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Protecting the Last Tree: Environmental Education in the United States, 1990-2012

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Table of Contents

SECTIONS

Introduction……....4-6
Methodology……5-6
Three Waves of Environmentalism: Early Environmental Policy in the United States…6-11
Not so Silent Spring……..6-9
Policy Changes…….....9-11
Educating Future Stewards: Environmental Education and Children ……11-15
Cultural Engineering……11-12
Why Focus on Children?.....12-15
Environmental "Edutainment": Environmental Messages in Children's Films……..15-32
The Movie as an Educational Medium……15-17
Criteria for a Children's Film……...17-19
Main Messages……19-27
Anti-Consumerism……19-22
Anti-Development/Deforestation……..22-24
Anti-Colonialism…….....24-25
Big Oil is Evil……...25-26
Technology as Savior……26-27
Limitations of Children's Films as an Educational Vehicle……27-33
Nature Through a Window: Energy Service Corps K-12 Education Program……33-40
Overview……..33-35
Critiques of ESC……...35-38
Benefits of ESC……....38-40
Off the Beaten Path: Leadership in Environmental Education Partnership…….....40-50
Overview……..40-41
Tenets of Place-Based Learning……...42
Critiques of LEEP……42-45
Benefits of LEEP.....45-50
Where do we go From Here?: Recommendations and Conclusions……..50-53
Acknowledgments……54
References……....55-58

FIGURES

Figure 1. Movie poster for *Over the Hedge*…….....23

TABLES

Table 1. Rubric for analysis of children's films……18

INTRODUCTION

Having already been hired as an environmental organizer, I reflect on how my childhood experiences impacted me. I embark upon this vocational journey with youthful optimism, a good dose of realism, and just a touch of cynicism. An environmental organizer is someone who works mobilizing individuals around targeted environmental issues. They create policy changes that are environmentally positive… generally for little pay. What has motivated me, and scores of others, to willingly take on this seemingly impossible task? For me: was it the summer vacations to Yellowstone and The Rocky Mountains with my brothers and parents? Maybe it was being able to explore in "The Woods" behind my elementary school as a child? These questions have been central in my life this semester, as I am involved in two environmental education programs: the K-12 education component of Energy Service Corps (ESC) and the Leadership in Environmental Education Partnership (LEEP). My work within these organizations, which I will elaborate on in greater detail, compels me to contemplate the impact these programs have on children.

ESC and LEEP are organizations that specialize in Environmental Education (EE) and focus on elementary school children. Children's films depict environmental messages and offer solutions to ecological problems. These programs and the films approach EE in differing ways and comparing them offers essential information about current modes of EE. My work with these programs and observations of messages prompts more questions: what vehicle of EE is most effective? What pushes people to action after "awareness" of the issues? Through observations and interviews, I attempt to answer these questions, which help me make recommendations about the future of EE in the United States.

Methodology

By comparing three different modes, films (passive), ESC (indirect), and LEEP (direct), of environmental education, I will critically analyze these programs and ascertain the strengths and weaknesses of each mode. To begin, I give a brief history of environmentalism and environmental policy in the United States. This history provides the context through which contemporary EE has evolved. I then explain why my focus for this research has been children. For the main part of this study, I compare three different types of environmental education that have been employed in the United States from 1990 to 2012. First off, I analyze the environmental messages present in children's films and discuss the issues when employing this passive mode of education. Secondly, I analyze ESC, a joint project between the California Public Interest Research Group (CALPIRG) and Americorps, that strives to educate K-12 students about energy efficiency and explore the problems and benefits of this program. ESC is an indirect vehicle of education, as children do not spend time in the outdoors. Next, I will consider LEEP, a program where college students teach sixth graders science lessons on a biological field station, which is a place-based method of education. Finally, I compare the disadvantages and advantages of this place-based program to the pros and cons of the other two methods. Comparing three different modalities of EE makes the strengths and weaknesses of each mode more apparent. I finish by suggesting changes to the forms of EE making them more effective in the future. These changes will spur the next generation of environmentalists and ultimately result in behaviors that are ecological favorable.

Though this study is necessary and useful, it has its limitations. Most of the data gathered on these programs has been through my own participant observation, and my perspective colors this study. To mitigate this limitation I include interviews with other people closely affiliated

with these programs. This study may be small, analyzing only two of the myriad EE programs available in the United States, but it still provides insights into application of EE in the nation.

With the present environment ills, current modes of environmental education deserve study, so that the most effective teaching methods are realized. I suggest teaching children about the environment though children's films is not as effective as an indirect classroom method or place-based learning because the solutions presented in the films are not feasible in the real world, and this passive mode provides no concrete connections with the natural world. It is still necessary to analyze movies since they are a prevalent mode of EE, as they introduce children to environmental issues. The model used by programs such as ESC is worthwhile because of its great reach, but also is problematic because it presents a superficial picture of environmental issues and does not expose children to the natural world. LEEP viscerally teaches children about the planet because children directly experience "nature" and thus form a deep connection with the environment through practice. The most effective way to teach children about the environment involves marrying the approaches of these two programs: children need to be taught generally about environmental ills and behavioral modification and then contextualize those behaviors through place-based learning.

THREE WAVES OF ENVIRONMENTALISM: EARLY ENVIRONMENTAL POLICY IN THE UNITED STATES

Not so silent spring

Ask any environmentalist to name the most influential book for the environmental movement in the United States and more often than not the answer will be *Silent Spring* by Rachel Carson (1962). I was personally introduced to this book at the age of twelve while writing a paper on the benefits and drawbacks of pesticides. Predictably, I came down on the side of environmentalists and concluded that the costs of pesticides greatly outweighed their

benefits. After reading it, I was upset by humanity's seeming disregard for Mother Nature. My story is analogous to that of many others who were inspired by *Silent Spring* to fight for the environment, as they realized humans are the ones destroying the earth and have the power to stop the ruination.

The first wave of environmentalism in the United States began early in the 20th century under President Theodore Roosevelt with his creation of national parks. This first wave focused on setting aside "pristine" land and the enclosure of natural spaces whereas the second wave placed emphasis on regulating air and water and legislated the protection of the natural world from man-made pollutants (Dowie 1992, 76). One such pollutant was dichlorodiphenyltrichloroethane (DDT), which farmers used on crops increasing production (Carson 1994, 155-160). The use of pesticides led to a domestic environmental crisis because they would accumulate in the bodies of animals that ate the sprayed crops causing sickness and death. Pesticides especially harmed birds, as the mothers crushed the egg shells made soft by DDT and "the peregrine falcon, the bald eagle, and the brown pelican were on their way out before the banning of DDT, aldrindieldrin, and other pesticides in the 1970s" (Speth 2004, 50). Many people did not know of the harmful affects of DDT until the publication of *Silent Spring* in 1962.

Silent Spring prompted this second wave, largely marked by social movements and progressive legislation in the United States. Carson's work captured sentiment that had been brewing regarding environmental degradation, specifically in regard to pesticide use. With the evocative language used in her book, she reached a wide range of Americans. The first chapter of *Silent Spring*, "A Fable for Tomorrow," chronicles the destructive power of pesticides on Anywhere, USA. The power of this fable lies in its authenticity and attention to detail. Upon first reading, one assumes that a terrible misfortunate has reaped havoc on this now silent, but

once thriving town. Carson shatters this illusion, as "no witchcraft, no enemy action had silenced the rebirth of new life in this stricken world. The people had done it themselves" (Carson 1994, 3). The book served as a catalyst for public interest in environmental issues in the United States. As Al Gore writes in the forward to the 1994 publication, "… when *Silent Spring* was first published, 'environment' was not even an entry in the vocabulary of public policy" (Gore 1994, xv).

At the same time the book was raising public awareness, outdoor enthusiasts were witnessing the negative effects of pesticides. Concurrent with the publication of this book "the outdoor recreation boom opened the way for the transformation in values and behavior that Carson's book had prompted. [O]utdoor enthusiasts… embraced Carson's…question: How can we live comfortably within nature while respecting natural processes?" (Brooks 2009, 100). The public and political awareness of issues culminated in 1970 with the first Earth Day. Americans began to consider how they could live amicably with nature.

Beginning in the 1960s, people were talking about the nature/culture dichotomy, reimaging how they could live peacefully with the natural world. With the depiction of a Native America canoeing through a river of trash, "The Crying Indian" public service announcement, broadcast in 1971 as part of the "Keep America Beautiful" campaign, was an attempt to reverse the nature/culture dichotomy by emphasizing humans destruction of the planet. (Keep America Beautiful 1971). The nature/culture dichotomy is the idea that humans are separate from nature. Carolyn Merchant describes it as a fundamental separation of humans and the natural world. This separation is detrimental to the environment: "nature-culture dualism is a key factor in Western civilization's advance at the expense of nature… European culture increasingly [sets] itself above and apart from all that [is] symbolized by nature" (1980, 143). Since humans are seen as better than nature, they feel as though they can use its resources without consideration for

the consequences. In the nature/culture dichotomy, "…man [is] seen as representing culture…" with a need to be "unconstrained by and to have domination over natural processes…" (Mack-Canty 2004, 155). Western culture acculturates children that nature is either too dangerous or too fragile to be played in and is not to be interacted with (Louv 2008, 123-132).

Policy Changes

Policy changes during the 1970s reveal the increasing importance of the environment as a political issues in 1970. Two issues of focus were clean air and water. As Lynton Caldwell posits, environmentalism "… was not another ephemeral American fad… That environmentalism was becoming a persisting and growing value in America was evidenced by the establishment, survival, and successes of public interest law firms" (1998, 15). One of the most influential environmental policies was the Clean Air Act (CAA), which was first enacted in 1970 under the Nixon administration. The declaration of Subchapter 1, "Programs and Activities" lays out the main purposes of the CAA:

> (1) to protect and enhance the quality of the Nation's air resources so as to promote the public health and welfare and the productive capacity of its population; (2) to initiate and accelerate the national research and development program to achieve the prevention and control of air pollution; (3) to provide technical and financial assistance to State and local governments in connection with the development and execution of their air pollution prevention and control programs; and (4) to encourage and assist the development and operation of regional air pollution prevention and control programs (Clean Air Act 1970, 5675).

