"holistic yet tangible": Embracing the Challenge of Complexity for Education for Sustainable Development

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> *The possibility of a sustainability transition becomes actual when mediated by and through ecosemiotics.*
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> *Max Oelschlaeger (in Noth and Kull, 2001, p. 232)*

Abstract
UNESCO defines education for sustainable development (ESD) as covering a broad range of issues from natural resources and HIV/AIDS to poverty reduction. ESD thus becomes a term that must be subtle yet clear, holistic yet tangible. One option for ESD, in dealing with this complexity, is to simplify its content and narrow the issues it addresses. Another more viable option for ESD is to retain a broad range of issues and related domains of knowledge while unifying the range of epistemologies it employs. The challenge then is to agree on an epistemology that is inclusive of all domains of knowledge while being practical for education initiatives in the field. This article will examine the utility of an ecosemiotic conception of the epistemological relationship between humans and nature (how we conceive of how we come to knowledge about nature), and a pragmatic method of making value judgments in helping ESD meet the challenges of complexity

Introduction
UNESCO's Draft International Implementation Scheme for the United Nations Decade of Education for Sustainable Development recognizes the need for education for sustainable development (ESD) to cover a broad range of issues from natural resources, HIV/AIDS to poverty reduction (UNESCO, 2004, p. 5). Covering such a range of issues will require a wide range of fields of knowledge, from the physical and social sciences to religion and local mythology. It is written in UNESCO's Draft International Implementation Scheme:

> No aspect of life is left untouched by the pursuit of sustainable development, just as development that is increasingly sustainable will have an impact in every part of life. Complexity and interconnectedness mean that ESD must convey messages that are subtle yet clear, holistic yet tangible, multi-dimensional yet direct (UNESCO, 2004, p. 13).

ESD curricula cannot concentrate only on one dimension, such as science in exclusion of religious beliefs, or global knowledge in exclusion of local knowledge, or vice versa. To succeed, ESD cannot afford to ignore, consciously or sub-consciously, any aspect of human culture no matter how "superfluous" or how "outright false" others may consider them (Patton, 1996, p. 82). But by aiming to be multi-dimensional and holistic, ESD risks being too cumbersome to work fluidly in the field and risks not being clear, tangible and direct.

One option for ESD is to simplify its content and narrow the issues it addresses, but this would undermine the far-ranging goals of sustainable development. ESD needs to work with the complexity of human culture, rather than try to confront it or tame it. Another option is for ESD to retain a broad range of issues and related domains of knowledge while unifying the range of epistemologies it employs. A difficulty with a wide range of domains of knowledge is the difference in theories of knowledge and meaning-making inherent in each domain. The challenge is to develop epistemologies that are inclusive of all domains of knowledge while being practical for the creation of curricula in the field.

Curricula are based implicitly or explicitly on theories of how we gain knowledge about the world and how to make judgments about meaning or value. The exact theories of knowledge and value judgment on which an education initiative is based will have a strong influence on what is taught and what is learned. To begin a dialogue this article will offer one perspective on the utility of an ecosemiotic conception of the epistemological relationship between humans and nature (how we conceive of how we come to knowledge about nature), and a pragmatic method of making value judgments in helping ESD embrace the challenges of complexity.

This article is an exercise in the development of "appropriate theory" (that is, theory that is easily learned and applied, adaptable to local contexts and encouraging of community participation) directed at promoting local community participation in the creation and implementation of ESD curricula.

History

In 1836 Ralph Waldo Emerson published *Nature*, which describes the benefits of developing a way of looking at nature as a system of signs open to an infinite number of interpretations dependent on the individual interpreter. Emerson combined this semiotic perspective of nature with a pragmatic theory of value judgment. Emerson fluidly moved from one knowledge domain to another, embracing complexity as he made connections between objects of nature and social justice, human history, ethics, religion as well as science. He viewed all interpretations of natural objects with an open mind believing that every interpretation is likely to have some value for the individual interpreter or the interpretive community. Likewise, Emerson was critical of attempts to fix interpretations of natural signs, to say that every individual should have the same interpretation of a natural sign. For example, Emerson criticized Emanuel Swedenborg, the eighteenth century theologian, for not having a more flexible attitude towards the potential meanings of natural signs. Swedenborg was open to religious interpretations of natural signs, but for him every natural sign has a one-to-one correspondence to a specific spiritual truth. Emerson writes about Swedenborg:

