An Environmental Pledge Assignment: Connecting Classroom Lessons to Behavioral Changes with Calculable Environmental Impacts

Anne Marie Zimeri
University of Georgia

Abstract
Since January 2008, the Environmental Health Science Pledge Project has made an impact on the local and state environments of the United States. More than six hundred students have participated as part of an upper-level introduction to environmental health science course in which they pledged to spend one week committed to being as environmentally sustainable as possible with a special focus of their choice (water conservation, reduction in meat consumption, fossil fuel use, and the use of plastics among others). Students collected environmental impact and ecological footprint data from a typical week and compared that to data obtained during a pledge week. Class data was collected and pooled at the semester end so that students could see the impact they made as a group. Students are also asked to calculate the impact they would have had if they continued their behavioral changes in part or wholly over time. Many students committed to making permanent lifestyle changes as a result of this experience. Here, data that show the impact a class can make over the course of one semester is presented in addition to post-class survey data that shows that the majority of the students who participated in the environmental pledge assignment continued to modify their behavior after the semester ended.

Introduction

The discipline of environmental health science is the branch of public health that studies how the environment affects human health. It is tasked with educating its students on the basics of environmental protection for the sake of public health as well as giving students tools to implement changes in their own lives that lessen their personal environmental impact. These changes, once effected at the student level, may also influence friends, colleagues, and family members outside of the environmental health sciences resulting in similar environmentally responsible behavior changes. Previous work has suggested that imploring a sense of
responsibility has been an effective way to impart behavioral change. This is of utmost importance because poor lifestyle choices are responsible for a variety of environmentally related illnesses as shown in several studies performed with medical students (Phillips, Pojednic, Polak, Bush, & Trilk, 2015). Responsibility toward environmental stewardship is difficult to convey with classroom lectures alone even when students are offered concrete advice and solutions that will increase their personal responsibility and may lead to behaviors directed toward environmental conservation. It has been shown that many environmental education programs give information to students, which alone may not be enough to cause action (Hungerford, 1990). Students need to not only know about environmental issues, but also they must take ownership of the issues and how they relate to themselves as well as believe that their actions will make a difference (Stern, 2002). In addition, it is difficult to overcome negative portrayals of conservation efforts in the media, which may affect personal behavior, including that of undergraduates (Geraee, Kaveh, Shojaeizadeh, & Tabatabaee, 2015), especially when it comes to climate change (Swim, Clayton, & Howard, 2011). It has been previously shown that role playing or trying on a new attitude has had a positive impact on increasing social responsibility because it gives students a taste of a "real life" conversation or situation (Doorn & Kroesen, 2013).

Active environmental student learning through participation and community involvement may lead not only to immediate benefits to the environment, but also the potential for long-term behavioral changes once students 1) try an activity and realize that it may not be as difficult to change their behavior as previously thought and 2) begin to feel a sense of community and responsibility about sustainability as they transition into adulthood and make the types of household decisions that can mitigate environmental problems at the local, state, national, and global levels. With this in mind, a project was developed for undergraduate students that promotes environmental stewardship and sustainability, that yields direct benefits to the environment during the course of the semester, and holds the potential to alter student behavior such that the changes in behavior will continue over the long term.

This project was developed in part by the instructor, who provided the basic structure of the activity, which included two weeks of data collection. Data is first collected during a students’ typical week, followed by a week in which the students pledge to make a change in their behavior with a focus on one environmental factor. The students also have an important role in structuring the project. They were placed in groups to discuss and propose options that might be
included for the project. Options included, but were not limited to, reducing or eliminating the use of plastics, reducing or eliminating meat consumption, reducing energy usage in the home, and reducing reliance on gasoline. Data presented will show that not only did the students (in a class size of approximately seventy) make a marked impact on the environment during the two-week-long assignment process, but when surveyed several semesters later, most continued with the behaviors they initiated for the assignment in full or in part.