The changes proposed were not simple fixes, and this Act enforced environmental regulation regarding air quality that was unprecedented in the United States. Shortly following the CAA, the Clean Water Act (CWA) was passed into law in 1972. The EPA website details the main purposes of this act: "The 1972 amendments … provide the statutory basis for the [National Pollutant Discharge Elimination System] (NPDES) permit program and the basic structure for regulating the discharge of pollutants from point sources to waters of the United States" ("Clean

Water Act" 2011, n.p.). The United States' government thus put great emphasis on environmental regulation to combat air and water pollution.

The policies enacted in the 1970s, which were characteristic of second wave environmentalism, centered attention on specific issues rather than looking at the Earth and environmental ills in a comprehensive manner. The second wave proposed retroactive solutions and the policies enacted, such as CAA and CWA, placed emphasis on fixing issues already present. In the 1990s, global warming became a political issue globally (Pralle 2009, 781). The Kyoto Protocol recognized human's contribution to global warming, and in 1997 it "[set] targets and timetables for 38 nations to control emissions of greenhouse gases" (Victor 2001, viii). The Kyoto Protocol advocates proactive solutions, as its focus is changing human behaviors that contribute to green house gas. The Protocol is an example of third wave environmentalism, which works to foster change through education. The main difference between second and third wave environmentalism is that second wave looks towards repairing past mistakes whereas third wave places emphasis on not making those mistakes in the future.

Public and political awareness of environmental issues converged in the 1960s, but only among adults. Children were not included in the environmental discussion until the 1990s with third wave environmentalism. Beginning in 1990, third wave environmentalism stressed the importance of individual action. Scholar Bill Devall asserts, "third-wave environmentalism is narrow and rational and focuses on economics and public policy. No recognition is given to ecological sensibilities, the necessity of providing an ecocentric critique of industrial society, or of exploring the 'wild self'" (1992, 55). Devall's view is problematic because it fails to recognize the emphasis placed on behavioral changes. Instead, this emphasis on changing behavior is what sets this new type of environmentalism apart from the previous two waves. The Environmental Protection Agency (EPA) has been providing grants to teachers for EE since

1992. The agency maintains, "through environmental education, people gain an understanding of how individual actions affect the environment …" ("Environmental Education" 2012, n.p.). Third wave environmentalism stresses education as a means of altering behavior, thus the number of EE programs has increased over the last decade. Education is and will continue to be an essential part of third wave environmentalism.

EDUCATING FUTURE STEWARDS: ENVIRONMENTAL EDUCATION AND CHILDREN

Cultural Engineering

There is a link between environmental education and behavior practices. George Howard refers to this phenomenon as "human engineering" (1997, 118). He argues that small, incremental changes lead to a new outlook on environmental issues:

> If I can produce more ecologically appropriate attitudes in myself… I might see some practical actions that I can take to make small changes toward living a more sustainable lifestyle… I can then use whatever skills and power I might possess to influence the attitudes of other humans (e.g., writing this book, teaching ecological psychology courses). Finally, I stand ready to support and facilitate the suggestions for creating more earth-friendly systems and policies that others (e.g., politicians, economists, ecological activists groups) might create (1997, 123).

This argument posits that if a person is consistently changing their behavior, the newly realized behavior will lead to new habits. He or she will then share this new outlook with others and attempt to change their actions. Howard refers to this technique as the bottom-up approach, which is necessary for changing attitudes and behaviors about the environment.

Using his idea of human engineering as a framework, I assert that systemic cultural change will occur through education. I characterize this concept as cultural engineering. Programs that educate children about sustainable behaviors from a young age change their attitudes, as individuals should not have to search for this information on their own. They can instead be exposed to it in the classroom, or through a program that provides them with the

information. If children are educated about the environment and the way their actions affect it from a young age, they will begin to relate to it differently. For example, if you are taught to turn off the lights every time you leave the room, this knowledge constantly reminds you of the environmental consequences of using energy. Similarly, I choose to be vegetarian after I learned about environmentally detrimental agricultural practices in the United States. Every time I am offered meat and turn it down, I am reminded of the issues surrounding agribusinesses and become even more steadfast in my vegetarianism. Eventually, environmental education can help shift the cultural paradigm, which results in cultural engineering.

Cultural engineering is important because it has the ability to create lasting change. Education introduces environmentally friendly ideas and changes children's attitudes about the environment. Howard brings up two important points; initially he argues, "in order to radically change human nature we need to reengineer the systems that serve to train and maintain our daily behaviors" (Howard 1997, 121). The system of education incorporates lessons helping children connect their actions to the environmental effects of their behavior, which reengineers that system. Secondly he maintains, that 'ecological problems of the twenty-first century will be more tractable to effective human engineering than they will be to technological breakthroughs" (118). Focusing on education is proactive as opposed to waiting for technological breakthroughs that may come too late. EE programs that have come out of third wave environmentalism use cultural engineering to change behavior.

Why Focus on Children?

While it is necessary to reach as many people as possible about environmental degradation, reaching individuals under the age of 12 is of upmost importance the. Drawing from the research presented by Charles Nelson, a person's brain is most malleable when it is developing, especially under the age of 12. Though the brain continues to develop after this

period, it undergoes the greatest changes before this age. What one learns at a young age has a great impact on them as an adult (Nelson 2011, 53-57).

Children need to be taught about the environment because many of them do not inherently realize the ecological dangers present today. Information is important since it "…can change behavior. In the area of health promotion, widespread information about heart disease has significantly altered the number of men getting regular check-ups and taking their hypertension medication, resulting in a 50% decline in stroke mortality in the U.S." (Mckenzie-Mohr & Smith 1999, 8). Many environmental problems occur because people are unaware of the consequences of their actions and people that are conscious of the issues often feel powerless to reverse them. Subsequently, educating youth about these issues provides them with tools to address the problems they encounter.

Youth can understand these problems if they are presented in an accessible manner. Scholar Carolyn Strong shows that "research conducted by the Henley Centre in 1994 found children's levels of understanding of environmental issues to be relatively high, with some primary school children able to understand fairly complex issues…" (1998, n.p.). Children can be taught to understand these issues and instructed on behaviors that will affect the environment in a positive, or, at the very least neutral manner. These programs are powerful because through them the child will gain an appreciation for nature and they are given reason to care about their actions and the actions of others.

Children are an important demographic to study and reach because they have a great impact on their parents as well as their peers. There are many cases in which advertising campaigns target children and use them as a way to reach parents. The thought process is that a whining child is hard to ignore and that a parent is more likely to buy a product if a child nags them. This similar "power" can be used to positively affect the environment. If children learn

about an environmentally friendly behavior through an educational program, they pass on the knowledge from these programs to their parents. David Folz and Joseph Hazlett find that children are important players in implementing recycling programs, as they affect the success of these programs (1991, 528). Children can reach parents in a way that traditional forms of disseminating information cannot.

There are two main benefits of introducing children to environmental issues at a young age. The earlier children are effectively introduced to environmental issues, the longer they will engage in environmentally friendly behaviors. Children are the policy-makers of the future, and environmentally educated children will grow into environmentally conscious adults. George Howard sums up the power that behavior has on one's outlook, and he reasons, "…humans should focus upon doing the little things correctly-acts produce habits that build the character that determines one's destiny. A satisfying destiny in life often represents the natural outgrowth of thousands of well-chosen acts" (1997, 79). Individuals taught environmentally friendly behavior from a young age have a different outlook on the environment as adults (cultural engineering). Michael Maniates provides a critique of human engineering, as it promotes "individualization," or placing focus on individual behavior rather than systemic cultural issues (2001). I contend with this critique in my analysis of LEEP and ESC. Mallory McDuff and Susan Jacobson argue "environmental attitudes are first formed during childhood" (2000, 414). These children may become policy makers and create environmental friendly polices based upon attitudes instilled from a young age. These future policies will affect American society and ultimately change culture. Not only is it essential to reach as many children as possible with this information, but also it is necessary to ensure the information is being taught in an effective manner.

Environmental Education raises important questions: how exactly are children "taught" about environmental issues? Are various modes of transmission effective, and can a mode be altered making it more successful in the future? In order to answer these questions, I will critically analyze the myriad ways that children are exposed to environmental messages. I examine environmental messages in children's films, the lesson plans taught by Energy Service Corps (ESC), and those plans taught through the Leadership in Environmental Education Partnership (LEEP). I focus on children's films and specific environmental education programs to discern the themes that run through the movies and programs and the implication of those themes as well as the solutions presented. Additionally, some modes of education are more advantageous than others, and it is important to ensure that these programs are as powerful as possible. I will start by reviewing the content of the children's films and then review the environmental education programs.

ENVIRONMENTAL "EDUTAINMENT": ENVIRONMENTAL MESSAGES IN CHILDREN'S FILMS

The Movie as an Educational Medium

Both of my parents have worked outside the home since before I was born, so as a child I spent many of my summers and school holidays at my grandparents' house. Some of my earliest memories were learning the alphabet with Kermit the Frog, or about the meaning of Passover with Lamp Chop. Sitting on the couch with my parents during the summer watching Johnny Deep as an animated lizard in *Rango*, I had flashbacks to my childhood. I began to wonder if movies such as *Rango*, with a strong message about the small amount of drinkable water that exists on planet Earth, could impact and teach children. Could children learn environmental messages through film? And, if so, what were the main messages children were exposed to through these films?

