Ecojustice Pedagogy

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Ecojustice in Science Education

Ecojustice philosophy merges social and environmental justice theories by emphasizing physical, spiritual, and emotional connections between an environment and the residing social group. It is concerned with environmental issues in a variety of ways including equity in relation to non-Western cultures, abuse of indigenous groups through land exploitation, economic prosperity in conjunction with land use, and modification to the environment in other ways that benefit particular lifestyles. Researchers such as Bowers (2002), Mueller and Tippins (2011), and Sachs (1995) present ecojustice philosophy as a way to make the global more local and encourage decision-making skills across intergenerational contexts. In terms of science education, these researchers maintain that ecojustice philosophy can help in creating democratic environments with learning taking place as a mediated process to encourage participation and action by multiple parties. They further emphasize that it can open the door to learning in different contexts while maintaining a focus on the relationship between society and ecological awareness, preservation, and sustainability.

What Are the Basic Tenets of Ecojustice Philosophy?

Ecojustice philosophy attempts to balance the tensions between cultural systems and environmental systems by analyzing what resources should be conserved and how the use of these resources can be less taxing on ecological and cultural systems. Three distinct components of ecojustice philosophy which make it unique are a focus on cultural assumptions and challenging these, a deeply rooted belief in local action, and an opportunity for the voice of the other to be recognized.

Challenging Cultural Assumptions

A key aspect of ecojustice philosophy is an awareness of cultural assumptions with the recognition of how they influence both thought and action in relation to "others." Foundational beliefs derived from our lived experiences, cultural knowledge, and traditions shape our actions, behaviors, and values. Ecojustice philosophy encourages the uncovering of our cultural ideas and analysis of those assumptions. From this perspective, it is only when value is acknowledged as existing outside of our known that we can begin to enact the actions of promoting justice. In terms of ecojustice, enacting a different mindset comes when what is seen and felt challenges what was thought to have been the ideal. The idea of challenging assumptions is enhanced by the emphasis on local, promoting a view from within which can possibly allow change to occur more readily.

Local Action and Intergenerational Knowledge

Ecojustice philosophy is informed by a belief in the importance of local action and knowledge which can foster responsibility, develop ownership, and encourage involvement and awareness for others. When action represents the "safekeeping" of what is known, the door is then opened for encouraging how individuals might contribute to the protection of the other. At the local level, action allows for familiarity and investment. Sachs (1995) shares several examples of large-scale environmental projects which were implemented and enforced because of a local belief that areas needed protection. When action is implemented by individuals unfamiliar with the community, the cultural use and value of that area are often overlooked. From an ecojustice perspective, local needs should be considered before large-scale decisions are implemented, with an emphasis on involving

local citizens to enact policy for their own community. Ecojustice philosophy promotes local action, highlighting contextually specific knowledge that can only be ascertained when there is direct contact with a people and place, with experiences that span generations. A focus on making the local paramount allows for *all* to have a voice; the place, beliefs, customs, and nonhuman inhabitants are heard together with the people.

Empowering the Voices of the Disenfranchised (People or Places)

Inherent within ecojustice philosophy are the personal interactions that promote a voice which is inclusive of living and nonliving, the visible and the invisible. In this sense, ecojustice calls for the equitable sharing of resources between all individuals on the planet, not just humans. This means that when decisions for "progress," "development," and "growth" are considered within a community, society will have to look beyond just the needs of *Homo sapiens* and consider the requirements of other species and ecosystems that will be impacted by such actions. Ecojustice philosophy extends social justice theories to argue that the inequitable distribution of power that ranks humans over nonhuman species or even some humans over others (related to class, race, gender, etc.) is unjust but is passed on through cultural norms such as language. Thus, ecojustice philosophy aims to create an intersection for teaching and environmental equity with science content, process, and pedagogy.

Other Dimensions of Ecojustice Philosophy

Ecojustice philosophy is grounded in uncertainty theory which acknowledges the degradation of Earth's resources as a result of human actions such as consumer-focused lifestyles, overutilization of technology, and the commodification of nature. Bowers (2002) claims that most citizens of Western culture fail to recognize that their consumer-oriented lifestyles, which are explicitly and implicitly encouraged by their society, are directly related to the decline of environmental and/or ecosystem health. Furthermore, according to Bowers, the formal education system is often a powerful force in maintaining the status quo of consumerism and globalization. Ironically, it can also be one of the most promising forces for developing in students a deeper understanding of how these cultural norms are negatively impacting the environment.

