Shifting from Saying to Doing: Evaluation of an Environmental Course Designed to Create Environmental Change Agents

A thesis submitted by

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Abstract

        This study evaluated a semester-long environmental course designed to enable students to become environmental change agents. Sixteen undergraduate students self-selected into the program course, which integrated social science-focused materials with environmental literacy. Fifteen undergraduate students who have self-selected into a traditional environmental course constituted the comparison group.

        Environmental literacy, environmental attitudes, environmental responsibility, self-efficacy, critical thinking, and environmental civic engagement, were measured by a survey at the start of the semester and again at the end of the semester. Results were examined using mixed-model analyses of variance and simple t-tests. Students in the program course showed increases over the semester in environmental attitudes and civic engagements; students in the comparison group did not show such increases. This study showed that empowerment is an important factor in environmental education, and enables students with the aptitude to act on their environmental concerns.

Chapter 1: Introduction

> …[One] myth is that *with enough knowledge and technology we can manage planet Earth*. 'Managing the planet' has a nice ring to it. It appeals to our fascination with digital readouts, computers, buttons and dials. But the complexity of Earth and its life systems can never be safely managed. The ecology of the top inch of topsoil is still largely unknown, as is its relationship to the larger systems of the biosphere.
>
> What might be managed is *us*: human desires, economies, politics, and communities. But our attention is caught by those things that avoid the hard choices implied by politics, morality, ethics, and common sense. It makes far better sense to reshape ourselves to fit a finite planet than to attempt to reshape the planet to fit our infinite wants.
>
> - David Orr (1991), *What Is Education For?*

The primary cause underlying present threats to the health and well-being of global ecosystems is human behavior. A growing number of people are becoming aware of and concerned about their impact on the environment. However, these same people, informed with the facts that their individual behavior can negatively affect the environment, still act with environmental disregard (e.g. driving when they have access to public transportation, or buying produce that was sprayed with pesticides). So, as stated in the quote above, how do we succeed in shaping ourselves to fit a finite planet? How do we get people to shift from knowing and saying they want to care for the environment to actually *taking* pro-environmental action? This question is important because the challenges to achieving pro-environmental behavior change undermine businesses, educators and policy makers invested in environmental protection.

Enabling people with the ability to overcome these challenges would have real effects on the health of the environment and society at large.

Environmental education programs can successfully inform people about what constitutes the natural environment and the science behind climate change and other environmental problems. However, these programs have fallen short in articulating the importance of understanding how human behavior intercedes in making progress on environmental issues. Koger and Britain (2007) assert that psychology is the essential discipline to understand why individuals behave in non-sustainable ways; they advocate for interventions designed to address behavioral change at the individual level. It would be essential for undergraduate environmental programs to construct these fundamental connections between psychology and the environment. Kasper (2009) makes this call for integration by stating "it is critical that social sciences play a central role in helping understand the interdependent relationships between people and the biophysical world (p 312)."

This current research project is an evaluation of a semester-long environmental course at Tufts University, taught in the fall of 2009, designed specifically to answer this call for integration, and in turn create a curriculum that gets students to shift from 'saying to doing.' The goal of the course is to educate students about environmental issues and enable them to become environmental change agents. Environmental change agents, defined in this research, are individuals who practice 'pro-environmental behaviors' and actively encourage

others to do the same. Kollmuss and Agyeman (2002) describe 'pro-environmental behavior' as behavior that consciously seeks to minimize the negative impact of one's action on the natural and built world (e.g. minimize resource and energy consumption, use non-toxic substances, reduce waste production). The course intended to achieve this goal by teaching environmental literacy in a setting that encourages students to analyze their specific ways of thinking about environmental problems. This structured environment gives students a place to learn the psychological theory of behavior change, practice pro-environmental behaviors, express challenges they face in changing their behaviors, and create a community for students that encourages the process of becoming change agents.

This thesis is a pilot study that explores behavior change in students participating in the designed program course, and compares their shift in attitudes to a comparison group of students who are taking a more traditional environmental course, that is, a course that does not integrate psychology into their curriculum. This work will explore changes in environmental awareness and environmental attitudes, which represent a shift in the program group toward environmental change agent qualities (e.g. self-efficacy, critical thinking, communication, environmental civic engagement, pro-environmental behavior).

Chapter 2: Literature Review

In order for society to tackle environmental issues, people need to be invested in changing their personal environmental behaviors. This task seems daunting when looking at how many separate "personal environmental behaviors" there are to change – approximately 6.7 billion according to U.S. Census (2010). However, Malcolm Gladwell describes in his book "The Tipping Point -The Law of the Few" (2000), what he calls the 80/20 rule: 20% of the people do 80% of the work. Gladwell attributes the success of social epidemics to the efforts of a few, albeit an influential few.

How does environmental behavior change happen? Social science and psychological behavior theory models have been developed to help answer this question. Theory represents the foundation for program planning, providing planners the necessary tools to move beyond intuition in designing and solving behavioral problems. It also can and has been used by health professionals to evaluate behavior and promote intervention in the health industry; for example, in an evaluation of a smoking cessation program or initiative (National Cancer Institute, 2005).

For this thesis, psychological behavior theory models were used to both identify a suitable target audience for the pilot study as well as provide the basis for the design of the program course. Along with behavior theory models,

theories in counseling and therapy were also explored. Counseling and therapy

could be used as an ideal model in how the program course would be structured.

Behavior Theory

Stages of Change Transtheoretical Model

In order to understand how people move towards changing their

environmental behaviors, it is crucial to understand where they are in their

individual behavior change process. Not all individuals have the same interest in

changing their behaviors. For example, there are still many people who smoke

cigarettes even with the knowledge that it is bad for their health. Some of these

people may have no intention to stop smoking at this point in time, while others

may have been contemplating quitting for weeks, months, or even years.

The *Stages of Change (Transtheoretical) Model* developed by Prochaska

and DiClemente (1983) highlights the example given above. The model's basic

premise is that behavior change is a process, not an event. Individuals move

through five basic stages: precontemplation, contemplation, preparation, action,

and maintenance *(Details of all the Stages of Change model are displayed on

Table 2.1).* A person in the precontemplation stage, for example, would be the

smoker with no interest or intention to stop smoking. However, the individual

who intends to take action within the next six months to give up smoking would

be in the contemplation stage. It would be difficult to create an effective

environmental course, designed to create pro-environmental behavior change,

without identifying the stage of Prochaska and DiClemente's model in which the participants are found. Furthermore, the model also can be used as a point of reference in evaluating the success of a program designed to create behavior change. An evaluator can ask questions like: Have participants in the program moved from precontemplation to the preparation stage? Has there been any sign of change at all?

Stages of Change Model – Table 2.1[1]		
Stage	**Definition**	**Potential Change Strategies**
Precontemplation	Has no intention of taking action within the next six months	Increase awareness of need for change; personalize information about risks and benefits
Contemplation	Intends to take action in the next six months.	Motivate; encourage making specific plans
Preparation	Intends to take action within the next thirty days and has taken some behavioral steps in this direction	Assist with developing and implementing concrete action plans; help set gradual goals
Action	Has changed behavior for less than six months	Assist with feedback, problem solving, social support, and reinforcement
Maintenance	Has changed behavior for more than six months	Assist with coping, reminders, finding alternatives, avoiding slips/relapses (as applicable)

Theory of Planned Behavior

Another popular behavior theory model is Azjen and Driver's Theory of Planned Behavior (TPB) (Azjen & Driver, 1991). In this model, the relationship between an individual's beliefs, attitudes, intentions, behavior, and perceived

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[1] Table adapted from the National Cancer Institute (2005)

control over that behavior are examined (*Details of the model are provided in Table 2.2).* The theory assumes that behavior intention is the most important determinant of behavior. In other words, the stronger a person's intention to change their behavior is, the more likely that s/he will act on these intentions.

Behavior intention is influenced by the person's attitude towards the specific behavior and their beliefs about whether people who are close to them (i.e. peers, colleagues) approves or disapproves of this behavior (Azjen & Driver, 1991). These subjective norms can be a deciding factor for whether someone chooses to commute to work by public transit or drives alone. If a person works in an environment where people are rewarded (either by praise or perks) for taking public transportation or carpooling, a person's intention to change their behavior is likely to increase. Another important factor would be access to these transportation options. For that reason, behavior intention is not only influenced by culture but our surroundings (i.e. structure, accessibility).

Perceived behavior control - a person's belief that s/he can control particular behavior - is another important influence on behavior (Azjen & Driver, 1991; National Cancer Institute, 2005). A common rationale for why people choose *not* to participate in a pro-environmental behavior is because they feel that current environmental issues are out of their personal control (Jensen & Schnack, 1997). The theory says it would be important to empower these

individuals, giving them a feeling of control, and in turn their behaviors would be more likely to minimize environmental problems.

Theory of Planned Behavior – Table 2.2[2]		
Concept	**Definition**	**Potential Change Questions**
Behavioral intention	Perceived likelihood of performing behavior	Are you likely or unlikely to (perform the behavior)?
Attitude	Personal evaluation of the behavior	Do you see (the behavior) as good, neutral, or bad?
Subjective norm	Beliefs about whether key people approve or disapprove of the behavior; motivation to behave in a way that gains their approval	Do you agree or disagree that most people approve of/disapprove of (the behavior)?
Perceived behavioral control	Belief that one has, and can exercise, control over performing the behavior	Do you believe (performing the behavior) is up to you, or not up to you?

Social Cognitive Theory

One of the most frequently used and robust behavior theories in health behavior is Bandura's (1986) *Social Cognitive Theory* (SCT). This theory has been used to explore the reciprocal interactions of people and their environment and the psychosocial determinants of health behavior (National Cancer Institute, 2005). Social cognitive theory integrates concepts and processes from cognitive, behavioral, and emotional models of behavior change and has been used successfully to promote dietary change (Baranowski, et al, 1993) and pain management (Lorig, Sobel and Stewart, 1999). Health choices, similar to our environmental choices, are driven by both personal and environmental factors. Social Cognitive Theory provides a natural fit for evaluating environmental behavior change programs.

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[2] Table adapted from the National Cancer Institute (2005)

There are six main factors that affect the likelihood that a person will change their behavior (Institute of Medicine, 2002). The six concepts in the SCT model are illustrated in Table 2.3.

Social Cognitive Theory - Table 2.3[3]		
Concept	Definition	Potential Change Strategies
Reciprocal determinism	The dynamic interaction of the person, behavior, and the environment in which the behavior is performed	Consider multiple ways to promote behavior change, including making adjustments to the environment or influencing personal attitudes
Behavioral capability	Knowledge and skill to perform a given behavior	Promote mastery learning through skills training
Expectations	Anticipated outcomes of a behavior	Model positive outcomes of healthful behavior
Self-efficacy	Confidence in one's ability to take action and overcome barriers	Approach behavior change in small steps to ensure success; be specific about the desired change
Observational learning (modeling)	Behavioral acquisition that occurs by watching the actions and outcomes of others' behavior	Offer credible role models who perform the targeted behavior
Reinforcements	Responses to a person's behavior that increase or decrease the likelihood of reoccurrence	Promote self-initiated rewards and incentives

Precaution Adoption Process Model

The final theory that will be discussed is the Precaution Adoption Process Model. It is a relatively new model and, like Social Cognitive Theory, has been used to understand health behavior. In the Precaution Adoption Process Model, people pass through seven steps in the process of behavior change, as shown in Table 2.4. It is possible for a person to get stuck in one stage or move backwards from a later stage to an earlier stage. However, people cannot return to the first

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[3] Table adapted from the National Cancer Institute (2005)

stage (Weinstein, 1988), which points to the importance of education and

creating awareness about the problem. Yet, this model also shows that

awareness does not necessarily lead to behavior change, as there are many

other steps in between.