One of the most important ways in which media is significant in our society is its effect on the outlook and perceptions of children. Pralle argues that movies and media are important because "non-governmental institutions, such as the media, … have agendas, and these can affect the public and governmental agendas" (2009, 782). Media can be used to sell a product, but also to educate children. Sesame Street, running from 1969 to the present, is a groundbreaking show that first proved television could be used as an educational tool. The goal of the show was to create a series that was as "engaging as it was informative" (Davis 2009, 62). Before Sesame Street was given the green light, producer Joan Cooney had to prove that children could be taught by way of a television series. For this project, she interviewed teachers, children, and ran physiological experiments. Through her research for the show, compiled in the study "The Potential Uses of Television in Preschool Education," and the subsequent millions of children educated through Sesame Street, she showed that television was a powerful educational medium (Davis 2009, 66-68).

The influence of media extends beyond the small screen of television, to the big-screen of film, which is also a powerful medium for disseminating messages. Garth Jowett, Ian Jarvie, and Kathryn Fuller delve into the complex Payne Fund Study (PFS), which posed the question: "…how [are] movies affecting the youth of America?" (Jowett et. al. 1996, 1). It found that there were impacts on children moviegoers ranging from learning and attitude change to emotional stimulation (Jowett et. al. 1996). One of the reasons I am considering movies is because it has been "…demonstrated that movies [have] a definite impact on children's emotion, attitudes and knowledge base" (Jowett et. al. 1996, 91). *Bambi*, released in 1942, is arguably the earliest children's film with an environmental message. There has been a surge in the number of children's films with environmental messages since the 1990s.

Though I considered analyzing television as well as movies, I decided that films were a more pertinent form of media to study. For one thing, television is often too commercially biased due to the prevalence of advertising. It would be impossible for me to track exactly which commercials are played during each program because commercials change from show to show. Movies do contain product placement, but there is not necessarily a need for commercial sponsorship due to the diverse way of financing them. Additionally, the length of movies allows messages to be presented in greater depth.

Criteria for a Children's Film

Due to the limited scope of this study, it was impossible for me to watch every movie with an environmental message, or even every child's film that presents an environmental message. The aim of this study is to review a wide enough range of movies to ascertain the themes, if any, that they share. To narrow the number I investigated, I created a rubric of inclusion criteria. First, the movies had to be rated either G or PG since children 12 and under are likely to be able to watch these movies. Second, they had to be either animated because animated films are widely regarded as "the children's" genre in the United States. This perception of animated movies is discussed in the book *Anime from Akira to Princess Mononoke: Experiencing Contemporary Japanese Animation.* Susan Napier discovered that when people were asked the question "what particularly attracts you to anime?" a majority "specifically compared anime with Disney and other American cartoons, which they saw as being more child-oriented and less creative than anime" (2001, 249). Third, I am analyzing full-length films specifically to ensure consistency in length among them. By comparing similar films, I try to minimize arbitrary bias. Additionally, full-length films tend to be shown in movie theaters where they are able to reach a larger number of children. Finally, I am considering films made during or after 1990 because those are the movies produced during third wave

environmentalism. With these criteria in mind, I looked for main messages that crop up across these movies. In total I looked at seven films ranging in length from 81 to 107 minutes.

To find films I typed "children's movies with environmental messages" into the Google search bar. The same movies showed up several times: *Rango* (Verbinski 2011), *Wall-E* (Stanton 2008), *A Bug's Life* (Lasseter 1998), *Jetsons: The Movie* (Hanna and Barbera 1990), *Fern Gully: The Last Rainforest* (Kroyer 1992), *Over the Hedge* (Johnson and Kirkpatrick 2006), and *Cars 2* (Lasseter 2011). The facets of the movies compared were the protagonist/ antagonist and their character traits (class, race, species, and age), the types of messages being expressed, the types of solutions presented, the portrayal of those solutions, and the strong images. Table 1 highlights the main messages and strong images apparent in the movies.

Table 1: Rubric for analysis of children's films

Title of Film (Year released)	Themes Presented	Strong Images
1. *Jetsons: The Movie* (1990)	1. Anti-consumerism 1. Anti-colonialism 1. Anti-development/deforestation	1. Thick brown smog, which covers Earth
2. *Fern Gully: The Last Rainforest* (1992)	2. Anti-development/deforestation 2. Big oil is evil	2. Hexxus as skeleton 2. Trees splitting Hexxus
3. *A Bug's Life* (1998)	3. Anti-colonialism	3. Thumper, the most viscous grasshopper
4. *Over the Hedge* (2006)	4. Anti-consumerism 4. Anti-development/deforestation	4. Dark green hedge
5. Wall-E (2008)	5. Anti-consumerism	5. Earth surrounded by trash, as seen from space 5. Grey, desolate Earth
6. *Rango* (2011)	6. Anti-development/deforestation	6. Las Vegas and the water used for its green golf courses
7. *Cars 2* (2011)	7. Big Oil is Evil	

By comparing the same aspects of each film, it was apparent that there were similar themes present. The messages presented in these seven movies are not the only ones in children's films, but they are most prevalent.

Main Messages

All the movies I analyzed contain at least one character who has childlike qualities, and to whom children can relate. The best example of this is in *Over the Hedge* when Hemmy, a squirrel, proudly announces that he can "burp his ABC's." This behavior is common with youth, and most children will find this scene amusing. This movie in particular strives to be accessible to all ages, as a different character represents each age group. Though not as overt in the other movies, the child archetype is present in all the films studied. In *Fern Gully* and *Cars 2*, Batty and Tow Mater (respectively) serve as these youthful characters. Though they have good intentions, they are easily excitable and get into trouble because of their short attention spans. With just the right amount of naïve gumption, scores of children are able to see themselves in Elroy (*The Jetsons*) and Dot (*A Bug's Life*). With the simple phrase "where's the water?" Priscilla (*Rango)*, an adorable young mouse with big yellow eyes, expresses her anxieties about the town's water shortage in a simplistic and innocent manner. *Wall-E* fulfills this role, as one of his main characteristics is his insatiable inquisitiveness. This archetype keeps the children engaged and provides them with a frame of reference. When this type of character is included, the children are more invested in the movie and the environmental messages presented are more likely to resonate.

Anti-Consumerism

One of the strongest images out of all the films is in the opening sequence of *Wall-E*: mounds of trash surround the brownish-grey Earth. This image is instantly recognizable, but something is amiss. One assumes that the earth has been invaded by some evil alien species

because of its grey and lifeless appearance. We soon learn humans have produced more trash than the planet can handle. Everyone has vacated the Earth and escaped to space with the intention of returning in five years after the robotic waste allocator load lifter-Earth Class (Wall-Es) get rid of the trash. This task proves to be insurmountable, and the only "life-forms" left on Earth are the indefatigable robot and his cockroach pet. The cockroach is, of course, symbolic; implying that humans have created the equivalent of a nuclear wasteland that only cockroaches are able to withstand. Wall-E follows his love, an Extraterrestrial Vegetation Examiner (EVE), to a central spaceship, the Axiom, which has housed the remaining human population for the past 700 years.

Wall-E introduces a dystopian future in which people are completely out of touch with reality and continually make the same mistakes as their ancestors. They interact with each other through mobile computer screens and are transported everywhere on hover chairs. Since they live in space, everything is simulated, and they are completely cut off from the outside world. After sleeping late, the captain is literally able to reverse time and none of the passengers seem to notice or mind because the weather and time are arbitrary simulations. The obese passengers are not physically healthy, due to their use of hover chairs and subsequent lack of exercise. The consumption promoted by the mega-corporation, Buy and Large, is partially responsible for this future. The corporation has complete control because it has become the governing body.

Jetsons: the Movie forces us to evaluate our endless consumption of products in the Western World. George Jetson is employed by Mr. Spacely to run a new asteroid mining facility, and the minerals from the "plant [produce] Spacely sprockets and spindles" (Hanna and Barbera 1990). Jetson does not know what these sprockets are used for, but knows that he will make good money if he runs this new plant. Odd occurrences begin to transpire, and we learn that the Grungees, the life forms living in the asteroid (intentionally fuzzy and adorable), have

been sabotaging the sprocket plant. The mining of the asteroid for sprocket making minerals has been interfering with the lives of the Grungees who live within the asteroid. The simple solution is to shut down the plant, but Mr. Spacely wants the operation to remain active because he is interested in profit. Children are supposed to root for the Grungees, as they are appealing and it is hard not to hope for their survival. This plot is anti-consumerist, as the sprockets are never given a purpose. These sprockets are analogous to all technological gadgets, such as iPhones, which are nonessentials, but use countless foreign resources.

Residential development in America and the expectation of privately owned plots of land promotes environmental degradation, as land is cleared to make way for suburbia. This theme is central in *Over the Hedge*. The whole plot revolves around one junk food crazed raccoon, RJ, and his unwise decision to steal processed treats from a hibernating bear. Throughout the movie, the raccoon attempts to convince wild animals, living in a forest adjacent to the burgeoning neighborhood, that the modern world is better than the natural world because of the food and amenities it provides. Verne, a turtle and the leader of the odd assortment of animals, is reluctant to follow RJ and pronounces that humans are dangerous because for them "enough is *never* enough." (Johnson and Kirkpatrick 2006). As the movie progresses, the animals steal more and more from the humans and bring the indoors outside. The actions of the animals distresses one woman in the neighborhood and she hires an exterminator. The climax of the movie involves RJ risking his life, the lives of his friends, and his friendships because he cannot turn his back on mounds of food is stored in the woman's house. RJ eventually rescues his friends from the exterminator forsaking the material human world and lives with his animal friends in the forest.

One of the central themes throughout these movies is Americans' compulsion to consume. This consumption is detrimental to humans, the Earth, and other species. George Jetson almost wipes out a species to make useless widgets. The humans in *Over the Hedge* have

created a world filled with material goods. Wall-E's home is filled with useless memorabilia found while cleaning up trash. *Wall-E* has the strongest and most obvious anti-consumerist message, as it illustrates a possible dystopian future of humanity if we do not change our current trajectory.

