



**Feeling Green: Linking Experiential Learning and University
Environmental Education**

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Abstract

While university education about the environment has existed for centuries, it has been criticized for being reductionist and empirical. Subjects such as biology, chemistry and geography have instructed students with regard to the fundamental principles of nature, but have failed to promote an understanding or appreciation for the environment as a whole. Experiential learning, or learning by doing and reflecting, is an excellent tool that can facilitate this process. This paper will present a brief review of environmental education, discuss experiential learning literature and illustrate how the two can be linked. The argument underlying this conceptual paper is that environmental studies and science courses in institutions of higher education can be enhanced through experiential learning, and that such an approach to education would better prepare students to address the environmental problems of the future.

Introduction

Our world is changing. The earth that supports all kinds of life is slowly becoming inhospitable for human beings. While we may not feel minute changes in global temperature, personally witness the disappearance of species, or understand how deforestation affects individual livelihoods, the degradation of the environment is real and must be addressed if we are to assure our survival. Institutions of higher education may be able to help in the preservation of the earth and of humanity.

While education about the environment has existed for centuries, it has been criticized in the past for being reductionist and empirical (Fien, 1988; Orr, 1995; UNCED, 1992). Subjects such as biology, chemistry and geography have instructed students on the fundamental principles of nature, but have failed to facilitate an understanding or appreciation for the environment as a whole.

Often those who do comprehend our plight intellectually cannot feel it, and hence they are not moved to do much about it. This is not merely an intellectual failure to recognize our dependence on natural systems, which is fairly easy to come by. It is, rather, a deeper failure to join intellect with affection and foster loyalty to particular places, which is to say a failure to bond minds with nature (Orr, 1996, p. 11).

Although there are some exceptions, it is widely believed that university science teachers have neglected to illustrate the connection between human beings and their natural surroundings, and have, therefore, produced students who can not adequately deal with today's environmental crises (Orr, 1995; Palmer, 1997; Schwass, 1986; Smith-Sebasto, 1997). The responsibility for the amelioration of environmental problems does not lie within the hands of one discipline alone. For the purposes of this paper, the scope will remain at the level of environmental studies and science faculties. These faculties and departments must avoid the passive role that is often assigned to students by traditional teaching methods, such as lecturing, and find new approaches to learning in order to adequately prepare students to deal with the environmental realities of our future.

No amount of preaching to the citizenry about the perils of a polluted environment, the dangers of irresponsible disposal of wastes or deforestation and the benefit to mankind [sic] of greening the environment will make people act to seek to forestall environmental degradation unless they are imbued with a deep concern for the common good, a sense of responsibility for maintaining a balanced and healthy ecosystem and a strong drive to achieve harmony with nature (UNESCO, 1990, as cited in Clover, Follen & Hall, 1998).

Experiential learning is an excellent tool to facilitate this process of preparing students. It attempts to create a connection between the learner and the content being taught by involving the student in reflection on his or her experiences. It has been defined as "a process through which a learner constructs knowledge, skill, and value from direct experiences" (Journal of Experiential Education, 1994, as cited by Luckman, 1996).

This paper will present a brief review of environmental education, discuss experiential learning, and illustrate how the two can be linked. The argument underlying this conceptual paper is that environmental studies and science courses in institutions of higher education can be enhanced through experiential learning, and that such an

approach to education would better prepare students to address the environmental problems of the future.

What Is Environmental Education?

In the past, environmental education was limited to specific scientific disciplines such as chemistry, biology and geography. Environmental education today is seen as more holistic, integrating many traditional disciplines into one. Defining this new vision of environmental education can be a great challenge as it is often used broadly and has various meanings for different teachers, facilitators and practitioners. The following are examples of definitions:

Environmental education is learning that develops a productive relationship with the natural world (Randle, 1989);

Environmental education is both a vision and a process that involves learning for change (Clover, Follen & Hall, 1998);

Environmental education is a process for aiding people to become environmentally knowledgeable and skilled in working towards achieving a dynamic equilibrium between quality of life and quality of the environment (Hungerford, Peyton & Wilke, 1980); and

Environmental education is the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the inter-relatedness among humans, their culture and their biophysical surroundings (IUCN 1970).

