

***Making the Connection:
Promoting Environmental Stewardship
among Providence Youth through
Experiential Environmental Education***



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Signature

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Table of Contents

Abstract	5
Introduction	6
Theoretical Background	9
<i>American Environmental Education</i>	9
History.....	9
Present.....	12
Future.....	15
Model Programs.....	17
<i>Environmental Educational Theory</i>	19
Experiential Education.....	19
Social Context.....	21
Critical Thinking.....	24
<i>Framework for Environmental Education</i>	27
Individual Factors.....	28
Institutional Factors.....	30
Educators.....	31
Outcomes and Program Assessment.....	32
Case Study Background and Research Methods	35
<i>The Met School</i>	35
History.....	35
Program Structure and Application.....	36
<i>Outdoor Leadership and Environmental Education Project</i>	39
History.....	39
Current Goals.....	41
Program Structure and Application.....	41
<i>Research Participants</i>	46
<i>Research Tools</i>	47
Results	55
<i>Environmental Perception and Stewardship</i>	55
Perception of the Environment.....	56

Environmental Stewardship.....	64
<i>OLEEP Program Evaluation</i>	67
Expectations versus Reality.....	68
Experiential versus Didactic Learning.....	72
Global Warming Unit.....	78
Conclusions	84
<i>Summary of Results</i>	84
<i>Research Limitations and Future Work</i>	85
<i>Urban Students' Environmental Perception and Stewardship</i>	87
<i>OLEEP and Urban Environmental Education</i>	88
<i>Lessons for Experiential Environmental Education</i>	92
Works Cited	96
Appendices	100
1: Preliminary Survey.....	100
1.a: NEP Questionnaire.....	103
2: Mentee Focus Group Facilitation Guide (new mentees).....	104
2.a: Mentee Focus Group Facilitation Guide (returning mentees).....	106
3: Mentor Midyear Evaluation Discussion Transcript.....	108
4: Workshop 1 Plan.....	112
4.a: Carbon Footprint Worksheet.....	114
4.b: Workshop 2 Plan.....	116
4.c: Living Deliberately Worksheet.....	118
5: Final Survey.....	119
6: Initial NEP Questionnaire Results.....	126
6.a: Final NEP Questionnaire Results.....	127
7: Framework for Environmental Education.....	128

Abstract

As environmental issues such as global warming become increasingly pressing, the role of environmental education is essential to encourage awareness and stewardship among future generations. While environmental education programs are becoming more widespread, there is still little consensus regarding the most effective approaches for diverse student populations, particularly those from urban backgrounds. Pedagogical theory suggests that students learn best when given hands-on experiences and the opportunities to make self-motivated connections. In this thesis, I therefore set out to investigate what kind of experiential education leads to a heightened sense of environmental stewardship among urban youth given their preexisting perceptions of the environment.

The Outdoor Leadership and Environmental Education Project (OLEEP) is a partnership between the Brown University Swearer Center for Public Service and the Metropolitan Regional Career and Technical Center (the Met), a charter high school in Providence, RI. OLEEP strives to foster personal growth and environmental stewardship through camping and field trips, weekly environmental education workshops, and one-on-one mentoring relationships between Brown student mentors and Met student mentees. This multidimensional approach to environmental education has the potential to balance experiential and didactic education and thus be more effective than either approach alone. Through qualitative surveys and focus group interviews of OLEEP participants, as well as the design and implementation of a module of workshops on global warming, I found that OLEEP does help further develop its participants' preexisting environmental awareness and stewardship. However, I do not believe OLEEP is currently reaching its full educational potential due to the lack of a cohesive mission and learning objectives through which to integrate its three educational elements.

Urban students are eager to learn more about the environment, but struggle to bridge the gap separating human environments from natural wilderness. Urban environmental education must make this connection by illustrating a positive definition of environment within the city. This local focus is key to defining OLEEP's mission and making the program most applicable to its participants. Within this framework, strong planning of learning objectives will enable OLEEP's trips, workshops, and mentoring to build off each other and contribute most effectively to participants' learning. Finding an integrated role in students' general learning is the biggest challenge to current environmental education programs. If successful, OLEEP will represent a model of multifaceted environmental education that is relevant to its participants and the world in which they live.

Introduction

This thesis was motivated by my interest in how experiential education affects environmental stewardship among youth. My own experiences led me to this topic: as a child, free time for me meant going outside. In the woods around my house, I found endless entertainment, wonder, and comfort in exploring the natural world. School science classes added depth to these experiences by explaining why leaves change color in fall or how tadpoles turn into frogs. Now I care enough about the environment to want to teach others the same things. While these connections between my environmental experiences and stewardship have never been proven using scientific methods, there is value in considering some of the more qualitative aspects of how perceptions are formed and changed. Education is integral to this process.

However, in an increasingly virtual society, it is becoming increasingly difficult to find opportunities for experiences in the natural world. Walking around Brown's campus, it seems that nearly everyone is plugged in to their little white iPod ear buds or bionic-looking Bluetooth cell phone headsets. With Facebook, one doesn't even have to leave the house to make hundreds of "friends." What does 'environment' mean to city-dwellers who spend much of their time interacting in a virtual world? This disconnect is the primary challenge for urban environmental education in helping youth make valuable connections between themselves and their immediate and global surroundings.

In this thesis, I set out to answer what kind of experiential education leads to a heightened sense of environmental stewardship among urban youth given their preexisting perceptions of the environment. The Outdoor Leadership and Environmental Education Project (OLEEP) pairs Brown University student mentors with high school

student mentees at the Providence Metropolitan Regional Career and Technical Center (the Met) to foster personal growth and environmental stewardship through camping and field trips, environmental education workshops, and one-on-one mentoring. Using OLEEP as a case study, I examined how its unique combination of programming meshes with participants' perspectives and what the program can do to better foster growth in stewardship. I investigated four primary research questions to address these larger themes:

1. How do OLEEP participants perceive of and behave in relation to their environment? How does this perception and stewardship change over the course of the OLEEP program and what differences are there between new and returning participants?
2. How do participants perceive the purpose of the OLEEP program and is its identity appropriate to meet these expectations?
3. How do the three elements of OLEEP (trips, workshops, mentoring) contribute individually and collectively to the environmental education of its participants?
4. How would OLEEP participants improve the program and what changes are suggested by my research and environmental educational theory?

This thesis is broken down into sections which reflect and address these questions. To determine the tenets of experiential education applied to environmental learning, I review the current status of environmental education in the United States. I then consider the theory behind experiential environmental education and lay out a framework from which to build environmental learning plans. In the study background and methods section, I describe the school where OLEEP occurs, as well as the details of the program and how they fit into my research. I then outline the surveys, focus groups, and unit plan used to determine how current OLEEP participants perceive of and interact with the environment and how effectively OLEEP is currently addressing the

environmental educational needs of its participants. The results section details these findings. Finally, in my conclusions I discuss the significance of my results in terms of OLEEP's future as well as implications for experiential environmental education as a whole.

Theoretical Background

American Environmental Education

History

Many attribute the rise of the modern environmental education movement to the success of Rachel Carson's *Silent Spring*, published in 1962.¹ While specifically addressing the hazards of pesticides, this eloquent work struck a chord of environmental awareness throughout the country. In 1970, America celebrated its first Earth Day and along with it the passage of many new environmental laws, including the National Environmental Education Act of 1970² which explicitly "identified education as a mechanism for improving the quality of the human environment."³ While environmental education had been occurring in both didactic and outdoor settings in various forms, the new attention to environmentalism brought similar attention to the ways the environment was taught both in and out of school. "Since the 1970s, environmental education has been characterized by the development of implicit and explicit interconnections with science, technology, and the issues and problems of society."⁴

As the practice of environmental education has evolved, so has its definition. In 1977, the United Nations Education, Scientific, and Cultural Organization (UNESCO) conducted the world's first intergovernmental conference on environmental education along with the United Nations Environment Programme (UNEP) in Tbilisi, Georgia. From this emerged the Tbilisi Declaration, which has remained the standard for environmental education ever since. The Declaration is based on the premise that people

¹ Carson

² P.L. 91-516

³ National Environmental Education Advisory Council (NEEAC), 3

⁴ NEEAC, 3

are members of a complex global ecosystem and the better they understand these relationships, the better they can make decisions and act upon them.⁵ Five basic environmental education objectives are at the heart of the declaration:

Awareness—to help social groups and individuals acquire an awareness and sensitivity to the total environment and its allied problems.

Knowledge—to help social groups and individuals gain a variety of experience in, and acquire a basic understanding of, the environment and its associated problems.

Attitudes—to help social groups and individuals acquire a set of values and feelings of concern for the environment and the motivation for actively participating in environmental improvement and protection.

Skills—to help social groups and individuals acquire the skills for identifying and solving environmental problems.

Participation—to provide social groups and individuals with an opportunity to be actively involved at all levels in working toward resolution of environmental problems.⁶

“Participation” is an especially important aspect of the definition, as it implies that the end result of environmental education should be not just knowledge, but direct action to improve the individual’s surroundings.⁷ The Independent Commission on Environmental Education (ICEE) suggests that this emphasis on behavior may lead to increased controversy over environmental education due to potential overlap with advocacy.⁸ However, one of the Commission’s directors admits that “of course, all schools are meant to change children’s behavior by teaching them to respect others, to cooperate, to stand quietly, and not to be wasteful.”⁹

⁵ United Nations Education, Scientific, and Cultural Organization (UNESCO), 1-2

⁶ UNESCO, 3

⁷ George C. Marshall Institute (Marshall), 5

⁸ Salmon, 8

⁹ Salmon, 8

This controversy aside, there is general consensus that the purpose of environmental education is to facilitate citizens' ability to make informed decisions regarding their environment that result in sustainable relationships.¹⁰ The United States Environmental Protection Agency (EPA) sees general demand for environmental education arising from American concern for the environment coupled with relatively little demonstrated knowledge and ability to improve environmental behaviors.¹¹ "In a 1993 survey of science and social studies educators and nonformal educators working in zoos, museums, nature centers, and aquariums, more than 90 percent of the more than 2,000 educators who responded indicated that environmental education should be a priority in schools and nonformal institutions."¹² Furthermore, environmental education is relevant for Americans as environmental issues such as global warming become increasingly pressing. The EPA sees environmental education as integral to protecting human health, increasing employment opportunities in environmental fields, increasing the amount of sustainable development that is occurring, protecting America's natural heritage, and advancing the quality of general education by drawing on a number of core academic subjects, forming interdisciplinary linkages, and bringing local issues into the classroom.¹³

Present

Current approaches to environmental education have attempted to meet this demand. They can be broken down into "formal," or school-based, and "nonformal," or

¹⁰ NEEAC, 2

¹¹ NEEAC, 3

¹² NEEAC, 4

¹³ NEEAC, 4

extracurricular settings such as businesses, nonprofits, and the media.¹⁴ Within the school system, most environmental education is based on either infusion or interdisciplinary models. Infusion, or multidisciplinary education, attempts to integrate environmental issues into traditional academic subjects such as science, history, and social studies by supplementing the existing curricula.¹⁵ This adds breadth to environmental education and avails the concepts to all students, but is often lacking in depth in already full curricula. Alternatively, interdisciplinary environmental education adds a new environmental science class that covers environmental issues from investigative and problem-solving approaches that add depth to the program.¹⁶ However, these classes are only available to a small number of students, usually in advanced secondary and post-secondary educational tracks. Federal, state, and local governments as well as schools are the actors most often involved in formal environmental education.¹⁷

Nonformal environmental education programs that take place in a variety of settings including zoos, museums, aquariums, nature centers, science centers, parks, and community centers ideally complement and enhance formal educational approaches.¹⁸ Interestingly, these links are often especially effective for the parents that help their children with their science homework and then take them to the museum.¹⁹ Media, supplementary materials, and training can target specific audiences' environmental understanding from a number of different angles such as saving money, saving time, or

¹⁴ NEEAC, 7

¹⁵ Chen, 234

¹⁶ Chen, 235

¹⁷ NEEAC, 11

¹⁸ NEEAC, 10

¹⁹ NEEAC, 10

even religion.²⁰ Nonformal environmental education is generally carried out by nongovernmental organizations, businesses, foundations, and the media.²¹

While these current environmental education practices are certainly steps in the right direction, a number of issues have been identified in various aspects of their content, structure, and implementation. The ICEE report focuses directly on the materials used for environmental education. The panel believes that environmental education is important in K-12 school systems and laments the controversy that has developed over the appropriateness of environmental education in schools. It attributes this controversy to the potential emphasis on environmental activism in educational programs and particularly the presence of incomplete or inaccurate material. They fear that this lack of factual education leaves students incapable of solving the more complex environmental problems and decisions that they are likely to face outside of school.²² These conclusions are based on the panel's expert reviews of environmental textbooks and other materials covering issues such as acid rain, ecology, economics, energy, forests, global warming, population, risk analysis, and waste management. While the materials varied in quality, many were lacking in scientific factuality and the necessary context to effectively evaluate the environmental problems they relate to.²³

A second major criticism of current environmental education practices is their lack of integration into the larger educational system. Woolman is disappointed that "in spite of the foreboding and critical nature of environmental issues, K-12 curricula for environmental education have achieved only an indefinite and non-binding status in most

²⁰ NEEAC, 11

²¹ NEEAC, 11

²² Marshall, 1-2

²³ Marshall, 8-16

United States school systems.”²⁴ Cortese reflects these sentiments and points to the lack of environmental education for professionals and future educators; “only 9 percent of teachers’ colleges require a practicum in environmental education at the elementary level, and only 7 percent at the secondary level. This is all the more unfortunate in the United States since two-thirds of all the K-12 teacher positions will be replaced within the next eight to ten years.”²⁵ The EPA also agrees that “environmental education is not a priority across the country,” resulting in inconsistent support and “a field that is often fragmented, inefficient, and duplicative.”²⁶ Furthermore, because environmental education is not being integrated into educational reform and improvement, opportunities are being missed not only to increase its presence but also to use it as a means to improve general education. Environmental education is an effective way to catalyze problem-solving analysis and draw on multiple traditional subjects such as science, math, history, and political science to examine local issues.²⁷

A third challenge for environmental education is to reach a broader audience. As mentioned above, Chen sees neither infusion nor interdisciplinary environmental education as effectively impacting the majority of the student population.²⁸ Questions of justice arise in regards to underprivileged and minority populations whose school systems lack the resources to incorporate quality environmental education materials or who do not read information printed exclusively in English.²⁹ Adults and the elderly may also miss out on material that is primarily presented in school settings.³⁰

²⁴ Woolman, 3

²⁵ Cortese, 10

²⁶ NEEAC, 9-10

²⁷ NEEAC, 16

²⁸ Chen, 235

²⁹ NEEAC, 16

³⁰ NEEAC, 16

Finally, there is the issue of how environmental material fits into the larger American educational philosophy. Smith illustrates the priority of preparedness to be economically competitive within a traditional capitalist economy.³¹ This competitive attitude emphasizes the individual over the collective, which is antithetical to the interconnected, collaborative emphasis of environmental education.³² Chen also believes that larger systematic changes are necessary to overcome the existing educational structure. “Neither the infusion model nor interdisciplinary teaching is enough when sustainable development needs to replace the position of unconditional economic development as the focus of the curriculum.”³³

Future

The future of environmental education will ideally address of the above concerns. The ICEE and EPA call for increased resource support and collaboration with local educators to form, oversee, and evaluate guidelines to regulate environmental education materials.³⁴ More extensive peer review and expert input will improve the accuracy and depth of environmental education textbooks and other literature.³⁵ Increased collaboration between environmental education organizations will facilitate the sharing of existing material among all educators and the identification of holes to be filled.³⁶ Common standards for programs and a stronger emphasis on essential concepts will also encourage greater dissemination of environmental education while giving students the tools to solve environmental problems outside of the classroom.³⁷

³¹ Smith, 12

³² Smith, 3

³³ Chen, 236

³⁴ NEEAC, 26

³⁵ Marshall, 3

³⁶ NEEAC, 27

³⁷ NEEAC, 27; Marshall, 3

The greater the availability and reliability of environmental education materials, the easier it will be to better integrate environmental education into existing and new educational programs. Cortese calls for deliberate efforts to integrate environmental concepts into school curricula: “ ‘The environment is not a competing interest; it is the playing field on which all other interests intersect.’ ”³⁸ Given the social and political nature of environmental education, Woolman agrees with this statement and sees a perfect opportunity to draw connections with social studies classes.³⁹ The EPA views increased “support, participation, collaboration, and coordination from all stakeholders”⁴⁰ as key to making environmentalism more of a priority in education. Because of the central nature of environmental issues, the EPA sees environmental education as a central means to improving education as a whole.⁴¹ As more educational agencies such as the Department of Education, the Association for Supervision and Curriculum Development, and national teachers organizations take on environmental education as a core part of curricula, they will develop model outcomes, program guidelines, evaluation, and certification processes to ensure effective teaching occurs.⁴²

While greater integration into school programs will help disseminate environmental material to a broader audience, deliberate outreach action must be taken as well. Environmental education material should be targeted toward groups historically lacking access, such as minorities, the underprivileged, and the elderly.⁴³ There is little

³⁸ quoted in Cortese, 3

³⁹ Woolman, 5

⁴⁰ NEEAC, ii

⁴¹ NEEAC, 5

⁴² NEEAC, 26

⁴³ NEEAC, 26

specific advice on how to accomplish this, however, and I will address this disparity in my discussion of diversity and justice in environmental education below.

Finally, it is possible that to truly transform the nature of environmental education to the greatest positive effect, it is necessary to re-frame our perspectives on how education occurs. Smith calls for an interconnected, global view of learning in place of the individualistic and competitive model that has dominated in the past.⁴⁴ Chen suggests that an entirely new educational approach is necessary to affect a sufficient change in worldview. This “green curriculum” could be based on the “transdisciplinary approach” in which environmental and social issues form the backbone of a new curriculum that employs integrated science, math, and social studies to find solutions to the environmental issues facing society.⁴⁵

Model Programs

One program lauded for its effectiveness by both Chen and the ICEE is *Project Learning Tree*, sponsored by the American Forest Foundation.⁴⁶ According to its website, *Project Learning Tree* “uses the forest as a ‘window’ on the world to increase students’ understanding of our environment; stimulate students’ critical and creative thinking; develop students’ ability to make informed decisions on environmental issues; and instill in students the commitment to take responsible action on behalf of the environment.”⁴⁷ These are the key precepts of environmental literacy. The program uses forests to focus on themes of diversity, interrelationships, systems, structure and scale, and patterns and change, all applied at the level of natural environments, resources and technology, and

⁴⁴ Smith, 3

⁴⁵ Chen, 236

⁴⁶ Marshall, 13

⁴⁷ Project Learning Tree (PLT): “Our Mission and Goals”

society and culture.⁴⁸ This multi-perspective approach allows the program to reach out to a diverse participant base, while depth of information on a variety of topics combined with a hands-on experiential approach helps convey important information in a way that will last with students. Furthermore, its interdisciplinary approach allows for easy classroom integration.⁴⁹ One potential downside is that educators must attend a *Project Learning Tree* workshop in order to receive its materials, though this likely makes them more able to effectively instruct the program.

Another particularly popular model for environmental education is the Outward Bound approach, which takes students who into a wilderness setting for anywhere from a few days to a month.⁵⁰ The idea behind this program is that “the learner is placed into [a] unique physical environment and into [a] unique social environment, then given a characteristic set of problem solving tasks [creating a] state of adaptive dissonance to which [the learner] adapts by mastery, which reorganizes the meaning and direction of the learner’s experience.”⁵¹ The results of these experiences, however, are much more strongly centered on personal and interpersonal awareness and growth than on environmental stewardship.⁵² This raises the question of the value of straight outdoor experiences without more deliberate educational components; it seems that one is not sufficient to affect change in environmental perceptions without the other.

Environmental Educational Theory

Given the issues associated with current practices and uncertainty regarding its future, it is necessary to reconsider the fundamental precepts of environmental education.