Anti-Development/Deforestation

Five of the movies analyzed have strong anti-development and anti-deforestation themes. This message is implicit in the title *Fern Gully: The Last Rainforest*. Hexxus, the evil oil monster in *Fern Gully*, is only released after humans cut down the tree in which his spirit is magically trapped. The monster gets stronger as the humans cut down more trees and use more oil for their deforesting machines. Batty asserts that the deforestation is unnecessary and complains that, "all the trees go, then you have the parking lots and the convenience stores" (Kroyer, 1992). The humans are destroying the last rainforest for no apparent reason. Hexxus' (voiced by Tim Curry) rendition of "Toxic Love" in Fern Gully has stuck me with since childhood. He and all but one of the humans present in the movie are pitted against the natural world, and he proudly sings that he: "[sees] the world and all the creatures in it, I suck 'em dry" (Kroyer, 1992). He is the personification of human greed and serves as a warning for what can happen when development is unregulated. In a similar vein, *Over the Hedge* illustrates the consequences of residential development: the destruction of natural habitat as the reinforcement of the nature/culture dichotomy. The most important image is the dark green hedge that separates the suburban neighborhood from the forest, which is pictured in figure 1. It springs up only after the cookie cutter housing development is built and serves as a divider between the forest and the neighborhood.

Figure 1. Movie poster for *Over the Hedge*

Wall-E and *Jetsons: The Movie* take the anti-development/deforestation theme and depict what the future holds for the human race if we do not change our destructive habits. In *Wall-E* all the trees have been cut down to create Buy and Large superstores. Nothing green exists because humans have removed all the vegetation for parking lots and convenience stores, as Batty, Crysta's friend in *Fern Gully*, predicted. *Jetsons* and *Wall-E* portray this theme in a similar way because both movies take place in space. The mall in *Jestons* flaunts a "nature zone" where all the trees and plants are holographic. The inhabitants on the Axiom rely on a fabrication of nature. In both these films, the natural world is artificial and humans have no hope of connecting with it.

This message of anti-development/deforestation is less overt in *Rango*, as its main message is the scarcity of fresh water. As is true of most environmental issues, the lack of water and issues of development and deforestation are intimately linked. *Rango* tells the story of the town of Dirt in which the inhabitants are desperate for this precious resource. The water imagery

in this movie runs throughout, as empty glass bottles serve as wind chimes and fill carts that would normally be overflowing with fruits and vegetables. The reason for the lack of water is unclear through most of the movie. For a good portion of the film, the audience is led to believe that a family of moles has stolen the scant amount of water remaining in the town. Through his investigations, sheriff Rango discovers that all the water has been diverted to water the green lawns of Las Vegas and for other development projects. The portrayal of Vegas as just over the hill is used to illustrate how oblivious humans are to the consequences of their actions. There is a whole cadre of animals living in close proximity to them dying because their water supply is being diverted. Humans are oblivious to the plight of the animals and are only interested in having a good time in their overdeveloped adult playground.

Anti-Colonialism

Anti-colonialism and environmental degradation are linked in *Jetsons: The Movie* and *A Bug's Life* because the colonizing entity is depicted exploiting the raw materials of the colonized group. Author Theotonio dos Santos describes this relationship of global politics and discusses how "… countries in which land and mines [are] in the hands of foreigners…" have "a great part of the accumulated surplus… destined to be sent abroad in form of profits…" (1996, 68). Essentially, the colonizer exploits the raw materials of the colonized country and the colonizer alone benefits from these materials. This interaction is vilified in both *Jetsons* and *A Bug's Life* due to the negative environmental implications as well as human rights abuses. After the Jetson family learns of the existence of the Grungees from Elroy, Jane, the matriarch of the Jetson household, implores George to stop mineral extraction from the asteroid, as "no job is worth destroying the lives of innocent creatures" (Hanna and Barbera 1990). There is a powerful scene in which the extraction machine violently shakes the home of the Grungees. The implication is

these machines are bad for the environment as well as the cute indigenous population living within.

The anti-colonialism sentiment in *A Bug's Life* is strong, but the environmental message is less overt. The colonizer grasshoppers expect that the ants, the colonized, turn over all surplus food gathered because of the threat the grasshoppers present: they are bigger and can attack the ants if they do not comply. After an unfortunate incident with "time-saving" seed removal technology, all of the surplus food is lost. The ants decide to fight the grasshoppers, as they will not have enough food for themselves and for the expected "double order of food" (Lasseter 1998). The underlying message is that for the ants to have enough food for both them and the grasshoppers they have to overexploit their resources. Throughout these two films, the colonizer comes out on top to the detriment of the colonized and the environment.

Big Oil is Evil

Cars 2 and *Fern Gully* paint big oil companies in a negative light in separate ways. Patrick Murphy discusses *Fern Gully* as it depicts "the ecological necessity of defending the rainforests… and the responsibility of industrialized societies for changing their behaviors is stated explicitly…" (1995, 135). *Fern Gully* presents the message by insinuating that humans are at fault for the degeneration of the planet since they burn fossil fuels and cut down trees. Hexxus is an interesting character, as he gives oil a voice, and he is the embodiment of the unfeeling oil companies only interested in the bottom line. He is often portrayed as a skeleton, which visually equates oil to death. The film does not, however, excuse other humans from responsibility, as they are implicated in environmental problems with their use of large amounts of oil. Humans are running the machines that cut down the trees. Without American consumption, these companies would not have money, nor power. A problem with this message is that children may not pick up on these themes, which I discuss more in the next section.

The main message of *Cars 2* is that big oil companies are bad, but the film presents this concept differently than *Fern Gully,* as it does not address the human aspect of burning fossil fuels. *Cars 2* presents a world without people. All vehicles are sentient and do not rely on humans to run them, so humans are removed from the picture entirely. The owner of a large oil reserve, Miles Axlerod, claims to have discovered a new, clean fuel source: Allinol. He holds a racing championship to promote this new fuel, but we find out the whole competition is a ruse, as he wants to promote conventional gasoline by making the new biofuel seem unsafe. This portrayal of oil companies and a world without people places the onus for CO_2 emissions and the other negative consequences of using gasoline on big oil alone.

Technology as Savior

Though all of the other movies deal with environmental degradation, this is not the main focus of *A Bug's Life*. Rather, it explores the idea of technology and its ability to save a population, as well as the risks associated with putting all eggs in one basket. Flik, an ant and the main protagonist, creates a machine that can gather seeds at a quicker pace than a bug. This machine creates a food shortage when it hits the leaf on which the food has been collected for the grasshoppers causing it to fall hundreds of feet below. This consequence suggests that technology is the problem and humans need to use less of it. The ending of the movie undercuts this message and promotes an alternative one. There are two instances in which technology acts as a savior for the ants. Flik convinces the ant colony to create a bird out of sticks and twigs to scare off the grasshoppers. Though the plan does not work perfectly, it buys the bugs time. A real bird carries off Hopper, the head of the grasshopper clan, which causes the rest of them to retreat. Without the fake bird, the grasshoppers would have massacred the ants before the arrival of the actual bird. The other time technology is portrayed in a positive manner is at the end of the movie. One of the last scenes depicts Flik teaching others how to use his seed extraction

machine. Even though this technology causes issues for the bugs in the first place, they are willing to rely on it. Since the bugs are highly anthropomorphized and serve as metaphorical humans, this scene implies "nature is controllable and exists to fulfill human needs… It also communicates that nothing exists in nature that humans cannot …control" (Corbett 2006, 123).

A Bug's Life portrays technology as both a potential savior and force for environmental destruction. Initially, the seed extraction machine has a negative consequence, as it causes the food shortage. However, at the end we are shown it used in a positive light. This depiction of technology raises important issues present in real life in relation to nature: technology and innovation can be both a vice and solution to environmental problems. For example, solar collection technology provides energy that is less polluting. Conversely, technology can speed up environmental degradation as shown in *Fern Gully and Jetsons: The Movie.* I am not arguing against employing technology, but its uses must be kept in check. The message in *A Bug's Life* is problematic because of its one-sided portrayal of the uses of technology. It is presented as a savior and shows that all innovation is good rather than leaving the matter open-ended.

Limitations of Children's Films as an Educational Vehicle

There are flaws with media as an educational vehicle, and the current solutions presented in children's films make this educational medium a wholly ineffective mode of EE. Animals are often anthropomorphized and presented in an unrealistic way. Two hours is not enough time to present complex environmental issues and problems are inevitably addressed in a superficial manner. In the event that kids do understand the messages some of the solutions presented are problematic and unrealistic. Watching movies with environmental messages does not give children the incentive to be in the outdoors and connect with nature on a personal level. Films can teach environmental messages, but they do not assist children in making connections between the lessons presented and the natural world and those messages can be problematic for

reasons elucidated below. Ultimately, movies are perhaps the least effective method of teaching children environmental messages.

Some of the concepts presented are quite subtle, such as the anti-development and deforestation message in *Rango*, and the intended message is lost on children. Though I was able to pick up on subtle ideas, I was analyzing these films though a specific lens. Some children appreciate the films for their entertainment value alone. Donna King discusses Neil Postman's critique of media as an educational tool:

> Postman (1985) values process over content in learning, and criticizes educational shows such as *Sesame Street* as primarily teaching children to love television. He argues that television serves best when it is purely entertaining, that all serious public discourse is undermined when transmitted through its glitzy, fast-paced medium (in King 1994, 105).

Children do not possess the same analytic framework as adults, and these messages will go unnoticed and will not be understood. For example, children twelve and under do not fill up gas tanks, so they have no idea that the price of gas is an important issue. They are not clued in to the great fluctuation in gas prices and how those fluctuations relate to the actions of mammoth oil companies and their connection to political elections. Therefore, when watching *Cars 2*, they are incapable of processing the anti-big oil message and focus on the cars racing and dramatic explosions. Movies can be used as a powerful tool to illustrate other messages, but they do not necessarily convey real world environmental issues effectively to children.