In 1977, the United Nations Environment Program (UNEP) and the United Nations Educational, Scientific and Cultural Organization (UNESCO) met in Tbilisi, USSR at the Intergovernmental Conference on Environmental Education in order to establish the goals and objectives of international environmental education programs. The following three goals were agreed upon: to foster an awareness of the environment; to provide every person with the opportunity to acquire the skills needed for environmental protection; and to create positive patterns of behaviour towards the environment (UNESCO-UNEP, 1978). The objectives were listed under five categories. These included the creation of awareness for the environment; helping students gain knowledge in a wide variety of environmental experiences; aiding students in developing feelings of concern towards the environment; helping students acquire the skills for identifying, investigating and solving environmental problems; and providing students with opportunities to actively participate in the resolution of environmental problems (UNESCO-UNEP, 1978). It is important to note for further discussion that experiential learning theory could help students and teachers achieve these objectives.

While there has not been one single, agreed upon definition for environmental education, current literature has highlighted the commonalities that exist in environmental education theory and initiatives. The three main tenets are education about the environment; for the environment; and in the environment.

Education About The Environment

It is essential first for students to comprehend how the earth functions. Environmental education must, therefore, begin with a basic understanding of the natural world. Theories of ecology, chemistry, and biology, covering subjects such as the carbon cycle, population theory, the water table, the laws of thermodynamics and the concept of biodiversity are all relevant topics of discussion. Yet it is equally necessary for students to understand the impact human beings have on the natural environment they are learning about (Queensland Board of Teacher Registration, 1993; Randle, 1989; UNESCO, 1980). Environmental education must also consider philosophical, political, economical and socio-cultural factors that influence how we affect the environment. Discussion evolves from basic principles of science to issues of human neglect, deforestation, loss of biodiversity, climate change, nuclear power, ozone depletion and climate change. Environmental education enables learners “to understand the complex nature of the environment as it results from the interaction of its biological, physical, social, economic and cultural aspects” (UNESCO, 1980, p. 23). Education about the environment makes it possible for individuals to understand and reconnect with their natural surroundings as well as realize the impact they have on it.

Education For The Environment

A basic understanding of natural and human systems alone does not constitute environmental education. Brookfield (as cited in Nesbit, 1998) suggests instructing and facilitating in universities is to “teach to change the world” (p. 158). Education is seen not only as a way to improve oneself, but also as a means for social change (Cranton, 1992; Dewey, 1960; Nesbit, 1998). Education transcends the mere acquisition of knowledge and becomes learning for the environment. Environmental education applies this by motivating and empowering individuals to participate in ethical practices, in environmental improvement and in the protection of the earth (Hungerford, Peyton & Wilke, 1980; Orr, 1992; Schumacher, 1973). It is an essential component to the development of environmental stewardship, helping students acquire environmental respect and interest, as well as a concern for future generations. It is vital for achieving environmental and ethical development in individuals as well as facilitating social change. In environmental education, students not only learn about the environment, but are encouraged to translate their concerns into behaviour for the environment.

Education In The Environment

To fully understand how natural systems function, and to develop a sense of environmental concern, students must also have the opportunity to experience the environment. This means using both outdoor natural and built environments as both teachers and classrooms. It does not matter if lessons take place in a city, forest, a prairie farm or mountain lake, as long as it involves a particular phenomenon to be observed such as processing on landfill sites or clear-cutting in the forests. Education in the environment helps develop skills of observation, identification and aesthetic appreciation. While it is recognized that classes within a university setting cannot always

be held in nature, one or two experiences can help link learning in the classroom with direct experience.

Education About, For, And in the Environment

The idea of education about, for and in the environment is not new. The term environmental education can be traced back to 1948 when the International Union for the Conservation of Nature and Natural Resources (IUCN) met in Paris (Disinger, 1983). However, it is only since the late 1960s that environmental education has gained more credibility with institutions of higher education and has been debated and promoted on a global level (Palmer, 1987). Society is beginning to understand that the future of humanity relies on the ability of citizens to anticipate, recognize, prevent, analyze and cope with environmental problems. If environmental education within a university setting is going to foster in students a responsibility for the environment and provide the impetus for social change, a paradigm shift in curriculum and teaching is necessary.