⁴⁸ PLT: “Conceptual Framework”

⁴⁹ PLT: “About PLT”

⁵⁰ Outward Bound: <http://www.outwardbound.org/corevalues.vp.html>

⁵¹ quoted in McKenzie, 10

⁵² Goldenberg, 144; McKenzie, 21

David Orr articulates what is lacking in environmental education as a whole—a balanced approach to environmental literacy. Orr calls for the establishment of a standard of “ecological literacy” that empowers students to ask “What then? ...before the last rain forests disappear, before the growth economy consumes itself into oblivion, and before we have warmed the planet intolerably.”⁵³ This environmental literacy is the awareness and sustainable decision-making ability that environmental education hopes to achieve. Orr laments the implicit lesson that ecology is unimportant due to its omission or cursory attention in many schools.⁵⁴ Furthermore, he asserts that “the way education occurs is as important as its content.”⁵⁵ Information is insufficient by itself; it is made stronger by “the sense of wonder, the sheer delight in being alive in a beautiful, mysterious, bountiful world.”⁵⁶

Experiential Education

The basic premise of environmental education is that what children learn and experience will shape their future perspectives and actions. Wells and Ewert place particular emphasis on the importance of childhood experiences and surroundings for environmental attitudes and behaviors as adults. In looking at the development of environmental professionals, they conclude that “youthful experience of outdoors and relatively pristine environments emerge as a dominant influence in these lives.”⁵⁷

Attempting to isolate these specific experiences, Wells and Ewert examine the long-term effects of childhood interaction with “wild” and “domesticated” nature as well as

⁵³ Orr, 85

⁵⁴ Orr, 85

⁵⁵ Orr, 91

⁵⁶ Orr, 86

⁵⁷ quoted in Wells, 5

“appreciative, mechanized, or consumptive” activities.⁵⁸ They find that appreciative activities, “activities that can be enjoyed while having little impact on the natural environment, such as bird-watching or enjoying the scenery,”⁵⁹ that take place in wild settings, such as while “hiking, walking, or playing in the woods or natural areas,”⁶⁰ are the most effective in impacting adult environmental perspectives and actions.

Furthermore, both researchers see much stronger impacts from outdoor experiences than traditional educational programs. “Participation in environmental education programs (in school, in scouts, at camp, or in community environmental improvement programs) was not a significant predictor of either environmental attitudes or behaviors.”⁶¹ Andersson agrees that “after being taught in the traditional way only a small proportion [of students] have functional scientific concepts that may be used in new situations.”⁶² This places further emphasis on the value of direct environmental experience. “It seems likely that most environmental attitudes are formed as a result of life experiences rather than any specific program that was designed to change attitudes.”⁶³

This conclusion is reflected in Devine-Wright’s study of the importance of community on the development of environmental attitudes. The researchers examined a United Kingdom organization called the Woodcraft Folk in which “there is an emphasis on co-operation and empowering young people. Young people are involved at all levels of decision-making within the organization, from setting their own programme at group

⁵⁸ Wells, 6; Ewert, 229

⁵⁹ Ewert, 229

⁶⁰ Wells, 7

⁶¹ Wells, 14

⁶² Andersson, 1108

⁶³ quoted in Ewert, 228

nights to attending the Annual Delegates Conference.”⁶⁴ This approach to education led to “significantly higher levels of perceived responsibility, perceived self-efficacy, environmental concern and personal awareness in comparison to children of a similar age.”⁶⁵ All of these factors increase children’s long-term environmental awareness, once again emphasizing “the need to focus upon the style of the child’s learning experience, with an emphasis upon how learning is managed so that active participation and cooperation amongst children is encouraged.”⁶⁶

Social Context

Orr suggested treating environmental education “as a dialogue with a place [that] has the characteristics of a good conversation. Formal education happens mostly as a monologue of human interests, desires, and accomplishments that drowns out all other sounds.”⁶⁷ Education, however, does not occur within a vacuum. Specifically because of its influence, it is irresponsible to discuss any form of education without considering its social context. Paulo Freire would equate Orr’s “monologue” to the passive system of “banking...in which the students are the depositories and the teacher is the depositor.”⁶⁸ As these unilateral exchanges don’t allow for questioning of the norm, they form part of an unconscious cultural domination by a majority that “literally [does] not see how race permeates America’s institutions” and is in fact dependent on the oppression of others to maintain its privilege.⁶⁹ Since schools are central to the teaching of societal norms, it is

⁶⁴ quoted in Devine-Wright, 495-6

⁶⁵ Devine-Wright, 500

⁶⁶ Devine-Wright, 502

⁶⁷ Orr, 90

⁶⁸ Freire, 58

⁶⁹ Brown, 34, 44

especially important to pay attention to which messages are being communicated and to what degree a conversation can occur.

While these concerns may seem out of place in the context of seemingly altruistic efforts to teach environmental education, the fundamental definition of ‘environment’ is subject to social interpretation. Richard White’s essay aptly titled *Are You an Environmentalist, or Do You Work for a Living?* illustrates the perceived elite status that separates many environmentalists from other people. Whereas human labor was traditionally directly tied to nature through activities such as farming, logging, or mining, in today’s service-based society “modern environmentalism lacks an adequate consideration of this work. Most environmentalists disdain and distrust those who most obviously work in nature. Environmentalists have come to associate work—particularly heavy bodily labor, blue-collar work—with environmental degradation.”⁷⁰ This sets the groundwork for tension when environmentalists, who tend to be of the middle and upper classes, criticize the labor that lower class, blue-collar workers need to put bread on the table. This is exacerbated by the recreational ways environmentalists often interact with nature. “Environmentalists so often seem self-righteous, privileged, and arrogant because they so readily consent to identifying nature with play and making it by definition a place where leisured humans come only to visit and not to work, stay, or live.”⁷¹ The problem with separating humans from nature is that it sets a standard that is impossible to reach. In *The Trouble with Wilderness*, Cronon posits that by defining wilderness as specifically devoid of humans, we establish a “dualism that sets humanity and nature at opposite

⁷⁰ White, 172

⁷¹ White, 173

poles. We thereby leave ourselves little hope of discovering what an ethical, sustainable, *honorable* human place in nature might actually look like.”⁷²

The dichotomy between privileged and underprivileged populations has been given particular attention through the movement for environmental justice. In the forward to Steve Lerner’s *Diamond*, Robert Bullard explains how “numerous studies have documented that African-Americans and other people of color in the United States are disproportionately impacted by environmental hazards. In the real world, all communities are not created equal. If a community happens to be poor, black, or located on the ‘wrong side of the tracks,’ it receives less protection than affluent white suburbs.”⁷³ One reason these communities are susceptible to environmental abuse is because their populations lack the in-depth environmental education and clout to pressure the political system to make up for the disproportionate environmental protection.

Furthermore, employing a justice model might ultimately lead to broader perspectives on sustainability as a whole. Susan Clayton suggests that “the most important or the most overarching question with regard to environmental justice is the issue of justice for whom: How is the moral community defined? Do we include other species, future generations, fuzzy concepts like ecosystems? ...The limits of the relevant community will affect the determination of all other issues.”⁷⁴ Therefore, learning to look at environmental issues as unjust to other species, places, and generations has the potential to catalyze greater concern on the part of all people.

⁷² Cronon, 81, emphasis his

⁷³ Lerner, ix

⁷⁴ Clayton, 472

To create a more equitable educational system, Freire agrees with Orr that “the correct method lies in dialogue.”⁷⁵ The key to positive educational change is not having the dominant class merely give knowledge to the oppressed (as in the “banking” process), but rather for the former to help empower the latter to help themselves. As opposed to traditional education that is a unilateral narrative from teacher to students, dialogue-based learning is mutual, in which both teacher and students are learning and teaching together.

Through dialogue, the teacher-of-the-students and the students-of-the-teacher cease to exist and a new term emerges: teacher-students with student-teachers. The teacher is no longer merely the-one-who-teaches, but one who is himself taught in dialogue with the students, who in turn while being taught also teach. They become jointly responsible for a process in which all grow. In the process, arguments based on ‘authority’ are no longer valid; in order to function, authority must be on the side of freedom, not against it. Here, no one teaches another, nor is anyone self-taught. Men teach each other, mediated by the world, by the cognizable objects which in banking education are “owned” by the teacher.⁷⁶

Critical Thinking

While such experience and dialogue-based education would be ideal, as made clear in the ICEE report there remains the need to present students with sufficient informational tools to make informed decisions in solving environmental problems. For example, Andersson, Gowda, and Koulaidis identify a number of central misconceptions that high school students possess about global warming. This confusion centers on the difference between the ozone layer and the greenhouse effect,⁷⁷ the mechanics of the greenhouse effect,⁷⁸ and the causes and effects of global warming.⁷⁹ They conclude that “the significant misconceptions that students display in the context of climate change

⁷⁵ Freire, 54

⁷⁶ Freire, 67, emphasis his

⁷⁷ Andersson, 1106; Gowda, 2233; Koulaidis, 563

⁷⁸ Andersson, 1101-2; Koulaidis, 563

⁷⁹ Andersson, 1105; Gowda, 2233-6; Koulaidis, 574

suggest the need for better educational materials focused on these major misconceptions.”⁸⁰

Developmental psychology offers valuable insights about the way children learn about all topics, including the environment. Piaget delineated four distinct stages of cognitive development (sensory-motor, preoperational, concrete operational, and formal operational). In a learning atmosphere, it is essential to consider the students’ developmental stage; an educational approach is highly unlikely to be successful if it is geared to the wrong level of cognitive ability.⁸¹ Vyogotsky built on Piaget’s contributions by introducing zones of proximal development, or areas above a student’s existing cognitive ability which could be reached with the help of a teacher or peer. By considering a student’s zone of proximal development, educators can set realistic learning goals and strategize how to best achieve them.⁸²

There may also be certain psychological barriers towards environmental learning and stewardship. Dustin Penn outlines an evolutionary approach towards understanding the lack of contemporary human environmentalism. In contrast to today’s overpopulation and limited resources, he posits that during the evolution of our species when resources were plentiful and population was small, there were fitness advantages to reproducing and consuming as much as possible.⁸³ More food, materials, and numbers gave individuals and their offspring the greatest chance of survival and passing down their genes to future generations. Judith Anderson looks for evidence of similar adaptation in the way contemporary humans solve problems. She blames our inability to understand

⁸⁰ Gowda, 2239

⁸¹ Class notes, ED0145 Li, Jin (October 20, 2006)

⁸² Class notes, ED0145 Li, Jin (October 25, 2006)

⁸³ Penn, 277

broad, poorly defined terms on the tendency to package information into discrete units.⁸⁴ For example, it is easier to understand sunlight, molecules that absorb heat, and the functioning of greenhouses separately than the greenhouse effect on the whole. Humans similarly struggle with numerical probability that isn't founded in concrete terms.⁸⁵ One readily understands that there were more warm days this winter than last, but would have a hard time internalizing a six percent increase in average temperature. Finally, the human tradition of storytelling and reliance on past experience to solve problems makes predicting and tackling future, unfamiliar risks more difficult.⁸⁶ Because global climate has not previously fluctuated within human life spans, there is no parallel to understand the severity of the current warming trend.

Anderson suggests facilitating environmental problem-solving by being aware of these cognitive limitations and tailoring environmental education to the way people do think.⁸⁷ This relates to the way Kaplan encourages environmental educators to tap into other factors influencing human motivation to learn. Traditional environmentalism construes conservation and altruism as sacrificial for the individual; "To the extent that altruistic action involves any cost or effort, it necessarily entails sacrifice since there cannot be a compensating benefit to the self."⁸⁸ Because people consider environmental stewardship to be altruistic and altruism to be inherently negative for the individual, they are less motivated to act in ways that help the environment.⁸⁹ Rather than overriding these motivational issues with the brute force of coercion (i.e.: "you *have* to turn down

⁸⁴ Anderson, 20

⁸⁵ Anderson, 21

⁸⁶ Anderson, 23

⁸⁷ Anderson, 25

⁸⁸ Kaplan, 494

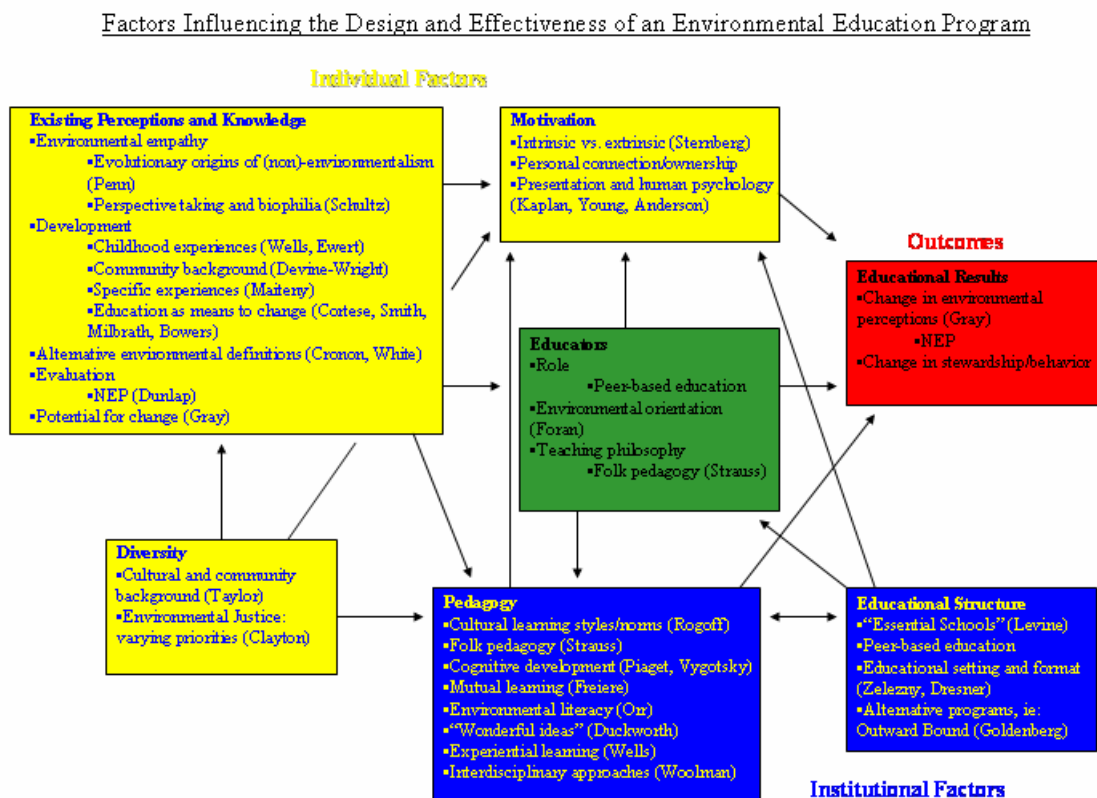
⁸⁹ Kaplan, 494

your heat and wear more clothes in winter”), Kaplan suggests showing people how environmental stewardship can in fact benefit them as well (i.e.: “replace your light bulbs with compact fluorescents and save ten dollars on your electric bill”).

Framework for Environmental Education

Based on the above literature review, I have assembled a framework upon which to base the content and pedagogical approaches of effective environmental education strategies. The framework, shown below in Figure 1, is divided primarily between individual factors, institutional factors, and program outcomes, with educators in between the first two headings, and it investigates the relationships and overlap between each of the categories.

Figure 1:



Individual Factors

Individual factors relate to the background and needs of the program participants, namely students. They can be divided into related categories of diversity, preexisting perspectives, and motivation. Especially in multiethnic communities such as Providence and the Met School where OLEEP occurs, it is important to consider the implications of students' diverse backgrounds for any educational endeavor. By being aware of potential biases or injustices against the participants, educators can attempt to identify these inequalities and give students the tools to fight them.

Diversity overlaps with preexisting perceptions in the central environmental education question of how the students define and interact with their environment. Does this mean solely pristine, natural wilderness areas that are untouched by humanity? What does this imply for students who have grown up in the city? When educators take them to the wilderness, does it catalyze their passion to care for the environment, or does it merely widen the separation between pristine nature and their immediate setting? Essential to an urban environmental education program should be the effort to find environment within the city, to “discover a common middle ground in which all of these things, from the city to the wilderness, can somehow be encompassed in the word ‘home.’”⁹⁰

Differing backgrounds also affect how students learn and what pedagogical approaches are most likely to be successful. Barbara Rogoff encourages educators to consider the importance of cultural customs and skills on student learning. She observes that differing backgrounds lead to unequal performance on numerous academic tests

⁹⁰ Cronon, 89

depending on the cultural familiarity of the material.⁹¹ For example, students whose families place higher value on verbal than written communication might perform better on presentations versus written assessments. Different learning styles at home and in the classroom can lead to students receiving conflicting messages.⁹² If a classroom experiment is dependent on trial-and-error but a student's parents condemn mistakes, he or she might get very upset while trying to complete the assignment.

Finally, diversity also informs the third individual factor of motivation. It is intuitive that students will learn more when they are interested and committed to the material. This taps into the idea of intrinsic versus extrinsic motivation. Extrinsic motivation is based on influences from outside the individual, such as receiving the approval of others, meeting public goals, and behaving in ways valued by the group. Extrinsic motivation provides immediate incentive, but is less persistent. Intrinsic motivation is that which comes from within the individual, such as meeting personal goals. Intrinsic motivation is sometimes harder to achieve but is more stable over time.⁹³ Depending on a student's background, his or her intrinsic interests and priorities and receptiveness to extrinsic incentives are likely to vary. Establishing these motivations ahead of time will lead to more successful educational programs.

When tackling environmental problems, individuals should be empowered to contribute to finding solutions on their own as opposed to being overwhelmed with information or simply told what to do. "People are motivated to know, to understand what is going on; they hate being confused or disoriented. People are also motivated to learn, to discover, to explore; they prefer acquiring information at their own pace and in

⁹¹ Rogoff, 241

⁹² Rogoff, 311

⁹³ Sternberg, 347

answer to their own questions.”⁹⁴ “Participatory problem solving” allows individuals to learn, discover, and explore while playing a role in the problem-solving process.⁹⁵ To catalyze this, one must provide a sufficiently specific and relevant problem to approach (i.e.: “How can we each reduce our energy use by one third?” as opposed to “How can we fix global warming?”) and then allow for the time and flexibility to find a satisfying solution. It is also important to allow for questioning and trial-and-error as opposed to immediately looking for the “right” answer. While many of our current environmental issues are both daunting in scale and pressing in time, they can be broken up—as suggested by Anderson⁹⁶—into manageable chunks and learning can be facilitated, rather than imposed, by an educator.

Institutional Factors

While there is clearly significant overlap between the parts of the framework, institutional factors refer to the setting, format, and approaches, or educational structure and pedagogy, that are applied to environmental education. The location and format of an environmental education program are central to its character, and there is controversy over which setting is the most effective for learning about the environment. Lynnette Zelezny found mixed results while conducting a meta-analysis of environmental educational interventions in “traditional” classroom settings and “nontraditional” camps, workshops, and excursion-based programs. Contrary to my hypothesis, she concluded that “interventions in nontraditional settings were less effective than interventions in classroom settings.”⁹⁷ However, unlike OLEEP, “interventions in nontraditional settings

⁹⁴ Kaplan, 498

⁹⁵ Kaplan, 498

⁹⁶ Anderson, 20

⁹⁷ Zelezny, 3

more often involved adult participants and consisted of short-term programs with no active participant involvement.”⁹⁸ More significantly, she found that “active participant involvement was positively related to effectiveness in improving environmental behavior.”⁹⁹ Thus, perhaps more important than the program structure is whether or not it encourages learning through experience.

Pedagogy, or educational technique, is the second major institutional factor that affects student learning. While many of the factors affecting pedagogy have already been discussed in terms of social context, critical thinking processes, and diversity, Eleanor Duckworth attempted to bring these concepts to life by describing students’ “having of wonderful ideas.” Taking Piaget’s cognitive levels as a baseline and Vygotsky’s proximal development as a means, she shows how when students are given manageable problems and the tools and encouragement to solve them, the discoveries they make on their own are much stronger and longer-lasting than when presented with tasks that are too structured, unattainably challenging, or overly simplistic.¹⁰⁰ For example, discussing the principles behind effective communication and then giving students materials to create their own posters advocating for responsible climate action catalyzes more investment than simply handing them flyers to put up.

Educators

Educators are affected by both individual and institutional factors. Teachers’ conception of their material and the best way to teach it directly affects students’ learning experiences. Strauss identifies this underlying belief of what makes students learn as “folk pedagogy.” It stems largely from the teacher’s own learning experiences, and is

⁹⁸ Zelezny, 3

⁹⁹ Zelezny, 3

¹⁰⁰ Duckworth, 1

thus somewhat separated from his or her subject area knowledge or even the way he or she claims to understand educational processes.¹⁰¹ Therefore, it is important to examine how these beliefs mesh with the backgrounds and perspectives of the students; if students and teachers conceive of the environment in totally different ways, productive environmental education is less likely to occur.