> He fastens each natural object to a theologic notion;- a horse signifies carnal understanding; a tree, perception; the moon, faith; a cat means this; an ostrich that; an artichoke this other;- and poorly tethers every symbol to a several ecclesiastic sense. The slippery Proteus is not so easily caught. In nature, each individual symbol plays innumerable parts, as each particle of matter circulates in turn through every system. The central identity enables any one symbol to

> express successively all the qualities and shades of real being. In the transmission of the heavenly waters, every hose fits every hydrant. Nature avenges herself speedily on the hard pedantry that would chain her waves. She is no literalist. Every thing must be taken genially, and we must be at the top of our condition to understand any thing rightly.His theological bias thus fatally narrowed his interpretation of nature, and the dictionary of symbols is yet to be written (Emerson, 1941, p. 302).

Emerson judged interpretations of signs according to how they could contribute to the improvement of individuals, rather than by any Swedenborg-like attempt to fix interpretations for all individuals.

In the 1870s, conceiving of nature as a system of signs was critical in the movement to create the world's first national parks as a means to protect natural symbols important for a U.S. nationalist identity (Guha, 2000, p. 53). This model was also at the core of John Muir's work in preserving the Sierra Mountains in a large part for their spiritual symbolic worth.

At the turn of the twentieth century, nature study was quickly growing into one of public education's first national reform movements. Nature study developed as a semiotic epistemology that incorporated a broad range of interpretations of natural objects, from scientific descriptions to moral teleology**.** But some education leaders with a theory of knowledge based in objectivity clashed with nature study. This debate culminated in the 1932 publication of the yearbook of the influential National Society for the Study of Education which strongly recommended that nature study be effectively ended, to be replaced by a more objective approach to nature under the name elementary science (Arnold, 1976, p. 99). Almost one hundred years after Emerson first articulated his semiotic perspective in *Nature,* its significance in conservation and education was quickly fading, being criticized relentlessly for being too inclusive of a wide range of domains of knowledge, too "subjective" and too complex.

During the 1960s, environmental education adopted elementary science's objective approach to knowledge of nature, without much discussion about alternative epistemologies. Thus, environmental education adopted the only remaining widely utilized theory of knowledge in education, the general objectivist model. Environmental education has succeeded within its limited realm, which is best suited for teaching about environmental problems and the human/nature physical relationship from a physical and social science perspective.

Both through inertia and the deeply ingrained epistemology of the scientific method, ESD risks following environmental education by grafting itself upon an objectivist model. Discussion about what theory of knowledge and method of value judgment ESD should cultivate may help ESD avoid the internal schisms that plagued nature study and it may also help ESD avoid the epistemological confinement environmental education finds itself within. Unlike environmental education, ESD is still in its early stages and has some ability to choose which epistemology or combination of epistemologies would best serve its needs.

An Ecosemiotic Theory of Knowledge

One concern is that ESD may inherit from environmental education a conception of our epistemological relationship with nature that would undermine any goals of inclusivity and respect. Environmental education is firmly founded upon a "spectator theory of knowledge" where observers are believed to sit passively outside of nature "getting the view of a spectator," as John Dewey's wrote. According to Dewey:

> There is something both ridiculous and disconcerting in the way in which men have let themselves be imposed upon; so as to infer that scientific ways of thinking of objects give the inner reality of things, and that they put a mark of spuriousness upon all other ways of thinking them, and of perceiving them and enjoying them (Dewey as quoted in West, 1989, p. 98).

