

A Disciplinary Framework for Teaching Environmental Sustainability

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Abstract: This article presents a case study of a collaborative project between the energy manager and a sociology professor at a small liberal arts college. Introductory sociology students designed and disseminated a survey on energy use at the college and found a disconnect between attitudes and behavior in energy use. While these results were not surprising, this exercise allowed the students to not only learn research methods but students also reported an increasing awareness of their own knowledge and practices in using energy. We believe this type of exercise, using one's disciplinary methods with an engaged learning project, would be a useful vehicle for teaching sustainability in a variety of disciplines not normally associated with the environment or sustainability.

Keywords: energy use, sociology, engaged learning, sustainability, environment

The United Nations has called upon universities and colleges to lead the charge in educating students about sustainability as part of the UN Decade of Education for Sustainable Development

(UNESCO, 2005). However, incorporating sustainability education in the higher education curriculum can be tricky without campus-wide coordination. Without administrative support, such as faculty development or other training incentives, professors are often left without guidance, especially those who may be interested but aren't sure about the scope of sustainability or how to teach it (*Sustainability: A Journal of Record*, 2009).. At our small, liberal-arts college in rural Virginia, one significant challenge in teaching students about any aspect of sustainability is the lack of a collaborative effort or institutional support for environmental education in the core curriculum in addition to a general apathy for environmental issues from the student body. We argue that by utilizing the core methodology of one's discipline, professors and instructors can integrate elements of sustainability in the higher education classroom in many diverse courses and disciplines and on campuses without a sustainability focus. We also argue that engaged and transformative teaching is more conducive to student learning than traditional classroom pedagogy. In this paper we describe one collaborative project between a sociology professor and the energy manager designed to increase student's awareness of how energy is used on campus and knowledge of research methods, as well as provide the energy manager with data to design future energy conservation projects.

Introduction to Sociology is a freshman survey course and often one of the largest classes on our campus. Given the number of topics that must be covered over the course of the semester, little time is left for substantive or in-depth discussion on any of the topics. One way to make space for sustainability education is to couple it with the discipline's central concepts or core topics. This introductory course is an especially important class to incorporate sustainability education because of the numbers of students enrolled; it is also important to engage students in environmental issues at the beginning of their college careers. In the fall of 2012, a sociology professor at Emory & Henry College and the college's energy manager met to discuss ways to collaborate on a mutually beneficial project. The primary activity was the design, dissemination, and analysis of a survey to measure behaviors, attitudes, and perceptions of energy use on campus. Half the class of 30 students would design and implement a survey, the other half would interview faculty and staff and students about these same issues. The objectives of this project were three-fold: the survey would orient the energy manager to the perspective and behaviors of the faculty and students on campus, sociology students would learn research methods and practice these skills, and the students would become familiar with energy use terminology and conservation issues.

This project went beyond traditional classroom pedagogy. Typically, students would read a textbook chapter or article, discuss it and take a test at the end. Engaging in a community-based research project as we are describing allows students to engage with environmental issues in a more experiential and collaborative way. This type of community-based or action research follows from Boyer's (1990) call for more engaged scholarship on the part of students and faculty. Experiential education can take many forms such as direct engagement and volunteering, public policy advocacy, public education efforts, among others. We categorize our project as community-based research, in which students and faculty undertake research projects in collaboration with community-based organizations to address needs/questions identified by the community (Strand, et.al. 2003). The energy manager represents a community stakeholder in that his mandate is to bring the campus community closer to carbon neutrality by 2036. The scholarship of teaching and learning has shown that more engaged learning, such as community-based research, can lead to increased civic participation (Marullo and Edwards 2000) and higher rates of information retention (Lewis 2004). One of our

implicit goals was for students to become more thoughtful consumers of energy as well as more aware of the nuances of research process.

To educate themselves on how much energy everyday devices use and the consequences energy use patterns on environmental problems on a global scale, students read several articles on these issues. Students were also assigned readings on survey and interview methods. Students were then given a choice as to which method they would like to work with, either survey or interviews, and the professor then put students in groups of four to create surveys and interview schedules.

The survey was designed in a participative process. Several class sessions were held to discuss possible questions and the reasoning behind them. The design process was an excellent teaching tool and facilitated an active discussion about methodology in a class of otherwise taciturn students. Each group submitted 5-10 sample questions, and the resulting bank was edited by the professor and energy manager. Redundant questions were culled and the remaining ones were edited to ensure internal consistency of the survey. The final questions were then proposed to the class, and a discussion was held to choose response scales and question ordering. Students took full ownership of this process, and the discussion of which questions to include and the best wording was one of the most lively of the semester. The final survey consisted of 26 questions that covered a range of behaviors and attitudes toward energy use on campus. The qualitative interview questions attempted to get more detailed information about these same issues. Both research instruments are included as Appendix A and B.