Due to the format of movies, environmental messages are presented in a simplistic manner. All environmental problems are complex and involve numerous actors each with a different agenda. Moreover, the films provide definite solutions to problems when there is no clear-cut answer. *Jetsons: The Movie* ends with a compromise between the indigenous population, the Grungees, and the humans, as the Grungees are given control over production of the sprockets. This resolution is highly unrealistic due to its lack of depth. Sometimes there is no way for a company and those negatively affected by its actions to come to an agreement.

Also, it naïvely assumes that all companies are invested in social justice. Even if children begin to understand the complexities of these issues, movies do not provide space for discussion. Discussion is an important part of education, but most children are not able to ask questions, so this aspect of learning is disregarded. Any misconceptions they have after watching the films are not usually addressed and will remain with them.

Even if children are able to understand the messages, the way nature and humans in nature are presented is problematic. In most of the movies, animals are used to symbolize humans and are given unrealistic human characteristics; they are anthropomorphized complete with human emotions and thoughts. Julia Corbett provides a summary of the issues with this approach:

> … many nature-oriented movies revolve around animals…Animals are a handy Hollywood shorthand with the ability to stand for all of nature and its values. The downside of such a focus is the simplistic understanding of ecological systems. It seems to viewers that 'saving' an individual bear or wolf magically saves an entire ecosystem, and that saving only the big, dramatic, top-of-the-food-chain animals save everything else (2006, 127).

This kind of portrayal halts further engagement with the natural world, as the problems presented are given simple answers and there is no need for further dialogue about the issues. In *Over the Hedge*, the animals are capable of creating elaborate plans to steal the humans' food as well as using the same technology as humans. When in nature, children will assume that animals are just like them and want to be treated as humans. In the same way that these movies only superficially address the politics of environmental issues, they provide inadequate and inaccurate information about the complexities of ecological systems.

Using non-humans as the protagonist is troublesome because children will not understand humanity's role in environmental degradation. Several of the films separate humans from their destruction of the planet, and they do not explicitly address the ways in which humans are responsible for environmental ills. This issue is especially apparent in *Cars 2* because there are

no humans; the cars are sentient beings. The lack of humans places the responsibility on inanimate objects rather than addressing the root of the problem: human's reliance on petroleum. There are no human characters in *A Bug's Life*, and the main antagonist is a group of grasshoppers. Since the main predicament is lack of food, the impact of humans on a natural ecosystem could have easily been incorporated. *Rango* hints that humans are responsible for the water deficiency, but this message is subtly stated. Children will not automatically recognize Las Vegas, nor will they understand the relations between Las Vegas and the disappearance of water because it is unlikely that they have been introduced to water issues. The one movie that works to incorporate humans to present a fuller picture of environmental issues is *Wall-E*. Unfortunately, *Wall-E* is an exception to the general trend. There are several human protagonists in this movie and the overt lesson is that people must work to repair the destruction they have caused.

The solutions presented in children's films often separate humans from the environment rather than presenting a resolution where humans live in equilibrium with nature. The consequence is that children will think they have to live apart from nature in order to keep it safe and will be less likely to engage with it. None of the humans in *Over the Hedge* are sympathetic to the animals' plight. People are the cause of the animals' loss of habitat and are only interested in land for building extravagant houses. They are also overly concerned with material goods. The main antagonist is a woman who is hell-bent on euthanizing all of the animals in the forest adjacent to her neighborhood. In order for the animals to "live happily ever after," they must remain over the hedge, and the solution does not prescribe interaction between animals and humans. There is no connection between humans and the ecosystem in which they are a part. *Fern Gully* depicts humans as evil because they do the bidding of Hexxus. The loggers are portrayed in a negative manner; they are overweight, sloppy, and lazy and are willing to blindly

follow the orders of their superiors. Zak (initially a logger) only begins to question his actions after a fairy accidently miniaturizes him, and he is forced to live like a fairy. He does not make any realizations on his own and relies on the main female fairy, Crysta, for survival. He "…is part of the problem until Crysta patiently straightens him out and works to correct the damage he has participated in creating" (Murphy 1995, 135). The loggers are forced out of the rainforest, and there is no discussion of sustainably using trees. The resolution presented in *A Bug's Life* and *Rango* cannot include humans because there are no humans in either film. The solutions in all these movies are deficient because they imply that humans and nature cannot live compatibly with one another. These movies reinforce the ever-present nature/culture dichotomy.

None of these movies, with the exception of *Wall-E*, portray realistic or environmentally positive solutions. It is possible to poke holes in every resolution. *Jetsons: The Movie*, prescribes a compromise between the multi-galactic mining corporation (Spacely Sprockets) and the indigenous inhabitants (the Grungees). In reality, animals are unable to voice their opinions and greedy corporations often ignore indigenous populations even though they have the potential to communicate with one another. One of the strongest scenes in *Rango* involves springs of water shooting from the ground. Rango and his team of animals have helped divert the water from Vegas to the village of Dirt, and this water provides the town with much needed hydration. This ending does not even prescribe a solution. What happens once the humans figure out what happened and reclaim the water? There is no discussion of water conservation. *A Bug's Life* relies on technology to combat the food shortages and glosses over the problems involved with mechanically harvesting crops. Unless one of the animals in *Over the Hedge* is considered an endangered species, the forest will always be under threat of development. There is no magic involved in oil extraction, and there is no fairy power that can trap the greed of oil companies inside an ancient tree, as the fairies trap Hexxus in *Fern Gully*. Though *Cars 2* is couched as a

film with an environmentally positive message, there is no solution presented. The "green" fuel proves to be a hoax, which leaves gasoline as the only option. It does not introduce children to the idea of electric cars, or mention any of the other green alternatives available. The alleged point of the movie is to promote sustainable transportation, so there should be sentient subways instead of cars. There are viable solutions that could have been outlined in these movies. If the solutions are presented in a more realistic way, movies could be a more effective mode of environmental education in the future.

Out of all the movies analyzed, *Wall-E* is the only one that teaches children about environmental problems with adequate depth while providing a realistic solution. *Wall-E* openly blames humans for the environmental ills illustrated in the movie. Though Auto, the "evil" robot attempting to prevent the humans from returning home, appears to be the main antagonist he is following 700-year-old orders given to him by humans. Unlike *2001: A Space Odyssey*, the computer has not become conscious and is therefore not the true antagonist. The end of the movie portrays an earth that, though damaged, can be renewed with hard work. There is no magic; the human's only hope at survival is returning to the land. The last scene is most poignant, as the captain, representing the human race, gets his hands dirty planting the last surviving vegetation.

The climate-controlled environment of a movie theater is an inadequate way to learn about the natural world. Out of the three methods I analyzed, learning about environmental messages through films is the least effective method. This strategy is the most indirect, as sight is the only sense not dulled. The children are not interacting with other humans or with nature. Media also potentially reinforces the nature/culture dichotomy since it removes children from the outdoors. In short, movies have two main problems: the solutions presented reinforce the

nature/culture dichotomy, and children are not able to interact with the subject matter about which they are learning.

NATURE THROUGH A WINDOW: ENERGY SERVICE CORPS K-12 EDUCATION PROGRAM

Overview

Energy Service Corps (ESC), funded by California Public Interest Research Group (CALPIRG) and Americorps, is highly influenced by CALPIRG and its mission. By working as one of the K-12 education coordinator interns for the chapter of ESC based in the Claremont Colleges, I have noted that the training of college students is precipitated by CALPIRG whereas Americorps mostly provides monetary support. CALPIRG's mission is to represent the interests of citizens against the power of lobbyists, as is stated on the CALPIRG website:

> When consumers are cheated or the voices of ordinary citizens are drowned out by special interest lobbyists, CALPIRG speaks up and takes action. We uncover threats to public health and wellbeing and fight to end them, using the time-tested tools of investigative research, media exposés, grassroots organizing, advocacy and litigation. CALPIRG's mission is to deliver persistent, result-oriented public interest activism that protects consumers, encourages a fair, sustainable economy, and fosters responsive, democratic government ("About CALPIRG" 2011, n.p.).

One of the reasons CALPIRG is effective in achieving its mission is because it employs and trains campus organizers whose main job is to mobilize college students. The organizer trains the college students on how to organize around an issue. Additionally, CALPIRG has distinct issues and goals on which it focuses that are agreed upon at the beginning of the school-year. For example, the CALPIRG campaigns for this year include: "campaign for safe energy," "close corporate tax loopholes," "consumer protection," "making healthcare work," "reining in Wall Street," "banning plastic bags," and "stop subsidizing obesity" ("All Issues" 2011, n.p.). The CALPIRG campus organizer is provided information about the campaign on which they are working and are then able to recruit and train college students. The CALPIRG model, which

allows one paid campus organizer to mobilize several unpaid volunteers, works well because the organizer is able to reach myriad college students that may not have had the proper knowledge or skills to organize. In this model, only one person, the campus organizer, receives payment since all other members volunteer, and everyone is benefiting from the skills gained through the program.

Energy Service Corps (ESC) is the organization that works on the campaign for safe energy, a main focus for CALPIRG this year. ESC is designed to combat energy usage by educating K-12 students, college students, and homeowners about sustainable behavior and alternative forms of energy. The program shares many resources with CALPIRG, but ultimately is its own entity with its own specific goals. It is in its second year and has 25 chapters in four states: California, Colorado, New Jersey, and Wisconsin. ESC strives to "…educate and engage communities around energy efficiency" ("Our Mission" 2011, n.p.). There are two main modes of attaining the ultimate goal of reduced consumption of energy: service and education. The reason for focusing on education is elucidated on the ESC website:

> Reducing energy use in people's homes and daily lives is actually pretty simple. Much of it is inexpensive and easy to do, and for the more advanced improvements there are tons of government programs that can help people out. Our education program informs people about how they can decrease their energy use and lets them know about programs available to help them and how reducing their energy use can help their financial bottom line as well as the environment ("Our Program" 2011, n.p.).