"Scientific ways of thinking of objects" has led to attacks on other forms of knowledge, leading to a loss of complexity. UNESCO, in a similar spirit of Dewey, acknowledges the importance of:

> Recognising and working with culturally specific views of nature, society and the world, rather than ignoring them or destroying them, consciously or inadvertently, in the name of development (UNESCO, 2004, p. 13);

A key component of any theory of knowledge where objectivity is the aim is the belief in de-cultured knowledge, which implies that objects and processes of the natural world can be only known as they really are through methods designed to de-culture our knowledge. If we remove our subjective biases inherited from our own cultures we can rise above culture and arrive at a universally recognized "real" understanding of nature. This belief in a de-culturizing process necessarily devalues local culture, including local views of nature. William Cronon writes that knowledge about nature cannot be de-cultured:

> Ideas of nature never exist outside a cultural context, and the meanings we assign to nature cannot help reflecting that context. The main reason this gets us into trouble is that nature as essence, nature as naïve reality, wants us to see nature as if it *had* no cultural context, as if it were everywhere and always the same…If we wish to understand the values and motivations that shape our own actions toward the natural world,…then the nature we study must become less natural and more cultural (Cronon, 1996, pp. 35-36).

An alternative to the habit of viewing the world through the lens of a spectator theory of knowledge and viewing "nature as naïve reality" is an ecosemiotic theory of knowledge. Mediation, not observation, is the operative action. Knowledge of nature is thought of as gained through the mediation of signs. Ecosemiotics is defined by Winfried Noth as, "...a theory of how human culture interprets nature. Ecosemiotics in this vein is hence the study of the culturalization of nature" (Noth, 2001, p. 73). The ecosemiotic model subverts the fantasy/fact debate, recognizing that all knowledge of nature is mediated by an active mind embedded within a particular culture.

The ecosemiotic theory of knowledge is informed by C.S. Peirce's theory of signs. The three elements of signs according to Peirce are object, representamen (or representation in less technical phrasing) and interpretant (or interpretation). For example, a sign mediates between an object in nature (or a thought before the mind) and the interpretation of the object. The sight of a tree is a representation of the actual tree (the object). The interpretation (interpretant) of the representation of the tree could be in the form of an attitude, emotion, past memory, religious belief, scientific description, etc. The interpretation of a sign has a direct consequence on both actions of the individual and the individual's future use of signs.

According to Peirce, "A belief is an habitual connection of ideas (Peirce, 1931, p. 218)." and "…a belief is itself a habit of the mind by virtue of which one idea gives rise to another (p. 215)." A belief is a habit of the mind, which occurs when one idea habitually gives rise to a second idea. From an ecosemiotic perspective, talk of changing attitudes or values is ultimately about changing what interpretations habitually arise in relation to particular objects. For example, an educator could help encourage people to habitually associate the sight of a tire full of stagnant water with the idea that this could be a potential breeding ground for malaria carrying mosquitoes or to habitually associate the sight of a condom or word "condom" with the idea of a necessary way to prevent the spread of HIV/AIDS. ESD can be seen as trying to change the way people "read" their local environment, encouraging as habits of mind the association of interpretations (consistent with sustainable development) with objects they see in their daily lives. By continuously asking what objects, interpretations and representations a particular issue means in the local environment, educators can keep ESD curricula clear, tangible and direct.

Pragmatic Method of Value Judgment

Applying an ecosemiotic theory of knowledge to ESD requires a method of judging the value of particular interpretations of objects, such as water filled tires. ESD must have a way to decide which interpretations are to be encouraged within education initiatives. ESD has specific goals and aims and cannot be content with a purely open ended discussion of the diversity of interpretations. But at the same time ESD cannot survive on a purely objective theory of truth, where value is based on some sense of "truth" in relation to "reality" rather than based on practical consequences of beliefs. A pragmatic method of value judgment may prove to work well for ESD in conjunction with an ecosemiotic approach. A pragmatic method of ascertaining value of interpretations would judge not in reference to any notion of an external reality, but rather based on consistency with the aims of sustainability.

Judging either the meaning or value of beliefs based on consequences rather than the power to explain reality is the basis of American pragmatism, which not coincidently was first formally theorized by Peirce but has its roots in Emerson. Pragmatism for Peirce was a theory of meaning based on potential consequences of specific beliefs and was later adapted by John Dewey to be a method for making value judgments. Peirce wrote:

> The intellectual significance of beliefs lies wholly in the conclusions that may be drawn from them, and ultimately in their effects upon our conduct (Peirce, 1931, pp. 218-19).