Methods

The Assignment
Students were given an assignment focused on changes that they could make in their lives that might reduce their environmental impact. Students were placed in groups of five or six and each group was asked to generate three ideas on how they might accomplish this. Ideas were discussed in class and listed at the end of the description of the assignment as written for the students below:

This assignment is designed so that during the course of this semester you can modify your behavior to make a positive impact on the environment. For credit, you must pledge to make one of the modifications discussed in class (listed below). I’m looking for you to investigate your options thoroughly and provide me with some data related to your effort. Data should be “before and after data,” and some projections of the impact you would make if you continue your effort fully or partially.

You are welcome to work with friends, roommates, or whomever will help support you during the assignment. You may include their data as well. Using the class website (discussion section on the university’s Desire to Learn system), I expect each group of students performing a specific pledge to agree on the same type of data that they will collect so that it can be pooled at the end of the semester. Be sure that you are collecting data in the same categories and units so that they can be easily pooled at the end of the semester. I’ll let you all decide the length and format of your individual report (I’m just looking for a complete picture of your experience as well as your individual data).
To turn in:
1) a one- to two-page report that includes your data, personal reflection on your experience, the impact you made, calculations as to the impact you would make if you continued with your pledge fully or partially in the future (whichever is more realistic for you).
2) One group report for each topic that totals your group’s impact. You will be given class time to work on this.

Pledges:
1) Vegetarian/vegan
2) Transportation
3) Single use disposables
4) Composting/packaging
5) Water conservation
6) Electricity
7) Local/organic

The following week, students were placed into groups based on which pledge they selected. Each pledge group needed a minimum of three students; otherwise that pledge option would be eliminated. Student groups were tasked with researching the potential impacts of their choice and decide on at least three data points that they would collect (and the units). For example, in the group that selected to reduce or eliminate meat intake, students tracked the type of meat they ate, in ounces, when it was consumed, and how much water was used to bring their meal from farm to table. They also weighed themselves and used an ordinal energy scale ranging from 1 to 5 to track how they felt during the pledge week. By working collaboratively to develop the assignment students took ownership of the process. This facilitated the compilation and comparison of their data at the end of the semester and the production of a group report. Groups were asked to find two sequential weeks that would be similar. For example, not one regular school week followed by a holiday week.

Participants
Students who participated in this study were enrolled in EHSC3060: Introduction to Environmental Health Sciences during one of the following semesters: spring 2012, fall 2012, spring 2013, or summer 2013. With the exception of summer 2013, students were enrolled in one of two sections, a Monday-Wednesday-Friday
or a Tuesday-Thursday section. Summer students were in one section that met Monday through Friday for two hours per day over the course of one month.

The survey was administered by sending a link to the Qualtrics-supported survey to the 445 students who were enrolled in and completed the course and whose emails were available (though slightly more than 600 students had completed the assignment, several of their emails were not available or had been deleted by the University system). Ninety-four responses were received (21%). Student respondents were primarily juniors (48%) and seniors (31%), with smaller numbers of freshman (9%) and sophomores (12%). Because the assignment was based on students making independent decisions in their daily lives, they were asked to report age and living arrangements. Most students were twenty years or older and lived off campus with roommates (table 1). Data for living arrangements during the assignment semester and current living arrangements were of interest because students who live off campus have more control over several of the pledge options. For example, students who live in the dormitories do not have access to the thermostat to save electricity nor can they change shower heads to low flow. Students were also asked what grade they earned in the course to ensure that the grade profile was representative of total grade profiles for each of the semesters included in the study to be sure that a representative sample of students responded to the survey.

Table 1 Student living arrangements (N = 94)

<table>
<thead>
<tr>
<th>Living arrangement</th>
<th>Percent (during the assignment)</th>
<th>Percent (at the time of the survey)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dormitory</td>
<td>14</td>
<td>3</td>
</tr>
<tr>
<td>Off campus, with parents</td>
<td>6</td>
<td>13</td>
</tr>
<tr>
<td>Off campus, alone</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>Off campus, with roommates</td>
<td>72</td>
<td>74</td>
</tr>
</tbody>
</table>

A full list of survey questions are listed in appendix I.
Results
Pledge assignment selection was typically distributed among eight pledge choices. The majority of the students selected the pledge to reduce or eliminate meat (29%) for a week or the pledge to conserve water for a week (23%). The remaining pledge choices are shown in table 2. Students were also asked whether they submitted an accurate report of their experience in order to find out if the students were exhibiting academic honesty during the pledge week data collection. Only 5% answered no to the survey question, “Did you submit an accurate report of your experience?”