Educators are also influenced by the setting in which they teach. A program in Boston found that many teachers were reluctant to take their classes on environmental field trips out of the school building due to concerns over managing behavior.¹⁰² For teachers used to a traditional education style, the walls of a classroom contain a more controlled and secure teaching environment. Andrew Foran, however, illustrates the positively “intense” learning experiences that can take place once the class ventures outside.

This intensity in the outdoors is possible because the four walls, the staleness, and classroom structure is removed. ... ‘Outdoors is not just a pencil and paper thing. You don’t get that level of surprise in the classroom because inside it is all in the books.’ A teachable moment can be achieved indoors through class discussion or as a result of reading the text, but outdoors, a teachable moment... can be picked up and held. ...The intensity of surprise is held right in their very hands as a direct experience.¹⁰³

It thus seems that students and teachers alike can benefit from the right balance of experiential and traditional education.

Outcomes and Program Assessment

The outcomes of environmental education are ideally positive changes in both the environmental attitudes and behaviors of students. There are a number of factors to

¹⁰¹ Strauss, 221

¹⁰² Barnett, 10

¹⁰³ Foran, 153

consider in assessing environmental education programs. Riley Dunlap created a scale in 1978 to measure proenvironmental orientations in relation to the “New Environmental Paradigm” (NEP). In contrast to the “Dominant Social Paradigm,” this scale was meant to gauge concern for relatively concrete environmental issues such as air and water pollution, loss of aesthetic value, and resource conservation.¹⁰⁴ Since then, he sees environmental perceptions as being increasingly linked to “attitude objects,” with “traditional measures of ‘environmental concern’ being supplanted by ‘ecological consciousness’...and ‘anthropocentrism versus ecocentrism.’ ”¹⁰⁵ While the original scale effectively measured “primitive beliefs” with well-established criterion and content validity, the revised version has been designed to include greater variety, balance between pro- and anti-environmental viewpoints, and updated content and language.¹⁰⁶

David Gray emphasizes the importance of specificity and outcome goals in the assessment of environmental perceptions. Rather than lumping together representations of perception, he stresses the need to differentiate between the “cognition, knowledge, and belief” of environmental issues.¹⁰⁷ Furthermore, when constructing an assessment it is imperative to focus on either general measures such as ecological attitudes or specific ones regarding particular issues such as recycling.¹⁰⁸ Within these scales, an assessment can cover multiple topics or multiple components within a single category. To demonstrate these relationships, Gray constructed a model of ecological measurement that is divided hierarchically between derived and primary environmental beliefs.¹⁰⁹ Its

¹⁰⁴ Dunlap, 426

¹⁰⁵ Dunlap, 426

¹⁰⁶ Dunlap, 432

¹⁰⁷ Gray, 24

¹⁰⁸ Gray, 28, 31

¹⁰⁹ Gray, 46

interconnecting pieces represent the correlation between components, much as I found the various factors of environmental education to be interrelated.

I attempted to balance all of these considerations while designing the assessments for my research. The specific tools I employed are described below in the methods section.

Case Study Background and Research Methods

I chose OLEEP as a case study for my thesis question because of the program's uniquely multifaceted approach to environmental education that seeks to bridge the gap between experiential and classroom approaches described in my theoretical review. In this section, I put OLEEP in context by giving a brief description of the Met School where the program is based. I then explain the program in depth and how each of its elements relates to my study. Finally, I introduce the research participants and describe the specific tools I devised to answer each of my research questions.

The Met School

History

The Metropolitan Regional Career and Technical Center is a public state-operated charter high school in Providence, Rhode Island. Opened in 1996, it currently consists of six small schools spread over three campuses (an additional Met school is located in Newport, R.I.), with a total of about seven hundred students. The Met's student body is 42% Hispanic, 29% African-American, 24% Caucasian, 3% Asian-American, and 2% Native American. 75% of students are from Providence, while the remaining 25% come from various towns throughout Rhode Island. 98% of Met graduates are accepted to college. The Met is the brainchild of Elliot Washor and Dennis Littky, who were invited to the Brown University Annenberg Institute for School Reform by Ted Sizer in 1994. With the support of the Rhode Island Department of Employment and Training's Human Resources Investment Council, the Annenberg Institute, the CVS Corporation (then the Melville Corporation), and the Big Picture Company, Washor and Littky formed a school based on the foundation of Progressivism. This educational framework is based on the

belief that students learn best by confronting problems that arise while doing things they find interesting. Progressivism is the foundation of Sizer's Coalition of Essential Schools, which has hundreds of sites across the country, and for which the Met is considered a model.¹¹⁰

Program Structure and Application

“[The Met] is founded on one word: *engagement*. The ‘engaged’ kid learns. The dis-engaged kid doesn’t. It’s damn near simple as that.”¹¹¹ This emphatic endorsement by Tom Peters sums up why the Met is the perfect setting to run a program centered on experiential education. In place of classes and grades, the Met focuses on real-world internships and presentations justifying the value of one’s work. Furthermore, the Met values the individual student and his or her unique learning experience, hence Levine’s title choice, *One Kid at a Time*. I would like to consider how three essential elements of the Met’s educational approach relate to OLEEP and environmental education: the ‘advisory,’ learning through internships (LTIs), and the student learning plan.

Rather than traditional classrooms, Met students are divided up into individual advisories. Within each school, these sub-units of fifteen students and a teacher stay together for the length of each student’s career. Beyond the traditional teacher roles, Met advisors go out of their way to truly get to know and keep tabs on each of their students; for example, after one student had an operation, her teacher visited her in the hospital every day for two weeks.¹¹² Students respond to this kind of individual attention: “ ‘At the Met it’s more like family, and I always know that they’re going to support me and

¹¹⁰ history compiled from Levine, xviii-xii, 142-4 and http://www.themetschool.org/about_history

¹¹¹ Levine, xii, emphasis his

¹¹² Levine, 22

help me move up.’ ”¹¹³ Many Met students need this kind of support, like many urban students coming from stressed families and facing serious life challenges well beyond their years such as poverty and drug abuse.

While OLEEP attempts to provide another means of support and confidence-building for Met students, it remains unclear how well a group of Brown students involved in an extracurricular program can live up to the standard of involvement set by Met advisors. It is possible that one reason the one-on-one mentor-mentee relationships have not seemed to blossom this year is the current Brown mentors’ inability to connect and invest the requisite time for this kind of support, which leads to a less satisfactory experience from the perspectives of both mentors and mentees.

LTI’s are at the heart of every student’s experience at the Met. Tuesdays and Thursdays are spent off campus working with a diverse range of local businesses and organizations, from computer companies to auto repair shops to elementary schools. Students are responsible for finding their own internships based on their interests, and may find one that lasts all four years at the Met or bounce around every semester. The idea behind the internships is that working relationships with real-world adults builds students’ knowledge, responsibility, and self-confidence. Being treated as adults has reciprocal results; one parent said, “ ‘That’s why [my son is] working so hard now—because he feels important and valued.’ ”¹¹⁴

LTI’s tap into the interdisciplinary approach to education that is integral to my thesis question and the OLEEP program. “When properly designed, hands-on learning

¹¹³ quoted in Levine, 1

¹¹⁴ quoted in Levine, 38

can lead to academic learning.”¹¹⁵ I see OLEEP as giving Met students hands-on learning experiences on field trips which can then be applied in more academic workshops. This, however, requires a concerted effort to make the integration salient. Furthermore, it is essential to keep students motivated to learn in both classroom and experiential settings.

Instead of following a traditional curriculum, Met students plan their educational experiences through individualized learning plans. These are matrices that students fill out to illustrate how each of their activities fit into the Met’s five overarching learning goals: empirical reasoning, quantitative reasoning, social reasoning, communication, and personal qualities. These goals can be satisfied through LTIs, extracurriculars, independent projects, and other activities. Most relevant to OLEEP are the empirical and quantitative reasoning components. These goals ask students to think like scientists and mathematicians, using empirical data and numbers to solve problems. Historically, these two goals have been the least successfully achieved at the Met.¹¹⁶ This is attributed to teachers who lack as strong backgrounds in math and science as in the humanities, in addition to “ ‘view[ing] empirical reasoning too narrowly. They tend to interpret it as traditional high school science—biology, chemistry, physics, and earth sciences—when in fact the Met’s notion of empirical reasoning is much broader than that.’ ”¹¹⁷

This is an important issue to consider in regards to OLEEP’s identity. As I will discuss in my results, many OLEEP mentees use the program as a means to fill their empirical or quantitative reasoning goals, and as a result many mentors feel obligated to teach to these learning objectives. However, many mentors view empirical reasoning (ER) in the same, traditionally narrow ways that Met teachers do. The result is a program

¹¹⁵ Levine, 42

¹¹⁶ Levine, 134; this may have changed since the date of publication

¹¹⁷ quoted in Levine, 136

that handicaps itself by trying to teach high school science to students who do not necessarily want to learn this subject and by teachers who are unequipped to instruct it. This represents a lost opportunity because there is a lot of student interest in working on science-related projects at the Met,¹¹⁸ which perhaps with better coordination could be better integrated into OLEEP and students' learning plans.

Outdoor Leadership and Environmental Education Project

History

OLEEP was conceived of in 1997, at the end of the Met's second year. The idea of students connecting with each other in an outdoor setting was inspired by the Brown Outdoor Leadership Training (BOLT) program, which takes Brown sophomores on five-day hiking trips in the White Mountains of New Hampshire. Ben Castleman, who was one of the original OLEEP founders and currently works at the Met, found while participating in his BOLT trip that "in a wilderness setting you connect with a group of people in a different way" than during daily interactions.¹¹⁹ Furthermore, Castleman found a disconnect between Brown and the Providence beyond College Hill, as well as general inequity in ethnic group participation in outdoor recreation (the majority of national park attendants are white).¹²⁰ In response to these issues, he decided to help "create a program that bridged the gap between Brown and the surrounding community and addressed the issues of equity, especially in the context of open space."¹²¹

The goals of this initial OLEEP—Outdoor Leadership and *Experiential* Education *Partnership*—were to "use wilderness expeditions as a vehicle to build personal

¹¹⁸ Levine, 67

¹¹⁹ Castleman interview, 10/2/06

¹²⁰ Castleman

¹²¹ Castleman

character, leadership skills, and group cohesion/identity.”¹²² These objectives are similar to those of the Outward Bound programs described in the educational background.¹²³ The program was therefore centered on numerous BOLT-style hiking and camping trips throughout the year, with weekly meetings to build outdoor skills and form relationships within the group, which were strengthened by one-on-one mentor/mentee partnerships. Conspicuously missing from the program was an emphasis on environmental education.

The first “E” in OLEEP came to stand for “Environmental” four years into the program, by which time the original leadership had graduated and new coordinators were shaping the organization’s agenda. Since then, OLEEP has continued to evolve in its attempt to find the correct balance between environmental experience and education, as Castleman notes:

*I think OLEEP on an environmental education point of view from where it is now is at a stronger point of integration with students’ academic and real-world learning than before. Students at Met are most engaged in learning when it’s out in the community and it’s real and authentic; it’s not abstract and we’re not pretending it’s school... OLEEP fills that niche.*¹²⁴

One question in my research is whether OLEEP actually is filling the niche of environmental education that is “real and authentic” as opposed to “pretending it’s school.” Castleman raised the concern that “environmental education is important, but a year or two ago there was almost too much focus on environmental education” as opposed to the basic focus on building relationships, leadership, and self-confidence.¹²⁵ I have therefore investigated whether this potential imbalance is still an issue.

¹²² Castleman

¹²³ Outward Bound

¹²⁴ Castleman

¹²⁵ Castleman

Current Goals

OLEEP currently describes its mission in three parts: (1) attempting to build meaningful relationships and commitment to the program through one-on-one mentoring, (2) exploring real-world leadership and natural science-based problems through experiential education, and (3) challenging its participants with uncomfortable situations to catalyze reflection and personal growth.¹²⁶ In the end, OLEEP hopes that “By exposing students to the environmental challenges facing our society and helping them to develop the skills to lead and communicate effectively, OLEEP is creating future environmental leaders for the urban communities that most need them.”¹²⁷ One of the primary components of my research is to assess how effectively OLEEP meets these goals through its balance of experiential and didactic environmental education. By using OLEEP as a model, I will extrapolate implications for environmental education as a field. However, it is essential to bear in mind that OLEEP is only one program example and that its integration of leadership and environmental goals may not be ideal for strict outcomes of environmental awareness and stewardship, as discussed further in the conclusion.

Program Structure and Application

OLEEP runs in partnership with the Met and the Swearer Center for Public Service, Brown’s center for community service and outreach. Both of these organizations provide financial support, though OLEEP strives to fundraise to maintain a significant portion of its budget. While advisors at the Met and the Swearer Center provide a degree of continuity for OLEEP, like most college-based programs it is run on a day-to-day basis

¹²⁶ http://www.brown.edu/Departments/Swearer_Center/programs/oleeppage.shtml

¹²⁷ http://www.brown.edu/Departments/Swearer_Center/programs/oleeppage.shtml

by individual students: in this case two Brown student coordinators along with a group of about fifteen Brown student mentors. The program is therefore very dynamic in nature, with this group of college students responsible for planning out the year's curriculum during the same weekend retreat when they will be introduced to OLEEP.

There are three primary components of OLEEP—camping trips, workshops, and mentoring—which I have examined individually and collectively to gauge their effectiveness for environmental education. I believe OLEEP is unique in having these three complementary aspects which in theory might strike a more effective balance between experiential and didactic environmental education while also connecting with the Met's larger learning goals.

The first component is camping trips. There are three primary two-night camping trips during the year, the first to the Rhode Island Washington State Park in October, the second to the Beckett, Massachusetts YMCA campground in February, and the third backpacking in southwestern Massachusetts in late April. These trips are the direct manifestation of OLEEP's original goal of exposing Met students to wilderness settings. During the trips, mentors and mentees apply outdoor living skills collaboratively to set up camp, cook meals, and participate in various outdoor activities. There is an emphasis on teamwork and leadership; as much as possible the mentees make decisions and perform tasks to apply their skills. There are ample opportunities for all participants to observe their surroundings, for example through quiet walks through the night woods, as well as to get to know each other better by spending forty-eight hours of uninterrupted time in close proximity.

The camping trips allowed me to observe how OLEEP introduces its participants to the wilderness environment and are the primary manifestation of experiential environmental education. They provided a clear picture of the mentees' perceptions and comfort level in the wilderness environment, including differences between new mentees and those who are returning from past years. They were illustrative of the group dynamic both within and between mentors and mentees. They showed how the mentors work together with each other and the mentees, and what activities—educational or otherwise—they choose to emphasize while in a wilderness setting. Their organization and programming could be changed to modify these priorities.

The second component of OLEEP's program is weekly environmental education workshops that take place on Monday afternoons from 3:30 to 5:00 p.m. Workshops are organized into broader "units," each with a separate theme agreed upon by the mentors at the beginning of the year. This year, units have addressed teambuilding, natural disasters, biotechnology, global warming, water, and sustainability. Two to three mentors are responsible for planning and implementing each unit, and they meet ahead of time with the coordinators to discuss their plans as well as outlining them to the other mentors at their meetings (see below). There is very little restriction of workshop structure—mentors can lead discussions, conduct experiments, go on field trips, use PowerPoints, and employ other activities. During workshops, the non-leading mentors help facilitate as encouraged by the leaders or independently deem helpful; mentees follow mentors' instructions.

The workshop component of OLEEP models primarily didactic environmental educational strategies, although there is flexibility to incorporate more experiential

activities. As a mentor in the program, I observed how workshops were conducted, how each participant was involved, and how their themes related to broader OLEEP goals. This helped me differentiate between the new and returning mentees based on their participation level and demonstrated expertise of each theme. There was little to no formal evaluation of workshops' effectiveness built into the program, though this is something OLEEP is hoping to improve. Based on the workshop content and style, I considered whether the expectations of the mentors and mentees (and the Met) were being met. Finally, I attempted to gauge how mentees' perceptions were reflected in their participation. The open-ended structure of the workshops leaves room for change and potential improvement, and I took advantage of this dynamic while planning my workshops for the global warming unit (see below).

The third component of OLEEP is the mentoring relationships between Brown mentors and Met participant mentees. Mentors are expected to meet with mentees for at least an hour each week. The activity is freely chosen and coordinated by the pair and is not expected to be directly related to environmental education; possibilities include getting coffee, walking, seeing a movie, bowling, and going to one's house. A new possibility requiring mentor-mentee pairs to work on an independent presentation to the OLEEP group has been suggested to catalyze increased learning and investment in the program. While this seems to have very good potential, it is still in the early stages of implementation.

This mentoring component of OLEEP is the least directly related to environmental education, originally incorporated to strengthen relationships within the program and build commitment to it, as well as providing a college mentor to support

personal growth and an introduction to college culture. As I have built a relationship with my mentee, heard about other mentors' experiences, and talked to both mentors and mentees about this aspect in general, I have considered how this does or does not play into the other aspects of OLEEP and the mentees' perceptions of the environment. Based on this, I suggest how this aspect could be changed to strengthen the program in the future.

In addition to the three primary components of OLEEP, the Brown mentors go on a weekend camping retreat to Washington State Park at the beginning of the year before the program begins. The purpose is for the Brown student mentors to get to know each other and form a preliminary plan for the year. This plan addresses primarily the themes of each unit of workshops. Mentors discuss general goals for OLEEP and how to integrate this into the units. They also discuss mentor-mentee relationships, the general background of OLEEP and the Met, and any new ideas mentors have for the program in general.

The mentor retreat helped me evaluate how OLEEP functions as a program by examining what went into the planning of the year's activities, how the mentors interacted with each other, and what its primary objectives were. The retreat forms a major basis of the didactic workshops and the pedagogy behind them. It is an aspect that could easily be changed, and therefore is a valuable mechanism through which to potentially improve OLEEP.

Finally, the Brown mentors meet once a week for an hour to check in with each other, discuss any issues, and plan for the coming week. This discussion includes individual updates on mentor/mentee activities, ongoing projects and goals, such as

whole-group activities and 10th anniversary preparations, and a run-through of the workshop plan for Monday (presented by the mentors responsible for that unit).

This complements the mentor retreat in terms of being the primary forum for mentors to discuss and plan the OLEEP program as a group. Therefore, mentor meetings formed a key setting for my observations regarding how effectively this occurs. Specifically, I looked for what strategies were employed for curriculum development, coordination (or lack thereof) between mentors, and communication between the regular mentors and the two OLEEP student coordinators. The meetings provide insight into the ongoing goals, insights, and actions of the mentors and therefore indicate areas where these interactions could be improved.

Research Participants

My research focused on the Brown student mentors and Met student mentees participating in OLEEP. Both groups applied to participate in the program at the beginning of the year, leading to self-selection for those students interested in teaching and learning about the environment. Both may participate for multiple years, leading to the important differences between new and returning mentees discussed in my results. Since my research evaluated the OLEEP program as a whole, all OLEEP participants were also research participants. Each evaluation was explained to them and responses were voluntary and confidential.

There were seventeen OLEEP mentors this year, including the two coordinators (who did not have mentees). They came with a variety of urban and rural backgrounds, ethnicities, and general strength of outdoor leadership experiences. Two were seniors, four juniors, seven sophomores, and four first-years at Brown.

There were sixteen OLEEP mentees, one of whom assisted the coordinators and did not have a mentor. All but one of the mentees (94%) completed the program, and the one that did not was replaced by another applicant for the spring. As discussed later, however, participation was very inconsistent throughout the program; only about ten were present on a regular basis. The mentees reflected the diverse backgrounds of Met students in general; the majority was from Providence, while a handful was from smaller communities throughout Rhode Island, and their ethnicities were very mixed. Likely related to their self-selection into OLEEP, they all had at least some experience in the natural environment (see results below). One was in ninth grade, five in tenth, three in eleventh, and six in twelfth; the majority of new mentees was in tenth grade while the majority of returning mentees was in twelfth.