Stages of PAPM - Table 2.4[4]			
Stage	**Behavior Change**		**Channels of Communication**
Stage 1:	Unaware of Issue		Mass Media
Stage 2:	Unengaged by Issue		
Stage 3:	Deciding About Acting		Personal experience Significant others
⇒	**Stage 4:**	Decided Not to Act	
Stage 5:	Decided to Act		Perceived susceptibility, Perceived severity, Perceived efficacy. Perceived barriers, Social norms
Stage 6:	Acting		Resources "how-to" info, Cues to action, Assistance
Stage 7:	Maintenance		

This model is useful in understanding the level of communication needed

for a population depending on what stage they are in. A general information

campaign might be appropriate for individuals in stages one and two; however, a

personal approach could be more effective for a population in stage three or

four.

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[4] Table adapted from the National Cancer Institute (2005)

Summary of Behavior Theory

As mentioned earlier, it is important to use theory as a foundation for planning a behavior change program. Stages of Change (Transtheoretical) Model, Theory of Planned Behavior, Social Cognitive Theory, and Precaution Adoption Process Model have all been used readily in the heath behavior field (National Cancer Institute, 2005). Health professionals have realized that their influence on healthy behaviors can only go as far as what the individual is willing and able to do. There are also the limits to the influence of policy and information campaigns in the environmental field. It is important for the individual to feel invested in the process, and have perceived control in order to have high intentions to change behaviors and then to act on these intentions.

Therapeutic Models

Therapy has been used to create or subdue many diverse behaviors; therapeutic models, in relation to group dynamics, will be examined in this section and were used to build a more focused program design.

Group Psychotherapy

In Yalom's quintessential book on group psychotherapy, *The Theory and Practice of Group Psychotherapy* (1995)*,* the first four chapters outline the twelve therapeutic factors that are of particular benefit in the group setting. Yalom suggests that "therapeutic change is a complex process that occurs

Yalom's 12 Therapeutic Factors of Group Psychotherapy – Table 2.5[5]	
Therapeutic Factors	**Definition**
Universality	The recognition of shared experiences and feelings among group members and that these may be widespread or universal human concerns, serves to remove a group member's sense of isolation, validate their experiences, and raise self-esteem
Altruism	The group is a place where members can help each other, and the experience of being able to give something to another person can lift the member's self esteem and help develop more adaptive coping styles and interpersonal skills.
Instillation of hope	In a mixed group that has members at various stages of development or recovery, a member can be inspired and encouraged by another member who has overcome the problems with which they are still struggling.
Imparting information	While this is not strictly speaking a psychotherapeutic process, members often report that it has been very helpful to learn factual information from other members in the group. For example, about their treatment or about access to services.
Corrective recapitulation of the primary family experience	Members often unconsciously identify the group therapist and other group members with their own parents and siblings in a process that is a form of transference specific to group psychotherapy. The therapist's interpretations can help group members gain understanding of the impact of childhood experiences on their personalities, and they may learn to avoid unconsciously repeating unhelpful past interactive patterns in present-day relationships.
Development of socializing techniques	The group setting provides a safe and supportive environment for members to take risks by extending their repertoire of interpersonal behavior and improving their social skills.
Imitative behavior	One way group members can develop social skills is through a modeling process, observing and imitating the therapist and other group members. For example, sharing personal feelings, showing concern, and supporting others.
Cohesiveness	It has been suggested that this is the primary therapeutic factor from which all others flow. Humans are herd animals with an instinctive need to belong to groups, and personal development can only take place in an interpersonal context. A cohesive group is one in which all members feel a sense of belonging, acceptance, and validation.
Existential factors	Learning that one has to take responsibility for one's own life and the consequences of one's decisions.
Catharsis	Catharsis is the experience of relief from emotional distress through the free and uninhibited expression of emotion. When members tell their story to a supportive audience, they can obtain relief from chronic feelings of shame and guilt.
Interpersonal learning	Group members achieve a greater level of self-awareness through the process of interacting with others in the group, who give feedback on the member's behavior and impact on others.
Self-understanding	This factor overlaps with interpersonal learning but refers to the achievement of greater levels of insight into the genesis of one's problems and the unconscious motivations that underlie one's behavior.

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[5] Information adapted Yalom (1995) *The Theory and Practice of Group Psychotherapy*

through intricate interplay of human experiences called "therapeutic factors." Table 2.5 above describes the key factors discussed in his book.

The benefits from group psychotherapy outlined here are not certain because much of the success of group therapy heavily relies on the group leader and the dynamics of the group itself (Yalom, 1995). Having a group leader and a group structure encouraging openness and trust is important to the success of the therapy. Therefore, the choice of an instructor for the course is just as important as the content that will be covered in the course.

Psychoeducation Therapy

How does group psychotherapy fit into an educational environment? The marriage of group psychotherapy and education is a recognized, compatible pair known as "psychoeducation therapy". Psychoeducation is designed to foster self-awareness and self-acceptance by learning specified theory and applying it to one's life (Merlino, 2002). This process teaches interpersonal skills and attitudes, which can be used to solve present and future psychological problems and enhance life satisfaction (Biggs, 1994).

In the context of an environmental course that focuses on creating pro-environmental behaviors, students would learn behavior change theory throughout the course. They would gain knowledge of why some behaviors are harder to break than others. This process could sensitize them, making them more cognizant of how their surroundings influence their everyday choices. This

process allows people to turn off their "auto-pilot" and become more thoughtful about why they choose the behaviors they do. Expected results are that psychoeducation paired with general environmental literacy would lead to students who are not only more aware of the current environmental issues, but are more confident in making behavioral choices that will mitigate environmental problems.

Behavior Therapy

Another therapeutic approach that focuses on creating measurable behavior change is behavior therapy, which is based on the work of key behavioral psychologists such as Ivan Pavlov, B.F. Skinner and John Watson (Kottler, 2002).

The basic principles of behavior theory are the practice of reinforcement, shaping, measurements, and goal setting. The systematic use of reinforcement (rewards or punishments) to increase or decrease target behaviors is one significant application of behavior therapy. A subtle example of this would be to smile and provide an encouraging nod of the head when a student talks about how they are turning off their lights when s/he leave a room (reward) and frowning when s/he discuss behaviors that are bad for the environment (punishment) (Kottler, 2002).

Shaping can be accomplished by setting up a series of smaller goals that lead to the next stage, ending up at the final objective. Accomplishing these

small goals gains confidence and is a way to practice desirable behaviors (Kottler,

2002). One way in which behavior therapy separates itself from other forms of

therapy is its emphasis on measurement. Behaviorists want to know from their

clients exactly what they are going to do, how often they are going to do it, and

what the consequences will be if they don't follow through. It is important that

these behavior changes are measurable as observable actions rather than

internal processes (Kottler, 2002; Watson & Tharp, 1997). For example, an

individual would need to find a way to measure a pro-environmental behavior,

perhaps comparing mileage driven one month to that of the next month if the

specific goals was to lower carbon emissions. Shaping and measuring are both

connected to goal setting. It is important to set up small goals that can be given

out as homework, as the amount of time in a therapy session is minute

compared to the time away from therapy. It is important to set up goals that are

mutually agreed upon, giving the person ownership of the process. Goals should

be specific, realistic, and relevant to the problem or task the person is working

towards (Kottler, 2002).

Behavior therapy, because of its objectivity, has gained popularity over

therapeutic models where the end result is more subjective (Kottler, 2002).

Nevertheless, the importance of the therapeutic relationship that is achieved in

group psychotherapy and the insights of psychoeducation should not be

downplayed. Human beings are far more complicated than their observable

behavior. It is this complication that can make the development of successful

environmental courses and environmental policies difficult even with the insight

of cognitive and behavioral science.

Chapter 3: Environmental Education and Course Development

Environmental education is aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to solve these problems, and motivated to work towards their solution

- Strapp (1969).

This chapter will discuss the development of the course, *Environmental Action: Shifting from Saying to Doing* as well as the history, strengths and weaknesses of environmental education programs.

Introduction to Environmental Education Programs

Jensen and Schnack (1997) write that "one of the overall objectives of environmental education is to build up students' abilities to act – their action confidence – with reference to environmental concerns" (pg. 163). They suggest that because environmental problems keep rising and there continue to be challenges to democracy and humanity, it is of the "greatest importance" to reflect on environmental pedagogical implications.

While traditional science-oriented teaching approaches to environmental education increase knowledge about existing environmental problems, it may impede what is known as action competence (being able and willing with the whole range of distinctions concerning behavior, activities, movements, habits and then action). Education that overwhelms students with knowledge and investigation of how bad things actually are can contribute to a feeling of powerlessness (Hillcoat et al., 1995). Jensen and Schnack (1997) stress the idea

that action competence should occupy a central position in environmental education.

Structure of Program Course

For this thesis, the program course was designed with an understanding of the importance of action competence. With behavior change and therapeutic theory as a foundation, students would gain this action competence in a thriving learning environment.

In the development of this study, a traditional science-orientated lecture course was chosen as a comparison to the program course. At the start, the two classes were not comparable in the amount of environmental information that was offered over the semester. The comparison group was able to cover more environmental topics in more depth, so that students in the comparison group would benefit more fully if the assumption that information leads to knowledge, and knowledge to action, is true.

The comparison group course, over the course semester, covered the following environmental topics[6]:

- Green Roofs
- Artificial Reefs
- Conventional vs. Organic Farming
- Bird Strikes and Aviation

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[6] *See appendices B and C for full syllabi for each course.*

- Genetically Modified Food

- Bio Fuels

- Urbanization

- Wildfires

- Ocean Iron Fertilization

- Reducing Carbon Footprint at Tufts

- Globalization

- E-waste

- Global Decline of Bees

- Invasive Species and Eco System Change

- Constructed Wetlands

- Marine Fisheries Decline

- Light Pollution

The program course also covered six main environmental topics; each of these topics was given about an hour of lecture time during a two and a half hour of class. The program group's environmental topics were:

- Solid Waste and Recycling

- Water

- Climate Change

- Population and Consumerism

- Food

- Environmental Initiatives at Tufts

Social science-focused materials were integrated into an environmental program curriculum in order to promote a discernable change in environmental

attitudes in the program group. This integration would also hopefully generate a discernable shift toward environmental change agent qualities (e.g. self-efficacy, critical thinking, communication, civic engagement, pro-environmental behavior). It is anticipated that the program course will show a higher change value in traits associated with environmental change agents than will those among members of the comparison environmental course.

The structure of the course was very similar to the structure of group psychotherapy. The reasoning for this was the idea that people are "addicted" to behaviors that destroy the environment, even if they believe they should be doing otherwise. Similar to a support group that would help someone work through her/his smoking addiction, this class encouraged students to work through barriers that were holding them back from practicing pro-environmental behaviors and beyond into becoming environmental change agents. To create this support group it was important to promote an atmosphere that was open to exploring students' beliefs, knowledge, frustrations, and passions towards environmental issues. More importantly, socializing techniques (extending repertoire of interpersonal behavior and improving social skills) for addressing environmental issues were developed. The class was a safe, structured, and supportive environment where students could practice getting over barriers (i. e., lack of confidence, fear of failing, lack of skills or knowledge) and learn new practical skills that would enable them to choose more pro-environmental behaviors.

As in group psychotherapy, students sat in a circle, allowing them to share their knowledge, concerns and questions with the entire group. There was time at the start of every class for students to check in and discuss any progress or setbacks they might have had in the past week. Instructors were charismatic, and shared their stories of how they became proactive about environmental issues.

Key teaching points were interwoven into the group psychotherapy structure of the course through lectures, class activities, and homework assignments. These key teaching points were: environmental literacy (topics described earlier), psychology, critical thinking, social marketing, communication, community building, and behavior change.