Examining Experiential Learning

Lewis and Williams (1994) note that while theories of experiential learning have existed for most of this century, the notion has become more recognized in the past decade. The genesis of the movement can be traced back to the mid-nineteenth century in the United States. One of the earlier thinkers, John Dewey (1960), felt that education should be more than the mere transfer of information from one individual to another, but rather a “continuous process of reconstruction in which there is progressive movement away from immature immediate experience to experience which becomes more pregnant with meaning, more systematic and ordered” (p. xi). He believed that if experience is made conscious it has the ability to be transformative. For Dewey, every true experience involves the intellect, emotions and struggle. “For taking in any vital experience is something more than placing something on the top of consciousness over what was previously known. It involves reconstruction” (p. 157). Here Dewey alludes to experience as an agent of transformation by means of an individual, conscious of her/his experience, goes through a metamorphosis of thought. Kolb (1984) furthers this, stating that the purpose of education is to stimulate inquiry and skill in the process of acquiring knowledge, not to memorize a body of information.

Experiential learning is very appropriate in institutions of higher education where students carry their own unique experiences into the learning environment. Knowles (1980) describes the concept of andragogy, which refers to the art and science of teaching adults. This model posits that adult learners (in this case, university students) are quite different from children. Assumptions of the model included that adults are intrinsically motivated, prefer problem and task-centred learning, have a self-concept as being self-directed learners, and have numerous and varied experiences. The teaching of adults must therefore transcend traditional approaches to education and focus more on the unique qualities these students bring to their learning environment.

There is a distinct shift in emphasis in andragogy away from the transmittal techniques so prevalent in youth education - the lecture, assigned readings, and

canned audio-visual presentation-toward the more participatory experiential techniques (Knowles, 1977, p.45).

Research into the use of experiential learning in the university classroom has shown that student motivation and satisfaction are elevated through active participation in learning (Acosta, 1991; Baslow and Byrne, 1993; Cranton, 1989). Cantor (1995) claims that experiential learning activities are natural motivators. This can be seen in terms of a feedback loop. Students participate in an activity that helps link theory and practice. As students begin to understand concepts and apply them, they become excited and motivated to learn, thus spurring on new experiential activities. Walter and Marks (1981) further this argument, stating that the natural tendency of human curiosity is often excited through experiences and that the social nature of experiential learning in the classroom is both satisfying and motivating.

Using experiential learning techniques in the classroom can result in other positive outcomes. Jernstedt (1995) discusses a qualitative and quantitative research study in which participants from a post-secondary institute were introduced to experiential learning. These subjects participated in a four day laboratory which provided a planned experience in a prescribed environment with a focus on learning about nature. In his statistical evaluation of the laboratory, Jernstedt found that individuals who participated in experiential learning activities were significantly more efficient workers and achieved higher grades than those who were taught passively or through highly directed learning.

Another benefit of using experience in the classroom is the increased ability of students to transfer salient learning to other settings and situations. A fundamental problem of traditional pedagogy is that students are required to memorize isolated pieces of information without understanding its practical application (Cantor, 1995). Students who are involved in their learning through experiential techniques are better able to make connections between their education and their daily lives (Cantor, 1995; Cranton, 1989; Knowles, 1977). Experiential education promotes the transference of knowledge and skills.

It is essential, however, that teachers provide more than just concrete experiences in their classrooms. Reflection is critical to any learning experience (Schön, 1983). Education should be a journey in which there are experiences, as well as time to reflect, conceptualize, and apply the knowledge gained. Kolb (1984) profoundly contributes to the literature through the introduction of what he calls the cycle of learning. Kolb believes that, for learning to be complete, an individual must first have a concrete experience and then reflect on that experience in an attempt to find meaning. The learner draws conclusions (a process known as abstract conceptualization) through reflection and discourse and finally enters a phase of active experimentation where ideas and conclusions are tested. This ultimately leads to new experiences and the cycle continues.