Research Tools

Research Tool	Initial semi-structured survey	Mentor midyear evaluation	Mentee focus group	Final semi-structured survey
Research Questions Addressed	baseline perceptions and stewardship; baseline expectations	program expectations and identity; program elements; improvement	change in perceptions and stewardship; meeting of expectations; program elements; improvement	change in perceptions and stewardship; program elements; improvement
Date Administered	October 13, 2006	December 10, 2006	December 11, 2006	February 26, 2006
Total Respondents	15	12	13	10
New Mentees	8	--	6	4
Returning Mentees	7	--	7	6

In addition to participating in and observing the various components of the OLEEP program, I developed a series of qualitative research tools to answer my thesis

questions. Before the first camping trip in October, 2006, I administered a semi-structured preliminary survey to all of the mentees to assess (1) their baseline definitions and perceptions of the environment, (2) their environmental stewardship, or pro-environmental concerns and behavior, and (3) their past experiences with environmental education.¹²⁸ The survey consisted of fourteen short response questions divided into three sections corresponding to each of the primary goals. Specifically, students were asked to describe ‘environment,’ where and how they spend time outside, how they think people from urban and rural backgrounds conceive of the environment, what environmental issues they think are pressing and how to solve them, and where they have learned about the environment in the past. I also included a fifteen-item Likert-style scale based on Dunlap’s New Environmental Paradigm as discussed in the assessment section above.¹²⁹ This allowed me to measure environmental perceptions in a more quantitative manner to be compared with results from the same assessment at the end of my study (see Conclusions for limitations).

In December, 2006, at the end of the first semester’s programming, I conducted a focus group with the mentees. The purpose of the mentee focus group was to serve as a midyear evaluation for both my research and OLEEP as a program. My three primary goals were to (1) gain a fuller understanding of mentees’ environmental perceptions to supplement conclusions and answer questions from the initial survey; (2) ascertain mentees’ expectations for OLEEP and how they have or have not been satisfied, assess reasons for any potential gap between their expectations of the program and what it actually delivers; and (3) delve into how OLEEP’s three components (field trips/camping,

¹²⁸ See Appendix 1 for Preliminary Survey

¹²⁹ Dunlap, 433; See Appendix 1.a for NEP Questionnaire

workshops, mentoring) fit into mentees' existing perceptions and learning styles to catalyze environmental stewardship. A secondary goal was to continue to observe differences between new and returning mentees and attempt to ascertain how much of these differences can be attributed to OLEEP (vs. age, home, or self-selection). It was administered to thirteen of the fifteen mentees (the other two were absent) during the normal workshop time. It lasted about fifty minutes, and consisted of three sections based on the above goals.¹³⁰ Questions in the first section centered on how the mentees define environmentalism, how they decide what environmental issues are important to them, and how past environmental education experiences fit into their current behavior. The second section asked why the mentees signed up for OLEEP, how it has met their expectations, and how the program could be improved. The third section asked how effective individual components of OLEEP are and how they fit together. The first section was conducted in two groups, divided between new and returning mentees, and led by an OLEEP student coordinator and me, respectively. The second and third sections were conducted as a full group with two facilitators. Overall, the focus group helped fill in many of the gaps in my understanding of mentee perceptions and was an effective midyear evaluation for the program that supplements feedback from the mentors collected separately.

Also at the end of the fall 2006 semester, I took part in a survey given to all the Brown mentors by the student coordinators. Because I was participating in the OLEEP program while conducting my research, I did not read the responses to the survey, which was meant to be processed by the student coordinators. The survey was followed by a

¹³⁰ See Appendix 2 and 2.a for Facilitation Guides

period of free discussion, however, during which I was able to ascertain the answers to many of the questions I would have asked the mentors in a more formal evaluation.¹³¹

The conversation broke down into three main categories based on questions from the survey: (1) “How would you describe the purpose of OLEEP? How would you change this purpose?” This relates to the central issue I identified between the expectations and reality of the program from the perspective of the mentees, the mentors, and the Met. (2) “What does effective science education mean to you? What elements of education do you feel have been the most and least effective in OLEEP?” This corresponds to my interest in OLEEP’s pedagogy and central hypothesis that outdoor experiences make classroom learning more effective. However, the use of “science” in place of “environmental” education is significant in terms of OLEEP’s purpose, as the two types of education are not the same. “Science” implies a more specific, biological, physical and chemical nature than the broader, interconnected “environmental” themes that I am most concerned about in this thesis. (3) “How effective has the curriculum been? What would you change?” Also overlapping with the former two categories, this portion of the conversation involved brainstorming potential changes to OLEEP’s planning, organization, and structure that fits into my goal of helping the program improve with implications for environmental education as a general field.

In February, 2007, I was responsible for leading a unit of workshops on global warming along with one other mentor. I used this as an opportunity to put my preliminary conclusions on effective environmental education and potential changes to OLEEP into practice, to be evaluated in my final survey (see below) and used as partial basis for my conclusions. The primary goal for the unit was to increase students’ awareness,

¹³¹ See Appendix 3 for Mentor Discussion Transcript

understanding, and positive behavior regarding climate change. Given the conceptual challenges and theoretical issues regarding students' pedagogical relationship with climate change, I identified two objectives towards achieving my primary goal: (1) Make climate change relevant for the students given their backgrounds and existing perceptions to catalyze motivation; and (2) Utilize all three aspects of OLEEP to make the overall lesson as strong as possible by balancing environmental education with outdoor experience. These goals drew specifically upon the lasting value of environmental experience as identified by Wells¹³² and Ewert¹³³ that results in the more balanced ecological literacy called for by Orr¹³⁴. The unit attempted to follow Kaplan¹³⁵ and Duckworth's¹³⁶ advice to frame questions in ways that the students can comprehend connect to, and solve on their own, resulting in lasting motivation to address these issues. Finally, it strived to consider the background of both students and teachers by integrating Strauss'¹³⁷ lessons on folk pedagogy, Rogoff's¹³⁸ cultural learning differences, Cronon¹³⁹ and White's¹⁴⁰ "wilderness," and Freire¹⁴¹ and Clayton's¹⁴² environmental justice.

The unit was divided into three workshops, the first two of which took place at the Met during the normal afternoon period and the third consisting of a field trip to the wind turbine at the Portsmouth Abbey school in Portsmouth, R.I. The first workshop focused

¹³² Wells (2006)

¹³³ Ewert (2005)

¹³⁴ Orr (1992)

¹³⁵ Kaplan (2000)

¹³⁶ Duckworth (1996)

¹³⁷ Strauss (2001)

¹³⁸ Rogoff (2003)

¹³⁹ Cronon (1996)

¹⁴⁰ White (1996)

¹⁴¹ Freire (1972)

¹⁴² Clayton (2000)

on the causes and effects of global warming.¹⁴³ To tie the workshop into the camping trip that had occurred the previous weekend, we discussed the highlights from the trip and how it might be different if global warming continues. These effects were graphically illustrated by clips from Al Gore's *An Inconvenient Truth* on shrinking glaciers, ecological changes, and rising sea levels, each of which were discussed in terms of local implications. Following this, the participants were broken into small groups to diagram the greenhouse effect based on a list of key terms, which were then collaboratively discussed as a large group. The final activity was a worksheet on individual carbon footprints based on daily energy consumption.¹⁴⁴

The second workshop centered on potential solutions to the problem of global warming.¹⁴⁵ In between the workshops, the participants were instructed to consider their energy use for a day by completing an exercise based on Thoreau's concept of "living deliberately," or carefully thinking about all of one's decisions and actions.¹⁴⁶ This was the basis of the second workshop's initial discussion, which also involved brainstorming a list of actions to help prevent global warming. To view firsthand technological responses to climate change, the entire group went outside to investigate a Toyota Prius hybrid gasoline-electric automobile. This catalyzed conversation over the pros and cons of alternative fuels and cost effectiveness. The third activity centered on effective environmental communication. In two groups, the participants considered a number of press advertisements regarding climate change. These formed the basis of conversation about facilitating change through five goals of communication: minimizing barriers,

¹⁴³ See Appendix 4 for Workshop 1 Plan

¹⁴⁴ See Appendix 4.a for Carbon Footprint Worksheet (co-leader Lindsay Mollineaux)

¹⁴⁵ See Appendix 4.b for Workshop 2 Plan

¹⁴⁶ See Appendix 4.c for Living Deliberately Worksheet (co-leader Lindsay Mollineaux)

maximizing benefits, building commitment, utilizing prompts, and buying into community norms. Finally, participants were encouraged to create their own poster based on these concepts which they could then post within the school to encourage change among their peers.

The third workshop's field trip to a local wind turbine was meant to illustrate a large-scale, tangible symbol of positive environmental stewardship. Seeing the windmill up close allowed the participants to get a firsthand feel for its size, sound, and overall appearance. Discussion with an on-site representative brought out much of the fact and controversy over wind power, which the students could then consider in their own communities.

The final survey¹⁴⁷ administered to the mentees immediately following the wind turbine field trip was geared largely towards evaluating the unit described above. This included questions regarding the causes, mechanisms, and effects of global warming, as well as awareness and stewardship around climate change, and subjective ratings of the unit components and how they interacted. This section was geared to determine how well the unit met its goals, as listed above, and thereby infer what strategies are or are not effective for general environmental education programs. The final survey also further clarified issues raised in the focus groups by asking questions regarding the interaction of OLEEP's three components and justification for environmental stewardship. Lastly, it asked some of the same questions as the initial survey regarding defining 'environment' and environmental issues and actions, as well as reusing the NEP questionnaire.¹⁴⁸ These sections illustrated the change in perceptions of the mentees over the course of the

¹⁴⁷ See Appendix 5 for Final Survey

¹⁴⁸ See Appendix 1.a for NEP Questionnaire

OLEEP program, indicative of its effectiveness in building environmental awareness and stewardship which can be extrapolated to the larger field of environmental education.

For all research tools, the short-answer survey responses and focus group recordings were qualitatively analyzed by summarizing and categorizing participants' statements.¹⁴⁹ I calculated the percentage of respondents falling into each category and weighted the results based on these proportions. The NEP questionnaire was the primary quantitative tool and was analyzed by charting and graphing the responses to each statement for all respondents, as well as divided into new and returning mentees.¹⁵⁰ The surveys also included a few quantitative questions, such as the rating of each activity in the unit on global warming on a scale of 1 to 5.¹⁵¹ The percentage of respondents at each level as well as the average response was noted for each statement.

¹⁴⁹ See Appendix 3 for Mentor Discussion transcript

¹⁵⁰ See Appendix 6 and 6.a for graphs

¹⁵¹ See Appendix 5, question 17

Results

In this section, I discuss my findings in terms of how OLEEP's program related to participants' perceptions of the environment and their inclination toward environmental stewardship, both at the beginning of the year and how they have evolved to the present. I also explain the overall impact of OLEEP and its effectiveness as a model for experiential environmental education. I compare the program expectations of the Met student mentees, their Brown student mentors, and the Met School faculty with the reality of how OLEEP is actually run. I then outline the structural components of the program and how its three elements work together to provide a balance between experiential and didactic learning. Finally, I analyze the effectiveness of my curricular unit on global warming as a possible new and more effective approach for future OLEEP workshops.

Environmental Perception and Stewardship

My findings of OLEEP participants' baseline environmental perceptions and stewardship are based on the preliminary survey I conducted in October, 2006. I was able to follow up on responses from the survey and see how these perceptions were evolving through the mentee focus group in December, 2006. The final survey I administered in late February, 2007 provided an assessment of whether and how mentee perceptions and stewardship have changed as a result of their participation in OLEEP. The evolution of perceptions and stewardship are treated separately in my assessment of participants' change in their environmental literacy affected by OLEEP. It is important to note the differences between mentees who were new to the program this year versus those who returned from previous years; the former represent direct change from the current

program, while the latter are more likely to embody the influence of this year's program combined with their previous experience in OLEEP.

Perception of the Environment

One of the premises behind this thesis is that students' preconceptions affect the ways they learn. Therefore, the more an environmental educator integrates his or her students' existing environmental perceptions in planning educational material, the more successful that material is likely to be. Given potential issues of isolation between urban and wilderness environments that have been highlighted by Cronon and White,¹⁵² this is especially important when teaching a mostly urban student body such as that at the Met. As my research was limited to Met students involved in OLEEP, it is also important to note that they voluntarily decided to participate in the program.

Given students' self-selection into the program, it is not surprising that overall, OLEEP mentees entered this year's program with previous interest and experience with the natural environment. All participants associated 'environment' with elements of the natural, non-human world. That said, there was significant variation between new participants and returning ones in the depth of their conceptions and interaction with the environment. In terms of articulating a basic definition of the 'environment,' both groups primarily listed concrete elements of nature, such as "plants, animals, and earth." The returning students exhibited more breadth in their terms, including "people" and "safety," as well as making more reference to environmental issues such as "pollution."

In contrast, their 'own outdoor environment' was much more readily identified with where students live, which is generally Providence. This was especially marked among the new OLEEP participants, who seemed focused on their urban setting of "city,

¹⁵² Cronon (1996); White (1996)

buildings, and people,” where 75% said they enjoy spending time. Furthermore, while they spend a significant amount of time outside on a daily basis (averaging 3-4 hours), around the city seems more by coincidence to be where they “hang out with friends, walk, and play sports” as opposed to being a deliberately chosen setting. There was therefore a significant gap between what new mentees thought of as the ‘environment’ and where they actually live and spent time. Returning participants had less of a disconnect between how they defined the environment and where they spend their time. More of them live outside of Providence, which may be coincidental or self-selecting, and the ones that live in the city had more negative reactions to the urban setting, associating it with “odor, bums, and litter.” Those who live outside the city were more likely to enjoy spending time in their environment, and their favorite outdoor activities were more deliberately linked to nature, such as going into the backyard to “relax.” This suggests that over time, OLEEP helps mentees develop more consistent conceptions of the environment and how the abstract concept relates to the settings in which they actually live and act.

When specifically asked about how urban versus rural backgrounds affect environmental perceptions, both groups initially associated a positive environmental attitude with rural areas and a negative one with cities. Virtually all respondents said that people from the city don’t know much about the environment, think it’s a dirty place, and don’t take care of it. Returning participants contrasted cities to rural areas, which are “more peaceful” and encourage learning about the “woods, outside, and animals.”

However, two months later both groups had changed their opinions about the urban versus rural environmental attitudes, potentially due to OLEEP’s influence or the

change in my assessment approach from written survey to a focus group discussion. New mentees identified a number of urban groups such as the Boy's and Girl's Club that are currently involved in clean-up projects. Furthermore, they focused on the fact that most people live in cities, and that urban life does not necessarily preclude environmental awareness. "I don't believe just because you live in the city means you don't care. What if you can't afford to live anywhere else?" Returning mentees agreed that people from the city can care about the environment, and sometimes "even more so because there's even less environment" there.

Follow-up questions on the meaning of 'environment' in the city showed similar change that reflected positive attitudes toward urban environments. One new mentee said that "the environment is the city, too, and we have to take care of that." Returning mentees emphasized the importance of broadening our definition of environmentalism to include a number of different factors, such as "social environmentalism" that focuses on how people relate to one another within a particular setting. However, while the mentees were striving to find positive environment in the city, it was still difficult to accomplish fully. As one commented, "There is and there isn't [good environment within the city]; you can do everything, but there's still cars and stuff" that negatively affect the immediate and surrounding areas.

Perceptions of environmentalists and environmentalism were also distinctive between new and returning mentees. Some new mentees "really don't know what environmentalism means," while others said environmentalists are "tree-huggers" or "hippies." A third portion referred to people who "study" the environment in order to take care of it. None of them self-identified as environmentalists, defining themselves as

“city people.” However, it seems that OLEEP helps to change these attitudes. One mentee said that, “At school we learned about the planet, but in OLEEP we learn how to take care of it.” Returning mentees demonstrated this shift in priority through more developed ideas about environmentalists. They referred to “someone who cares for the environment and will work towards learning about it, take care of it, and will teach others to better their surroundings.” When asked on the initial survey to identify people at the Met who care about the environment, 33% of returning mentees mentioned OLEEP. While I failed to ask them explicitly whether they would consider themselves environmentalists, these responses suggest they do.

The supplementary questionnaire based on Dunlap’s New Environmental Paradigm (NEP) administered at the end of the initial survey provided more quantitative corroboration to the qualitative data collected in the initial semi-structured survey and the mentee focus group.¹⁵³ For each NEP statement, respondents selected either “strongly agree, agree, unsure, disagree,” or “strongly disagree.” As determined by Dunlap, pro-environmental views are demonstrated by agreement to odd-numbered environment-centric statements such as “Despite our special abilities humans are still part of nature” and disagreement to even-numbered anthropocentric ones such as “Humans were meant to rule over the rest of nature.”¹⁵⁴

There is generally a clear distinction among OLEEP participants’ responses to the two types of statements. Across the board, the participants exhibited much stronger pro-environmental responses on the environment-centric statements. Not a single mentee disagreed to any of them, and most environment-centric statements elicited strong

¹⁵³ See Appendix 6 for graphed results

¹⁵⁴ Dunlap, 434

agreement. “Plants and animals have as much right as humans to exist” and “Despite our special abilities humans are still part of nature” were especially strongly supported, with 93% of respondents strongly agreeing or agreeing with the first and 100% with the second, likely because they are directly in line with the mentees’ definitions of the ‘environment.’ These statements’ positive environmental language activates the mentees’ preexisting positive environmental inclinations. There were more “unsure” responses to the statements that “We are approaching the limit of the number of people the earth can support” (53%), “When humans interfere with nature it often produces disastrous consequences” (46%), and “The earth is like a spaceship with very limited room and resources” (46%). While I was not able to ask participants why they chose individual responses, the content of the third question was likely confusing, while the first two may be related to a lack of information that OLEEP could attempt to address.

Results were much more mixed on the anthropocentric statements. Only “The balance of nature is strong enough to cope with the impacts of humans” and “Humans were meant to rule over the rest of nature” had a majority of disagreement (73% and 60%, respectively). That “The so-called ‘ecological crisis’ facing humankind has been greatly exaggerated” and “Humans will eventually learn enough about how nature works to be able to control it” elicited high levels of uncertainty (66% and 53%). Both “Humans have the right to change the natural environment to suit their needs” and “Humans will always be able to develop new solutions to environmental problems” had relatively high levels of agreement (46% and 53%). It requires a more sophisticated understanding of the human-environment relationship to determine the environmentally “correct” responses to these statements. These responses also support the mentees’ anthropocentric justification

for environmental action, as elaborated in the stewardship section below. It is also important to note that Dunlap's baseline perception of the 'environment' may be different than that of some of the participants, leading to apparently "lower" scores that in fact are simply reflective of different values. In particular, he seems to buy into the idea that anthropocentric is environmentally negative and humans have separated themselves from nature, to which Cronon and White¹⁵⁵ would take issue. This is potentially a factor that I should have considered more before choosing this instrument, but based on its success in other contexts¹⁵⁶ I think it was still a useful measure of participants' more abstract environmental attitudes.

Between new and returning OLEEP participants, responses to environment-centric statements were relatively similar. New participants were more often "unsure," whereas returning participants "strongly agreed" more frequently. Anthropocentric statements brought out greater differences between the groups. Whereas new participants were still likely to lean towards agreement or uncertainty, veterans were more balanced, and in many cases leaned towards the pro-environmental disagreements. This contrast is especially evident in response to the assertions that "The earth has plenty of natural resources for humans if we just learn how to get them" and "The so-called 'ecological crisis' facing humankind has been greatly exaggerated." Both groups disagreed more with "The balance of nature is strong enough to cope with the impacts of humans" and "Humans were meant to rule of the rest of nature" (new mentees: 75% and 63%, respectively; returning mentees: 71% and 57%). Whether "Humans have the right to change the natural environment to suit their needs" was especially split in both groups

¹⁵⁵ Cronon (1996); White (1996)

¹⁵⁶ Dunlap, 436

between agreement and disagreement (new mentees: 63% agreement vs. 25% disagreement; returning mentees: 43% agreement vs. 57% disagreement).

The initial NEP results generally supported those from the short-answer survey questions. All of the participants strongly identified the natural environment as important and positive, with the veterans even stronger in this respect. More complex or ambiguous statements resulted in fewer pro-environmental responses in both groups, but the returning participants less so than the new ones. This could stem from a number of factors including an older average age and therefore educational and general experience for the veterans, but some of this difference can likely be attributed to the past effects of OLEEP. Past experiences with the program seems to have given returning mentees a heightened sense of environmental value and a greater understanding of the human relationship to environmental issues that lead them to respond more negatively to the anthropocentric statements. The overall reduction in “unsure” responses among returning mentees supports this conclusion. Statements that led to a greater degree of uncertainty—especially those dealing with the issue of human limits and the environment—could be used as starting points from which to strengthen OLEEP’s future depth of curriculum.

