbanization	Area of urban formal and informal settlements
Oceans, seas and coasts	Coastal zone	Algae concentration in coastal waters
	Fisheries	Percent of total population living in coastal areas

		Annual catch be major species
Fresh water	Water quantity Water quality	Annual withdrawal of ground and surface water as a percent of total available water BOD in water bodies Concentration of fecal coliform in fresh water
Biodiversity	Ecosystem Species	Area of selected key ecosystems Protected area as a percent of total area Abundance of selected key species

Economic Indicators

Theme	Sub-theme	Indicator
Economic structure	Economic performance Trade Financial status	GDP per capita Investment share in GDP Balance of trade in goods and services Debt to GNP ratio Total ODA given or received as a percent of GNP
Consumption and production patterns	Material consumption Energy use Waste generation and management Transportation	Intensity of material use Annual energy consumption per capita Share of consumption of renewable energy resources Intensity of energy use Generation of industrial and municipal solid waste Generation of hazardous waste Waste recycling and reuse Distance traveled per capita by mode of transport

Institutional Indicators

Theme	Sub-theme	Indicator
Institutional framework	Strategic implementation of SD International cooperation	National sustainable development strategy Implementation of ratified global agreements
Institutional capacity	Information access Communication infrastructure Science and technology Disaster preparedness and response	Number of internet subscribers per 1000 inhabitants Main telephone lines per 1000 inhabitants Expenditures on research and development as a percent of GDP Economic and human loss due to natural disasters

Note. From "Table 4: CSD Theme Indicator Framework," UN Department of Economic and Social Affairs, Division of Sustainable Development, Copyright March 24, 2003 by the United Nations. Retrieved April 4, 2004 from http://www.un.org./esa/sustdev/natlinfo/indicators/isdms2001/table_4.htm

Appendix B: Categories of Sustainability Research Goals

Twenty Main Categories of UNESCO's Encyclopedia of Life Support Systems to be used for publication of the *Handbook of Sustainability Research.* The *Handbook of Sustainability Research* will be the first publication to report, document and disseminate experiences, projects and practical initiatives related to sustainability research performed by universities both in industrialized and developing nations, providing a contribution to the UN Decade of Education for Sustainable Development.

The book will be organized around the main categories of UNESCO's Encyclopedia of Life Support Systems (EOLSS), which include:

1. Earth and Atmospheric Sciences
2. Mathematical Sciences
3. Biological and Medical Sciences
4. Social Sciences and Humanities
5. Physical Sciences, Engineering and Technology Resources
6. Chemical Sciences
7. Water Science and Resources
8. Water Engineering Resources
9. Energy Science and Resources
10. Energy Engineering Resources
11. Environmental and Ecological Sciences and Resources
12. Environmental Engineering Resources
13. Agricultural Sciences and Resources
14. Food and Agricultural Engineering Resources
15. Human Resources Policy and Management
16. Natural Resources Policy and Management
17. Development and Economic Resources
18. Institutional and Infrastructural Resources
19. Technology, Information, and Systems Management Resources and include
20. Education for sustainable development

Moreover, the book will pay a special emphasis to research encompassing one or more of the Millennium Development Goals categories: poverty and hunger; universal primary education; gender equality and women's empowerment; child mortality; maternal health; HIV/AIDS, malaria, and other diseases; as well as environmental sustainability.

Note. From "Handbook for Sustainability Research: Rationale," TuTech, Hamburg, Germany. Retrieved April 4, 2004 from http://www.projekte.org/handbook

Appendix C: Woolwich, Ontario – Indicators of Environmental Health

This group of questions can be used in making decisions. *Is this decision/plan likely to:*

Build a Feeling of Community?
Create more opportunities for friendly interaction and neighbourly support among people in Woolwich Township? Support churches, service organizations, neighbourhood groups, cultural activities? Promote interaction among individuals living in the Township?

Give Voice and Choice?
Encourage all those affected, including people often left out, to participate in making decisions that affect them? Increase people's capacity to choose what's best for them?

Support Farming?
Provide opportunities for people to pursue farming, either full-time or part-time and/or to pursue other agriculture-related activities for pay or pleasure? Increase the amount of food produced and available for purchase within the Township?

Support Local Business?
Increase the quality and quantity of products and services made available to Township residents by local businesses? Increase locally available employment opportunities that include fair wages and safe and healthy working conditions? Help bring sustainable business opportunities to Woolwich Township?

Treat Waste as a Resource?
Promote the 5 R's by - Re-using local resources as much and as many times as possible? Reducing the amount of waste going to landfills and other waste disposal outlets? Recycling what cannot be reused? Replacing what has been taken (e.g. agricultural lands), so that the amount of local resources is not being diminished? Use waste products or waste treatment processes for replenishing resources that have been damaged or degraded?

Improve Community Amenities?
Promote public transit, bicycle use and other non-car modes of transport? Make main streets, byways, trails and neighbourhoods safe, healthy and attractive 'people places'? Provide good housing to people of all income levels? Ensure that people have good access to shops and stores where they can buy basic necessities?

Improve the Quality of the Environment?
Create a clean, green township? Improve soil, air and water quality in rivers, streams and wells? Preserve and maintain woodlands, wetlands, river edges, habitats and corridors for wildlife and wild plants? Encourage environmentally sound practices by businesses, industries and individuals?

Provide for People's Basic Needs?
Change people's capacity to provide for their own basic living requirements? Give access

to adequate food, clothing and shelter, clean water, soil and air, educational opportunities, assistance with care for dependent or ill family members? Provide sources of productive, safe and satisfying work with an adequate income?

Honour the Past, Safeguard the Future?
Preserve and maintain cultural resources, including rural landscapes, wildlands, buildings and street scapes that connect people to their history and to local cultural heritage? Consider the needs and interests of future generations, so that quality of life and choice for our children's children is assured?

Note. From "From the Ground Up: The Woolwich, Ontario Healthy Communities Guiding Principles." Retrieved March 6, 2005 from http://www.grandconnections.com/woolwich/principles.htm

Appendix D: Representation of Affiliate Universities, Organizations, and Publishers among Sample Textbooks

Spring, J. (2002). *American education* (10th ed.). Boston: McGraw-Hill.
Joel Spring: Faculty: New School University

Sadker, D. M. & Sadker, M. P. (2005). *Teachers, schools, and society* (7th ed.). Boston: McGraw-Hill.
Myra Sadker: Late Professor, American University
David Sadker: American University

Johnson, J. A., Musial, D., Hall, G. E., Gollnick, D. M. & Dupuis, V. L. (2005). *Introduction to the foundations of American education* (13th ed.). Boston: Pearson.
James Johnson: Northern Illinois University
Diann Musial: Northern Illinois University
Gene Hall: University of Nevada, Las Vegas
Donna Gollnick: National Council for the Accreditation of Teacher Education (NCATE)
Victor Dupuis: Pennsylvania State University

Ryan, K. & Cooper, J. (2004). *Those who can, teach* (10th ed.). Boston: Houghton Mifflin.
Kevin Ryan: Boston University
James Cooper: University of Virginia

Parkay, F. & Stanford, B. (2004). *Becoming a teacher* (6th ed.). Boston: Pearson.
Forrest Parkay: Washington State University
Beverly Stanford: Azusa Pacific University

Ornstein, A. C., Levine, D. U. & Gutek, G. (2003). *Foundations of education* (8th ed.). Boston: Houghton Mifflin.
Allan Ornstein: St. John's University, New York
Daniel Levine: University of Nebraska at Omaha

Summary of representation: Three different publishers, eleven different universities, and the NCATE are represented by the sample textbooks.