From this mission, it is clear that education is a sizable portion of ESC.

The mission of the ESC organization is reaching as many K-12 students as possible. At the Claremont Colleges, the K-12 education branch has more coordinators and interns than any other section. As one campus organizer explains, CALPIRG works to teach children about energy efficiency to "prime the pump" and get kids "thinking about where our energy comes from" (personal communication, March 26, 2012). College students go to nearby school districts and present lessons to elementary school students. Though lessons plans vary from school to

school, the two main lessons taught are sustainable behavior and energy saving forms of transportation, such riding a bus. The main lesson we hope the students gain from the first type of presentation is that there are simple everyday behaviors to reduce overall energy usage. We assess their comprehension using pre and post quizzes. Both quizzes ask the same four questions, and the students take one before the lesson and one after. We grade these quizzes and count a student's improvement based on answering one question in the post quiz that they could not answer in the pre-quiz. The quizzes vary based on the lesson presented. In the "Sustainable Behavior" plan, we instruct students to "carry reusable bags with [them] anytime [they] shop, switch to compact fluorescent light bulbs (CFL), and skip bottled water" (Sustainable Behavior: K-6, 2011-12). With the second lesson, we introduce students to possible ways to save energy when traveling from place to place, such as riding their bikes more often or carpooling when the distance is too great (Renewable Transportation: K-6, 2011-12). With these lessons, which employ an indirect teaching model, ESC is not the most effective way to teach children about the environment.

Critiques of ESC

With the release of *The Muppets* (2011), the newest installment starring Jim Henson's plucky creations, energy efficiency and the way it is taught to children has been thrust into the political spotlight. The movie, which depicts Tex Richman, the money hungry oil baron, as the antagonist, sits uneasily with some viewers. Some parents of children and oil lobbyists argue that it is not appropriate to indoctrinate children with information about a controversial topic at a young age. In the same vein, the education branch of ESC can be cast in a negative light because one can make the claim that children are being forced to learn about environmental issues, and they are only presented with one side. There is little evidence for the claim that these lessons are forced on children, and Carolyn Strong cites a study completed by the Henley center in 1994,

which collected data from children in multiple ways. The study found that "the environment is a key concern to young people. This is particularly true amongst younger children… When asked in an unprompted question what their main concern was, 47 percent of children stated an environmental issue was their main concern…" (qtd. in Strong 1998, n.p.). Many children want to learn about issues surrounding the environment and are often not given the opportunity. ESC lesson have been taught in 48 classrooms since October 2011 and no students, or their parents have complained that they were learning information contrary to their beliefs. Moreover, none of the teachers have expressed that energy efficiency is an inappropriate topic for the classroom.

Primarily because ESC is young, there are changes that can be made to the program which will make it more effective for both K-12 and college students. The presenters need to have more experience. There is little standardization of the lesson plans from college to college. Lesson plans need to be tailored to specific age groups because some of the language used is either too rudimentary or advanced for the students. Lessons should educate students about the importance of sustainable behavior through first-hand experience.

The presenters are college students, so many of them have little experience teaching. There is currently no mechanism ensuring that all college students who present the lessons are comfortable communicating the material. The presenters are expected to go to teacher training, but there is no certified teacher involved. One way to improve the program is hiring a certified teacher from the area. This change rectifies another issue as well: teachers would help create standardized lesson plans used for the ESC programs on all campuses. The teacher would ensure that the language used is age appropriate considering some of the language is not. For example, in the "Sustainable Behavior" lesson, which is intended for K-6 graders, the presenter describes fossil fuels as "…a limited supply of earth's natural resources that release greenhouse gases into our atmosphere when burned for fuel" (Sustainable Behavior: K-6, 2011-12). Though fourth

through sixth graders may be able to grasp this concept, younger students may need the information presented in a different manner. Incorporating input of certified teachers would assist the program greatly, and they would only have to exert a small amount of effort. With more funding for the program, ESC could provide monetary incentives for the teachers. As this program becomes more established and better funded, it will be important to continue to tweak the lessons as they are tested in the classroom. Involving teachers in teaching college students and helping with the creation of standardized lessons will make this program more effective for both college and K-12 students.

According to the concept of cultural engineering, extrapolated from George Howard's concept of human engineering (1997, 123), changes in habit at a young age can cause institutional reform. Children that connect with nature at a young age are more likely to have an environmentally centered career and be aware of current environmental issues (Louv 2008, 150). One such career is an environmental organizer, which creates institutional change through citizen activism and policy reform. The approach currently prescribed by ESC does not fully employ cultural engineering because the students are not pressed to relate the energy saving behavior to broader environmental issues as well as political structures. One reason there is little connection between shifting actions and the explanation behind those behavioral modifications is because the ESC model provides little depth. We go into each classroom only once, so we can reach as many children as possible: the focus is on the behavioral change rather than the justification for that change. In his article, "Individualization: Plant a Tree, Buy a Bike, Save the World?", Michael Maniates explains that there are issues when emphasizing behavior in relation to combating environmental ills because "when responsibility for environmental problems is individualized, there is little room to ponder institutions, the nature of exercise of political power, or ways of collectively changing the distribution of power and influence in society…"

(2001, 33). Simply changing individual behavior will not cause the necessary paradigm shift, and Maniates argues that the changes cannot occur at the individual level alone (2001, 35-38). This is an appropriate critique of ESC and one that needs addressing in the future.

Due to the nature of the program, students are taught in the classroom as opposed to being taught lessons in the natural world. The traditional method of education does little to reverse the human/nature dichotomy, which causes several behaviors that are a detriment to the environment. Humans see themselves as *apart from* rather than *a part of* the natural world. There is no direct experience in the ESC lessons, and this type of experience is important because of the "…relationship between children's attitudes and their participation in environmental relevant activities. Children learn from direct experience and from observations of others" (Musser and Diamond 1995, n.p.). As mentioned previously, a placed-based method is more effective than an indirect one. Since there is little of this direct experience, the student's perception of nature is more difficult to change, and the energy efficiency presentations are less effective than other modes. William Cronon asserts that there is "…knowledge that comes from working the land with one's own hands…" (1995, 15). The lack of direct experience can be partially mitigated if students are taken out of the classroom simultaneous to the information being presented. Even if the students are taught in a nearby park, there is more of a connection with nature than in the classroom.

Benefits of ESC

The scope of ESC is a weakness and strength. Though it may cause some of the information to be presented in a shallow manner, many children are reached through this method. When asked about the methods used by ESC, one campus organizer explained: "no other Environmental Education program can claim [our] numbers" (personal communication, March 26, 2012). ESC's goal is to expose children to this information even if the exposure is brief.

Since October 2011, ESC members in the Claremont area have taught roughly 2200 students. ESC has a great affect because of the sheer number of students reached. These large numbers mean that many students begin to think about their energy usage. One of the best ways to learn information is to teach it. Some of the college students involved in the K-12 education branch of ESC are not environmental analysis majors and often have little knowledge of environmental problems. This program assists these students in learning about environmental friendly behavior, and they are more likely to change their own behavior after having taught these lessons to children.

ESC fosters a relationship between college students and the surrounding schools and the children that attend those schools. There are organizations on the campuses that connect K-12 students with students at the Claremont Colleges, but ESC is able to reach a wider range of schools due to the fundamental mission of the program. It is good for youth to interact with students from the Claremont Colleges because this interaction enlivens the K-12 children's curiosity about and goals for their own college education. In several instances, the college students field questions about their college experience, and, though it is not directly related to EE, this question and answer session is still a beneficial part of the program. For an elementary school student, college may seem a long way off, but interacting with college students makes distant college life a concrete possibility. Carolyn Magnuson and Marion Starr postulate, "career awareness and self-awareness go hand-in hand. As mentors in the lives of children, we can provide for active and intentional involvement of children with their social and cultural environments as they engage in the process of learning" (2000, 100). Not only do mentors help children learn pertinent information about the environment, but also pique their interest in college. I encountered this phenomenon first hand when, after an energy efficiency lesson, a boy excitedly told me that he wanted to attend Pitzer College when he reached the appropriate age!

Even though the ESC lessons are not able to present much depth because of their extended reach, they are still introducing and reinforcing good habits among a great number of students. One of the reasons ESC strives to reach a large number of children is because CALPIRG wants as many people as possible to be exposed to the information. If every child in California has at least one of these lessons, which is CALPIRG's ultimate goal, many more people will be aware and will employ sustainable behaviors. Though one lesson about sustainable behavior will not transform a child's outlook on life, it will introduce them to the topic and get them thinking about issues surrounding their energy usage. These lessons are meant as an introduction to this information, and this knowledge should be reinforced in the future. Two of the teachers expressed that our lessons were a great foundation for energy lessons taught later in the year. As explained earlier, dissemination of information is the first step to changing behavior.

OFF THE BEATEN PATH: LEADERSHIP IN ENVIRONMENTAL EDUCATION PARTNERSHIP

Overview

The Leadership in Environmental Education Partnership (LEEP) has been running on the Claremont Colleges (the 5Cs) for the past fifteen years and has been a great asset to the elementary school students in the Claremont area. It is the brainchild of Paul Faulstich, one of the Environmental Analysis professors at Pitzer College. His motivation for founding the program was to "…provide an opportunity for [his] students to have a really rich hands-on experience in a local ecosystem while simultaneously providing a social responsibility component to the community" (P. Faulstich, personal communication, March 26, 2012). His idea for LEEP occurred at a time when the colleges were placing an emphasis on collaboration with elementary schools in the area. LEEP was the culmination of Faulstich's goal for a

program with an emphasis on experiential learning while integrating the 5Cs commitment to collaboration with elementary schools (P. Faulstich, personal communication, March 26, 2012).