As I was more concerned with ascertaining OLEEP participants’ baseline environmental perceptions for their pedagogical implications, ascertaining their change was less of a priority in my final survey. In asking the mentees to re-define ‘environment,’ I did find new mentees to have somewhat broader conceptions than they did at the beginning of the year, with their definitions open to more encompassing “outdoors” and “your surroundings” than simply listing elements of nature. Returning mentees’ responses changed less, while still exhibiting a greater breadth of topics than

new mentees' (though this is likely due in part to discrepancies in sample size in the final survey).

More interesting is how participants responded when specifically asked how participating in OLEEP this year had changed the way they think about the environment. New mentees' responses were limited to increased awareness of specific issues, and they listed topics such as plant flammability and genetically modified foods that were covered in individual units this year (natural disasters and biotechnology, respectively). While at first seeming relatively superficial, these factual gains could potentially represent the kind of baseline information that sources such as the ICEE report consider prerequisite to more in-depth environmental problem-solving ability.

This is complemented by the more advanced environmental awareness reported by the returning mentees. They now think “that we should be more concerned with environmental issues such as global warming,” “about how I can help,” and “about the choices I make” regarding the environment. Again, assuming at least some of the difference between new and returning mentees can be directly attributed to OLEEP, one can see how having spent the first year learning about the details of environmental issues allows participants to spend the second year thinking about more abstract ways to start making a difference. This suggests that programs such as OLEEP are their best when there is continuity in participants from one year to the next, though there is the potential added challenge of tailoring education to different experience levels to avoid repetition.

The final survey NEP component showed little change relative to the initial survey,¹⁵⁷ though the smaller sample size is a possible source of error. Responses to environment-centric statements remained largely in agreement, with “unsure” responses

¹⁵⁷ See Appendix 6.a for graphed results

increasing on some measures and decreasing on others. Anthropocentric statement responses changed even less overall, with the exception of a marked increase in agreement with “Humans will eventually learn enough about how nature works to be able to control it” (66% vs. 20%) It is possible that as OLEEP participants learned about more how nature worked, they deemed it more likely to be controllable. The lack of overall change implies that the more abstract, long-term environmental perceptions that the NEP attempts to measure remain relatively unchanged over the few months encompassed by this study. It is likely that with more time and experience with OLEEP, new mentees’ perceptions would demonstrate increased convergence with those of the returning mentees.

Environmental Stewardship

While positive environmental perceptions are an essential component of environmental literacy, what makes a tangible difference in the world is how individuals change their behavior or take action in the interest of the environment through stewardship. A second part of the initial survey was geared at measuring OLEEP participants’ existing inclination toward environmental stewardship. In identifying key environmental issues, all participants indicated relatively broad, well-known problems such as “pollution” and “global warming,” which likely relates their also identifying the media as a large source of environmental information. Returning participants were again more specific, referencing different types of pollution such as oil spills and more issues overall including overuse of limited resources.

More relevant to environmental education than the issues themselves are the motivations for environmental stewardship that could be activated for future efforts.

Nearly all reasons to care for the environment listed on the initial survey were anthropocentric (“because it’s my home;” “because we need air to breathe”), including strong references among new mentees to sustainability (“to protect future generations”). These responses were reinforced by the new mentees’ focus group assertion that the most important environmental issues are “the ones that affect you the most.” Clearly, if these students are to invest in environmental issues, it is essential to illustrate how those issues are immediately relevant to their lives.

While human welfare is a compelling reason to care for the environment, I wondered if the students’ nature-focused view of the environment sets intrinsic value of nature as a potential additional motivator. In the focus group, I asked new mentees whether it is more important to worry about negative consequences for people or for the rest of the Earth. The discussion quickly turned to whether people or the Earth affect environmental issues more, however, with the unsurprising conclusion that people do: “I think people because until you start changing that—if people are doing negative things—then the Earth isn’t going to get any better.”

While the mentees’ attention was still focused on concrete human actions over abstract intrinsic environmental worth, they were genuinely intrigued by what it takes to stop people from doing negative things to the environment. A few particularly interesting survey responses from returning mentees centered on promoting awareness through “protest, learning, demonstration, and education.” Focus group follow-up indicated that this model had been modeled on activism seen at Brown and based on the idea that “the more you tell people, the more people are going to get involved.” It is clear that much of this drive to educate others to care for the environment comes from OLEEP, which

suggests an exciting positive-feedback cycle. One returning mentee said that after being in OLEEP for the first year, “I know that I *can* really affect it. ...I learned so much, it’s almost greedy for me to keep it to myself; I’ve got to share it with the world!” If OLEEP can successfully teach its participants to not only change their behavior but influence others, its effect will be exponentially greater.

However, new mentees also readily admitted to being “lazy” and only sometimes helping by “recycling” or “picking up litter,” raising the central issue of motivation to act. While they really wanted to work on “getting the word out more,” they were discouraged by the intuition that “some people will always stop [caring] and that will make others stop.” This discussion over realistic limits to human motivation to change indicated progress over initial survey responses asking “why not [take care of the environment]?” This healthy skepticism combined with returning mentees’ enthusiasm suggests that giving mentees strong communication tools, as modeled in my second global warming workshop, will help them effectively become environmental stewards by continuing the spread of environmental awareness started by their mentors.

Final survey responses to environmental issues were more specific among both new and returning mentees, suggesting that workshops have effectively increased their awareness. This is corroborated by the issues’ relating to workshop topics, with 100% of respondents listing global warming, including specific fossil fuel issues. Stewardship actions were similarly more specific, with 66% of returning mentees suggesting conservation of electricity and hot water as brainstormed during the global warming unit. Participants also reported doing these actions more, with 50% indicating they do so often. It is important to note that the survey was administered immediately following the global

warming unit, evaluated in detail below, which potentially skewed participants' responses toward that unit's lessons. When asked what would make it easier to follow through on environmental stewardship, mentees identified the need for additional information and more people also behaving in environmentally responsible ways. This suggests that the more environmental education programs can spread information and facilitate action, the more people will buy in, adding further weight to the potential positive-feedback cycle of OLEEP spreading environmental awareness.

In regards to motivation, 100% of the final survey respondents said that it is important to take care of the environment for the sake of both people and nature. Again, most indicated that people need the environment to survive, while a couple went further towards explaining why the environment needs people, saying that the relationship between the two is symbiotic. Particularly interesting was one comment that "nature also needs to be tamed by people." It is clear that despite the call for balance, these students' are still focused on implications of the environment for people and that if a goal of OLEEP is to instill intrinsic appreciation of nature, it has not yet occurred. While I see this as potentially adding to mentees' stewardship, the overall effect of OLEEP is to increase its participants' efforts to care for the environment in various forms. Particularly among an urban population, accepting a more anthropocentric approach that works is perhaps more important than holding onto the more wilderness-based argument that nature must be valuable for its own sake.

OLEEP Program Evaluation

Evaluating how effectively OLEEP addresses the environmental education needs of its participants is central to my case study approach of using OLEEP as a model for

other environmental education strategies. Having examined above the nature and change of environmental perceptions and stewardship in OLEEP participants, here I consider what each of the groups invested in OLEEP (the mentors, the mentees, and the Met faculty) expect the learning, process, and outcomes of the program to be. I compare these expectations to OLEEP's actual implementation to see how well they are being met. I then consider each of the three program elements (camping trips, workshops, and mentoring) individually and together to determine how each aspect of these experiential and didactic learning strategies come together. Finally, I evaluate the curricular unit I designed to utilize as many of my initial findings as possible with the hope of providing more effective environmental education for OLEEP participants, strategies which could be employed by the program in the future.

Expectations versus Reality

There are three primary stakeholder groups in the OLEEP program: Met student mentees, Brown student mentors, and the Met School faculty. While the Met faculty are not involved in OLEEP on a daily basis like the participants, I chose to include them in this comparison because the school provides the institutional setting in which OLEEP occurs, and its structure and needs are integral to the program. I did not include the Swearer Center at Brown in my analysis because—while it does influence the long-term character of the program as discussed in my conclusions—it has little to do with its daily operation and educational strategy.

On the initial survey, I asked mentees why they applied to the OLEEP program and what they hoped to learn from it. Again, there was a significant difference between new and returning mentees' responses. New mentees were relatively vague in their

motivation, saying they looked forward to being outdoors and learning “everything” about the environment. For many of them, the program had been recommended by past participants. One response that appeared in 25% of the surveys and surfaced more in conversation was using OLEEP to fulfill their quantitative or empirical reasoning (ER) requirements. These expectations were reflected in the focus group, when new mentees said they “needed empirical reasoning and OLEEP seemed like a cool way to get it.” Furthermore, they saw fulfilling learning goals as reason to adding a mentee peer-teaching component to OLEEP. As one noted,

I feel like that would really show a lot of the people at your [exhibition] panel that you’re doing some serious ER stuff. You actually developed your own workshop and you’re actually going to be running it and show them all the papers and stuff to do that. It’s like super ER credit and would blow them all away and be really positive.

The returning mentees’ responses suggested that OLEEP’s lasting appeal lay outside of fulfilling specific learning goals, as for them it was the positive learning, camping, and mentoring experiences from past years that led them to reapply. One said, “At first, I was like, ‘environment?—crap!’ Then I started to find out how fun it is to actually help out and learn about this stuff.” Their desire to learn “more” suggests that OLEEP does a good job of catalyzing students’ intrinsic desire and motivation to learn about the environment. While quantitative and empirical reasoning credits are perhaps incentives to attract students to OLEEP, it seems that the experiential learning aspects of the program convince them to return. This in turn suggests that OLEEP’s broader goals of increasing its participants’ environmental awareness and leadership ability, as discussed in the methods section, have been met relatively successfully in past years.

Despite these larger themes, the fulfillment of science requirements mentioned by new mentees dominated the mentor approach to this year's OLEEP program, potentially to a disproportionate degree. In the midyear evaluation, mentors said that they "feel a huge responsibility to fulfill their science requirement." This feeling of responsibility to be science teachers made it harder for mentors to focus on the experiential and leadership aspects of OLEEP. "I think that they give empirical reasoning credit for OLEEP is a big issue because it limits us." Because Met students do not have a standard baseline of science education, mentors felt the need to cover the fundamentals before going on to more advanced topics. For example, during the global warming unit I felt obligated to go over the less engaging mechanics of the greenhouse effect before I was able to lead a more sophisticated conversation on stewardship practices, despite the fact that some of the mentees had already learned that material. It is possible that these mentor perceptions stemmed from a lack of understanding of the Met school approach and the folk pedagogy discussed in the theoretical background; since most mentors came from more traditional high schools, they assumed that traditional science education is essential and take on the role of science teachers when they didn't see it in the existing curriculum.

This expectation to serve as science teachers conflicted with the mentor's simultaneous understanding of OLEEP as an "outdoor experiential program." As many of the mentors' environmental experiences have been wilderness-based, they saw extended Outward Bound-style camping trips as ideal to catalyzing environmental awareness. "Ideally we would have a BOLT-like trip, but that isn't logistically feasible given the lack of time, training, and—most important—mountains." BOLT, or Brown Outdoor Leadership Training, is a five day hiking trip that Brown students can go on at the

beginning of their sophomore year, but it requires a week of free time, months of leadership training beforehand, and transportation to and from the White Mountains in New Hampshire that is not part of the current OLEEP structure.

The mentors would likely be surprised to learn that this Outward Bound¹⁵⁸ perception of OLEEP is in fact more in line with the way it was originally conceived at the Met. As explained in the methods section, Ben Castleman actually modeled OLEEP on the BOLT experience, with the goal of opening the wilderness to a diverse population that would not otherwise go there. While Castleman thought the addition of environmental education to OLEEP's identity is valuable, he cautioned about it going too far:

I think environmental education is important, but a year or two ago there was almost too much focus on education. The most powerful thing that the students are going to get out of it are the one-on-one mentoring relationships and the opportunity to get out of Providence into the woods with a group of Brown students, form relationships, challenge themselves, and build their confidence.

To OLEEP's founder at the Met, the science education aspect of OLEEP is meant to be more supplemental to the program foundations of mentoring relationships and wilderness experience. However, mentors and mentees also mentioned that Met advisors do not seem to have accurate conceptions of OLEEP, expecting it to be a part of mentee exhibitions but not being clear about how it fits into the larger Met learning experience.

Perhaps because there are so many expectations for OLEEP that at times compete with each other, in reality it seems that few are being fully met. One mentee reported that "I can't really explain [OLEEP] that well at my exhibition," suggesting that the reasoning components were not being fully met. At the same time, they were disappointed with

¹⁵⁸ Outward Bound

OLEEP's heavy classroom emphasis; "they lied; they said there were a lot of outdoor things and I thought we would do a lot more [field trips and camping]". Mentors reflected both of these disappointments. When it comes to fulfilling learning goals, they wondered whether it is an appropriate objective to be responsible for giving the mentees science credit, pointing out that "no one in here is a teacher." But, as mentioned above, they felt simultaneously unable to fully exploit the experiential aspect of OLEEP; "if we want this to be effective we have to go on so many more trips." Finally, I was surprised when Castleman said to the group that "far and away the strongest part of the program is the one-on-one relationship" between mentors and mentees. This year, it was unusual to have more than one or two mentors who have connected with their mentees each week. While some mentees identified the mentoring component as important to OLEEP, others complained that they did not spend any time with their mentor at all.

Experiential versus Didactic Learning

One of the reasons I chose OLEEP as a case study is that it struck me as unique for having three separate components that would ideally work together to provide an effective and balanced environmental educational experience. Here I discuss how effective camping trips, after-school workshops, and mentoring relationships are as both independent and combined elements of the OLEEP program.

As mentioned above, the most notable aspect of OLEEP camping trips this year was their paucity. There was one in October, 2006 to Washington State Forest in Rhode Island, a second in February, 2007 to the Chimney Corners YMCA camp in Becket, Massachusetts, and a third to northwestern Connecticut in early May, 2007. While three weekend trips is no small accomplishment for an extracurricular program such as

OLEEP, on a weekly basis it did not feel like the program centered around these wilderness experiences as was originally hoped by Castleman and the other founders of OLEEP. That said, the trips were absolutely highlights, and arguably the most memorable aspect for OLEEP participants. In the mentee focus group, trips were enthusiastically identified as the favorite part of OLEEP and what returning mentees liked and miss the most from past years. Both mentees and mentors would like to go on trips more.

The camping trips were illustrative of how OLEEP introduces its participants to wilderness environments. While most mentees had been camping before, they considered OLEEP to be more authentic than past experiences: “I’ve never been outside like this before... I’ve been camping, but not for real.” Overall, the trips were structured very informally and geared heavily toward the experiential end of the education spectrum; the wilderness seemed to be more a convenient setting for all of the participants to spend time together rather than being treated as a living classroom. Thus, the trips emphasized relatively little wilderness activities and skills such as hiking and setting up camp. Also, there was relatively little mentor planning to decide exactly how the time would be spent and activities would be run. Therefore, as many of the mentors had significant outdoor experience, leadership came spontaneously from anyone who happened to step up at the moment.

While this resulted in a very informal and at times disorganized feel, the atmosphere was relaxed and there were opportunities for individual appreciation of the outdoor setting. For example, on a night hike during the first trip I turned to one of the mentees and asked if he had ever seen a shooting star before. He said no. I asked if he had ever seen stars clearly before, and his response was the same. Given my rural

background, it was hard to believe that someone could have never really seen the stars. While this speaks to the potentially highly valuable nature of exposing urban students to the wilderness, it also brings up the amount of experience that mentors are likely taking for granted, making it more difficult for their environmental education style to synch up with the backgrounds and perceptions of their students.

Despite these pedagogical gaps, the real emphasis of the camping trips was community building among the group. The extremely informal atmosphere blurred the lines between mentors and mentees and encouraged everyone to feel comfortable as part of the group. Deliberate teambuilding activities and games added to the bonds between participants. Everyone was expected to contribute to tasks such as cooking and setting up tents, and while some did more or less, everything got done with little drama. This was aided by the fact that there were significantly more mentors than mentees who participated, contributing to the feel of a large group of peers rather than students and teachers.

Final survey responses reflected this structure, as both new and returning mentees emphasized having learned and enjoyed teambuilding activities. 85% of returning mentees also listed survival skills such as using camping stoves and starting fires, so perhaps a more informal atmosphere is in fact conducive to learning among this group. New mentees, however, wished they had “learned more camping skills,” and one focus group comment suggested that more workshop time should be spent developing these skills.

In between camping trips and workshops were field trips such as the one during the global warming unit to the wind turbine at Portsmouth Abbey. In past years, there

have been more of these to destinations such as Save the Bay and the local recycling center, and all participants wish there were more. As a result, efforts are being made to include one field trip in every unit. 50% of returning mentees said they enjoyed the Portsmouth Abbey trip because “windmills are cool” and they had not seen one before, while 33% did not because they had already been, were cold, and found the speaker uninteresting.

Workshops were the most traditionally didactic element of OLEEP. As explained in the methods section, the two or three mentors leading the workshop were free to structure it however they felt would most effectively contribute to the mentees’ learning. While mentors attempted to make workshops as engaging and interactive as possible, as explained above, they often felt constrained by the need to give sufficient scientific background and tailor activities to the perceived empirical reasoning needs of the students. This generally resulted in some form of academic presentation, such as a PowerPoint, movie, or question-and-answer diagramming such as in explaining the greenhouse effect. There was also often an experimentation activity designed to emphasize the scientific method, accompanied by a worksheet on which to record hypotheses, observations, and results so mentees had tangible evidence to bring to exhibitions. These strategies reflected the way mentors see science education occurring, but this more traditional classroom model was not necessarily in line with the more experiential learning style prioritized by the Met. While part of the hypothesis behind this thesis is that more didactic science education can support outdoor experiences in promoting environmental awareness, crucial to this model’s success is effective overlap between didactic and experiential learning that will activate students’ interest. This year’s

workshops did not draw significantly on OLEEP trip experiences, and mentees used to OLEEP's unstructured learning atmosphere often seemed unreceptive to workshops' more traditional teaching style.

In response to what they learned and enjoyed about workshops, most mentees listed specific topics from this year's units, such as genetically altered foods, natural disasters, and global warming. 33% of returning mentees said they enjoyed the interactive nature of workshops, while others said they were informative and helped illustrate the scientific method. 33% of returning mentees would improve workshops by adding trips and improving interaction by breaking into smaller groups. They would also like to have more student-driven topics and information that relates to their lives. I have evaluated the global warming workshops in depth below to draw further conclusion on how OLEEP workshops can be improved given the nature of the program.

Despite historical trends reported by Castleman, I see one-on-one mentoring as by far the weakest element of OLEEP this year. Again, mentors and mentees rarely spent time together outside of group activities, and both groups saw this as a neglected element of OLEEP. There seemed to be a lack of communication between mentors and mentees who both felt that their counterparts were not making enough of an effort to connect. This was compounded by the limits of all students' very full schedules, lack of proximity and transportation between Brown and the Met, and general uncertainty over mutually enjoyable activities. New and returning mentees said that mentor-mentee relationships have the potential to be close, but need to be more consistent, perhaps with required bi-weekly meetings (in theory, mentors are already required to meet with mentees every week). Mentors and mentees were able to spend time together during workshops and

trips, but given the inconsistent attendance of both mentors and mentees and large group nature when everyone is together, this does not seem sufficient to create lasting bonds.

It was often unclear to participants how mentor-mentee relationships fit into OLEEP's other elements and overall environmental theme, as pairs' activities are not expected to relate to nature. One mentee suggested that mentoring should deliberately tie into the environment more, which is part of the idea behind a mentor initiative to require all mentor-mentee pairs to work together on an environmental topic of their choice which they will then present to the whole group. The purpose of these projects is to catalyze mentees' commitment to the program and a specific topic by helping to teach their peers, while "us[ing] learning through inquiry during time with mentor [might] improve integration between elements [of OLEEP]" as well as give helpful structure and motivation to mentor-mentee meetings.

While each of these elements has the potential to be an effective environmental education strategy on its own, I am most interested in how they interact to build on OLEEP participants' environmental perceptions and stewardship. Overall, mentees responded that the three elements do build well off of each other, though I believe there is room to improve. In the focus group, mentees recalled the natural disaster workshop experiment on flammability, when different materials such as dry and wet leaves were burned and parallels were drawn to the risk of forest fires being started by campfires. They also reported "gossiping" with mentors about the camping trip, indicating that despite a general lack of substantial connections between learning material, the mentor-mentee interactions can serve as a general bond. On the final survey, nearly all responded "yes" to the presence of overlap, again recalling the flammability experiment. 40% of

returning mentees said they used information from the workshops on trips, that the mentors add depth to workshops, and that workshops and trips are opportunities to bond with mentors.