Psychology

In the first two classes of the semester, students learned about basic behavior change theory and terms such as classical conditioning (process by which certain inborn, involuntary behaviors come to be produced in new situations), operant conditioning (the strengthening or weakening of a behavior as a result of its consequences), and cognitive dissonance (tension that arises when one is simultaneously aware of two inconsistent cognitions) (Powell, Symbaluk, & Macdonald, 2002; Myers, 2005). This awareness of the science behind behavior change (why we do what we do) is an example of psychoeducational therapy. In theory students becoming aware of their

behavior (i.e. how social cues can shape behaviors) are more likely to gain control of their own personal behaviors.

Group psychotherapy factors were developed when students shared stories of times when they might have felt cognitive dissonance when they behaved in a way that went against their environmental values. They also described ways they used operant conditioning to try to shape their behavior whether or not, at the time, they knowingly did so. This open conversation allowed students to realize that many challenges they have faced in changing their behaviors are shared amongst their peers (*universality*); there are different strategies to change their behaviors (*imparting information*); and how they can achieve a greater levels of insight into the root of environmental behavior problems and the unconscious motivations that underlie that behavior (*self-understanding*).

Critical Thinking

Reciprocal determinism (the dynamic interaction of the person, behavior, and the environment in which the behavior is performed) was used during the course to point out the necessity of critical thinking skills. This was done through a class activity where students were asked to sign a petition to ban water from the Tufts University campus. The petition gave students facts that were technically true but reframed to inspire a negative reaction about water (i.e. can be found in all toxic waste sites, can cause death by inhalation). These

facts were paired with water's scientific and less well-known name, dihydrogen monoxide. This activity was used to demonstrate the importance of taking time to look for research sources, investigating both sides of a topic, and critical thinking in the choices they make in their lives. More importantly, it was designed to create cognitive dissonance, a feeling that they want to eliminate. One way to remove this feeling would be to change their behaviors and learn to be a better critical thinker to not get "tricked" into saying something, or doing something which they don't actually believe.

Following the dihydrogen monoxide class activity, students were given critical thinking homework assignments throughout the semester. These assignments asked students to research pro and con articles for controversial environmental topics. For example, on the topic of climate change, the homework assignment would encourage students to find two sources that supported the need to mitigate carbon dioxide in the air and two that argued against this need. These students were then asked to report on who wrote these articles, which organization sponsored the research of each article and if they thought there were any biases in the results that were given. Each critical thinking assignment allowed students to gain the knowledge and skills necessary for critical thinking (behavior capability) so that when they are bombarded with controversial topics in the media they are proficient at researching both sides of an issue and coming up with their own view on the topic. Critical thinking was also reinforced through praise for comments in class that demonstrated that

students were thinking critically. Observational learning (behavioral acquisition that occurs by watching the actions and outcomes of others' behavior) also took place when critical thinking worksheets were discussed in class in a round table discussion.

Social Marketing

One of the key components of the course was that students would get hands-on experience putting on a social marketing campaign. Social marketing is a process that applies marketing principles and techniques to create, communicate, and deliver value in order to influence target audience behaviors that benefit society (public health, safety, the environment, and communities) as well as the target audience (Kottler, Lee, & Rothschild, 2006). Students were introduced to social marketing through class lectures and then were asked to vote on a campaign that would increase environmental sustainability behavior at Tufts. This program course chose a campaign to save energy, food and water on campus by persuading the dining halls at Tufts University to remove trays from campus dining halls (i.e. trayless dining).

The process of putting on a social marketing campaign gave students a tangible and realistic idea of the steps involved in creating change. Students learned the importance of preliminary research (research on other schools that went trayless, assessing the student body's interest in trayless dining at Tufts); identifying who the important stakeholders are; and practicing different

communication skills (i.e., social media, newspapers, magazines, and public speaking). Students also received firsthand experience learning how to communicate with people who opposed their idea; an important barrier to learn how to overcome.

Putting on a social marketing campaign is a big task. Therefore, this undertaking was broken down into smaller achievable goals. Similar to the use of goal setting in therapy, students focused on "bite sized" goals every week with the main campaign in mind. Also, once again, students had each other for support to keep focused and celebrate small achievements together.

As the campaign progressed, students realized their efforts were creating a campus discussion about environmental issues. However, they also realized that their campaign did more than just create a discussion; they were creating action. Students in this program group convinced dining services at Tufts to do a trayless pilot study to investigate if going trayless at Tufts would indeed be more sustainable (saving water, electricity, and food waste). The results of the pilot study will help dining services determine whether or not a trayless policy is a feasible option. The campaign gave students a "start-to-finish" experience which is an important skill of environmental change agents.

Communication

Every student in the course was asked to create an online blog for the course. These blogs were used as an outlet for reflection. Students wrote about

their experience in the course and about their personal behavior change. Students were encouraged to write these blogs in their own voices and had creative liberty in their writing. Although similar to a personal journal, social media allowed students to experience writing about environmental issues in a public forum.

Blogs were also used to give instructors an inside understanding of what students were going through during the class and campaign, especially those students who were less vocal in class. Course discussions stemmed from blog entries, and each student had access to other students' blogs (unless students asked for it to be private). This open dialogue both in class and on their blogs created cohesiveness among people both in the class and on-line.

Community Building

As discussed in the previous chapter, much of the success of group therapy heavily relies on the group leader and the dynamics of the group itself (Yalom, 1995). Therefore, building a community was important in the implementation of the course. Through the use of the blogs and open discussion, students were encouraged to see this class as a community and a support group. Both instructors set the tone of a high-energy, yet casual atmosphere. They also made sure to follow lectures about difficult environmental issues with instillation of hope, reminding students of the power of a motivated small group of people.

Community building also occurred on a larger scale as students assisted in putting together an environmental symposium. The structure of this symposium allowed students from different schools around the Boston region to lead learning sessions on different campus environmental initiatives. Students from all schools learned how to network with students from other universities and how to create grassroots peer-to-peer environmental education in their own schools as well as in their communities after they graduate.

Finally, the program class had a pot luck event in the middle of the semester that tied into the lecture on sustainable foods. At the end of the semester students were invited to a pancake breakfast at one of the instructor's houses to celebrate a semester together and again encourage community growth. The process of sitting down and sharing a meal was used as a way to strengthen the feeling of community.

Behavior Change

There was much emphasis on creating goals and practicing pro-environmental behaviors in the course (the *action stage* of the *Stages of Change Model*). Students participated in individual behavior challenges to accomplish these two components of the course. Three times during the semester students were asked to test themselves by taking part in "behavior challenges". Students were asked to write about their behavioral change process in their blogs and learning experiences were discussed at the end of the week.

One example of a behavior challenge the students had was the "zero waste challenge". Students were given a clear plastic bag in which to put all of their waste (anything that was not biodegradable or recyclable). Single-use water-bottles also had to be put into the plastic bag as reminder to use reusable water bottles. For an entire week, students had to keep their waste in this clear plastic bag on the outside of their bags. A zero waste sticker was placed on the bag as a reminder to the students and as a conversation piece to encourage others to ask questions about their waste bag.

By carrying around their waste, students become more cognizant of their consumer behaviors. A Styrofoam to-go container might go unnoticed when ordering lunch most days; however, the idea of carrying the container with you for a week during the "zero waste challenge" might deter one from eating at a venue that uses Styrofoam. This process helped students gain a new perspective on the difficulties of changing behaviors and yet at the same time learning that they are capable of changing their behavior.

Each added element to this program course gave the students a better understanding of how to transform theory and knowledge into action. A team of first-time basketball players would not fare well if they were only given information about the sport. Any basketball coach knows that practicing fundamental skills is key in the development of successful team. The same is true when teaching a course with an aim to have students become pro-active in

creating environmental change. Information is not, and will never be, enough;

students need the opportunity to practice the fundamentals of changing

behavior and influencing change in the community.

Chapter 4: Methods

Criteria for Class Curriculum

The overarching goal of this 14-week undergraduate course was to empower students to shift from knowing and saying they want to care for the environment to actually becoming environmental change agents. The class curriculum was designed with both short-term and long-term behavior change objectives in mind. Short-term is defined as the period during or immediately following the conclusion of the class, while long-term represents behaviors that are maintained over time.

Short-term objectives-

By participating in the program students will show:

- discernable change in environmental awareness and environmental attitudes.
- discernable shift toward environmental change agent qualities. More specifically; an increase in self-efficacy, critical thinking, environmental responsibility, environmental attitudes, environmental-civic engagement, and pro-environmental behaviors.
- a higher number of traits associated with environmental change agents than members of a comparison course (a course that does not integrate psychology into their curriculum).

Long-term objectives-

By participating in the program students will demonstrate:

- a discernable change in environmental awareness and environmental attitudes.

- a discernable shift toward environmental change agent qualities.
- greater number of traits associated with environmental change agents than members of the comparison course.
- signs of having incorporated environmental considerations into their core value system; impacting their work and social life.

In order to achieve both short-term and long-term objectives, lesson plans were carefully designed around the six key teaching concepts discussed in the previous chapter.

Criteria for Program Group

Participants of the experimental group were undergraduate students at Tufts University. A total of 16 participants (14 females and 2 males) self-selected to take the course based on the information provided in the course description (see Appendix) and the title "Environmental Action: Shifting from Saying to Doing." Therefore, students who signed up for the course already have a general interest in environmental issues. The course was offered through the Tufts Experimental College, which serves as a center for educational innovation, expansion of the undergraduate curriculum, and faculty/student collaboration within the Colleges of Arts and Sciences and Engineering[7]. The course is graded

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[7] Tufts Experimental College: Through its innovative, interactive, and interdisciplinary programs, the Experimental College strives to enrich the intellectual experience of undergraduates at Tufts. These programs aim to engage students actively in the design and delivery of new academic initiatives, often in collaboration with faculty. Shared governance, collaborative learning, and involvement with the community are hallmarks of the ExCollege (Tufts University, 2009)

and students receive one credit upon completion, which will count for an environmental studies track.

Criteria for Comparison Group

There were several criteria for selecting an appropriate comparison group. First, the students in the comparison group must be undergraduates at Tufts University taking an environmentally focused course. They must have self-selected to take a course with an understanding that it is an environmental course and that the course counts towards an environmental studies track. Also, this course must be taught using a *traditional* teaching method. Traditional is defined as a course where students are taught about environmental issues without an integrative method of adding behavior change psychology or the practice of pro-environmental behavior. Finally, the class must be taught during the same semester as the experimental course and be worth a single course credit upon completion.

The course chosen as the comparison group was Environmental Studies 91: *Seminar on Contemporary Environmental Concerns*; the course description is provided in the Appendix. A total of 18 participants self-selected to take the course. Only 15 volunteered (8 females and 7 males) to take part in the survey. In order to make sure that this course met the control group selection criteria, the professor of the class was contacted and asked about course curriculum and the teaching approach. Past students who took the course were also contacted to make sure that the class was indeed traditionally taught. The syllabus was also

reviewed to get an understanding of how the course would be structured. Since

this course met all the criteria it was chosen as the control group.

As Table 4.1 indicates, along several critical dimensions the populations in

both courses were comparable. However, as also evident in Table 4.1 the two

classes also differed in student class year and gender ratio.

Background – Table 4.1

Question as seen on survey: Please select how accurate these statements are for you. Never (1) Rarely (2) Sometimes (3) Most of the time (4) Always (5)		
Question	**Program Group n=16**	**Comparison Group n=15**
Background Info	Average	Average
Question		
My family talked about environmental issues while I was growing up.	3.25	3.33
I came to Tufts with an interest in learning more about environmental issues.	3.94	4.07
I was involved with environmental clubs/programs in high school.	2.87	2.60
The protection of the environment is important to my family.	4.00	4.07
I was involved with environmental clubs/programs in middle school.	1.88	1.80
Gender Ratio	14 females 2 males	8 females 7 males
Percentage of Upper Classmen (Juniors and Seniors)	53.33%	100%

Evaluation Design

This preliminary study was designed according to Jacobs (1998) Five-Tiered Approach to evaluation. The Five Tiered Approach "acknowledges that evaluation questions and concerns change and evolve across the life cycle of the program and that capacity to undertake evaluation must be built into a program" (pp12). The five tiers of this approach are: Tier One - needs assessment, Tier Two - monitoring and accountability, Tier Three – quality review and program clarification, Tier Four- achieving outcomes, and Tier Five - establishing impact. Evaluation at Tier Four, which was used for this study, determines what changes, if any, have occurred among students and the extent to which these changes can be attributed to the course. Tier Four evaluation also provides information for improvement of this course.