While Kolb's model provides a good conceptualization of how experiential learning occurs, it does not provide direction on how to teach in such a manner. Fortunately, the notion of experiential learning has been expanded to include frameworks and models to facilitate the process.

Lewis and Williams (1994) discuss three practical applications of experiential learning for adult and higher education. The first, field-based learning, involves internships and practicums to prepare a student for the working world. Prior learning

assessment is the second application where universities and colleges recognize and grant credit for life experience. Finally, applying experiential learning techniques for personal development and classroom-based learning involves students in active participatory learning, rather than the traditional lecture methods used in higher education institutions. Tools such as role plays, case studies, journals and problem-solving exercises are used to help students critically reflect and grow.

Jernstedt (1995) offers further examples of how experiential learning can be facilitated. Within the classroom, activities could involve the recalling of personal experiences that explain a concept learned. Other methods might include reading novels that provide knowledge of other people's life experiences, instructor modeling and hands-on demonstrations. The author also suggests that education does not only have to be confined to the four walls of a university classroom. Jernstedt recommends field trips, outdoor laboratories, journal writing, and cooperative education experiences as methods to be used outside the formal classroom.

Svinicki and Dixon (1994) discuss Kolb, presenting practical ways in which instructors can use his cycle of learning in college and university learning environments. The authors contribute to the Kolb model by listing activities that can be used to facilitate experiences at each part of the cycle. For example, concrete experiences could involve field work, academic readings, laboratory experiments and games. Reflective observation might be achieved through the writing of journals or group discussion. Abstract conceptualization could occur when the student had to apply and test these ideas in papers, projects and model building. Finally, active experimentation might be facilitated through case study, more field and laboratory work, and simulations.

Such models can have profound implications for both students and professors within universities. Introducing experiential learning into the classroom can fundamentally change the traditional role of the professor from that of a knowledge expert to a facilitator of experiences. Professors shed their didactic cloaks and become participants in the learning process. The educator's task becomes to ask questions and encourage students along their individual learning paths, to offer advice and information, and to provide relevant experiences for learning as well as the opportunity to reflect, conceptualize and apply the insights gained.

Linking The Concepts

Environmentalists believe that current institutions of higher education are failing in that they teach skills and knowledge, yet do not provide a situation where students can adopt positive attitudes towards the environment, and therefore graduate ill equipped to deal with real life problems (Orr, 1995; Palmer, 1997; Schwass, 1986; Smith-Sebasto, 1997). Combining experiential learning and environmental education may reverse this trend by helping to develop in students a sense of empathy for the natural environment and an understanding of how to solve environmental problems through hands on learning. Dewey (1960) stressed that students should have the ability to investigate issues within their surroundings and be able to make decisions regarding solutions. Not only did he view schooling as a basis for societal change, he also felt that experiential activities within an educational setting would lead to behavioural change amongst students.

Experiential learning can be used to facilitate awareness and emotion regarding the environment, and therefore may have a critical role to play in the development of solutions to environmental and resource management problems. This is referenced in the proceedings of the Intergovernmental Conference on Environmental Education in Tbilisi, USSR in October of 1977. The delegates at the conference agreed that formal education must integrate environmental concerns into the educational process. They criticize education for its fragmentation as well as producing feelings of indifference towards the environment.

Education must naturally inform, but information alone can never provide an adequate training... Environmental education should not confine itself to disseminating new knowledge but should help the public to question its misconceptions concerning the various problems of the environment and the value system of which these ideas are a part (UNESCO-UNEP, 1978, p. 27).

While the phrase 'experiential learning' is not specifically used, the term 'experience' is found throughout the document. The delegates state that teachers can no longer restrict themselves to the traditional methods of passing on knowledge, and unequivocally call for the incorporation of concrete experience into all classrooms.

*How to Incorporate Experience Into Learning About,
For, and in the Environment*

There is much agreement amongst environmental educators that teaching and learning should involve experience. The question that arises is: how? Peters and Gaddy (1981) incorporated experience into learning about the environment when they developed an environmental program for more than sixty schools in New York and Ohio. Their lesson plans included activities that helped students learn to interpret and work with a topographic map of a nature preserve, identify vegetation samples brought into the classroom through the use of identification manuals, learn the hydrologic cycle by conducting soil and precipitation analyses of the area, and understanding the stages of succession through daily observations of a rotting log.