Mentors also saw connections as ideally present, but currently underdeveloped. This particularly ties into the lack of trips, as one stated, “Go on a trip and focus on local issues, then they can bring knowledge home. Go on a trip one week and talk about it in the classroom the next and supplement it with leadership skills.” Another commented, “Make references to workshops so they can see the connection. When you see something that isn’t on paper it makes more of a lasting impression. Discuss things to point out before you go on the trip.” Mentors said it is harder to make connections in workshops to trip experiences because the trips aren’t as concrete as workshops, which goes against the idea that outdoor experiences could then be built into didactic learning. They also suggested integrating service learning projects in the local community to draw immediate connections, an idea that was echoed by one of the mentees in the focus group. However, mentors also saw an overarching issue of “lack of common experience.” Because so few participants consistently attended all aspects of OLEEP, it was much harder to draw parallels that everyone would understand. Castleman suggested that it is the one-on-one mentoring relationships that are most likely to build the commitment necessary for consistent investment, but these bonds currently lack the strength to accomplish this purpose.

Global Warming Unit

As detailed in the methods section, I designed my unit on global warming to draw on as many of my preliminary conclusions regarding effective environmental education

strategies through OLEEP as possible. The primary goal for the unit was to increase students' awareness, understanding, and positive behavior regarding climate change. To achieve this, I attempted to (1) Make climate change relevant for the students given their backgrounds and existing perceptions to catalyze motivation and (2) Utilize all three aspects of OLEEP to make the overall lesson as strong as possible by balancing environmental education with outdoor experience.

Overall, I believe the unit had mixed results relative to these goals. The first workshop, which focused on causes and effects of global warming,¹⁵⁹ illustrated the difficulty of maintaining interaction with the mentees while also getting through a certain baseline level of factual understanding, in this case on the mechanisms of the greenhouse effect. The initial activity sharing positives and negatives from the weekend camping trip was an effective link between the trip and the workshop, but the connection between snow and climate change was very specific and the only real such integration during the course of the unit. Interaction between the three elements of OLEEP is therefore a strategy that needs to be improved on. Using *An Inconvenient Truth* to illustrate effects of global warming seemed to shock participants, especially regarding rising sea levels, but garnered mixed reviews from the mentees (averaging about 3 on a scale from 1-5, 5 being the best, with responses split between both ends). The greenhouse effect drawing activity was the biggest challenge. I attempted to design the activity to allow for collaborative learning between the mentees and the workshop leaders by having mentees work together to diagram the effect and then together form a consensus on the correct process. It proved very difficult to keep everyone on task, however, particularly when working as one big group. Interestingly, the other mentors if anything seemed to detract from the overall

¹⁵⁹ See Appendix 4 for Workshop 1 Plan

learning atmosphere by giving away answers or even carrying on side conversations with each other and the mentees. This was partially my fault as a facilitator for not giving them sufficiently specific roles in the workshop. It seems more effective when attempting to cover a body of information to either lecture to the whole group or divide up and work through the whole concept in smaller groups. This exercise was rated the lowest (average 2.1) in terms of preference among all the activities by returning mentees; new mentees rated it higher at 4.3. Criticism centered on either not understanding the material or having already learned it, though the new mentees found learning how global warming works to be a positive experience, perhaps because the material was newer to them. The carbon calculation exercise was less effective than hoped because the worksheet was not designed to be sufficiently relevant to mentees' lives,¹⁶⁰ and the greenhouse effect exercise had also run long, leaving less time than planned. The mentees responded relatively positively, however, with an average of 3.7.

The second workshop seemed to flow more smoothly and more successfully engage mentees than the first one, limited primarily by time at the end.¹⁶¹ The Living Deliberately exercise had given mentees an effective opportunity to think about how the larger issue of global warming connects to their lives,¹⁶² and their responses and ideas to change behaviors (such as turning off lights, radios, and hot water) to save energy made it seem worthwhile. Participants gave the exercise an average rating of 3. However, I was disappointed with lackluster commitment to actually changing their behavior, which was reflected in mixed likelihood of following through on positive actions listed on the final survey. This reflects the continuing gap between awareness and stewardship in

¹⁶⁰ See Appendix 4.a for Carbon Worksheet

¹⁶¹ See Appendix 4.b for Workshop 2 Plan

¹⁶² See Appendix 4.c for Living Deliberately Worksheet

environmental education, which can hopefully be further improved by Kaplan's¹⁶³ idea of showing participants how environmentally positive behavior does not have to be sacrificial. Going outside to see the Prius hybrid was a great success. The mentees were extremely excited to experience the car firsthand, one exclaiming, "That is the bangiest thing I've ever seen in my life! I'm trading my car in for one tomorrow!" Clearly sixteen-year-olds are not likely to follow through on these claims, but the car had the exact hands-on, wow-factor effect that I'd hoped for. I was therefore surprised that the activity didn't receive a higher rating than an average of 3, one new mentee complaining of "standing outside in the cold to look at a car." The discussion about changing peers' behavior also went pretty well, though it was very difficult to cover all the material in so little time (about 40 minutes). Some of the five communications factors had to be simply explained, but the advertisements were very effective material to discuss and relate to. Mentees brought up many of the obstacles to changing their own behavior, as illustrated above, such as too little time or lack of support. The actual poster-making was only marginally successful because of lack of time and ideas, though there is something to be said for participants seeing the challenges behind building effective environmental communications. This activity also received reviews of about 3.

Unsurprisingly, the field trip to the Portsmouth Abbey wind turbine was the highest rated part of the unit, at 4.4. It was extremely valuable to simply stand next to the turbine and see it in action, and 50% of the returning mentees said that it effectively supplemented the rest of the unit by acting as a tangible example of saving energy. This complements responses that the best activities were ones that were interactive and hands-on, supporting the more experiential aspects of OLEEP's environmental education

¹⁶³ Kaplan (2000)

strategy. Overall, 66% of the final survey respondents said that the global warming unit struck the right balance between information and hands-on activity, with 33% saying there was too much information and 11% that there was too much activity (there was one repeat).

Most respondents said that the global warming unit did a good job of using the different elements of OLEEP to build off one another, though I still believe this aspect could be improved by making larger-scale efforts to link integrate OLEEP's structure. 56% of mentees said that their peers helped them learn during the unit, tapping into potentially higher motivation through self-discovery. Particularly, the group activities such as making posters were effective for this. Interestingly, one mentee included her mentor as a "peer", saying that "she really broke things down for me." This has important implications for OLEEP as a peer-based environmental education program, suggesting that students sometimes get more out of learning from teachers closer to their age. It also supports the value of potentially having new mentees team up with returning participants to boost mutual learning and teaching while fostering increased commitment to the material from all students.

In terms of factual learning, the global warming unit was only somewhat effective. All but one of the respondents answered the final survey question on the relationship between the ozone hole and global warming incorrectly, and not a single one got all of the effects right. They did much better on the greenhouse effect mechanism, implying that despite the lack of excitement in its explanation, the message got across. I believe these results support the challenge for OLEEP in providing effective science

education to students not used to learning in conventional didactic settings, even as a prerequisite to discussing the related environmental issues.

That said, overall concern over global warming directly following the unit was very high, with 100% of respondents responding 4 or 5 on a scale of 1 to 5, with 5 being the highest. They were also able to effectively list behaviors to help prevent global warming, again focusing on driving less and saving energy used on electricity and hot water. If the goal of OLEEP is to enhance the overall environmental awareness and stewardship of its participants, than perhaps these numbers are more important than the knowledge of scientific facts. Mentees reported that the global warming unit was as good or better than other ways they had learned about climate change, such as in school (presumably pre-Met) and by talking with family and friends. 66% of mentees said that global warming was their favorite workshop of the year, explaining that to know the details about it is “super cool.” Beyond the details, the unit seemed to accomplish its central goal of increasing awareness and action. One new mentee explained, “I didn’t know how serious it was and I’ve changed my life style as a result.” Considering future design of OLEEP units, planning these workshops in January, 2007 was a very valuable exercise for me to integrate environmental educational theory with half a year of experience with OLEEP. While it remains to be seen whether the positive response to it will last over time, despite its shortcomings this unit speaks positively to the potentially stronger environmental educational impact of OLEEP workshops when deliberately infused with environmental educational theory in context of the program.

Conclusions

Summary of Results

Met students first entering OLEEP perceived of the environment in relatively simplistic, pro-nature terms. These definitions conflicted with the urban setting where they live, though this was not of significant concern to them. Their environmental stewardship was also relatively undeveloped, focusing on high-profile issues such as recycling and based on anthropocentric motivations for a healthy environment. During the course of the OLEEP program, these perceptions and actions became more sophisticated, particularly in regards to specific issues and in favor of the possibility of environmentalism within the city. Returning OLEEP participants exhibited more advanced perceptions and stewardship from the start of the year, suggesting that the program is most effective as a long-term learning experience. The students' awareness shifted from that of specific issues to larger possibilities for stewardship, including spreading awareness to other people.

OLEEP mentees, mentors, and the Met school faculty all had different expectations of what the program outcomes should be. Unfortunately, in an effort to cater to all of these expectations, few were fully met. A primary concern for OLEEP's future is therefore cementing its identity. The trip, workshop, and mentoring elements all contributed to OLEEP with experiential, didactic, and interpersonal learning styles, respectively. However, there was little integration between these three elements to achieve specific learning goals. My unit on global warming was relatively successful in meeting its goals of promoting awareness and stewardship relating to climate change, at least in the short term, representing the value of applying environmental educational

theory to OLEEP workshops. In contrast, the unit was only marginally effective in communicating detailed information about the science of global warming. Integration of the three elements of OLEEP within the unit was also only somewhat effective.

Research Limitations and Future Work

This study was based on a single, unique program. Because OLEEP is so dependent on its leadership and those leaders change every one or two years, the nature of the program itself is inconsistent from year to year. This phenomenon may therefore limit the reliability and generalizability of these research results. Furthermore, the responses of this year's participants may not be representative of OLEEP's historical success and identity. My contact with Met faculty was limited to Castleman, so it is possible that I lack a full view of the school's view of OLEEP. This study also lacked a control environmental education program with which to compare the evolution of students' environmental perceptions and stewardship, as well as the success of the unit on global warming. This relates to the general qualitative nature of my research tools; while allowing for more flexibility in participants' responses, my interview instruments made it more difficult to measure distinct changes in quantitative terms. The final survey was only completed by about 66% of the participants, limiting its comparability to the initial measure, and its administration directly following the global warming unit may have skewed the results in favor of the material that had just been covered. Furthermore, the more quantitative NEP questionnaire produced relatively inconclusive results. This could stem from statements that were confusing or less relevant to participants' environmental perceptions due to their wilderness-centric environmental definition. It could also relate to the relatively short duration of this study, which lasted from October, 2006 to March,

2007, at which point the year-long program was only about 75% completed. This short duration is especially unfortunate given that the largest differences in perception and stewardship occurred between new and returning mentees, suggesting that following the program for at least two years would be beneficial to determine its long-term effects. This would also help account for the yearly variability of the program as described above.

Future research would ideally address many of these limitations. First, it could build on my results by following OLEEP over an extended period of at least two full years to fully ascertain how mentees' perceptions and stewardship evolve with greater continuity. This would also better illustrate how OLEEP changes in character from year to year and what additional strategies might help it maintain a constant, effective identity. Comparison of OLEEP to other programs with similar populations but different educational styles would provide a more effective baseline of comparison for the impact of different experiential education strategies.

On a larger scale, while existing research has illustrated the importance of experiential environmental education, there is relatively little material on how to effectively integrate it into larger-scale educational systems. More work therefore needs to be focused on expanding small, supplementary environmental education programs such as OLEEP to be part of every student's educational experience. This means asserting the relevance of environmental education in academic curricula and developing new approaches that utilize the advantages of both experiential and didactic approaches while ensuring both sufficient depth of material and accessibility to all students.

Urban Students' Environmental Perception and Stewardship

OLEEP participants represent a diverse, primarily urban population. It is important to note that because the Met is such an independent and student-driven school, the students who attend it are potentially more individualistic and self-motivated than their peers at conventional schools. Furthermore, OLEEP itself is a voluntary program to which its participants apply, so there is a strong degree of self-selection for those already predisposed to learning about environmental issues.

The binary between new mentees' theoretical 'environment' and where they actually live and spend time is exactly the "Trouble with Wilderness" that Cronon so laments;¹⁶⁴ particularly when teaching about the environment in an urban setting such as Providence, it is imperative to face the challenge of bridging this gap that sets human and natural environments apart as exclusive to one another. Cronon and White¹⁶⁵ call for new environmental paradigms that allow room for humans within natural settings and nature within human settings, but it is questionable whether this is truly embraced by experiential environmental education programs, including OLEEP. The mentors' more rural backgrounds and wilderness-focused perceptions of the environment coupled with the original conception of OLEEP as an Outward Bound-style program work against these goals by prioritizing wilderness as genuine 'environment' while neglecting the potential value of urban environments.

OLEEP participants, once they consider the issue, do want to make more of a connection between urban and natural environments. OLEEP would improve in this respect by providing its participants more immediate opportunities to find environment in

¹⁶⁴ Cronon (1996)

¹⁶⁵ White (1996)

Providence, such as through service-learning projects in conjunction with local organizations. One mentee reflected White's call for better models of everyday environmentalists:

We should see how people live their everyday lives as environmentalists and who do normal things and how you can take those beliefs and without going overboard and moving out to the woods and all those crazy things... Not all environmentalists work for environmental jobs ...How you can still have a life and have a real career and do those kinds of things and still really support the environment and do good things for it?

Especially at the Met, where the learning style emphasizes collaborating with adults and seeing how things work in the real world, experiential environmental education that models this kind of balance by taking place in urban settings is essential. In addition to field trips to natural settings within Providence, OLEEP could address this need for diversity of perspective by implementing a unit on environmental justice. Such a unit could include a field trip to the brownfield site adjacent to Mashapaug pond, workshop discussion of the risks and remediation options of lead paint, and mentor/mentee pairs volunteering to clean up a local park. In the context of the city where most OLEEP participants live, this would allow for open discussion of many of the issues such as race and class that traditionally isolate people from a greater range of environments.

OLEEP and Urban Environmental Education

The character of an educational program directly affects its strategies and outcomes. In the words of one mentor, "OLEEP has a huge identity crisis." In trying to meet all of its stakeholders' expectations, OLEEP struggles to do justice to any of them. Rather than being a strong didactic science program, a strong outdoor adventure program, or a strong leadership and teambuilding program, it is only somewhat effective in all these respects. This conflict is most evident in the mentors' struggle to reconcile didactic

empirical reasoning learning objectives with OLEEP's basis in experiential wilderness excursions. Despite these roots in the Outward Bound model of environmental education,¹⁶⁶ I believe OLEEP would be most effective as an urban environmental education program. Focusing on local issues would add immediacy to workshop lessons while mitigating mentors' frustration with attempting to teach outdoor adventure in an urban setting. The popular camping trips could be used to add perspective to discussion on human versus wilderness environments. This local focus would increase OLEEP's relevance for its participants, address the important discrepancy in defining 'environment,' and contribute to the larger societal need to find a sustainable relationship between humans and the world in which we live.

Once OLEEP clearly identifies its overarching mission, it can identify specific learning objectives within the larger context of its identity. Rather than brainstorm topics at random, at the start of each year mentors can select one or two themes they consider especially relevant and then structure units to build into those themes. While fewer general topics might be addressed in a given year, they would be examined in more depth and would encourage repeat participation by reducing redundancy of information from one year to another. For example, if global warming were to be chosen as a semester-long theme, units could focus on the differential causes, effects, and solutions in different areas of Providence and in contrast to other environments.

Such learning goals are the necessary means to integrate OLEEP's three elements of trips, workshops, and mentoring. My original hypothesis for OLEEP's approach to experiential education was that the combination of its three components might add up to more than their individual values. While still a compelling model, I do not see these three

¹⁶⁶ Outward Bound

elements as currently working together towards common goals sufficiently to have a strong combined environmental educational effect in OLEEP. This is largely due to a lack of central learning goals for each element to tap in to. Such goals would enable OLEEP to take advantage of its multifaceted structure by using the strengths of each element to contribute to the lesson from a different angle.

Field trips can remain the center of the program, but with increased structure to connect with issues discussed in workshops. By prioritizing local destinations, it will be easier to go on trips regularly, emphasizing the experiential education basis of OLEEP and responding to mentor and mentee feedback. Each trip should have specific goals that tie into unit themes. On camping trips, more clearly defined plans and mentor roles would allow simultaneously for more concrete learning and the maintenance of free time to enjoy nature and foster bonding within the group. Local trips in a global warming unit could go to see the effects of climate change on Narragansett Bay and the positive potential of the Portsmouth Abbey wind turbine, while camping trips could compare the effects of climate change on wilderness ecosystems.

Workshops should directly complement trips by providing scientific and social information and discussion illustrating larger unit themes. This content can still fulfill the Met's empirical learning goals by encouraging scientific analysis of a problem, while the emphasis on local issues will be more relevant to mentees than the traditional experimental design mentors associate with high school science education. Increased partnering between mentors and mentees (see below) will increase accountability for both groups while also increasing the opportunity for Freirian dialog.¹⁶⁷ Global warming workshops could be similar to those I conducted this year, but with even more of an

¹⁶⁷ Freire (1972)

emphasis on local, social issues. As explained below, mentor-mentee pairs could work together to teach the whole group which populations within Providence are most susceptible to harm from direct heat increases because of no air conditioning, from sea level rise because of coastal residences, or from ecosystem changes because of fishing or agricultural businesses.

Mentoring, if given more structure, can remain a valuable way to encourage personal development of OLEEP mentees while building commitment to the program. Mentor-mentee pairs can be encouraged to further explore environmental destinations around Providence. If successfully executed, the idea being currently put into place to have mentor-mentee pairs present a relevant topic to the larger group will effectively give the pairs greater purpose, investment in the material, and relevance for OLEEP's educational nature. Furthermore, structuring workshops to emphasize work in pairs and small mentor-mentee groups will help build on the strengths of a peer-based education program while directly involving both mentors and mentees to build commitment to workshops. The global warming examples listed above would require pairs to research the scientific and social issues behind a topic, investigate the relevant areas of Providence, analyze their findings, and present results to the rest of the participants.

To effectively implement OLEEP's mission and learning goals, communication must improve between mentees, mentors, and the Met faculty involved in the program. While OLEEP benefits from the continuity lent by its connection to the Swearer Center at Brown, as a college-run program it is very much dependent on the individuals who lead it from year to year. The more the mentors and particularly the student coordinators have a clear sense of mission and connection to the Met and past participants, the more they will

be able to hit the ground running as opposed to beginning anew each year. This connection can be fostered by maintaining records of programming from year to year and increasing dialog between outgoing and incoming coordinators, who should be selected at the end the of each year. Mentor meetings should be used to develop more concrete roles for each mentor during workshops to fully utilize each one's skills and ensure participation. They should also be the setting for more deliberate consideration of educational frameworks and pedagogy which would lead to more focused lessons, efficient use of time, and confidence in teaching. Ideally, the mentors would receive stronger training in urban environmental education during the retreat at the beginning of the program and by reading some background material, such as *One Kid at a Time*¹⁶⁸ and *The Trouble with Wilderness*.¹⁶⁹ One possibility to increase mentor knowledge and commitment would be to run OLEEP as a year-long group independent study project (GISP) with links to the Brown Education and Environmental Studies departments, though this risks diminishing ties to the Swearer Center and giving the program an overly academic nature. Finally, mentees' advisors should be aware of OLEEP learning objectives so they can encourage mentees to build these topics and skills into independent learning activities throughout the week and increase mentee commitment by mandating the inclusion of OLEEP in exhibitions.

Lessons for Experiential Environmental Education

OLEEP's currently weak connection to the Met and the school's essential learning goals is reflective of the larger struggle for nonformal environmental education to be integrated into students' formal learning programs. OLEEP fits into the

¹⁶⁸ Levine (2002)

¹⁶⁹ Cronon (1995)

interdisciplinary model of environmental education that uses a separate program to examine environmental issues in depth and from a number of different approaches.¹⁷⁰ However, the downside of these programs is their inability to reach a broad enough population of students. Very few Met students are able to participate in OLEEP. While efforts such as OLEEP are important, in order to gain a more stable position in students' learning and foster broad-scale stewardship environmental education programs must integrate into schools by clearly defining their goals and how they will connect to the larger context of their students' lives. Is the mission pure wilderness experience and social growth, as demonstrated by Outward Bound?¹⁷¹ Holistic environmental literacy as called for by Orr?¹⁷² The traditional biology, chemistry, and physics classes that remain the model in most schools? Furthermore, what kind of "environment" is the educator trying to illuminate? The people versus wilderness, urban versus rural dichotomy as illustrated by Cronon twelve years ago¹⁷³ remains prevalent in the way many teachers view the human-nature continuum, in turn affecting their students relationships with their environments.