Both the experimental group and comparison group were not chosen at random because of the constraints of having students self-select into the course. Therefore, a quasi-experimental design[8] was used to determine whether any differences between the two groups were discovered over the course of the semester. This was done by administering a baseline survey to both the groups at the beginning and end of the semester.

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[8] Any research method that has some of the features of an experiment but is not strictly experimental inasmuch as the investigator either does not manipulate the independent variable directly or does not have full control over the extraneous or nuisance variables that might influence the results (A Dictionary of Psychology, 2010).

Survey Criteria

In 1986, Hines, Hungerord and Tomera undertook a meta-analysis of 128

pro-environmental behavior research studies. They found that there were six

attributes of individuals associated with responsible pro-environmental

behaviors, although these attributes did not necessarily guarantee pro-

environmental behavior. These attributes are listed in Table 4.2 below.

Table 4.2 Pro-Environmental Attributes [9]	
Attributes	**Description**
Knowledge of issues	The person is familiar with the environmental problem and its causes.
Knowledge of action strategies	The person knows how she or he has to act to lower her or his impact on the environmental problem.
Internal locus of control	This represents an individual's perception of whether she or he has the ability to bring about change through her or his own behavior. People with a strong internal locus of control believe that their actions can bring about change. People with an external locus of control, on the other hand, feel that their actions are insignificant, and feel that change can only be brought about by powerful others.
Pro-environmental Attitudes	People with strong pro-environmental attitudes were found to be more likely to engage in pro-environmental behavior, yet the relationship between attitudes and actions proved to be weak.
Verbal commitment	The communicated willingness to take action also gave some indication about the person's willingness to engage in pro-environmental behavior.
Individual sense of responsibility	People with a greater sense of personal responsibility are more likely to have engaged in environmentally responsible behavior.

The researchers of the study were not able to link these variables to a

direct explanation of pro-environmental behaviors. Nonetheless, the meta-

analysis was sufficiently persuasive to adopt these criteria as a point of reference

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[9] Table adopted from Hines, Hungerord and Tomera (1986)

in the creation of the survey for this evaluation. The survey instrument for this study was designed to measure the following eight (*see Table 4.2*) criteria that are sub-categories of the above.

Table 4.3 Survey Criteria	
Attribute	**Survey Instrument**
Knowledge of issues	- Environmental Literacy
Knowledge of action strategies	- Environmental Civic Engagement - Critical Thinking
Internal locus of control	- Self - Efficacy
Pro-environmental attitudes	- Environmental Attitudes
Individual sense of responsibility	- Environmental Responsibility
Other	- Environmental Behaviors

The survey was constructed using a combination of existing instruments. A pilot group was used to test this survey and found sections of the original instruments to be outdated and/or difficult to understand. These sections were adapted in order to have a survey that was more relevant and understandable. The first component in the survey was a section of Kaiser and Wilson's (1994) environmental behavior measured on a five point likert-scale. This scale was placed first so that participants would be more likely to respond honestly about their behaviors than if it were to follow environmental literacy or attitude questions. The second component measured participants' environmental literacy. This multiple choice instrument was used in a research report *Environmental Literacy in America* (Coyle, 2005) and was previously used for a national survey to measure general knowledge of environmental issues.

Environmental attitudes were measured using the New Environmental Paradigm (NEP) instrument, (Dunlap et al., 1992) an instrument used by many researchers to assess pro-environmental orientation The next section measured both self-efficacy and critical thinking. The self-efficacy instrument measured beliefs about one's ability or competence to bring about intended results (Schwarzer & Jerusalem, 1993). Self-efficacy was measured because it illustrates a strong source of motivation and is one of the major traits found in effective leaders (Bandura, 1986). Critical thinking is the identification and evaluation of evidence to guide decision making. A critical thinker uses broad in-depth analysis of evidence to make decisions and communicate his/her beliefs clearly and accurately. Critical thinking, along with environmental responsibility, civic engagement and values were measured using instruments from the Civic Measurement Models (Flanagan, Syvertsen & Stout, 2007)

The environmental responsibility component measured one's feeling of responsibility for creating change that would lead towards positive environmental behaviors in oneself and one's community. The civil engagement section measured general involvement on key environmental issues in one's community. Value components were used to measure how different topics were valued[10].

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[10] The values table was not used in the analysis of the program because many of the questions were neither related to environmental issues nor a part of the change agent traits.

The results of pre- and post- program surveys from both the program group and comparison group were put into an Excel spreadsheet. Each answer to a Likert-Scale question was numerically coded using the numbers one through five. An average was calculated for each question in both sets of surveys. A full set of the average comparison results can be found in the appendices.

Chapter 5: Findings and Discussion

The intention of this research was to examine the extent to which students in the class changed along the dimensions of interest, the extent to which the comparison group changed, and the differences between the changes experienced in the program group and the comparison group. In this chapter, findings will be presented in the seven areas where success of the program would most likely be apparent: environmental literacy, environmental behaviors, environmental attitudes, environmental responsibility, self-efficacy, critical thinking, and environmental-civic engagement.

Statistical analysis was used to look beyond simple trends of change accumulated from the survey results. However, because of the limitations of this preliminary study (i.e., small sample size, non-random samples), statistically significant findings from these analyses were not expected. Nevertheless, due to the exploratory nature of this preliminary study, statistical analysis was used not to infer causal relationships but instead to inform future work and generate hypotheses based on the pilot data. A mixed-model analysis of variance (ANOVA) was used with group (program or comparison) as the between-participants factor and time of survey (at the beginning or end of the semester) as the within-participants factor. Simple effects are examined through t-tests. Because of the data limitations noted earlier, a stronger threshold p-value was applied to infer statistically significant results from these tests ($p < .01$ as

opposed to p<0.05). Changing the p-value strengthens the conclusions drawn from these tests, and creates more confidence that statistically significant findings are attributable to the program course and not to chance.

As stated earlier in the methods section, the expected outcome for this research was that there would be an increase in environmental literacy after the course. However, the increase in environmental literacy would not necessarily be greater than the comparison group, which is exposed to a broader range of environmental topics during the course of the semester.

Results illustrated that there was a trend in change (see Graph 5.1) of an increase of environmental literacy over the semester yet no significant differences were found in this increase or between the program and comparison groups.

Graph 5.1 – Environmental Literacy
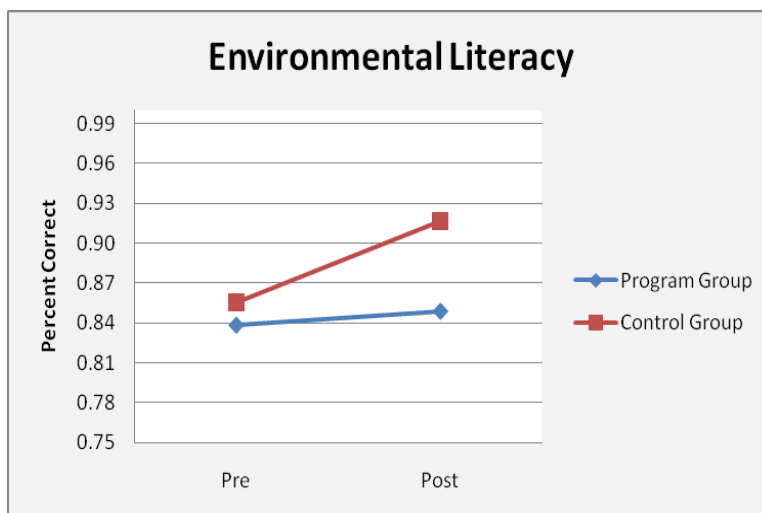
Expected results for environmental attitudes, environmental behaviors,

environmental responsibility, self-efficacy, critical thinking, and environmental-

civic engagement were that students in the program course would show

measurable improvements in these areas. Also expected was that these changes

within the program group would be larger than those experienced by the

comparison group. When looking at trends of change as illustrated on the graphs

provided below (*see Graphs 5.2, 5.3, 5.4 & 5.5*) environmental behavior, self-

efficacy, environmental responsibility, and critical thinking suggest positive

change over the semester. However, these trends were not statistically

significant.

Graph 5.2 – Environmental Behavior
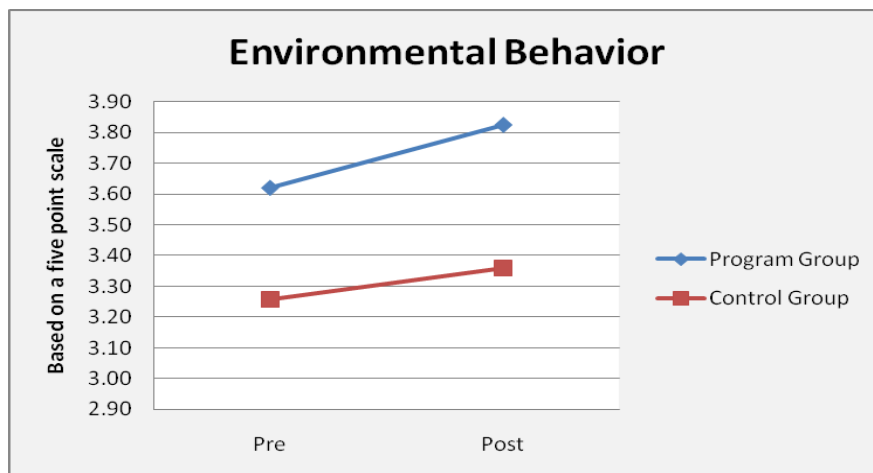
Graph 5.3 – Self-Efficacy
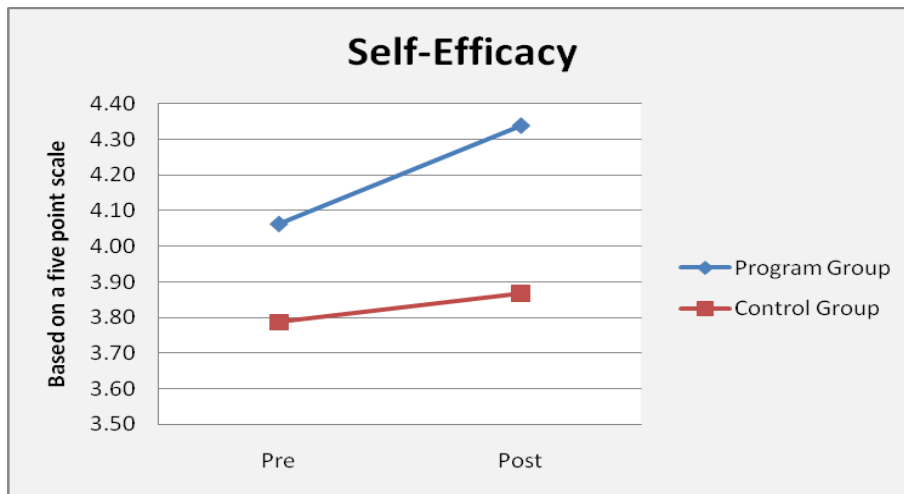
Graph 5.4 – Environmental Responsibility
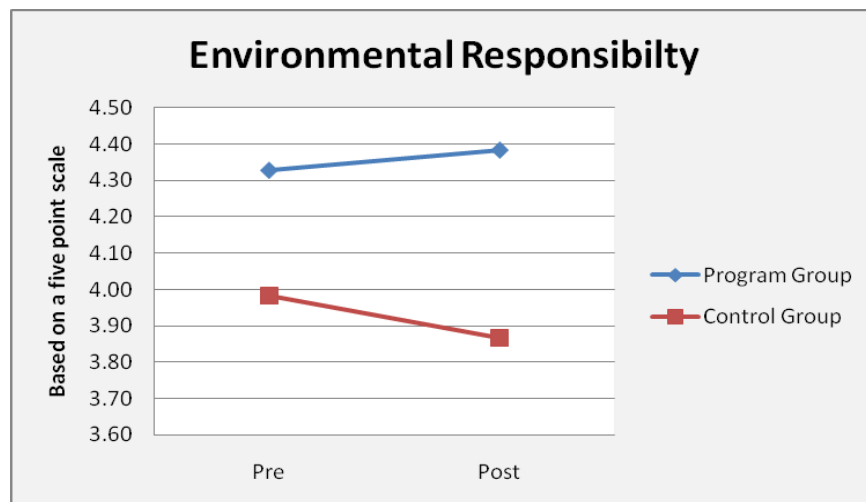
Graph 5.5 – Critical Thinking
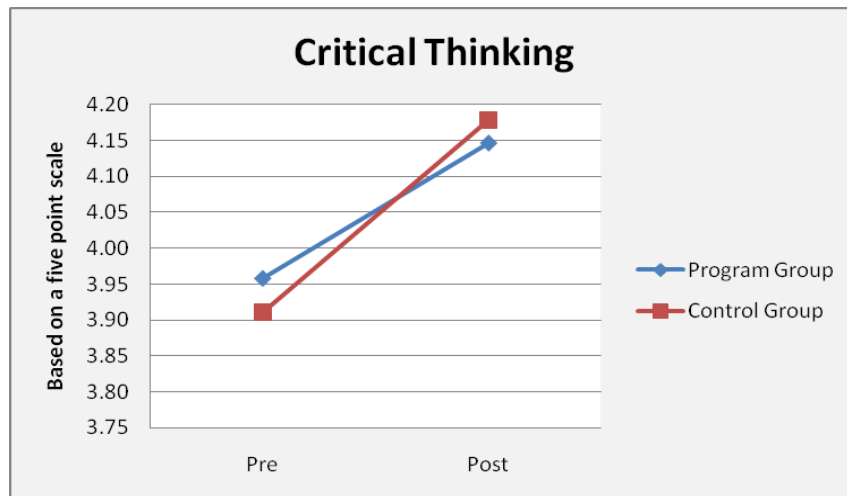
Statistically significant change was, however, found in the survey