LEEP brings students from four local schools to the Bernard Biological Field Station (BFS) where college students teach them science lessons using a place-based method. The BFS is 85 acres of coastal sage scrub and is five minutes walk from Harvey Mudd College. College students who partake in LEEP enroll in the Environmental Education class offered at Pitzer, which teaches students about the Coastal Sage Scrub Ecosystem of which the BFS is apart, as well as basic teaching strategies. Each student in the class is then assigned a group of elementary school students with whom they work all semester.

LEEP is beneficial for college students as well as the elementary school children. The Environmental Education class at Pitzer is different from other classes offered at the colleges because a large portion of the work is done outside of class, and the onus for learning is on the college students' and their engagement with the program. After learning core-teaching principals in a three-hour class, five to six person groups of college students create lesson plans by adapting activities from science curriculum books containing lessons already tested in the classroom. As stated in Project Learning Tree (PLT), one of the main books used for reference, "…PLT stays on the leading edge of educational quality through continuous review, revision, and evaluation" (American Forest Foundation, 2). The lessons focus on teaching the children environmental science, and the main ones taught include: fire cycle, soil, ecosystems, the water cycle, Native American uses of the land, and flora and fauna of the BFS. College students are also expected to meet with a mentor teacher (the students' homeroom instructor) once a week in order to review and revise the lesson plan for that week.

Tenets of Place-Based Learning

LEEP is one of the only programs in the area that provides students with the opportunity to learn in a natural environment using place-based teaching strategies. Richard Louv, the author of *Last Child in the Woods: Saving our Children from Nature Deficit Disorder* and major advocate for this type of teaching, succinctly defines place-based education as a model striving "to use the surrounding community, including nature, as the preferred classroom" (2008, 206). LEEP employs the main tenet of place-based education by bringing students to one of the last natural sites in Claremont, the BFS. Faulstich discusses the need for place-based learning in his as it "…[counters] alienation from nature and [endows] youth with a strong and lasting kinship with the earth" (2004, 218). As expressed by Faulstich, one of the main goals of LEEP is to combat the nature/culture dichotomy. The mission of the class is to get students out of the classroom and give them the opportunity to interact with nature. He maintains that LEEP is important because it "… provides hands-on lessons in environmental science, ecological diversity, human ecology, environmental awareness and appreciation, habitat restoration, and pollution prevention" (Faulstich 2004, 216). A place-based learning method is different from traditional methods of teaching because the students can connect the lessons they are learning to the natural world they are exploring. For example, when teaching a lesson on invasive species, the students are prompted to postulate why the introduction of the Largemouth Bass reduces the number of Western Pond Turtles in pHake Lake, the man-made lake used for aquatic research. With this concrete example the sixth graders witness predator/prey relations as they relate to invasive species first-hand, which makes the concept of invasive species easier to grasp.

Critiques of LEEP

Though LEEP is an effective way to teach children about the environment and introduce them to environmental issues, there are some limits to the program. As opposed to Energy

Service Corps, it reaches only a small amount of students because the same students are taught several different lessons rather than a large number of students being taught the same lesson. The program takes up class time, and the college students and mentor teachers must put in extra effort. Also, the program lacks a concrete way to assess the students, so there is no proof that the students are learning. It teaches students that the wilderness is a place untouched by humans and may ignore the ways in which humans have interacted with the environment in a sustainable manner.

LEEP has a small reach, as it impacts roughly 140 children per year, which is less than one percent of the students reached by ESC on one campus. LEEP previously worked with students from the Pomona area, but the partnership with Pomona schools was unsustainable because of complications caused by lack of funding and distance from the BFS. When comparing sheer number of students reached, ESC is the more powerful program. One way to combat this problem is by duplicating the LEEP model at many other college campuses with similar nature preserves. Over time, it will be possible to ascertain LEEP's concrete effects by interviewing adults who have gone through it as children. With these testimonials, it will be possible to obtain grants and manpower to recreate the LEEP experience on other college campuses. LEEP is currently undergoing an in-depth assessment process, which should provide insights and data useful for fostering programmatic improvements.

A dissenting view is children that partake in LEEP are at the field station for three hours each session instead of in class, so this program uses valuable class periods and the time sacrificed by college students and teachers is not worth the benefits. This view does not take into account that children learn in many different ways and may actually understand a concept better if they are able to experience it first-hand. There have been programs similar to LEEP, which propose alternative methods of teaching students. Daniel Rasmus and Rob Salkowitz maintain

"open learning environments can give education systems greater flexibility by extending the resources of education beyond the traditional school day, year, and physical location" (2009, n.p.). In the final analysis, LEEP provides students with a unique opportunity and is worth the class time and extra effort involved.

As discussed earlier, LEEP employs unconventional teaching methods, and one worries that there is no concrete way to assess students. The main way the program combats this issue is by use of the LEEP Field Guide. The books are soft cover volumes, which the students are expected to bring with them and carry into the field. Not only are the guides useful because they serve as a workbook for the students in conjunction with the lessons, but also the students are expected to provide written reflection on each session and journal about it. The college students and elementary school teachers read the journal entries and ensure the sixth graders are grasping the concepts. Additionally, most lessons have built in assessments. For example, in one plan students dissect owl pellets for rodent bones. The students are then expected to lay out those bones in the correct manner using the field guide. With evaluations such as this, the college students can confirm that the youth understand the topics introduced that day.

The most compelling critique is that LEEP teaches children that wilderness is a place that is untouched by humans, as there is little readily apparent evidence of the original Native American inhabitants of the BFS, the Tongva. Cronon expounds upon this issue and reasons:

> Wilderness is not quite what it seems. Far from being the one place on earth that stands apart from humanity, it is quite profoundly a human creation- indeed, the creation of very particular human cultures at very particular moments in human history. It is not a pristine sanctuary where the last remnant of an untouched, endangered, but still transcendent nature can for at least a little while longer be encountered without the contaminating taint of civilization" (1995, 69).

The point Cronon brings up is an important one, as this conception of wilderness is misleading. One of the problems with place-based learning is striking a balance between cultivating an appreciation for a natural setting while also stimulating discussions about humans' place in the

natural world. LEEP attempts to foster discussion about this incongruity by introducing the children to the Tongva. The Tongva involvement in this land is a recurrent theme throughout the program and is consciously reinforced, as a Tongva elder is invited to speak with the students. She leads them in different traditional Tongva practices. Thus, it is possible to use place-based learning as an introduction to the reality of people-in-wilderness.

Benefits of LEEP

Place-based learning and LEEP have many advantages and are the most effective method of teaching environmental education. Similar to Energy Service Corps, LEEP cultivates a relationship between students at the Claremont Colleges and the surrounding elementary schools. College students are taught necessary teaching skills, as the elementary school teachers advise them on lesson plans and teaching methods. The best mode of learning about the environment is through hands-on experiences, and LEEP provides students with this opportunity to directly explore nature. As one of the mentor teachers explains, looking at an owl pellet in a textbook is much different than dissecting one. Through dissection, all of a student's senses are employed, which creates strong connections with the natural world (personal communication, March 26, 2012). Many of the elementary school children enrolled in the program live in an urban setting and, without LEEP, would not have this opportunity to connect with nature. Children are instilled with respect for the planet because they are exposed to the natural world. It is likely that some of them will fight to protect the environment in the future, or, at the very least, be conscious of the effect their actions have on the environment. Placed-based education, as opposed to other less flexible modes, is able to employ multiple intelligences, especially kinesthetic and naturalist intelligence and recognizes that there are multiple ways in which children learn.

One of the issues with ESC, lack of training for college students that present the lessons, is not present with LEEP. Each group of college students is paired up with a mentor teacher who teaches the sixth graders on a daily basis, so the college students are given feedback on both the lesson plans and their teaching styles. When asked about the involvement of the mentor teacher, one of the college students reported, "I feel like he is… in tune to our growth" (personal communication, March 21, 2012). From personal experience, the course and teacher feedback are extremely valuable because they provide a basic introduction to teaching. Elements of being a good teacher are intuitive, but there are sets of skills imparted through interaction with the elementary school teachers that cannot be attained through any other method. The same college student expressed that through LEEP she has "…gotten a better understanding of effective ways to teach students" (personal communication, March 21, 2012). LEEP is helpful to students who are considering teaching as a profession.

Another great aspect of the class is that it creates a support network. Each student is matched up others at the same level, and they are able to assist each other in this process. A portion of the class time is devoted to trial runs of activities, which serve as dress rehearsals. This segment of the Environmental Education class makes the activities more effective when they are applied to the elementary school children's activities because of the constructive criticism offered by the professor and other college students.

The experiences one forms at a young age will remain with them for the rest of their life. LEEP is an important program because it advances a positive relationship with the environment. Therefore, a strong positive association with the natural world is created within the students because of their fond memories of the BFS. There is psychological evidence for this claim because, as Nelson explains, "…where the effects of experience most powerfully and compelling influence the brain development pertains to the formation of synaptic circuits. Here the evidence

is overwhelming that both positive and negative experiences can influence the wiring diagram of the brain" (2011, 57). By creating a supportive environment where students can explore and learn about nature, LEEP instills a lifelong connection with and love for nature. It is possible to extrapolate this concept and see how these positive associations can color a person's belief system. Julia Corbett maintains:

> Your belief system is both an individual and a cultural product. The environment history of this country, your childhood and adult experiences with the natural world, the beliefs of your parents and significant others-these all helped to develop your environmental beliefs. The process begins in childhood, particular through direct experiences with nature and through deep connections to physical places. By adulthood, much of your ideological foundation has been laid… (2006, 13).

By this reasoning, LEEP is the most effective program at creating environmentally minded adults because it promotes direct experience. Beginning in childhood, these children will have strong positive associations with the environment.