Table 2 Environmental pledge projects chosen by the students for their assignment (N = 94)

<table>
<thead>
<tr>
<th>Environmental pledge option</th>
<th>Student pledge assignment choice by percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eliminate plastics/disposable items</td>
<td>17</td>
</tr>
<tr>
<td>Reduce or eliminate meat</td>
<td>29</td>
</tr>
<tr>
<td>Conserve water</td>
<td>22</td>
</tr>
<tr>
<td>Conserve electricity</td>
<td>1</td>
</tr>
<tr>
<td>Modify transportation habits</td>
<td>9</td>
</tr>
<tr>
<td>Eliminate processed corn (corn syrup, modified corn starch, etc.)</td>
<td>7</td>
</tr>
<tr>
<td>Compost kitchen wastes</td>
<td>4</td>
</tr>
<tr>
<td>Eat locally and/or organically</td>
<td>5</td>
</tr>
<tr>
<td>No data</td>
<td>4</td>
</tr>
<tr>
<td>I didn’t complete the assignment</td>
<td>1</td>
</tr>
</tbody>
</table>

Data from the pledge week demonstrated to students that already, as college students, they could make life choices that would lessen their impact on the environment. In addition, the pledge assignment required that they make a calculation that would measure the long-term impact they would make if they continued the pledge in full or in part (it was their choice as to which calculation
to make). Two questions were asked to the pool of survey recipients to determine whether they continued their pledge behavior after completing the class. Students were first asked if they continued their pledge behavior beyond the pledge week at all. To this question 72% answered “yes”. Another question in the survey asked if students were currently imparting some of the behavioral changes from their pledge assignment to which 69% answered “yes.” To determine the extent to which students continued pledge behavior, they were asked to assess their continuous pledge behavior based on percent of the time that they continued with the pledge. The highest response was that students (26) continued their pledge behavior 50% of the time, followed by a group who continued with 75% of this time.

To determine, in general, why students did or did not continue the pledge assignment behaviors after the semester, they were given a series of responses from which to choose that would best characterize why they chose to continue the behaviors or not. The responses listed were determined through several conversations with students outside of class over previous years regarding pledge continuance. For those who did continue their environmentally conscious behaviors, 52% selected the following response: I feel better for participating in a change to better the environment for the sake of society and future generations. The next most frequent response (24%) was: I was unaware of the impact of the changes that individual actions could have prior to the pledge, but was compelled to continue once I saw the impact that I could make. The other two responses were: I always wanted to make a change, but needed a reason to get started (8%), and I feel (physically) better for having made the change based on my pledge (15%).

For those students who did not continue the pledge 80% chose the following response: I did feel that the pledge made a significant change in the environment but it was too difficult to continue. The remaining 20% of respondents split equally between the following two responses: 1) I did not feel that the pledge made a significant change in the environment and it was too difficult to continue, and 2) I did not feel compelled to reduce my environmental impact.

Environmental Impact of Pledge Assignment
Environmental impacts resulting from the pledge assignments themselves were compiled by students who were enrolled in one of two sections of the Introduction to Environmental Health Sciences course in the spring semester
2013. Data from the two most commonly chosen pledges, “reduction in meat (vegetarian or vegan)” and “water conservation,” are shown in figures 1 and 2 respectively. The group that chose to reduce meat consumption recorded their meat consumption by weight and type. When meat was eaten at a restaurant, the students assumed that a serving the size of a deck of cards was equivalent to 4 ounces. Students categorized, in addition to meat, all the food they consumed that week in order to calculate the potable water that it takes to bring food from farm to table. Non-meat categories included: chocolate, butter, cheese, rice, pasta, bread, pizza, nuts, lettuce (salad items), vegetables, cereals, milk, eggs, wine and beer, tea and coffee. Students used a variety of online tools and the literature to come to a consensus for how much water (in gallons) to assign to each food. During the non-pledge week, the students calculated that the required water consumption for their group of 13 was 60,358 gallons, and the pledge week consumption was 26,873 gallons. Therefore this group saved 33,485 gallons of water and dropped their per person consumption of meat on average by more than half (figure 1). The same group added a semi-quantitative twist to their assignment where they rated, on a scale of 1 to 10, their energy level for each day during the pledge assignment weeks. The average energy per student for the week was not statistically different between the two weeks which put to rest some student concerns that without meat they would feel weak or tired.