Following Dewey's instrumentalist adaptation of pragmatism, the question to be asked is what practical consequences might conceivably result as a consequence of having a particular interpretation of objects in the local environment? If the practical consequences are consistent with the aims of sustainability, then the interpretations should have value for sustainable development and thus for ESD.

The question that should be continuously open for debate then becomes how to know whether or not a specific interpretation is consistent with sustainability? What are the guidelines for sustainability and who is to decide what is sustainable?

Applications

As conceptualized in this article, a semiotic/pragmatic perspective will not resolve any conflicts between knowledge domains such as science and religion. But it can be used as an effective cultural tool to foster dialogue that is inclusive of all knowledge domains while keeping discussion away from debates about "truth."

A semiotic/pragmatic perspective may be offensive to some domains of knowledge; for instance, some religious leaders may not want to say that theirs is just one of many possible interpretations, or scientists may not want to give up debating about their power to explain reality. This semiotic/pragmatic perspective is a tool for discussion and not any claim of truth. It is a useful way to keep dialogue focused on the goal of sustainability as the standard for making value judgments and to keep dialogue grounded in objects in local environments and people's daily "reading" or interpretations of these objects.

A semiotic/pragmatic perspective can help dialogue structured by an inclusive framework, rather than from the framework of any one knowledge domain. This lessens the need for participants to compete with other cultural fields for relevance and importance in the dialogue as may happen when an observation from a religious perspective is made during a scientific discussion, or vice versa. This also decreases the need to move discussion from one knowledge domain to another, which can disrupt dialogue and create spaces where stakeholders speak past each other. With a semiotic/pragmatic view, the discussion across cultural fields can be about different interpretations of natural signs that various stakeholders have and the value of various interpretations for ESD.

Community participation in curriculum creation

On a local level, ESD needs to be effective doing open-ended Participatory Learning and Action (PLA) exercises as well as more focused pre-designed individual initiatives focusing on a set of related issues. PLA is used to refer to a range of participatory methodologies, including Rapid Rural Appraisal and Participatory Rural Appraisal, designed to rapidly assess the needs of local communities while at the same time empowering community members to act on their behalf using local and global knowledge and technology.

I will provide one example of how the ideas discussed in this article could be applied to ESD with the understanding that there are countless other ways to apply it. In this example, a PLA exercise is used to promote community participation in the creation of curriculum.

Asking which objects in their local environment have particular value to them collectively or as individuals could start an activity. From the onset, the educator should make it clear that she is not searching for objective truth as grounded in any "scientific expert" conception of reality. No interpretation will be dismissed as "non-scientific" or "false." Instead she is asking about any meaning or interpretation of any object found locally that an individual feels has particular importance for their community. The presumption is that after continued discussion the more meaningful objects to the local community will be elucidated, whether their meanings are important for the preservation of their local culture or whether they signify problems the community faces such as HIV/AIDS. For example, the objects identified could range from a tree considered sacred to mosquitoes as vectors of disease to a practice such as the harvesting of rice.

Then the objects could be mapped showing their location in the local environment. The group using the map could visit the objects and discuss their interpretations of the objects. Asking what idea, feeling, emotion, story, memory etc. comes to mind when they perceive the object, such as a local tree or water well, could be a part of this process.

The next step would be to introduce the concept of sustainability, discuss general problems and solutions related to sustainable development such as agriculture or health issues and how sustainable development depends on strong economies, social health and a flourishing environment.

The interpretations could then be categorized by participants according to whether they signify problems or solutions related to sustainable development or if they are more neutral when it comes to sustainable development. Each object identified as signifying a "problem" and each object signifying a "solution" could then be further broken down into the three pillars of economy, society and environment. At this stage the educator may introduce as options open for discussion some outside knowledge of possible problems and/or solutions in the form, for example, of a technology or practice. For example, a water-filled tire could be introduced as a "problem" object related to malaria and a properly disposed tire as an object that is a "solution." Participants would be asked what are the economic, social and environmental causes of the problem? What are some economic, social and environmental aspects of the solutions? Thus, each meaningful object relevant to a problem or solution for the local community could have added to it multiple layers of meaning derived in dialogue with community members that put the problem and solutions in larger context.