Ideally, environmental education programs will achieve all of these goals. This calls for a multifaceted, experiential approach to environmental education as modeled by OLEEP. Outdoor experiences make a real difference in how students perceive of and relate to the environment. Therefore, educators will gain immensely from using activity in both the immediate and wilderness environments to supplement didactic education. However, particularly in urban programs, these experiences cannot occur in a vacuum.

¹⁷⁰ Chen, 235

¹⁷¹ Outward Bound

¹⁷² Orr (1992)

¹⁷³ Cronon (1996)

Increasing the immediate connection between people and the environment is essential to facilitating increased environmental stewardship. It is therefore crucial to burst the bubble isolating the wilderness “out there” from the ambit of daily life by finding nature in urban settings as well as rural ones. In reverse, people from rural areas should make similar efforts to experience the urban environment to minimize taking their less developed environment for granted and privileging their proximal connection to it over those from urban areas.

The Met school excels in placing its students’ learning experiences in the context of the world they live in by replacing a traditional academic curriculum with independent study relating to student interests and internships. All environmental education programs should strive to be similarly relevant to their students. As environmental issues such as global warming become increasingly part of daily life, environmental educators have more of an opportunity and responsibility to draw parallels between academic understanding of science and environmental topics and how students can actually make a difference on a local and global scale. By using environmental education as a model for relevant, interdisciplinary learning, teachers can help increase demand and integration of programs such as OLEEP.

Finally, the idea of fostering connections between objects, processes, and ideas is central to both the environment and environmental education. In addition to utilizing hands-on experiences, environmental educators should consider the interrelationships between the various aspects of education, as demonstrated in my framework of factors influencing the design and effectiveness of an environmental education program.¹⁷⁴ Many existing programs are less successful because they neglect less obvious elements such as

¹⁷⁴ See Appendix 6 for Framework

the biases inherent in their educators' perspectives or the implications of their students' backgrounds. Opportunities are missed to draw parallels between different learning styles. We should not forget that when Orr called for ecological literacy and dialog, he reminded us that "the way education occurs is as important as its content."¹⁷⁵

¹⁷⁵ Orr, 91

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Appendix 1: Preliminary Survey

Pre-OLEEP Survey

Welcome to OLEEP! I'm really excited to be a mentor this year and am also working with OLEEP to do some research. I am a senior at Brown where I am majoring in environmental studies. For my thesis, I am looking at how students perceive and learn about the environment, which is where I'm hoping you can help me out. All of your answers to any of my questionnaires will be completely confidential, so please do *not* write your name on the surveys. Also, if you don't feel comfortable answering any question, just skip it! Feel free to ask me if you ever have any questions, and thanks a lot for your help!

-Seth

- (1) What are the first three words or phrases that come to your mind when you think of the term "environment"?

- (2) Describe your own outdoor environment.
 - (2a) Do you enjoy spending time there? Why or why not?

- (3) How many hours do you spend outside on a normal weekend day? (Circle one)
(0 hours) (1-2 hours) (3-4 hours) (5 hours or more)
A normal week day? (Circle one)
(0 hours) (1-2 hours) (3-4 hours) (5 hours or more)

- (4) What are your favorite things to do outdoors (i.e.: walking, playing sports, hanging out with friends/family, relaxing...)?

- (4a) Where do you do these activities?
- (5) How do you think growing up in a city (or the country if you're from a town other than Providence) affects the way you learn and think about the environment?
- (6) Do you think it's cool to take care of the environment? Why or why not?
- (6a) Do you know anyone at your school who spends a lot of time outdoors and talks often about environmental issues? What do you think about them and their enthusiasm for the environment?
- (7) Have you ever gone camping before this weekend? If so, how often do you go? If not, why not?
- (8) How do you feel about going camping (i.e.: excited, nervous, grossed-out, relaxed...)?
- (9) List what you think are the three most serious environmental issues we face today.
- (10) Do you think it is important for you to take care of the environment? Why or why not?

(11) What kinds of things would you be willing to do to help take care of your environment? List three things that you know you can do to help.

(11a) How often do you actually do these things? (Circle one)

(very often) (often) (sometimes) (not very often) (never)

(12) How have you learned about the environment in the past? (Circle *all* that apply)

(through school lessons)

(through camp activities/outdoor programs [Describe] :_____)

(talking with family/ friends)

(doing things outdoors [Describe] :_____)

(reading books/newspapers)

(watching TV/movies)

(other [Describe] :_____)

(13) Do you think everyone should learn about the environment in school?

(14) What made you decide to apply to the OLEEP program?

(14a) What are you hoping to learn from the OLEEP program?

(15) What grade are you in school?

Appendix 1.a: NEP Questionnaire

Listed below are statements about the relationship between humans and the environment. For each one, please circle whether you *strongly agree*, *agree*, are *unsure*, *disagree*, or *strongly disagree* with it.

(1) We are approaching the limit of the number of people the earth can support.	strongly agree	agree	unsure	disagree	strongly disagree
(2) Humans have the right to change the natural environment to suit their needs.	strongly agree	agree	unsure	disagree	strongly disagree
(3) When humans interfere with nature it often produces disastrous consequences.	strongly agree	agree	unsure	disagree	strongly disagree
(4) Humans will always be able to develop new solutions to environmental problems.	strongly agree	agree	unsure	disagree	strongly disagree
(5) Humans are severely abusing the environment.	strongly agree	agree	unsure	disagree	strongly disagree
(6) The earth has plenty of natural resources (such as oil, water, wood, minerals...) for humans if we just learn how to get them.	strongly agree	agree	unsure	disagree	strongly disagree
(7) Plants and animals have as much right as humans to exist.	strongly agree	agree	unsure	disagree	strongly disagree
(8) The balance of nature is strong enough to cope with the impacts of humans (such as pollution).	strongly agree	agree	unsure	disagree	strongly disagree
(9) Despite our special abilities humans are still part of nature.	strongly agree	agree	unsure	disagree	strongly disagree
(10) The so-called "ecological crisis" facing humankind has been greatly exaggerated.	strongly agree	agree	unsure	disagree	strongly disagree
(11) The earth is like a spaceship with very limited room and resources.	strongly agree	agree	unsure	disagree	strongly disagree
(12) Humans were meant to rule over the rest of nature.	strongly agree	agree	unsure	disagree	strongly disagree
(13) The balance of nature is very delicate and easily upset.	strongly agree	agree	unsure	disagree	strongly disagree
(14) Humans will eventually learn enough about how nature works to be able to control it.	strongly agree	agree	unsure	disagree	strongly disagree
(15) If things continue the way they are, we will soon experience a major ecological catastrophe.	strongly agree	agree	unsure	disagree	strongly disagree

From the New Ecological Paradigm Scale, Riley E. Dunlap, 2000

Appendix 2: Mentee Focus Group Facilitation Guide (new mentees)

Mentee Focus Group Facilitation Guide

Intro (*Dan*): Hi everyone. Thanks a lot for coming today. For this workshop we're going to be having a conversation to reflect on what we've done this last semester. This is going to help the mentors know how to make OLEEP better in the future, and also help Seth with his thesis research on environmental perception and education that he told you about at the beginning of the year. We're going to be taping the discussion to help us remember what comes up, but nothing you say will be linked directly to you, so try to just ignore the recorders. The idea is just to have a normal conversation; we'll ask questions to keep it going, but we're most interested in the ideas you have. We will start out in two groups divided between new and returning mentees to talk about some of our general thoughts about the environment. Then we'll join up and talk all together about OLEEP specifically. The whole thing shouldn't take more than an hour, and then we'll just relax and have some food. Let's get started...

Divide into two groups between new and returning mentees (Dan with new and Seth with returning). 20 min

1. First we're going to just go around the circle and everyone is going to say what they think it means to be an "environmentalist."
 - a. Based on what everyone said, would you call yourselves environmentalists? Why or why not?
2. On the survey, many of you mentioned words like "woods, animals, and nature" to describe what comes to your mind when you think of the environment. You also use the words "buildings, streets, and dirty" to describe where you live (if you're from Providence). Most of you also said that people from the city don't care about the environment.
 - a. Do you think this is true?
 - b. Is it possible to have a healthy environment and take care of it even if you live in the city?
 - c. Does "environment" always mean wilderness, where people don't live?
3. You all said that you've learned about the environment in school before; what have you done and how are the ways you learn in OLEEP similar or different from what you've done in the past?
 - a. What do you think is the best way for you to learn about the environment (in class, camping, doing projects, etc...)?
4. (*If extra time*) How do you decide what environmental issues are the most important for you to address?
 - a. Is it more important to worry about negative consequences for people or for the rest of the Earth?

Come together

(Dan) Were there any especially interesting topics that came up in your group that you'd like to share with the other group?... Any questions?...

Now we're going to talk some about your ideas about OLEEP. 20 min

5. When you first signed up for OLEEP (the first time) what did you hope to get out of the program? What did you think the purpose of OLEEP was?
 - a. (*Returning mentees*) After doing OLEEP for the first year, why did you sign up again? Did your expectations of the program for the second year change?
6. Has OLEEP satisfied your expectations?
 - a. Why or why not?
 - b. Do you ever think your expectations are different from what the mentors or the Met think it is?
7. What would make OLEEP better meet your expectations and help you feel more committed to the program?

(Seth) The last thing we want to talk about is what you think of the different parts of OLEEP, specifically the camping/field trips, mentoring, and workshops. 20 min

8. What is your favorite part of OLEEP?
 - a. Why?
 - b. What do you learn in each part?
9. Thinking about the questions we were asking you in the smaller groups, how do the three elements of OLEEP work together?
 - a. Does what you do in one part affect how you learn in another?
 - b. What would help them overlap more?
10. If you could redesign OLEEP, would you add or get rid of any parts?
 - a. Why would you keep any?
 - b. Why would you change any?

Does anyone have any last questions?... Thanks so much for your feedback and have a really great Holiday!

Appendix 2.a: Mentee Focus Group Facilitation Guide (returning mentees)

Mentee Focus Group Facilitation Guide

Intro (*Dan*): Hi everyone. Thanks a lot for coming today. For this workshop we're going to be having a conversation to reflect on what we've done this last semester. This is going to help the mentors know how to make OLEEP better in the future, and also help Seth with his thesis research on environmental perception and education that he told you about at the beginning of the year. We're going to be taping the discussion to help us remember what comes up, but nothing you say will be linked directly to you, so try to just ignore the recorders. The idea is just to have a normal conversation; we'll ask questions to keep it going, but we're most interested in the ideas you have. We will start out in two groups divided between new and returning mentees to talk about some of our general thoughts about the environment. Then we'll join up and talk all together about OLEEP specifically. The whole thing shouldn't take more than an hour, and then we'll just relax and have some food. Let's get started...

Divide into two groups between new and returning mentees (Dan with new and Seth with returning). 20 min

1. First we're going to just go around the circle and everyone is going to say what they think it means to be an "environmentalist."
 - c. Based on what everyone said, would you call yourselves environmentalists? Why or why not?
2. On the survey, some of you mentioned that promoting "awareness" of the environment and environmental issues is a good way to help take care of it.
 - d. Where did you get this idea?
 - e. What exactly do you do to promote environmental awareness?
 - f. How does it work when you do it?
3. Think about what you have learned from OLEEP in the past.
 - g. How does this affect the ways you think about the environment now?
 - h. How does this affect your behavior now?
4. (*If extra time*) How do you decide what environmental issues are the most important for you to address?
 - i. Is it more important to worry about negative consequences for people or for the rest of the Earth?

Come together

(*Dan*) Were there any especially interesting topics that came up in your group that you'd like to share with the other group?... Any questions?...

Now we're going to talk some about your ideas about OLEEP. *20 min*

5. When you first signed up for OLEEP (the first time) what did you hope to get out of the program? What did you think the purpose of OLEEP was?

- j. (*Returning mentees*) After doing OLEEP for the first year, why did you sign up again? Did your expectations of the program for the second year change?
- 6. Has OLEEP satisfied your expectations?
 - k. Why or why not?
 - l. Do you ever think your expectations for OLEEP are different from what the mentors or the Met think it is?
- 7. What would make OLEEP better meet your expectations and help you feel more committed to the program?

(*Seth*) The last thing we want to talk about is what you think of the different parts of OLEEP, specifically the camping/field trips, mentoring, and workshops. *20 min*

- 8. What is your favorite part of OLEEP?
 - m. Why?
 - n. What do you learn in each part?
- 9. Thinking about the questions we were asking you in the smaller groups, how do the three elements of OLEEP work together?
 - o. Does what you do in one part affect how you learn in another?
 - p. What would help them overlap more?
- 10. If you could redesign OLEEP, would you add or get rid of any parts?
 - q. Why would you keep any?
 - r. Why would you change any?

Does anyone have any last questions?... Thanks so much for your feedback and have a really great Holiday!

Appendix 3: Mentor Midyear Evaluation Discussion Transcript

Mentor Midyear Evaluation

- *How have Becca and Dan presented goals/purpose?*
 - **“trying to figure out what OLEEP really is...without knowing we can’t fulfill those goals”**
 - “lack of communication w/Met administration”
 - affects curriculum, relationship w/ mentees
- *What does effective science ed mean to you?*
 - **“this is getting to be a very science-based program, and less about leadership and mentoring”**
 - “we presented them with a lot of facts, but real science ed is thinking about things in a scientific way...problems that interest them”
 - “good job identifying problems, but not helping kids find solutions to those problems”
 - “do we want to be science credit for the Met students?”
 - **“what are we equipped to give them and what do they need?”**
 - mentees have lots of diff levels of knowledge
 - “I think they need basic science ed but I don’t think we’re equipped to give that to them”
 - “initial planning took for granted background material necc to get to meat of material—have to spend most of time teaching that foundation”
 - OLEEP shift from outdoor adventure to science ed; “adventure didn’t work”
 - “cool and fun, but a struggle to keep going on trips and relevance [of camping skills] was really lost”
 - “good because a little less trying to push all this info into their heads”
 - **“we need to resolve whether this is an outdoor experiential program that relates to science vs. a science education program because they’re completely different. Right now we’re trying to do both and it isn’t really working”**
 - “Trying to do three with mentoring component. Issue of twice as many mentors as mentees...OLEEP has a huge identity crisis”
 - *Does it have to be one or the other? Can outdoor experience lead to classroom interest? Is there overlap between the three elements?*
 - “Leadership is common theme.”
 - **“Go on a trip and focus on local issues, then they can bring knowledge home. Go on a trip one week and talk about it in the classroom the next and supplement it with leadership skills.”**

- **“make references to workshops so they can see the connection.** When you see something that isn’t on paper it makes more of a lasting impression. Discuss things to point out before you go on the trip”
 - *Can it be in the other order (trip—workshop)?*
 - “things we learn on trips aren’t as concrete as in workshops so it’s harder”
- “Service projects to think about how they are connected to the environment and apply info from workshops”
- “issue of lack of common experience—**if we want the trips to be effective then we have to go on so many more trips.** The first retreat would have been even more effective had it been backpacking.”
 - *What is the environment to the mentees? Can we integrate the urban environment with wilderness?*
 - “ideally have a BOLT-like trip, but not logistically feasible. During the week, have local issues and the urban natural environment and things going on around Providence like Save the Bay and Lincoln woods”
 - “a lot of them do going on camping trips separate from us”
- Lack of teaching coordination, efficiency
- **“We need to figure out what we’re doing. We’re doing a really good just doing all sorts of random things and we’re all very capable and very smart, but we don’t really know what we’re doing.”**
- *What has OLEEP done well?*
 - “lots of good workshops, but emphasizing diff things (science, leadership, bonding) **at exclusion of others**—is going for a hike more important than learning about volcanoes?”
- *To what extent has community been established?*
 - “this is the big picture, but sometimes we miss it because we’re so focused on planning details; I think having good community can solve a lot of these problems b/c mentees will be more interested and want to come”
 - **“returning mentees regard OLEEP as something that’s much more important to them and they have more ownership of”**
 - not sure why—age, returning, participation in retreats?
 - “how do we relate to the bigger Brown community, ie: BEAN”
 - try to get more exposure to their daily routine—**“I just have no idea what they really do”**

- *Motivation?*
 - classroom vs. more firsthand—**“I think we should do more fieldtrips and get them out there doing things because the time in the classroom is kind of wasted on them”**
 - self-selection
- *Workshop planning?*
 - “huge time commitment, and to really do it ideally it would take a lot more”
 - lack of involvement outside three mentor leaders
 - **“there’s so much knowledge among us that to not use all 14 perspectives is a waste”**
 - “teaching everyone else at the same time”
 - **“no one in here is a teacher”**
 - but, too many cooks in the kitchen
 - start sooner, esp for trips
 - ideas for the next week’s workshop the Sunday before
 - “feel huge responsibility to fulfill their science requirement”
 - “more freedom to change direction throughout the year to accommodate changes in perspectives vs. the first retreat planning”
 - including the mentees in planning?
 - criteria—**“use learning through inquiry during time with mentor—improve integration between elements...I think a Met-type learning and evaluation style would be helpful”**
 - “is this too much for Met curriculum based on inquiry-based learning?”
 - “yes and no—that’s what they signed up for and we can’t totally go against it”
 - “importance of clear learning goals—what kind of *environment* are we teaching about?”
 - more coordination with Met administration—What can they do?
 - **“I think that they give ER credit for OLEEP is a big issue because it limits us”**
 - “how are they billing OLEEP—credit vs. what excites them?”
 - advisors come to workshops so they have a better idea of what’s going on
 - **“That would be really cool if every single workshop or every other one was a fieldtrip”** *general agreement and enthusiasm*
 - but, logistical challenges—plan ahead with templates/routines that every group can apply; challenge of repeats, availability (winter), time, money
 - “field trips are very contingent on the place; there’s less pressure on us, but there can be a lot of bad speakers”
 - integrate leadership by extending projects outside of workshops with mentees and mentors

- **“we’re currently an after-school program, so to get more time, we have to look at OLEEP’s identity—are we ready to give more time and be science teachers?”**
 - OLEEP as a class? Do justice to a big program and give more time to think about things.
 - *enthusiasm*
 - issue of breaking from the Swearer Center
 - “that would be more envied than stewardship”
 - reading
 - **“this is a volunteer thing and we have to keep this in perspective—we’re doing a really good job given the amount of time we have and lack of mountains nearby”**

Appendix 4: Workshop 1 Plan

Global Warming Workshop 1 Outline

- Rose and Thorn: to recapitulate from the weekend camping trip and transition to the workshop, everyone sits in a circle and shares one positive experience (“rose”) and one negative (“thorn”) from the weekend. The hope was that many of these would be linked to the snow that fell just in time for the trip.
- Effects of global warming
 - transition from rose and thorn by asking how many of the positive experiences would have been possible without snow
 - point out that the hottest 10 years on record have been in the last 15
 - use “An Inconvenient Truth” to illustrate and discuss other major effects
 - shrinking glaciers: before and after images, commentary on the importance of glaciers for recreation, water
 - changing ecology: flora and fauna shifting north/upward changing landscapes, natural rhythms being disturbed, issues of food production and possible disease born by insects, such as mosquitoes
 - “Who’s heard of West Nile Virus?”
 - rising oceans, sinking coastlines: particularly compelling simulations of major areas such as southern FL, Beijing, Shanghai, India, Netherlands, New York shrinking
 - show an aerial photo of Providence and discuss what 20’ of water would flood (most of downtown, coastlines)
 - “So, why does this happen?”
- The greenhouse effect
 - small group drawings: divide mentees into groups of 2-3, with mentors evenly divided, give each group a piece of posterboard and markers, write up greenhouse effect terms (sun, earth, space, ozone hole, ozone layer, atmosphere, greenhouse gasses, ultraviolet rays, solar rays, infrared rays) on board and instruct to diagram and label as best as possible how greenhouse effect works, not worrying about unknowns/errors
 - big group discussion: ask someone from each group to come up to board and draw each term, mutually correcting as you go
 - emphasize that ozone is a separate issue; GHG’s are evenly distributed through atmosphere
 - explain each type of ray
 - where is coldest (space) vs. warmest (earth)?
 - is the greenhouse effect a good thing? (yes, in moderation)
 - greenhouse gasses: (CO₂, H₂O, CH₄)
 - where do they come from
 - H₂O: water cycle
 - CH₄: swamps, farms

- CO2: transportation, industry, electricity, deforestation...
 - illustrate the rapid rise of carbon in recent years linked with rise in temps
- “So how does this apply to you?”
- Carbon footprints
 - do worksheet to calculate personal carbon footprint based on energy use
 - “stand up/sit down” exercise asking questions and seeing who behaves well/poorly to compare self
 - “living deliberately”: based on Thoreau, assignment to be conscious for a day of all one’s activities, specifically related to energy use; keep a journal to record and share thoughts in workshop 2
 - also, be prepared to share one individual and one global action to fight global warming

Appendix 4.a: Carbon Footprint Worksheet (Lindsay Mollineaux: OLEEP co-mentor and unit leader)

**Global Warming Worksheet
Estimating Your Carbon Footprint**

Transportation:

- (1) Do you have a
- (a) massive pick-up or SUV (with rims, of course) – 21.5 miles / gallon
 - (b) medium size car – 26 miles / gallon
 - (c) small car – 29 miles / gallon

How many miles a week do you drive? _____

Hint: If you're not sure, 225 miles / week is average in the United States.