**Figure 1** Water conserved during a typical week vs. pledge week by meat reduction/elimination group (Sample data from one semester, spring 2013. Standard deviations are shown.)
The water conservation group focused on two ways in which they could reduce water consumption in their daily routine: time and frequency of showering and time running water while brushing their teeth and shaving. This particular group aimed for each member to cut shower time in half as one of their goals. They were able to go from an average shower time of more than twelve minutes to an average time of little over six minutes (figure 2).

Figure 2 Water conserved during a typical week vs. pledge week by shower group (Standard deviations are shown.)

Discussion

Innovation, Sustainability, and/or Partnership

The environmental pledge assignment is a new approach to teaching environmental health because it allows students to design and implement the assignment on an individual basis, potentially influence friends and family, and work collaboratively with other students to decide how they might live more sustainably in the future, all in the context of learning that takes place through the Introduction to Environmental Health Science course. By partnering with other students to design the options in the pledge assignment and as the type of data to collect, students take ownership of the assignment and begin to make independent, adult behaviors that are less harmful to the environment.

By implementing a week of behavioral changes, tracking the environmental impact of such changes, and making adult, household decisions, students are empowered to continue with their environmentally responsible and
more sustainable choices. Students are asked to calculate the impact they would have if they continued their pledge in full or in part, in the future, and asked whether they would continue with their behavior. Many of the students’ narratives include pledges to continue their new behavior and they often remark a feeling of social gratification and delight in how easy the pledge was to implement. These project-based motivational changes in student behavior could have far-reaching implications in the students’ lives and in the way that environmental health science is taught. Previous work has shown that engaging students in project-based learning in service of an important intellectual purpose can inspire students in K-12 to learn through their own investigations (Sizer 1984). This same principal held true for the undergraduates who were assigned the pledge.

Data collected in class showed a larger impact on the environment than the students expected. Class discussions revealed that students were often surprised at how much of an impact that they, as individuals, could make during the course of a week, and were thrilled at the potential impact that they could make in the future on their own or as the head of a household. This experiential learning assignment conveyed environmental knowledge but had students participate such that long-term impacts were achieved.

There are limitations to this type of assignment in that the students, although told that no points would be deducted for lapse of commitment in a pledge week, self-report their data. It is possible that in order to please the instructor or to ensure a positive view from the instructor, students may misrepresent either their non-pledge week or their pledge week. The survey did address this by asking “Did you report your results accurately?”, but again this is self-reported. Certainly more concrete evidence could be provided during the assignment like water meter or electrical meter readings, or even grocery bills, but because students are expected to adhere to the University Student Honor Code and Academic Honesty Policy and because they were asked to report their experience accurately regardless of whether they lapse in their commitment to the pledge, no concrete evidence was required for the assignment.

In addition, students self-reported on the survey questions and could have provided inaccurate answers. This seems mostly unlikely because students who were surveyed were promised confidentiality and they were surveyed after the grades for the semester in which they took the course were reported.

The ultimate goal of environmental health education is to educate practitioners and academics who can impart and discover ways in which humans can make less of a detrimental impact on the environment. Chawla and Cushing
(2007) suggest that students get a sense of self competence or self efficacy by believing they can be successful in an area of significance. The pledge assignment provides this opportunity to students by allowing them to develop the assignment, in part, and implement it when they want throughout the semester. It also shows them the impact that they made through their behavioral change and, according to survey data, has long-lasting effects on the students’ life choices.

References