Next participants would begin to make connections between various objects, interpretations, the three pillars, issues, problems and solutions in order to develop a few general themes that could form the framework of a local curriculum. If this bottom-up process is carried through, then the abstract themes of a curriculum could always be

readily reduced to specific objects found in the local environment. The curricula should not remain static, but rather community members should be encouraged to meet and discuss the addition of new representations or new interpretations to existing representations as signs grow and evolve.

School-wide applications

ESD could also be taught as a habit of mind that can be applied to any subject. Applying a semiotic/pragmatic perspective to a school's curriculum, children could be encouraged to ask themselves the value of what is being taught relative to a concept of sustainability they have in their mind. "We are being taught x and y are possible interpretations of these objects, are these consistent with sustainability?" Students should be encouraged, on an ongoing basis, to locate objects of significance in their local environment and to come up with interpretations from various domains of knowledge and from the three pillars of economics, society and environment, to be shared with other students and community members. Again, the interpretations' value for sustainability should be open for debate.

Conclusion

The challenge of complexity for ESD can be summed up in that one statement in the UNESCO Draft Implementation Scheme: "Complexity and interconnectedness mean that ESD must convey messages that are subtle yet clear, holistic yet tangible, multi-dimensional yet direct (UNESCO, 2004, p. 13)."

Attention to local culture and worldviews will help develop messages that are subtle, in using references to local culture yet clear in the lesson deemed necessary for sustainable development. A semiotic approach to ESD will provide both room for all ranges of human experience, thus being *holistic* and *multi-dimensional*, yet remain grounded in actual natural objects and processes. Discussion of interpretations and values of local objects and processes will keep the learning and teaching grounded and *tangible*. A site of erosion can be visited, touched, sensed and at the same time interpreted on a variety of levels: from what science knows about erosion, to local experience with erosion and local practices that abate erosion, to any particular religious relevance of the mountain or hillside. With a semiotic approach to nature, participants can tangibly touch the "subject" while flowing from one level of meaning to another seamlessly without presumption of any one domain of knowledge's way of interpreting or attributing meaning to the subject privileged over others.

The spirit of Emerson and the complexity of human culture can be found in education initiatives around the world that hold a renewed sense that sustainable development in the coming decades will require the application of the full complexity of human experience, expression and emotion. Working in this spirit is the Andean Condor Conservation Project in Argentina, whose director Luis Jacome, recently remarked, after releasing captive bred condors accompanied by the sounds of chanting, flute playing and shell blowing and the sight of children throwing feathers into the air, "Letting them go is a symbol of the condors who once flew here. It is important to Argentina both culturally and ecologically (Nichols, p. 2005)."

References

Arnold, J. (1976). *Nature Study: An Analytical History of its Demise*. Master's Thesis, Ithaca, New York: Cornell University.

Cronon, W, ed. (1996). *Uncommon Ground: Rethinking the Human Place in Nature*. New York: W.W. Norton.

Emerson, Ralph Waldo. (1941). *The Works of Ralph Waldo Emerson*: *Four Volumes in One*. New York: Tudor Publishing.

Guha, R. (2000). *Environmentalism: a global history*. New York: Longman.

Nichols, V. (Jan. 27, 2005). "Returning Condors To The Wild." CBS News. from http://www.cbsnews.com/stories/2005/01/27/world/main669911.shtml

Nöth W. and Kull K., eds. Semiotics of Nature. *Sign System Studies*. 29(1) 2001.

Patton, L. and Doniger, W., eds. (1996). *Myth and Method*. Charlottesville: University Press of Virginia.

Peirce, C.S. (1931). *Collected Papers of Charles Sanders Peirce Vol. 7.* Cambridge: Harvard University Press.

Simpson, F. (2002). Conjunctive use of water resources in Deccan Trap. *Best Practices on Indigenous Knowledge II.13* from http://www.unesco.org/most/bpik13-2.htm.

UNESCO, (October 2004). United Nations Decade of Education for Sustainable Development 2005-2014, Draft International Implementation Scheme.

West, C. (1989). *The American Evasion of Philosophy: a Genealogy of Pragmatism*. Madison, Wisconsin: University of Wisconsin Press.