responses focused on environmental attitudes and environmental-civic

engagement (*see Graphs 5.6 & 5.7*). Results from the mixed-model ANOVA

showed that there was a significant impact across the program and control

groups in their pre- and post- survey environmental attitude responses

($F_{(1,29)}$=8.51, p=0.007). Also, a simple t-test showed that students in the program

group showed significant change in their environmental attitudes from the

beginning to the end of the course ($t_{(15)}$=3.76, p=0.002).

Graph 5.6 – Environmental Attitudes
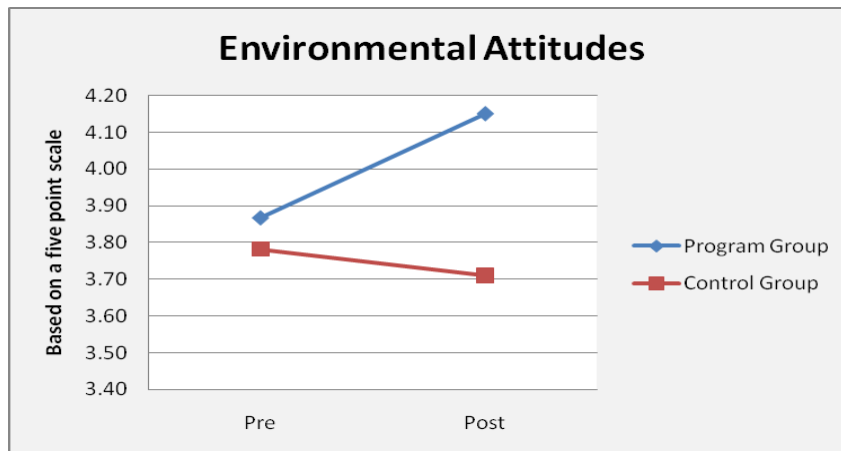
Similarly, there was a statistically significant difference in environmental-civic engagement scores between the program and control group pre- and post-survey ($F_{(1,29)}$=9.02, p=.005). Simple t-tests showed that students in the program group increased in their environmental-civic engagement over time ($t_{(15)}$=3.23, p=.005).

Graph 5.7 – Enviro-Civic Engagement
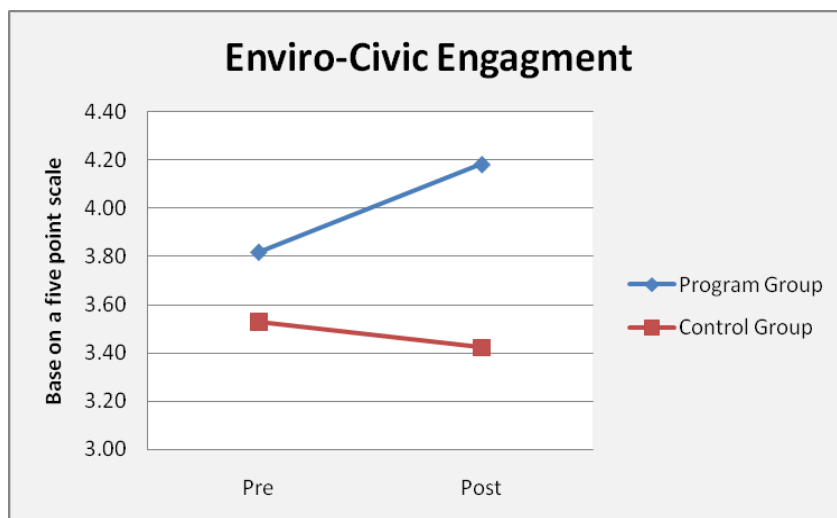
These statistically significant findings in environmental attitudes and environmental-civic engagement suggest that the course had an effect on these

traits related to environmental change agents. Furthermore, these components are arguably two of the strongest gauges of students' intentions to work towards pro-environmental change in their community. As discussed in the literature review, intention to change behavior is influenced by the person's attitude towards the specific behavior (Azjen & Driver 1991). More specifically, people with strong pro-environmental attitudes were found to be more likely to engage in pro-environmental behavior (Hines, Hungerord & Tomera, 1986). These findings may possibly be due to the program course's focus on learning how to reflect on personal attitudes and actions in relation to current environmental issues, and combating the depression that occurs with increased knowledge of environmental problems.

Although attitude is important, the relationship between attitudes and actions can be weak (Hines, Hungerord & Tomera, 1986). Therefore, the significant findings in environmental-civic engagement are encouraging. Example questions for this survey component were: How likely would you be willing to 'get involved with heath and environmental issues that effects your community?'; 'create a plan and work with a group to solve a problem?'; and 'express your views in front of a group of people?'. Hines, Hungerord & Tomera (1986) note that willingness to take action gave some indication about the person's willingness to engage in pro-environmental behavior. Similarly, behavior intention was an important piece in many of the behavior theory models.

These changes over the semester may be due to the social marketing class project assigned to students in the program course that specifically taught how to be pro-active with an environmental issue in the Tufts community. They were given small achievable goals that they accomplished; this could explain the increased intention for students to repeat such actions again in the future. On the other hand, the comparison group, without any former practice, might have found the idea of creating social change to be overwhelming. This could be especially true since they had just come from a semester of learning some of the daunting facts about the severity of environmental issues.

Chapter 6: Conclusion

Major Findings

In reviewing the findings from this preliminary research, there were some key outcomes that are important to discuss. First, it is significant to note that the program group started with a higher baseline than the comparison group in all the conditions but environmental literacy. This would indicate that the two groups are not as ideal a match as one would hope for a preliminary study, as the students are clearly not randomly distributed across the program and control groups. One explanation for the difference in starting points could be the demographic differences (i.e., gender ratio, year in school). Another explanation could be that students who signed up for the program course, which advertised itself as teaching students to "shift from saying to doing", were in a different stage of the behavior change model. They might have been ready to move from contemplation to action while the comparison group might not have been.

Next, both courses did show trends of change from pre- to post- program surveys. In the program group, all trends of change over the semester were positive, whereas in the comparison group only four of the seven components showed change in a positive direction towards pro-environmental traits.

The strength of these changes is also significant. Only two survey components, environmental attitudes and environmental civic-engagement, showed statistically significant differences. Because both of these survey components contain questions directly related to environmental topics, whereas

critical thinking and self-efficacy were not, these findings could be important

indicators to the effects of the program course and are encouraged to be

investigated further in future research.

Implications for higher environmental education

This thesis suggests that students in the program group showed positive

trends of change in all six survey components, two of which were statistically

significant. However, do these findings translate into a population of students

who have become environmental change agents? There is no way to really

know, yet one could argue that these students have at least shifted in the

direction needed to become environmental change agents.

It is obvious that an increase in knowledge about environmental issues is

important, but empowerment is just as important if the objective is to enable

students' with the aptitude to act on their environmental concerns. It is clear we

can teach college students facts about environmental issues, yet could there be a

problem with too many facts? The program course was designed to support

individuals as they explore their abilities to create change as well as to teach

students that individual efforts are important. Information can lead to change

and yet it is important to realize the human component is as essential as all the

hard science facts of environmental issues.

In the best of all worlds we would not have to choose between depth of

knowledge in environmental issues and the psychology and behavior science skill

sets used in the program course. If it is expected that students receive all of their

environmental education from a single course, loss is inevitable. The program

course would not be a substitute for courses that focus on environmental

science, but rather it is an important addition to environmental programs in

higher education.

Limitations

There were several limitations of this preliminary study due to research

constraints. The first of which was the small sample size of the program and

comparison groups. Another important limitation was that students self-selected

into each of the groups and in turn had different demographics in gender ratio

and year in school, which may have been the reason for the different starting

points.

Findings from this research was based on students self-reports. This could

be a limitation as students in both groups might have answered questions that

they thought would be most "correct". This would be especially true for the

program group as the program design, program implementation, and analysis

was done by the primary investigator. Having the primary investigator "wearing

too many hats" is an important limitation to note.

Finally, the instruments used could contain limitations. Because some of

the base-line scores of the program group were already high there might have

been a ceiling effect happening with some of the results. The use of a seven-

point likert scale and/or a larger sample size would help correct that limitation.

Also, the instrument measuring environmental literacy might have been too

simplistic for the education level of the students in the preliminary study. Both groups started off with a high base line score and might not have effectively measured the level of environmental literacy learned during the semester.

Final Thoughts

David Orr observes that "the state of our threadbare environment is not the work of ignorant people. It is, rather, largely the result of work by people with BAs, BSs, LLBs, MBAs, and PhDs" (1991). This thesis is one contribution to a growing list of ways that higher education can correct this wrong of educated leaders neglecting to protect our environment. The goal of higher education should be to create a population of graduates that can feel confident that they not only have the knowledge, but the mindfulness and skills needed to mend our environment.

Appendix

Appendix A – Survey

1. Environmental Questionaire: Welcome

I would like to thank you for participating in this survey. This survey will take approximately 10-15 minutes to complete. Those who complete all three surveys will be entered in a raffle to win a $100 credit gift card. Please answer each question completely. Thank you.