LEEP opposes the seductive pull of the unceasing march of technology. The gadgets in the modern world distract children (and adults) from the outdoors and people are spending less time in the natural world than ever before. Louv warns that humans need to interact with natural spaces because we "…have an innate affinity for the natural world, probably a biologically based need integral to our development as individuals" (2008, 43). The fact that people are spending less time outdoors is detrimental to their mental health. Children are at the highest risk because they are in the formative period of their lives, and there is now more technology available to them than ever before. He coined the term "nature-deficit disorder," and defines it as the … "divide between the young and the natural world, and the environmental, social psychological, and spiritual implications of that change" (Louv 2008, 2). Nature deficit disorder is detrimental to both humans and nature, as it reinforces the nature/culture dichotomy and removes humans from a natural setting. Place-based learning counter acts nature-deficit order, as students are continually interacting with nature and are no longer separated from it.

One of my fondest memories of the program was when I witnessed LEEP as an antidote to this "disorder." Most of the children involved in the program were excited to be part of it and happy to be out of the classroom. However, one of the girls I was teaching was not so thrilled and expressed that she would have been happier playing video games. Though I did not share her sentiments, I was understanding and allowed her to engage with the BFS in her own way and in her own time. We had hiked to one of the vernal pools and as she looked at the swarms of tadpoles swimming in the shallow water her eyes sparkled, and she sported one of the biggest smiles I have ever seen. Apparently she had a soft spot for frogs. LEEP combats nature-deficit disorder in a way that traditional classroom learning cannot because it moves children outdoors and it gives them the opportunity to interact with nature and recognize where their passions lie.

The connection LEEP cultivates between children and nature will create more environmentalists in the future because, with a placed-based mode of teaching, they will better understand environmental issues and will have an environmental-based outlook. LEEP addresses Maniates critique of environmental education as it is generating institutional change even if it is on a small scale: education is one of the most important institutions. A worry is that with less and less exposure to the natural world, fewer children will grow up with an appreciation for the outdoors, and they will not be interested in careers that protect the environment. I would not desire to become an environmental organizer if I had not been able to have adventures in nature as a child. Louv cites a 1978 study undertaken by Thomas Tanner, Professor of Environmental Studies. After polling employees at major environmental organizations, Tanner discovered that "'far and away the most frequently cited influence was childhood experience of natural, rural, or other relatively pristine habitats'" (qtd. in Louv 2008, 150). By this reasoning, LEEP is an important program in the short term, as it teaches students

natural science by creating concrete connections using the BFS, and it has long-term implications, as it creates more stewards for the environment.

Disadvantaged children especially suffer from nature-deficit disorder, as traveling to many wild spaces costs money and time. Yellowstone and Yosemite National Parks, two of the most famous undeveloped wilderness areas in the United States, both have nontrivial entrance fees (National Park Service 2012, n.p.). It is not likely that families barely subsisting will make trips to places such as these national parks. A benefit of LEEP is that it strives to include students of all ethnicities and classes:

> The four schools that currently participate in LEEP are relatively diverse, each with unique features. Mountain View School's student body is 38 percent Caucasian, with the remaining 62 percent representing other ethnicities. Vista del Valley serves a multiethnic population, and more than 68 percent of the students qualify for Chapter 1 funding. Sumner-Danbury is a joint campus where standard education students and orthopedically challenged and health impaired students are fully integrated. Sycamore Elementary provides a multi-age developmental program that serves students who speak eleven different languages. Of the 140 students who participate in LEEP each year, approximately 61 % qualify for free and reduced lunch (Faulstich 2004, 217).

Though these statistics are from six years ago, these same schools are involved in the LEEP program, and the makeup of students is similar. LEEP is a unique program, as students from all backgrounds are learning and exploring in a natural setting.

Due to the flexibility of the program, LEEP allows the college student presenters to integrate activities that apply the concept of "multiple intelligences" into the lesson plans. Howard Gardner introduces this idea in his book *Multiple Intelligences: New Horizons*. He believes "…that human cognitive competence is better described in terms of a set of abilities, talents, or mental skills... All normal individuals possess each of these skills to some extent: individuals differ in the degree of skill and in the nature of their combination" (Gardner 2006, 7). The types of intelligences include: linguistic, logical/mathematical, visual/spatial, musical, bodily/kinesthetic, interpersonal, intrapersonal, and naturalist. The Environmental Education

class pushes college student teachers to engage as many of these intelligences as possible. For the midterm, college students are expected to create two lesson plans and provide a justification for the lesson plans. Multiple intelligences is an aspect of the plans that the college students are encouraged to incorporate. For example, my group has a day devoted to adaptations, and, after the lecture, we have the children walk around the BFS. After looking at some of the organisms present in this ecosystem, they have to explain how they are adapted to the lack of water, which is an important aspect of a Coastal Sage Scrub Ecosystem. This type of activity, and its use of visual intelligence, cannot be completed in a traditional classroom.

WHERE DO WE GO FROM HERE?: RECOMMENDATIONS AND CONCLUSIONS

Environmental Education (EE) has dominated my senior year. I have been fortunate enough to critically analyze several methods of environmental education through participant observation. This analysis has reaffirmed my belief in the need for programs such as the Leadership in Environmental Education Partnership (LEEP) and Energy Service Corps (ESC), and I am fortunate that I am continuing this work next year. My favorite part of ESC and the LEEP has been my interaction with kids. These programs have allowed me to combine my interest in teaching with my passion for the environment. Taking part in LEEP and ESC and my survey of children's films with environmental messages has provided me with an intimate knowledge of vehicles of EE, as well as ideas on how to make curriculum stronger.

Movies are not as effective a way to teach children environmental messages as the other two methods analyzed. The messages and solutions espoused in the films as well as the setting in which the films are presented make them an inadequate form of EE for children. There are a few movies, like *Wall-E*, which delve into the complexities of environmental issues, but in general movies are not a good format when teaching children about the environment. I have no problem with children watching these movies, but they are problematic if they are the only

method used. One of the most important aspects of environmental education is that it includes an experiential component.

Since ESC is in its infancy, the biggest issue is experience. Many of the college student presenters have little experience teaching and are not supervised by a certified teacher. Lesson plans vary from chapter to chapter and school to school, so each student is not taught the same information in the same way. To combat both of these issues, CALPIRG might hire certified teachers. One mentor teacher per classroom would greatly enhance the program. Faulstich describes the teachers involved in the LEEP program, as "surprisingly enthusiastic." He explains that he is "surprised only in that they have so many other things on their plate," and he is "impressed with their level of commitment to the program" (personal communication, March 26, 2012). The LEEP mentor teachers are generally not reimbursed for their time and give freely of it because they believe in the program. It is possible to find a mentor teacher in the area willing to tweak lesson plans and mentor college students.

The main concern with LEEP is its limited reach. LEEP is a great program for students, as they are able to experience nature first-hand. The look on the kids' faces when they interact with nature and get their hands (and pants and shirts) dirty will remain with me for many years. However, the small number of students it is able to reach is problematic. Especially with the advent of iPods, Xboxes, and PlayStations, students are less inclined to spend time outside. The nature/culture dichotomy is becoming deeply entrenched. LEEP fosters a love for the outdoors that combats this technophilia, so it needs to reach a large amount of children.

Due to the complexities of environmental issues, one approach will not suffice. Classroom presentations and discussions should be augmented with lessons in the field. Julia Corbett elucidates reasons for instating environmental education at many levels and in myriad ways:

> Environmental communication is a complex and multi-layered phenomenon. All environmental messages have ideological roots that are deep and that are influence by individual experience, geography, history, and culture. Communication takes place at the individual level, in small social interaction, and at the macro level in our cultural institutions (Corbett 1998, 6).

A program combining the reach of ESC and the depth of LEEP is the most effective way of teaching children about the environment. ESC has the manpower needed to impact a wide array of K-12 students, as it is a partnership between two established organizations, CALPIRG and Americorps. LEEP provides a model of EE that teaches kids the complexities of environmental issues through a place-based method, and this model can be replicated other places with more college student volunteers involved. In this manner, more elementary school children get a holistic education and introduction to complex environmental issues. LEEP allows K-6 students the opportunity "…to get to know their natural community in a way that the school curriculum isn't geared towards (P. Faulstich, personal communication March 26, 2012). CALPIRG and ESC have the resources and scope to reach a greater amount of children than LEEP. At the moment, the two programs are diverting resources from one another rather than combining them. The goal of these two organizations is similar: to teach children about the environment and how their actions affect it, so the benefits each could gain from the other are significant.

When the iPhone was released, people predicted that it would reshape communication. With each successive generation, there are new innovations, many of which are meant to keep people entertained. For me, the iPhone symbolizes the technology that has caused the nature/culture dichotomy. During dinner one day my friend was entertaining himself by testing out his new iPhone and exclaimed that the whole world was within. I was taken aback, and responded that he need only look outside to experience the world. The first step in shifting the paradigm regarding the environment is by reconnecting people with the outdoors.

Cultural engineering, or providing people with reasons for changing behavior, is one way to combat the separation of humans and nature. Teaching children about sustainable behavior through place-based learning methods will result in adults who are environmentally conscious. With a combination of the LEEP and ESC models of teaching, K-6 students will internalize the positive behavior at a young age and be more inclined to spend time in the outdoors. I have witnessed the power of both classroom presentations and placed-based learning.

Some favorite moments of my college career have been working with elementary school children at LEEP and ESC. I cannot see myself in a career that did not involve spending time in the outdoors or working on environmental policy reform, as the outdoors have always been a big part of my life. This study has reaffirmed my passion for educating about the natural world and humans' place in it. After my involvement and careful analysis of ESC and LEEP, I am certain at least some students I have taught will begin contemplating their relationship with Mother Nature and will be the next reformers of environmental policy. The environmental movement needs dedicated people because shifting the current paradigm is a never-ending struggle. Though changing the current system may seem hopeless, introducing children to the environment will spur the next generation of environmentalists, one developing mind at a time.

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