What Is the Role of the "Commons" in Ecojustice Philosophy?

In order to embrace a holistic view of sustaining other cultures and the Earth's natural systems, ecojustice philosophy emphasizes the importance of communities working to protect and revitalize their cultural and environmental "commons." The concept of the "commons" is multifaceted in nature. According to Bowers (2002), the commons, historically, were the environmental aspects of the community required for subsistence: pastures, forests, lakes, streams, etc. In other words, the commons were the aspects of the environment that citizens depended upon to provide for their families. More recently our understanding of the commons has expanded to include more intangible items: air, language, narratives, craft knowledge, and technology, to name a few. These are aspects of the community and culture that are common to the majority of individuals of an area even though they are not "owned" by any one person and cannot be bought. What is important from an ecojustice perspective is the way in which human cultural practices and natural systems interact. An understanding of the ways in which the cultural and environmental commons intersect requires teachers and students to develop thoughtful awareness of cultures and traditions that both sustain and oppress social and ecological well-being. In today's world, this is essential as more and more knowledge generated within the commons becomes enclosed and vulnerable to extinction.

Ecojustice Philosophy Framed Within Science Education

Martusewicz et al. (2011) describe the important role that science teachers play in helping their students become "aware of the rich practices

and knowledges-the assets-in local communities, involving their students in work that is focused on protecting independent relationships that are part of the intricate living systems" (p. 20). In this way, an ecojustice philosophy argues that educating individuals is a critical aspect of ensuring resource availability for future generations, the revitalization of the commons, and development of a more just society. Of course teachers need to be educated themselves about matters of ecojustice and sustainability in order to teach about them in ways that are embedded in the local community.

In science education, several important pedagogical trends have emerged in recent years that reflect the basic tenets of ecojustice philosophy: place-based education, citizen science, and socioscientific issues and reasoning. Place-based education focuses on grounding learning in local phenomena and students' lived experiences. For teachers, and by extension their students, this means forming meaningful connections to other people and the community or the environment in which they live. These personal connections actively work against the forces of globalization which act to enclose the cultural and environmental commons. Citizen science is another ecojustice pedagogy which is uniquely situated to bridge the growing chasm between professional science and science education. Traditional top-down approaches to citizen science involved local individuals in collecting data for the projects of scientists with little opportunity to participate in the formulation of questions or analysis of data with relevance to local issues. The more recent movement toward the "democratization of citizen science" (Mueller et al. 2011) has provided exciting opportunities for students to view science as something to which all individuals can contribute, for example, through environmental monitoring and habitat restoration projects. This reconceptualized citizen science movement (referred to by some as the public participation in science) repositions teachers and students as producers of scientific knowledge and legitimate members of the extended scientific community. Socioscientific issues and reasoning about these have also been characterized as a pedagogical approach consistent with ecojustice philosophy. Socioscientific issues are social dilemmas with conceptual or technological links to science that require students to engage in a degree of moral reasoning or evaluation of ethical concerns in the process of arriving at decisions regarding possible solutions. Increasingly, as science educators work toward a philosophy of ecojustice which recognizes uncertainty thinking and values cultural pluralism, intergenerational knowledge, and narratives, other pedagogies will be recognized as alternatives to a decontextualized science education.

New Pathways and Directions: The Importance of Mindfulness in Ecojustice Philosophy

How can science educators help students process experiences and question their assumptions in ways that increase awareness and knowledge of others? Research shows that students are more apt to apply knowledge in this way when principles of mindfulness are part of the instructional framework (Frauman 2010). To encourage mindful behavior, hypothetical "what ifs" become especially useful. Rather than promoting a set of rules that will be adopted as second nature, mindfulness research points to the need for increasing the level of thought behind particular actions. In this regard, science educators should propose situations that require student action and allow time and opportunity for dialogue for determining what should happen, rather than presenting things as resolved with little thought as to how they came to be. Mindfulness includes greater exposure to specific settings and consists of higher-order considerations for relationships. Mindful thinking enhances awareness for multiple perspectives, highlights relationships to immediate surroundings for more personally relevant interactions, and includes group responsibility that in turn encourages ownership and greater concern for the local.