1. Your name:

2. Your E-mail address:

3. Please select the how accurate these statements are for you.

	Never	Rarely	Sometimes	Most of the time	Always
I wait until I have a full load before doing my laundry.	○	○	○	○	○
In the winter, I turn the heat up to a level that does not require me to wear a sweater.	○	○	○	○	○
I collect and recycle used paper, glass and bottles.	○	○	○	○	○
I use a compost bin.	○	○	○	○	○
I take my own coffee/tea cup to work or school.	○	○	○	○	○
I make an effort to take short showers.	○	○	○	○	○
I prefer to drink bottled water over tap water.	○	○	○	○	○
I let the water run for a time to reach the right temperature.	○	○	○	○	○
I use more energy efficient light bulbs in my home.	○	○	○	○	○
I walk, ride a bike, or take public transportation to work or school.	○	○	○	○	○
I buy organic vegetables.	○	○	○	○	○
I use reusable grocery bags when shopping.	○	○	○	○	○
I put dead batteries in the garbage.	○	○	○	○	○
I use chemical toilet cleaners.	○	○	○	○	○
I hang my clothes up to dry.	○	○	○	○	○
I eat meat.	○	○	○	○	○

4. Please select the how accurate these statements are for you.

	Never	Rarely	Sometimes	Most of the time	Always
My family talked about environmental issues while I was growing up.	○	○	○	○	○
I came to Tufts with an interest in learning more about environmetnal issues.	○	○	○	○	○
I was involved with environmental clubs/programs in high school.	○	○	○	○	○
The protection of the environment is important to my family.	○	○	○	○	○
I was involved with environmental clubs/programs in middle school.	○	○	○	○	○

5. Carbon monoxide is a major contributor to air pollution in the U.S. Which of the following is the biggest source of carbon monoxide?

○ Factories and businesses

○ People breathing

○ Motor vehicles

○ Trees

○ Don't know

6. How is most of the electricity in the U.S. generated?

○ By burning oil, coal, and wood

○ With nuclear power

○ Through solar energy

○ At hydro electric power plants

○ Don't know

7. What is the most common cause of pollution of streams, rivers, and oceans?

○ Dumping of garbage by cities

○ Surface water running off yards, city streets, paved lots, and farm fields

○ Trash washed into the ocean from beaches

○ Waste dumped by factories

○ Don't know

8. Which of the following is a renewable resource?

○ Oil

○ Iron ore

○ Trees

○ Coal

○ Don't know

9. Ozone forms a protective layer in the earth's upper atmosphere. What does ozone protect us from?

C Acid rain

C Global warming

C Sudden changes in temperature

C Harmful, cancer-causing sunlight

C Don't know

10. Where does most of the garbage in the U.S. end up?

C Oceans

C Incinerators

C Recycling centers

C Landfills

C Don't know

11. What is the name of the primary federal agency that works to protect the environment?

C Environmental Protection Agency (the EPA)

C Department of Health, Environment, and Safety (the DHES)

C National Environmental Agency (the NEA)

C Federal Pollution Control Agency (the FPCA)

C Don't know

12. Which of the following household wastes are considered hazardous?

C Plastic packaging

C Glass

C Rechargeable batteries

C Spoiled food

C Don't know

13. Scientists have not determined the best solution for disposing of nuclear waste. In the U.S., what do we do with it now?

○ Use it as nuclear fuel

○ Sell it to other countries

○ Dump it in landfills

○ Store and monitor the waste

○ Don't know

14. There are many different kinds of animals and plants, and they live in many different types of environments. What is the word used to describe this idea?

○ Multiplicity

○ Biodiversity

○ Socio-economics

○ Evolution

○ Don't know

15. What is the most common reason that an animal species becomes extinct?

○ Pesticides use

○ Their habitats are destroyed by humans

○ Over-hunting

○ Climate change

○ Don't know

16. What is the primary benefit of wetlands?

○ Promote flooding

○ Help clean the water before it enters lakes, streams, rivers, or oceans

○ Help keep the number of undesirable plants and animals low

○ Provide good sites for landfills

○ Don't know

17. How much do you agree or disagree with each of these statements?

	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
My friends encourage me to express my opinions about the environment, even if they are different from their views.	○	○	○	○	○
The balance of nature is very delicate and easily upset.	○	○	○	○	○
The so-called "ecological crisis" facing humankind has been greatly exaggerated.	○	○	○	○	○
Humans will eventually learn enough about how nature works to be able to control it.	○	○	○	○	○
Human ingenuity will ensure the earth remains livable for humans.	○	○	○	○	○
I do not hesitate to remind my friends to practice environmental friendly behaviors (e.g., recycling, turning off lights when leaving a room, driving less, not littering)	○	○	○	○	○
Nature is strong enough to cope with the impact of modern industrial nations during our lifetime.	○	○	○	○	○
If things continue on their present course, we will soon experience a major ecological catastrophe.	○	○	○	○	○
Being actively involved in environmental issues is my responsibility.	○	○	○	○	○
Being concerned about state and local environmental issues is an important responsibility for everyone.	○	○	○	○	○
I believe I can make a difference in my community.	○	○	○	○	○
Humans are severely abusing the environment.	○	○	○	○	○
The earth has plenty of natural resources if we just learn how to develop them sustainably.	○	○	○	○	○
Humans have the right to modify the natural environment to suit their needs.	○	○	○	○	○
We are approaching the limit of the number of people the earth can support.	○	○	○	○	○
Plants and animals have as much right as humans to exist.	○	○	○	○	○
By working with others in the community I can help protect the environment.	○	○	○	○	○
The earth is like a spaceship with very limited resources.	○	○	○	○	○
I'm interested in my friends' opinions about environmental issues.	○	○	○	○	○
Despite our special abilities, humans are still subject to the law of nature.	○	○	○	○	○
Humans were meant to rule over the rest of nature.	○	○	○	○	○
I talk to my friends about environmental issues.	○	○	○	○	○
When humans interfere with nature it often produces disastrous consequences.	○	○	○	○	○

18. How true are the following statements?

	Not true at all	Hardly true	Uncertain	Somewhat true	Very true
When I am confronted with a problem, I can usually find several solutions.	○	○	○	○	○
I can remain calm when facing difficulties because I can rely on my coping abilities.	○	○	○	○	○
I listen to people talk about politics even when I know that I already disagree with them.	○	○	○	○	○
It is easy for me to stick to my aims and accomplish my goals.	○	○	○	○	○
When I see or read a news story about an issue, I try to figure out if they're just telling one side of the story.	○	○	○	○	○
I can solve most problems if I invest the necessary effort.	○	○	○	○	○
If someone opposes me, I can find the means and ways to get what I want.	○	○	○	○	○
If I am in trouble, I can usually think of a solution.	○	○	○	○	○
I am confident that I could deal efficiently with unexpected events.	○	○	○	○	○
I can always manage to solve difficult problems if I try hard enough.	○	○	○	○	○
Thanks to my resourcefulness, I know how to handle unforeseen situations.	○	○	○	○	○
I can usually handle whatever comes my way.	○	○	○	○	○
When I hear news about politics, I try to figure out what is REALLY going on.	○	○	○	○	○

19. How likely is it that you would do each of the following?

	Not at all likely	Not likely	Maybe	Likely	Extremely likely
Contact an elected official about a problem.	○	○	○	○	○
Get involved in issues like health or the environmental that affect my community.	○	○	○	○	○
Participate in political activities such as a protest, marches, or demonstrations.	○	○	○	○	○
Refuse to buy clothes made in sweatshops.	○	○	○	○	○
Do volunteer work to help needy people.	○	○	○	○	○
Express my views in front of a group of people.	○	○	○	○	○
Post links about important environmental information on online social networks (e.g. Facebook, Myspace)	○	○	○	○	○
Identify individual or groups who could help you with a problem.	○	○	○	○	○
Work with a group to solve a problem in the community where you live.	○	○	○	○	○
Create a plan to address a problem that you have identified in your community.	○	○	○	○	○
Get others to care about a cause that is important to you.	○	○	○	○	○
Participate in a boycott against a company.	○	○	○	○	○

Section 4

20. When you think about your life and your future, how important are the following? It is important to me to...

	Not at all important	Not important	Uncertain	Important	Very important
help people in my community.	○	○	○	○	○
work to stop prejudice.	○	○	○	○	○
follow the principles of my personal values.	○	○	○	○	○
help bring people out of poverty.	○	○	○	○	○
help protect animals.	○	○	○	○	○
do something to stop pollution.	○	○	○	○	○
be active in my religion.	○	○	○	○	○
improve race relations.	○	○	○	○	○
preserve the earth for future generations.	○	○	○	○	○
help those who are less fortunate.	○	○	○	○	○
be active in politics.	○	○	○	○	○
serve in my country's military.	○	○	○	○	○
get a job that pays well.	○	○	○	○	○
get a job where I won't get laid off.	○	○	○	○	○

8. Final Section

Thank you very much for participating in this final survey.

Appendix B – Program Course Description/Syllabus

Environmental Action: Shifting from Saying to Doing
Syllabus Fall 2009

Professor: Dallase Scott
    Office: Office of Sustainability: Miller Hall
    Phone: 617-771-9981
    Email: dallase.scott@tufts.edu
    Office hours: By appointment

Professor: Tina Woolston
    Office: Office of Sustainability: Miller Hall
    Phone: 617-627-5517
    Email: Tina.Woolston@tufts.edu
    Office hours: By appointment

Meeting Schedule: Monday, 6:00 – 8:30 pm: Olin 002

Course Description
This class is designed for students who want a refreshing way to examine the truths behind the environmental concerns in the news. Through the lens of psychology, social marketing and critical thinking, we will examine the current environmental issues impacting our world. As you learn more about our environmental challenges you will gain tools to examine your and your peers' personal behavior and learn how to create behavior change.

This course aims to empower you to find your voice and become a leader for environmental action. You will learn practical skills in communication, social marketing campaigns, and event planning. Activities during the semester will include: critical thinking research examining current environmental issues; personal challenges; campus social marketing group projects; and the opportunity to prepare for and host a symposium on peer-to-peer sustainability education with Boston-area colleges and universities. By the end of the semester you will leave this class with a new perspective on themselves, society and the environment.

Course Reading
The course readings will be a combination of handouts and online reading for critical thinking research assignments.

Blackboard
Blackboard will provide student access to general course information, handouts, supplemental readings, and other materials throughout the semester.

Grading Policy
Grades will be based on attendance and class participation, weekly project sheets, and completion of individual and group activities.

Assignment	Total Points Possible	% of Grade
Attendance/Participation	@ 10pts per week = 100	25%
Weekly Project Sheets	@ 10pts per sheet = 100	25%
Individual Activities	@ 30pts per activity = 90	25%
Group Activities	@ 30pts per activity = 90	25%
Total	380	100%

Course Syllabus

Date week of	Topic	Assignments Due:
9/14/09	Introduction	--
9/21/09	Changing Behavior - 1st Behavior Challenge	- Bio, Picture e-mailed to Dallase - Journal experience: Introduce your "eco-self", what are my habits? - Set up blog (optional)
9/28/09	Trash and Recycling	- Critical thinking worksheet: Trash and Recycling - Journal: Reflect on Behavior Challenge
10/5/09	Social Marketing & the Environment - 1st Group Project – Social Marketing	- Critical thinking worksheet: Social marketing - Journal: Social Marketing Ideas - Take personality test and e-mail results to Dallase http://cultdyn.co.uk/Process/indexEuropae.php
10/12/09	Water	- Critical thinking worksheet: Water - Journal: Reflect on 1st group project
10/19/09	Connecting with other Universities	-Critical thinking: what are other universities up to? -Journal: How is the class so far?
10/26/09	Climate Change	- Critical thinking worksheet: Climate Change
11/2/09	Eco-Rep Symposium* - 2nd Group Project- Symposium	- Symposium project - Attend Symposium on Nov. 7th
11/9/09	Finding your voice	- Journal: Reflect on symposium - Critical thinking worksheet: Best ways to Communicate
11/16/09	Population – Consumerism - 2nd Behavior Challenge – Zero Waste	- Critical thinking worksheet: Population/Consumerism
11/24/09	Food THANKSGIVING - Eco Feast-	- Critical thinking worksheet: Food/Thanksgiving - Journal: Reflect on Zero Waste Challenge- - Write a list of the main name brands in your closet. Clothing that you wear on a regular basis.
11/30/09	Green Fatigue - 3rd Behavior Challenge – Clothing Conscience	- Critical thinking worksheet: Environmentalist - Journal: Reflect on introducing your "eco-self" to your family and friends.
12/7/09	Green Jobs - 3rd Group Project - Social Marketing	- Critical thinking worksheet: Green Jobs and Technology - Journal: Reflect on Clothing Conscience.
12/14/09	Final conclusions. Survey	- Critical thinking worksheet: Course Evaluation - Journal: Reflect on final Social Marketing project and your semester.