Learning for the environment is more complicated as it involves translating students concerns into behaviour for the environment. Oberlin College in the United States successfully brought experience into the curriculum through a unit titled The Black River (Orr, 1996). In this course, students helped to develop a database on the local watershed, and created plans for a remedial action plan that would help make the river a healthier ecosystem.

Teaching in the environment has been present for many years at camps, outdoor education schools and occasionally in university classrooms. Perhaps the best example is the Sunship Earth program developed at the Institute for Earth Education in West Virginia (Johnson, 1995). The Sunship Earth program is an intense five day experience that teaches through experience. Students learn about photosynthesis by crawling inside a giant leaf, identify ecosystems through walks in the woods and understand the earth's place in the solar system through an evening walk. The Sunship Earth program is unique in that it not only teaches about and in the environment, but it also teaches for the environment. Students actively engage in learning by receiving permits to their energy and material use (everything from tickets to use water for washing, to permits for wearing

certain types of clothes). Students are challenged to discover the various ways of looking at the world and the different choices they have regarding how they can live their lives.

By merging experiential learning theory with teaching in, for and about the environment, facilitators who want to bring a more holistic view of environmental issues into their classrooms are offered the opportunity to implement teaching frameworks such as the models of Kolb (1984), and Svinicki and Dixon (1994), which can help facilitate awareness and empathy. Content is related to current and future environmental problem solving, and therefore becomes relevant to both students and society. Class participants are no longer taught about a concept as separate from the rest of the world, but are allowed to reflect on it in context, and encouraged to apply the concept to current events and situations. Content becomes directed towards individual thought, transformation and furthers the aim of preparing students for responsible citizenship.

Uniting the concepts also offers unique opportunities for research. As a result of an extensive literature search, I conclude there is very little research that investigates the role experiential learning can play in university environmental studies and science courses. Investigators are given the opportunity to further test and amend hypotheses and models of experiential learning within the classroom and can also explore the many possibilities of experiential learning techniques in environmental curriculum development to determine how it can be used most effectively to maximize understanding and compassion for the environment. While there are ideas of how environmental education should be delivered, no concrete conceptual models or guidelines for teaching within a university context exist. Further research could investigate how experiential learning frameworks can contribute to the development of models for experiential environmental education. Additionally, future research projects could include examining the benefits and barriers to teaching and curriculum modification towards environmental literacy, the changing role of the university in environmental activism, shifts in employment choices of students graduating from environmental studies and science programs, as well as monitoring variations in perception towards the environment in faculty and students.

Conclusion

Traditional models of education have been generally unsuccessful in preparing students to face the complexities of humanity's environmental problems. This has mainly been the result of the abstraction of teaching subjects and the fragmentation of disciplines. In essence, our educational system has divorced students from nature. The goal of environmental education is to transcend these models and create an atmosphere in which learning is both holistic and meaningful. The marriage of experiential learning and environmental education will help us to reach the objectives of student environmental awareness, aiding students in acquiring the skills to identify, investigate and solve environmental problems, helping develop in students a set of values and feelings of concern towards the environment, and providing opportunities in which students can actively participate in the resolution of environmental problems.

Experiential learning is a student-centred approach that focuses on process and the development of independent thought. It stresses the relevance of learning activities to the lives of students as well as critical reflection. When combined with environmental

education it allows for the development of skills, the acquisition of knowledge, and the growth and maturation of empathy for the environment.

Our world is rapidly changing. If universities want to remain relevant societal institutions, they must also transform. Change in the knowledge, skills and attitudes individuals hold regarding the environment is feasible through the modification of teaching styles and curriculum development within institutions of higher education. Educators have a responsibility to themselves, their students and to society, to guide individuals and prepare them for the environmental challenges to come. Only when students both understand and experience the natural environment will they be able to adequately address environmental problems and find creative solutions for the future of humanity on the earth.

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