Mindfulness is a crucial learning outcome which has been linked to co-generative dialogue. Co-generative dialogue involves multiple stakeholders in conversation that expands the base of

knowledge and recognizes the diversity in voices which are intimately associated with creation and recognition of knowledge. Co-generative dialogue encourages mindful behavior and aligns with ecojustice philosophy by increasing awareness of the other and enabling the voice of the disenfranchised to be recognized as equal and valuable, through group dialogue and deliberation. Mindful behavior is an expected outcome of group interaction when there is a moderating voice, but what happens when participants are encouraged to undertake self-analysis and dialogue occurs within rather than between? Within ecojustice philosophy, both self and group encounters play a role in how understanding develops. Yet, mindfulness is more likely to be based on individual perceptions rather than knowledge and beliefs established as truths by the group. Within science education, specifically within the frame of ecojustice, mindfulness can be encouraged by promoting engagement within the familiar and providing the opportunity to question what is often common. Meaningful encounters within the local that include open and continued dialogue, in and about these spaces, enable knowledge of self, the unheard, and the experiences of the communal whole to be further developed.

Implications of Ecojustice Philosophy for Twenty-First-Century Learners: Some Challenges

In a time when youth in industrialized countries are very commonly more disconnected from the natural world than any previous generation in human history, ecojustice philosophy has great potential for making a difference in the way educators frame twenty-first-century science education around principles that may challenge traditional conceptions of scientific literacy. How does one both encourage community involvement in ways that increase the dialogue between partnering groups and multiple generations and decrease vulnerability to outside (and often opposing) forces, forces which deemphasize the value found in locally constructed knowledge?

There are challenges educators often face when attempting to implement reforms informed by ecojustice philosophy.

Challenges

The personal involvement at the heart of ecojustice philosophy makes it very appealing, even when the drawbacks of language, context, and "local" are considered. One of the greatest obstacles involved with ecojustice philosophy is the lack of a shared language, an open dialogue in which all players have equal value and voice to enact change. An open forum for dialogue would provide the common ground necessary for shared knowledge essential to cultivating students equipped to make informed decisions and participate more fully in advocating for Earth's natural systems and other affected parties. Without consistency in the conversation and without the existence of a continued conversation, ecojustice philosophy may never be utilized to its fullest. Learning networks must be built between the school and community as a starting place for conversations which value locally constructed knowledge and experiences.

Ecojustice philosophy is both situational and contextual which poses an additional challenge. It is situational in that opportunities exist in location and relation to something and contextual in that experiences of one event happen within specific parameters that cannot often be replicated. Having an experience and hence beginning understanding of one event may enable meaning to evolve, yet the specific actions are not always replicable elsewhere. These situational and contextual aspects limit transferability and make enactment of ecojustice philosophy challenging. Decontextualized international, national, and state standards, in particular, are troublesome issues for ecojustice and place-based reforms. While ecojustice alternatives are starting to stimulate science education reforms in the directions argued above as appropriate, they may be limited by the significance of how local matters are viewed by policymakers. Teachers and students, in many cases, are often displaced by the priorities of high-stakes tests. This is

a predicament which deemphasizes or ignores the responsibility of schools to cultivate students who can participate fully in local decision-making.

Another challenge to using ecojustice philosophy involves its focus on local issues and the emphasis on growing community knowledge so as to avoid being vulnerable to outside influence, such as harmful new industry or economic imperatives that undermine the greater good of the "whole" community. With such interference, knowledge held within a community does not necessarily get passed to future generations. This intergenerational aspect of ecojustice philosophy carries with it the question of how wisdom is imparted to other generations. What relationship must develop between the community and school to encourage solidarity, scientific literacy, and action when outside forces oppose what is best for the local? A continuing challenge in current science education rhetoric is the isolation of school from the local community. While this is not insurmountable, it can prove difficult to connect the voice of the student, local ecosystem, elder, business person, and concerned citizen. Ultimately, for schools in the twenty-first century to capture the meaningful purposes of educational reforms that reflect ecojustice philosophy, teachers and students must be repositioned as producers of science and participants in ecological decisions.

Cross-References

- Citizen Science
- Cultural Influences on Science Education
- Discourse in Science Learning
- Immersive Environments
- Knowledge-Building Communities
- Meaningful Learning
- Public Engagement in Science
- Science for Citizenship
- Social Epistemology of Science
- Socioscientific Issues
- Sustainability and Science Education

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E-Learning

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Keywords

Online learning

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E-learning (electronic-learning) refers broadly to the use of information and communication technologies for the electronic delivery of instructional content and the support of educational processes. Computer-supported learning can vary from being completely "self-paced," with