* The Eco-Rep Symposium will be a conference where Eco-Rep participants from campuses region wide come to Tufts University to share best practices in peer to peer education.

Appendix C – Comparison Course Description/Syllabus

Envst 91: Environmental Preservation and Improvement Seminar
Course Expectations
Fall 2009

This is a seminar course which by definition involves a small group of students engaged in advanced study on a topic, meeting weekly to exchange information and hold discussions based on readings of original research (the **primary literature**: that which is written by the researchers themselves and which is the first to report their finds, including data i.e., graphs or tables). The core of our seminar involves students reading scientific articles (based mostly on data and not on opinion), and presenting an organized talk on current environmental issues highlighted in recent issues of our "feature journal": Frontiers in Ecology and the Environment. Students in teams of 2 will make **2 presentations (40 min each**, so each speaker responsible for about 20 min. in the 40-min talk) over the course of the semester. Ideas for topics are drawn from articles since 2006 in our feature journal.

The week before a presentation, each presenter team will provide copies of one paper relevant to their presentation. Each member of the audience must read the one paper assigned to us from each presenter team, by the following week (thus, **2 papers each week** to prepare for hearing and discussing the talks). Each member of the audience is to provide a **written statement of something that surprised you** (and why) about each paper you read. Please hand in your written statement of "surprises" at the beginning of the class period, before the presentations are made.

On the day of their talk, the presenters will distribute a **half-page abstract** (250-300 words) of their talk, followed by at least 5 citations from the scientific literature that they read in preparing the talk. Following each presentation, the presenters will lead a discussion on the material, and the audience is expected to participate. Details are provided below.

Grading

- Presentations: These comprise 60% of the grade (30% per presentation). Each presenter pair will give 2 oral presentations. The following page outlines minimum benchmarks that should be included in each presentation. Each presentation is graded based on how well organized it is, whether it covers the material, evaluates some original data, and appears well-rehearsed (does not go over time). Additional factors affecting presentation grades include the quality of discussion questions you prepare for the audience, how well you handle questions and discussion from the audience, if you brought together materials from at least 5 sources, and the clarity of any visuals used. A copy of the evaluation form used by the instructor is found on the last page of this syllabus.

- Abstracts and scientific references cited: 20% (10% per presentation) An abstract (summary) not exceeding 1 page, and a bibliography of at least 5 scientific sources on your topic, should be handed out to the class on the day of

Envst 91 – Seminar: Environmental Preservation and Improvement
Fall 2009

Instructor: Prof. George Ellmore
Office Hours: Ellmore: Tuesdays 1:00 – 4:00 in Barnum 205

Date		Topic	
September	14	Introduction to Environmental Frontiers	George Ellmore
	21	Green Roofs	George Ellmore
		Tisch Tools	Regina Raboin
	28	Artificial Reefs	Thomas and Tot
October	5	Bird Strikes and Aviation	Evan and Shelly
		Active Pharmaceutical Ingredients	Daniel and Jennifer W.
	13	Genetically Modified Foods	Katy and Meridi
		Invasive Species and Ecosystem Change	Sam C. and Sam J.
	19	Constructed Wetlands	Jeremy and Jenny
		Conventional vs. Organic Farming	Yosefa and Thomas
	26	Global Decline of Bees	Alyssa and Lori
		Paying Farmers for Env. Services	Kaylee and Andrea
November	2	Urbanization	Matt and Nick
		Wildfires	Shelly and Evan
	9	e-Waste	Tot and Yosefa
		Biofuels (automotive)	Jenny and Jeremy
	16	Meat Production/consumption	Alyssa and Lori
		Climate Change and Infectious Disease	Meridith and Katy
	23	Light Pollution	Andrea and Kayle
		Phytoremediation	Sam J. and Sam C.
	30	Reducing the C footprint at Tufts: heating and electricity	Sarah Creighton (guest)
December	7	Marine Fisheries Decline	Nick and Matt
		Bioprospecting	Dan and Jen

Topics drawn from current articles in Frontiers in Ecology and the Environment, a monthly publication of the Ecological Society of America.

Appendix D – Survey Result Tables

Background Information

Question as seen on survey for Background questions 1-5:
Please select the how accurate these statements are for you.
Never (1)   Rarely (2)   Sometimes (3)   Most of the time (4)   Always (5)

#	Question	Program Group			Comparison Group		
	BACKGROUND INFO						
		Average	Median		Average	Median	
	Age	19.88	20		20.46	20	
		Female	Male		Female	Male	
	Sex	14	2		8	7	
1	My family talked about environmental issues while I was growing up.	3.25	Range 1-5		3.33	Range 1-5	
2	I came to Tufts with an interest in learning more about environmetnal issues.	3.94	Range 1-5		4.07	Range 1-5	
3	I was involved with environmental clubs/programs in high school.	2.87	Range 1-5		2.6	Range 1-5	
4	The protection of the environment is important to my family.	4.00	Range 1-5		4.07	Range 1-5	
5	I was involved with environmental clubs/programs in middle school.	1.88	Range 1-5		1.8	Range 1-5	

Environmental Behavior

Question as seen on survey:

Please select the how accurate these statements are for you.

Never (1) Rarely (2) Sometimes (3) Most of the time (4) Always (5)

#	Question	Program Group			Comparison Group		
	Environmental Behavior	Pre-Average	Post-Average	Change in Average	Pre-Average	Post-Average	Change in Average
1	I put dead batteries in the garbage.	2.87	3.13	0.26	3	2.4	-0.6
2	I collect and recycle used paper, glass and bottles.	4.50	4.56	0.06	4.46	4.74	0.28
3	I make an effort to take short showers.	3.31	4.25	0.94	3.2	3.2	0
4	In the winter, I turn the heat up to a level that does not require me to wear a sweater.	2.75	2.38	-0.37	2.6	2.13	-0.47
5	I wait until I have a full load before doing my laundry.	4.56	4.88	0.32	4.47	4.73	0.26
6	I hang my clothes up to dry.	2.56	2.56	0.00	2.47	2.67	0.2
7	I use more energy efficient light bulbs in my home.	3.94	3.94	0.00	3.6	3.6	0
8	I use chemical toilet cleaners.	2.25	2.31	0.06	3.33	3.2	-0.13
9	I take my own coffee/tea cup to work or school.	3.56	3.81	0.25	3.2	2.93	-0.27
10	I prefer to drink bottled water over tap water.	1.75	1.25	-0.50	1.93	2.07	0.14
11	I use reusable grocery bags when shopping.	4.19	4.44	0.25	3.47	3.4	-0.07
12	I use a compost bin.	2.69	3.25	0.56	2.07	2.33	0.26
13	I let the water run for a time to reach the right temperature.	3.45	3.31	-0.14	3.53	3.2	-0.33
14	I buy organic vegetables.	3.44	3.38	-0.06	2.87	2.8	-0.07
15	I eat meat.	2.25	2.13	-0.12	3.93	4	0.07
16	I walk, ride a bike, or take public transportation to work or school.	4.50	4.63	0.13	4.67	4.73	0.06

Highlighted questions were rated in reverse order

Environmental Literacy

Result coding for Environmental Literacy questions:

Correct (1)   Incorrect (2)   Response was marked "Don't Know" (3)

#	Environmental Literacy	Program Group			Comparison Group		
		% Correct Pre	% Correct Post	Change	% Correct Pre	% Correct Post	Change
1	Carbon monoxide is a major contributor to air pollution in the U.S. Which of the following is the biggest source of carbon monoxide?	0.50	0.38	-0.13	0.467	0.467	0
2	How is most of the electricity in the U.S. generated?	0.81	1.00	0.19	0.933	0.933	0
3	What is the most common cause of pollution of streams, rivers, and oceans?	0.63	0.50	-0.13	0.667	0.867	0.2
4	Which of the following is a renewable resource?	0.88	0.94	0.06	0.933	0.933	0
5	Ozone forms a protective layer in the earth's upper atmosphere. What does ozone protect us from?	0.75	0.75	0.00	0.933	1.00	0.067
6	Where does most of the garbage in the U.S. end up?	1.00	1.00	0.00	0.933	1.00	0.067
7	What is the name of the primary federal agency that works to protect the environment?	0.88	1.00	0.13	1.00	1.00	0
8	Which of the following household wastes are considered hazardous?	1.00	0.88	-0.13	0.867	0.933	0.066
9	Scientists have not determined the best solution for disposing of nuclear waste. In the U.S., what do we do with it now?	0.88	1.00	0.13	0.733	0.867	0.134
10	There are many different kinds of animals and plants, and they live in many different types of environments. What is the word used to describe this idea?	1.00	1.00	0.00	1.00	0.933	-0.067
11	What is the most common reason that an animal species becomes extinct?	0.94	0.88	-0.06	0.933	0.933	0
12	What is the primary benefit of wetlands?	0.688	0.875	0.187	0.8	1.00	0.2

Environmental Attitude

> *Question as seen on survey:*
>
> How much do you agree or disagree with each of these statements?
>
> Strongly Disagree (1)   Disagree (2)   Unsure (3)   Agree (4)   Strongly Agree (5)

#	Question	Program Group			Comparison Group		
	Environmental Attitude **	Pre	Post	Change	Pre	Post	Change
1	We are approaching the limit of the number of people the earth can support.	3.50	4.63	**1.13**	3.93	4.07	**0.14**
2	Humans have the right to modify the natural environment to suit their needs.	2.13	1.88	**-0.25**	2.47	2.8	**0.33**
3	When humans interfere with nature it often produces disastrous consequences.	3.31	3.88	**0.57**	3.93	4.07	**0.14**
4	Human ingenuity will ensure the earth remains livable for humans.	3.13	2.81	**-0.32**	3.06	3.07	**0.01**
5	Humans are severely abusing the environment.	3.88	4.81	**0.93**	4.26	4.2	**-0.06**
6	The earth has plenty of natural resources if we just learn how to develop them sustainably.	3.56	4	**0.44**	3.6	3.47	**-0.13**
7	Plants and animals have as much right as humans to exist.	4.63	4.63	**0.00**	4.4	4.07	**-0.33**
8	Nature is strong enough to cope with the impact of modern industrial nations during our lifetime.	1.81	1.88	**0.07**	2.13	2.33	**0.2**
9	Despite our special abilities, humans are still subject to the law of nature.	4.38	4.69	**0.31**	4.33	4.33	**0**
10	The so-called "ecological crisis" facing humankind has been greatly exaggerated.	1.56	1.31	**-0.25**	1.93	2.07	**0.14**
11	The earth is like a spaceship with very limited resources.	3.56	4.31	**0.75**	3.07	3.13	**0.06**
12	Humans were meant to rule over the rest of nature.	1.50	1.38	**-0.12**	1.53	1.73	**0.2**
13	The balance of nature is very delicate and easily upset.	4.13	4.13	**0.00**	3.73	3.53	**-0.2**
14	Humans will eventually learn enough about how nature works to be able to control it.	2.00	1.88	**-0.12**	2.4	2.27	**-0.13**
15	If things continue on their present course, we will soon experience a major ecological catastrophe.	4.31	4.31	**0.00**	4.2	4.07	**-0.13**

Highlighted questions were rated in reverse order

Environmental Responsibility

Question as seen on survey:

How much do you agree or disagree with each of these statements?