Now multiply that number by 4. _____

This tells you how many miles you drive in a month.

Now divide that number by the fuel efficiency you circled above. _____

This tells you how many gallons of fuel you use in a month.

Now multiply that number by 19.55 _____

This is how many pounds of CO₂ your car emits each month.

On average, a vehicle in the US emits 1125 pounds / month.

Household Heating and Electricity:

How many people are in your household? _____

Do you use natural gas to heat your home? Yes No

If yes, divide 1,000 pounds of carbon emission by how many people there are in your home.

How much do you pay for electricity per month? _____

Hint: \$80 is the average in the US for a household of two people.

Now divide that number by .08 _____

This will give you the number of kilowatt-hours used per month.

Now multiply that number by 1.34 _____

This is how many pounds of CO₂ emitted per month because of your household electricity use.

Now divide the number above by how many people there are in your household. _____

Add that number to how many pounds of CO₂ your car emits each month _____

If you said yes to natural gas heating your home, add that number, too. _____

That's your individual contribution to global warming!

Where you do fall in nationally?

Pounds of CO2 emissions per month:

Below 507 lbs/mo	Much less than average
Between 507 and 1,013 lbs/mo	Less than average
Between 1,014 and 2,028 lbs/mo	Average
Between 2,029 and 2,535 lbs/mo	More than average
Above 2,535 lbs/mo	Much more than average

Appendix 4.b: Workshop 2 Plan

Global Warming Workshop 2 Outline

- Living Deliberately
 - sit in a circle as a whole group and go around with each mentee sharing something he or she noticed and was surprised by during the exercise
 - How did it feel to think about all of your actions for a day?
 - How will this affect your behavior?
 - go around circle and everyone share at least one concrete action to help fight global warming; make a master list to distribute next workshop
- Prius
 - everyone goes outside to parking lot to see firsthand CES Prius hybrid vehicle
 - What is this car?
 - What is a hybrid and how does it work?
 - combination of gas and electric power
 - generate electricity when coasting/braking; no plug-in
 - Impact
 - better gas mileage, especially around cities (approx. 50 mpg), therefore less carbon released
 - image effect? what does it say to drive a hybrid, even if it isn't a perfect solution—means to transition
 - different options: Lexus vs. Toyota
 - limitations
 - still requires gas—not perfect solution
 - cost/availability
 - doubt over technology
 - alternatives
 - conventional, ethanol, diesel, biodiesel, electric, hydrogen
 - rides to see energy flow monitor in car, experience firsthand accel, braking, stopped
- Change
 - divide into two groups to discuss how to go about affecting change through communications strategies
 - break down elements of communication
 - minimize barriers
 - expense/economy; save over long term, create jobs
 - too overwhelming/vague
 - new behaviors require sacrifice in comforts
 - maximize benefits
 - avoid negative impacts (weather, disease, etc.)
 - sustainability (future generations)
 - build commitment

- be realistic
 - facilitate buy-in: what is important to you?
- utilize prompts
 - constant reminders, ie: signs, ads, etc.
- tap into community norms
 - peer pressure
 - awareness of numbers (x many people drive hybrids...)
 - regard for trends
- demonstrate a variety of actual ads re: global warming
 - which do you like/dislike and why?
 - who is it targeting?
 - what is its message and is it effective?
- based on preceding discussion, in small groups make a communication (poster, etc) for to put up in the Met using posterboard, markers, magazines, glue
 - consider the audience, the context of the message, specificity, end goal, is it memorable?
 - share messages with rest of group

Appendix 4.c: Living Deliberately Worksheet (Lindsay Mollineaux: OLEEP co-mentor and unit leader)

What does it mean to “live deliberately?” It means choosing a day and living it on purpose. For us, we're going to look for climate change and global warming in our everyday lives. So look around. Notice things that you usually take for granted. Ask questions of the status quo. Then record what you saw and thought about in the space below.

Things to think about: When do I drive to a place instead of walking or riding the bus? Why? Do office buildings leave their lights on at night? Why? When I do use electricity? Heat? How does the Met use electricity and heat? Is it always needed?



Henry says: I went to the woods because I wished to live deliberately, to front only the essential facts of life, and see if I could not learn what it had to teach, and not, when I came to die, discover that I had not lived. I did not wish to live what was not life, living is so dear; nor did I wish to practise resignation, unless it was quite necessary. I wanted to live deep and suck out all the marrow of life, to live so sturdily and Spartan-like as to put to rout all that was not life, to cut a broad swath and shave close, to drive life into a corner, and reduce it to its lowest terms, and, if it proved to be mean, why then to get the whole and genuine meanness of it, and publish its meanness to the world; or if it were sublime, to know it by experience, and be able to give a true account of it in my next excursion.

Appendix 5: Final Survey

Final Survey

This survey is meant to gauge your environmental perceptions and perspectives on the workshops you have participated in over the course of the last several months. As in previous surveys, all of your responses are confidential; you should not put your name on this survey. Thanks again so much for all of your help with evaluating the OLEEP program this year!

-Seth

General OLEEP Evaluation

1) Are you (*circle one*)?

(new to OLEEP this year)

(returning from past years)

2) What are the first three words or phrases that come to mind when you think of the term “environment”?

a.

b.

c.

3) How has your participation in OLEEP this year changed the way you think about the environment?

Has your participation in OLEEP motivated you to change certain things in your life to help the environment? If yes, how?

4) List what you think are the three most serious environmental issues we face today.

a.

b.

c.

- 5) Do you think it's more important to take care of the environment for the sake of
(*circle one*)...
(people) (nature) (both people and nature)

Explain your choice:

- 6) What kinds of things would you be willing to do to help take care of your environment? List three things that you know you can do to help.

a.

b.

c.

How often do you actually do these things?

What would make it easier for you to do these things more often?

- 7) List two to three sentences to describe what you have learned from and really liked about each aspect of OLEEP.

Workshops:

a.

b.

c.

Camping and trips:

a.

b.

c.

Mentoring:

a.

b.

c.

8) List two to three things that you would improve about each aspect of OLEEP.

Workshops:

a.

b.

c.

Camping and trips:

a.

b.

c.

Mentoring:

a.

b.

c.

9) Do you believe that the three aspects of OLEEP (workshops, camping and trips, mentoring) build well off each other? Explain why or why not.

10) Which of the units we've had this year (community-building, natural disasters, biotechnology, global warming) was your favorite? Briefly explain why.

Global Warming Unit Evaluation

11) The ozone hole contributes to global warming.

True / False

12) The greenhouse effect is caused by (*check all that apply*)...

(ultraviolet rays being let in through the ozone hole, heating the earth, and being trapped by clouds)

(solar rays entering the atmosphere and heating the earth, which releases infrared rays that are then trapped by greenhouse gasses in the atmosphere)

(people not recycling their trash and wasting water)

13) If global warming continues at its current rate, in 100 years it is likely that (*check all that apply*)...

(downtown Providence might be under water)

(it might usually be 60 degrees in Providence in the winter)

(there might be more mosquitos carrying diseases like West Nile Virus)

(Greenland might actually be green)

(all of the animals and plants on earth might die out)

14) How concerned are you about global warming, 1 being the least and 5 being the most?

1 2 3 4 5

15) List three things you can do to help prevent global warming.

a.

b.

c.

16) How likely are you to actually do these things, 1 being the least and 5 being the most?

1 2 3 4 5

17) During the last unit on global warming, rate each of the activities, with 1 being the worst and 5 being the best.

___ (watching clips from An Inconvenient Truth to learn about the effects of global warming)

___ (drawing the greenhouse effect and discussing it as a group)

___ (calculating your personal carbon footprint)

___ (“living deliberately” for a day)

___ (brainstorming actions to help prevent global warming)

___ (learning about the Prius hybrid)

___ (discussing communication strategies and making a poster)

___ (visiting the Portsmouth Abbey wind turbine)

What did you like about your favorite global warming activities?

What did you dislike about your least favorite global warming activities?

List two to three things you would change to improve the unit on global warming.

- a.
- b.
- c.

18) How did the field trip to the windmill today fit into the rest of the unit on global warming?

- a. Did it feel worthwhile and interesting to you? Why or why not?

19) During the unit on global warming, do you think there was (*check one*)...

___ (too much information and not enough hands-on activity)

___ (too much hands-on activity and not enough information)

___ (the right balance between information and hands-on activity)

20) During the unit of global warming, do you believe that the three aspects of OLEEP (workshops, camping and trips, mentoring) built well off each other? Explain why or why not.

21) Describe the ways your peers helped you learn during this unit.

Describe the ways you helped your peers learn during this unit.

22) How have you learned about global warming in the past (*check all that apply*)?

___ (through school lessons and science classes)

___ (talking with family/friends)

___ (reading books/newspapers)

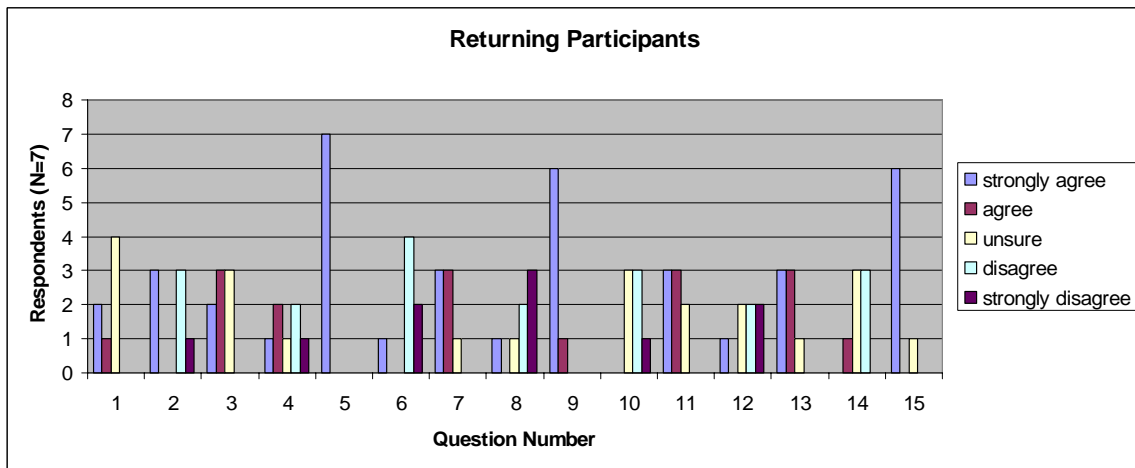
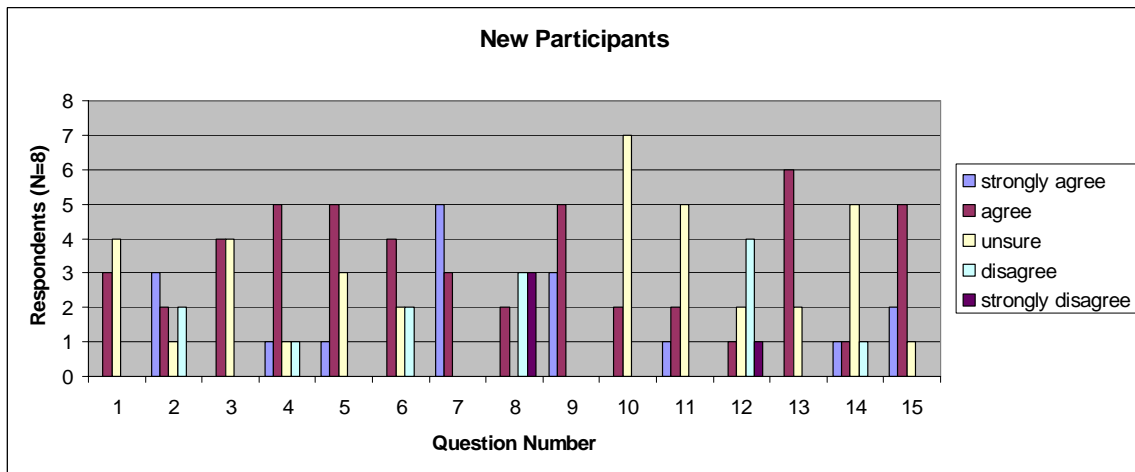
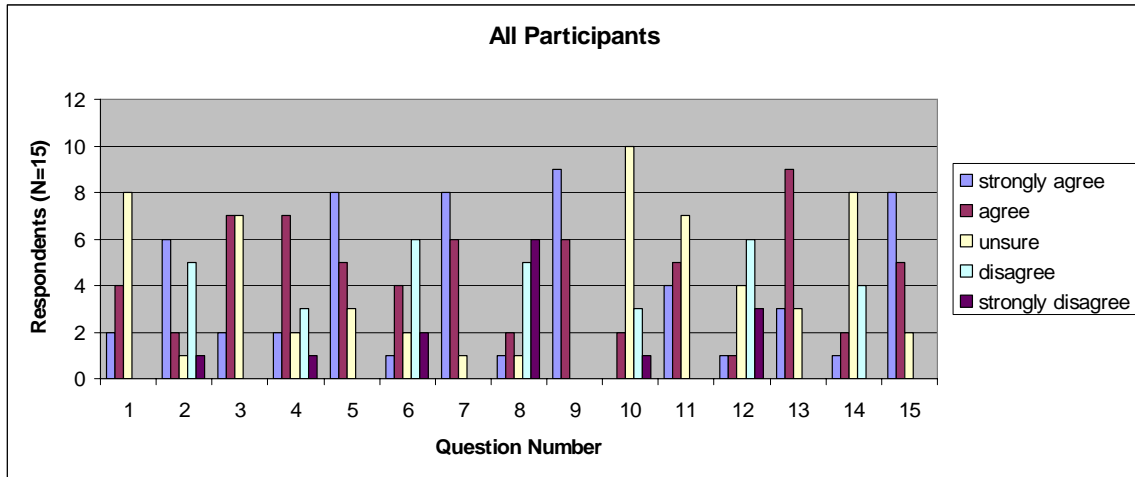
___ (watching TV/movies)

___ (this is the first time)

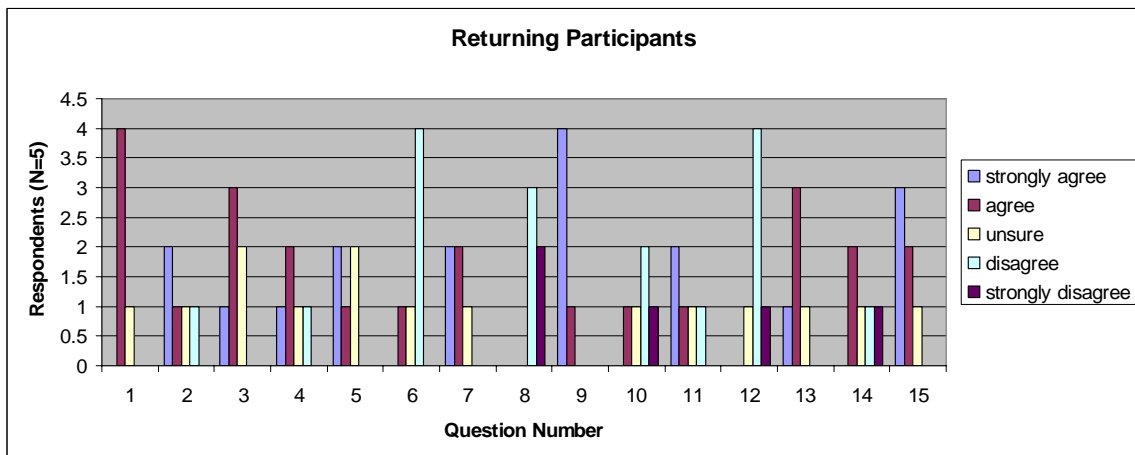
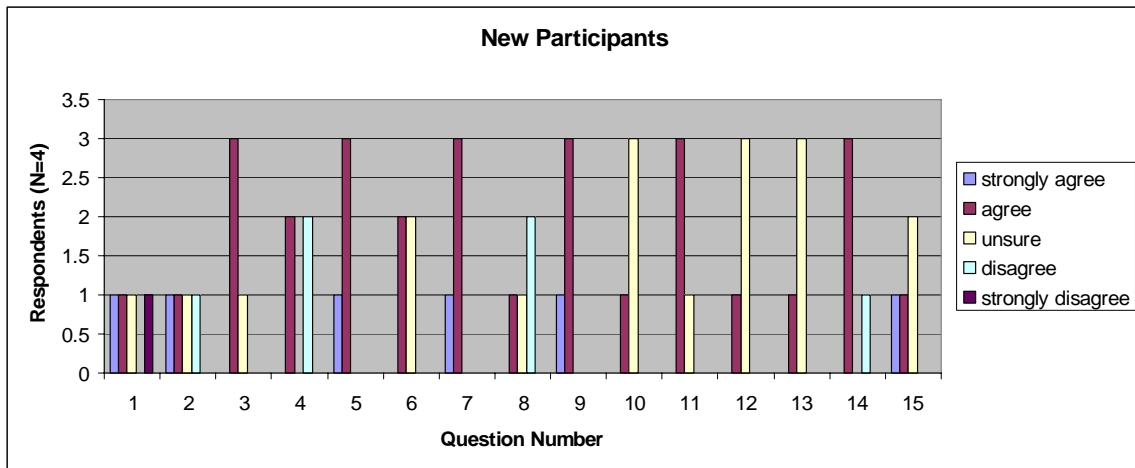
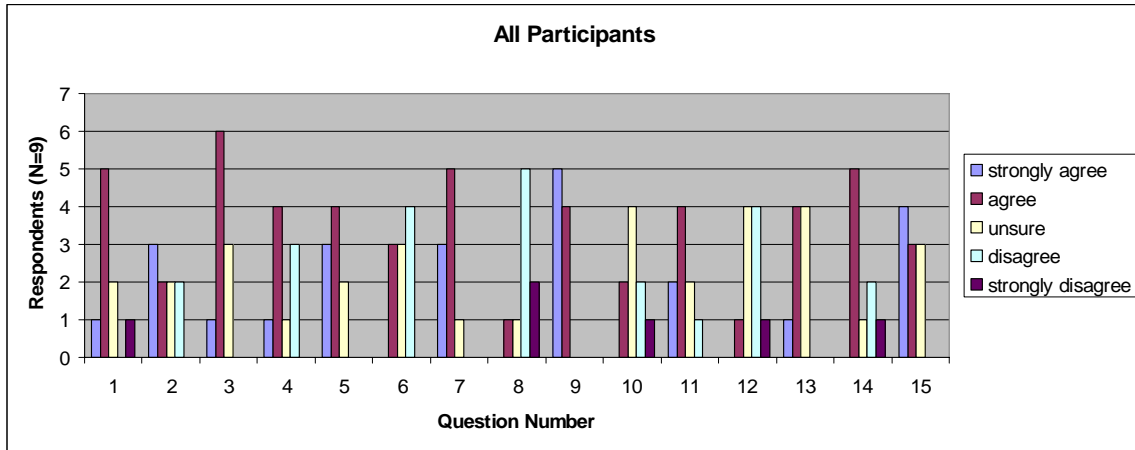
___ (other—specify):

How interesting was this workshop compared to these other settings?

Appendix 6: Initial NEP Questionnaire Results



Appendix 6.a: Final NEP Questionnaire Results



Appendix 7: Framework for Environmental Education

Factors Influencing the Design and Effectiveness of an Environmental Education Program