Strongly Disagree (1)   Disagree (2)   Unsure (3)   Agree (4)   Strongly Agree (5)

#	Question	Program Group			Comparison Group		
	Environmental Responsibility	Pre	Post	Change	Pre	Post	Change
1	Being actively involved in environmental issues is my responsibility.	4.56	4.63	0.07	4.2	4.2	0
2	Being concerned about state and local environmental issues is an important responsibility for everyone.	4.50	4.69	0.19	4.2	4.2	0
3	I believe I can make a difference in my community.	4.25	4.44	0.19	3.87	3.87	0
4	By working with others in the community I can help protect the environment.	4.38	4.56	0.18	4.27	4.07	-0.2
5	I talk to my friends about environmental issues.	4.38	4.25	-0.13	4.13	3.8	-0.33
6	I'm interested in my friends' opinions about environmental issues.	4.31	4.63	0.32	4	3.93	-0.07
7	My friends encourage me to express my opinions about the environment, even if they are different from their views.	3.69	3.5	-0.19	3.33	3.07	-0.26
8	I do not hesitate to remind my friends to practice environmental friendly behaviors (e.g., recycling, turning off lights when leaving a room, driving less, not littering)	4.56	4.38	-0.18	3.87	3.8	-0.07

Self-Efficacy

Question as seen on survey:
How true are the following statements?
Not true at all (1)   Hardly true (2)   Uncertain (3)   Somewhat true (4)   Very true (5)

#	Question	Program Group			Comparison Group		
	Self Efficacy	Pre	Post	Change	Pre	Post	Change
1	I can always manage to solve difficult problems if I try hard enough.	4.00	4.33	0.33	3.6	3.73	0.13
2	If someone opposes me, I can find the means and ways to get what I want.	3.56	3.81	0.25	3.4	3.4	0
3	It is easy for me to stick to my aims and accomplish my goals.	3.94	4.25	0.31	3.93	4.07	0.14
4	I am confident that I could deal efficiently with unexpected events.	4.19	4.56	0.37	3.67	4	0.33
5	Thanks to my resourcefulness, I know how to handle unforeseen situations.	4.06	4.19	0.13	3.8	3.93	0.13
6	I can solve most problems if I invest the necessary effort.	4.13	4.44	0.31	4	4.07	0.07
7	I can remain calm when facing difficulties because I can rely on my coping abilities.	4.06	4.25	0.19	3.87	3.8	-0.07
8	When I am confronted with a problem, I can usually find several solutions.	4.19	4.5	0.31	3.87	3.8	-0.07
9	If I am in trouble, I can usually think of a solution.	4.31	4.44	0.13	4	3.87	-0.13
10	I can usually handle whatever comes my way.	4.19	4.56	0.37	3.73	4	0.27

Critical Thinking

Question as seen on survey:
How true are the following statements?
Not true at all (1)   Hardly true (2)   Uncertain (3)   Somewhat true (4)   Very true (5)

#	Question	Program Group			Comparison Group		
	Critical Thinking	Pre	Post	Change	Pre	Post	Change
11	I listen to people talk about politics even when I know that I already disagree with them.	4.13	4.06	-0.07	4	4.2	0.2
12	When I see or read a news story about an issue, I try to figure out if they're just telling one side of the story.	3.94	4.19	0.25	4	4.33	0.33
13	When I hear news about politics, I try to figure out what is REALLY going on.	3.81	4.19	0.38	3.73	4	0.27

Enviro-Civic Engagement

Question as seen on survey:
How likely is it that you would do each of the following?
Not at all likely (1)   Not likely (2)   Maybe (3)   Likely (4)   Extremely likely (5)

#	Question	Program Group			Comparison Group		
	Enviro-Civic Engagement	Pre	Post	Change	Pre	Post	Change
1	Participate in a boycott against a company.	3.63	4.13	0.50	3.53	3.47	-0.06
2	Refuse to buy clothes made in sweatshops.	3.19	3.19	0.00	3.2	2.93	-0.27
3	Participate in political activities such as a protest, marches, or demonstrations.	3.75	4.13	0.38	3.26	3.13	-0.13
4	Do volunteer work to help needy people.	4.19	4.31	0.12	4.07	3.87	-0.2
5	Get involved in issues like health or the environmental that affect my community.	4.19	4.75	0.56	4	3.8	-0.2
6	Get others to care about a cause that is important to you.	4.31	4.31	0.00	3.53	3.74	0.21
7	Express my views in front of a group of people.	3.81	4.31	0.50	3.73	3.53	-0.2
8	Create a plan to address a problem that you have identified in your community.	3.50	4.19	0.69	3.2	3.27	0.07
9	Identify individual or groups who could help you with a problem.	4.06	4.19	0.13	3.87	3.53	-0.34
10	Contact an elected official about a problem.	3.31	3.56	0.25	2.87	3.2	0.33
11	Work with a group to solve a problem in the community where you live.	4.06	4.56	0.50	4.07	3.6	-0.47
12	Post links about important environmental information on online social networks (e.g. Facebook, Myspace)	3.81	4.56	0.75	3	3	0

Values

Question as seen on survey:

When you think about you8r life and your future, how important are the following? It is important to me to...

Not at all important (1)   Not important (2)   Uncertain (3)   Important (4)   Very Important (5)

#	Question	Program Group			Comparison Group		
	Values	Pre	Post	Change	Pre	Post	Change
1	be active in my religion.	2.25	2.63	0.38	2.6	2.46	-0.14
2	follow the principles of my personal values.	4.81	4.94	0.13	4.67	4.53	-0.14
3	work to stop prejudice.	4.00	4.19	0.19	4.2	3.87	-0.33
4	improve race relations.	3.69	3.88	0.19	4.13	3.8	-0.33
5	help those who are less fortunate.	3.94	4.25	0.31	4.13	3.93	-0.2
6	help people in my community.	4.13	4.56	0.43	4.2	3.93	-0.27
7	do something to stop pollution.	4.50	4.56	0.06	4.6	3.93	-0.67
8	help bring people out of poverty.	4.13	4.13	0.00	4	3.87	-0.13
9	help protect animals.	4.19	4.25	0.06	4.2	3.73	-0.47
10	preserve the earth for future generations.	4.88	4.94	0.06	4.67	4.47	-0.2
11	serve in my country's military.	1.63	1.5	-0.13	1.73	1.8	0.07
12	be active in politics.	3.63	3.88	0.25	3.4	2.93	-0.47
13	get a job where I won't get laid off.	3.44	3	-0.44	4.4	4	-0.4
14	get a job that pays well.	3.69	3.88	0.19	3.93	3.6	-0.33

References

A Dictionary of Psychology. Edited by Andrew M. Colman. Oxford University Press 2009. *Oxford Reference Online*. Oxford University Press. Tufts University. 4 April 2010 <http://www.oxfordreference.com.ezproxy.library.tufts.edu/views/ENTRY.html?subview=Main&entry=t87.e6930>

Ajzen, I., & Driver, B. L. (1991). Prediction of leisure participation from behavioral, normative, and control beliefs: An application of the theory of planned behavior. Leisure Sciences, 13(3), 185-204.

Bandura A. (1986). Social Foundations of Thought and Action: A Social Cognitive Theory. Englewood Cliffs, N.J.: Prentice-Hall.

Baranowski T, et al. (1993) Increasing fruit and vegetable consumption among 4th and 5th grade students: results from focus groups using reciprocal determinism. *Journal of Nutrition Education* 25:114–327.

Biggs, D. (1994). In Porter G. (Ed.), Dictionary of counseling. Westport, CT: Greenwood Press.

Coyle, K. (2005). Environmental literacy in America: What ten years of NEETF/Roper research and related studies say about environmental literacy in the U.S. The National Environmental Education & Training Foundation. Retrieved Aug 6, 2010 from http://www.neetf.org/pubs/ELR2005.pdf

Dunlap, R.E., Van Liere, K.D., Mertig, A.D., Catton, W. R., Jr., & Howell, R. E. (1992). Measuring endorsement of an ecological worldview: A revised NEP scale. State College, Penn.

Gladwell, M. (2002). The tipping point: How little things make a big difference. United States of America:

Hillcoat, J., Forge, K., Fein, J., & Baker, E. (1995). I thin it's really great that someone is listening to us...: Young people and the enviornment. *Environmental Education Research, 1*, 159-171

Hines, J. M., Hungerford, H. R. & Tomera, A. N. (1986-87). Analysis and synthesis of research on responsible environmental behavior: a meta-analysis. Journal of Environmental Education 18, 1-8.

Institute of Medicine. Speaking of Health: Assessing Health Communications Strategies for Diverse Populations. (2002) Washington, D.C.: National Academies Press.

Jacobs, F. (1998). The five-tiered approach to evaluation: Context and implementation. In H. Weiss & F. Jacombs, (Eds.), *Evaluating family programs,* pp. 37-68. Hawthorne, NY

Jensen, B. B. and Schnack, K. (1997) The action competence approach in environmental education. Environmental Education Research 3, 2:163-178.

Kaiser, F. G., & Wilson, M. (2004). Goal-directed conservation behavior: The specific composition of a general performance. *Personality and Individual Differences, 36*(7), 1531-1544.

Kasper, D. V. S. (2009). Ecological habitus:Toward a better understanding of socioecological relations. *Organization & Environment, 22*(3), 311-326.

Koger, S. M., & Scott, B. A. (2007). Psychology and environmental sustainability: A call for integration. Teaching of Psychology, 34(1), 10-18.

Kollmuss, A., & Agyeman, J. (2002). Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? Environmental Education Research, 8(3), 239-260.

Kottler, J. A. (2002). Theories in counseling and therapy: An experiential approach. Boston, MA: Allyn & Bacon.

Lorig K, Sobel D, Stewart A, et al. (1999). Evidence suggesting that a chronic disease self-management program can improve health status while reducing hospitalization. Medical Care 37(1):5–14.

Merlino, R. P. (2002) Psychoeducation: from classroom to treatment group. College Student Journal. FindArticles.com. 11 Feb, 2010. http://findarticles.com/p/articles/mi_m0FCR/is_2_36/ai_89809981

Myers, D. (2005). Social psychology (8th ed.). New York, NY: McGraw-Hill.

National Cancer Institute (Ed.). (2005). Theory at a glance: A guide for health promotion practice (2nd ed.) NIH publication.

Orr, D. (1991). What is education for? *The Learning Revolution, 27*, 52.

Powell, R., Symbaluk, D., & Macdonald, S. (2002). Introduction to learning and behavior. Belmont, Ca: Wadsworth.

Prochaska J.O., DiClemente C.C., Norcross JC. (1992). In Search of How People Change: Applications to the Addictive Behaviors. *American Psychologist* 47:1102–1114.

Schwarzer R, & Jerusalem M, (1993). The General Self-Efficacy Scale. [Online] available: http://userpage.fu-berlin.de/~health/engscal.htm. Last accessed 3rd Jan 2010.

Strapp, W. B. (1969). Theconcept of Environmental Education. Journal of Environmental Education(,1), 30-3 1.

Syvertsen, A., Flanagan, C., & Stout, M. (2007). Best practices in civic education: Changes in students' civic outcomes. *The Center for Information and Research on Civic Learning and Engagement, 57* Retrieved from http://www.civicyouth.org/PopUps/WorkingPapers/WP57Flanagan.pdf

Weinstein, N. D. (1988). The precaution adoption process. *Health Psychology, 7*(4), 355-386.

Watson, D. L., & Tharp, R. G. (1997). Self-directed behavior: Self-modification for personal adjustment (7th ed.). Pacific Grove, CA: Brooks/Cole Publishing Company.

Yalom, I. D. (1995). The theory and practice of group psychotherapy (4th ed.). New York, NY, US: Basic Books.