The survey was administered online using Survey Monkey. It was emailed to faculty and staff and posted on E&H's Facebook page for alumni responses. Additionally, students were asked to personally send the survey to 10 people. This was done as an experiment to increase student response rate, with the idea that personal emails would be more convincing than batch emails. The level of response appears to indicate that this tactic was effective. A total of 203 survey responses were collected, with the majority coming from students (69%). Faculty, staff and alumni also responded, each representing 10% of total respondents. The limitations of the survey's statistical significance were discussed during the design process and students learned about data validity and making assumptions based on a non-random survey. In the end, though, this project was focused on process rather than the end-product, which is the ultimate goal of experiential or transformative learning (Burns 2011).

The survey results highlighted some of the challenges facing many campuses: the behavior impact gap. More than 70% of faculty, staff, alumni, and students responded positively to the question "I am willing to make changes to reduce my energy consumption." When asked later in the survey if they try to limit the amount of time they spend in the shower, the percentage of all groups responding positively dropped significantly. The most prominent decline was among students, with less than 40% agreeing that they try to limit the amount of time spent in the shower.

This question is indicative of the broader challenges with encouraging sustainable behaviors on college campuses across the country. Respondents tended to reply positively when the statement is about hypotheticals including things they think they do or would be willing to do in the future. But when the focus of the question turned to current behaviors, there was a significant decline in positive response. Survey respondents often respond in ways to avoid embarrassment or present a positive

image, which could be one potential explanation for this result (Fisher 1993). Further study is needed to better understand this discrepancy.

Another surprising result of the survey focused on the basic energy knowledge proxy question, “in our region, our primary fuel source for electricity is.” Students were much less likely to answer this question correctly, with less than 60% choosing the correct answer compared to 75% for other groups. This discrepancy was slightly less when class standing was considered; while less than 50% of freshman answered correctly, more than 75% of seniors were able to choose the right answer. This could potentially be attributed to academic maturation, but it is difficult to pinpoint where students would learn about environmental issues in general and energy use in particular. The college offers few courses outside of the natural sciences in which this information is covered in any systematic fashion and again points to the lack of a coordinated environmental education effort.

This survey proved to be an effective means for not only teaching survey design and methodology, but also to teach basic aspects of energy use and awareness. Students reported they gained valuable insight into the research process. One student said,

“I learned how important it is for sociologists to gather enough information. If they don’t get enough information then their data doesn’t mean much. Now it makes sense why projects take so long to complete.” Another student said “The main thing I learned about the research process is that in order to make interpretations you must have a lot of data to analyze and present...doing this project was no easy task.”

At the same time they stated learning more about research methods, the students also reported learning more about energy use and sustainability in general. At the most basic level, students learned how their energy gets delivered to them. More than half the class in a pre-test could not identify the energy source (coal) that powers their college. In the reflection summaries, many replied that one thing they learned about was energy on campus was “Emory & Henry gets its energy from a coal plant.” Another student learned “...our campus is heated by water running underground through the campus.”

Students were also shocked that they (indirectly) paid for energy through their tuition. Since they do not see a bill or statement, they assumed it was free. “I did not know I was paying for energy use. It makes sense, but I just didn't realize I was paying for energy costs.”

Students reported learning more about energy conservation because of the project. One student “... learned that a lot of energy is wasted in ways that require minimal effort to prevent, such as leaving chargers plugged in.” This new knowledge led to some behavioral changes for a few students, such as this one who said “...I find myself being more aware of leaving lights, computers, printers, etc. on when not in use.” This process highlighted some gaps in student knowledge, both in energy awareness and survey design. Students did, however, report a greater recognition of the interconnection between different stakeholders on campus such as students, facilities and the energy manager. More importantly, students in the course became educated consumers of surveys and learned to think critically about how researchers collect and analyze data. An educated and critical public is crucial in the consumption and interpretation of scientific knowledge, an issue no more relevant than in the recent climate change debates.

Even beyond individual awareness, some students could generalize the analysis and recognize the difficulty in changing individual behavior environmental behavior. For example, one student said, “I also learned that implementing energy conservation policies into a college and incentivizing/motivating students to conserve energy is really difficult and complex.” Another said, “I learned that people tend to say they care about energy conservation more often than they actually do things to reduce their energy consumption. A lot of people would say they cared about energy conservation, but then they would say that they were not willing to limit their shower time or that they would still choose convenience over conservation.”

Conclusion

This community-based research project proved an effective means for teaching survey design and methodology as well as teaching energy awareness in an institutional environment lacking a comprehensive commitment to sustainability education. Students reported they learned how energy is delivered on campus and how difficult the survey process is. A few students even reported they will make behavioral changes based on the project. For the energy manager, the survey provided a baseline for the behaviors and attitudes toward energy conservation on campus, and suggested a direction for further study to determine the best strategies for effecting behavior change. A longitudinal study tracking students’ behaviors and knowledge for their entire college career would help fill in some of the gaps in the data.

This technique of using one’s disciplinary skills coupled with a case study or project is an adaptable framework that can be incorporated into myriad disciplines. The intent of these engaged pedagogical projects is to lower barriers and broaden the reach of sustainability education on campus by building on the strengths and core principles of academic disciplines not associated with sustainability and to engage students in more meaningful ways with greater impact than traditional classroom practices. These types of projects better prepare our students for making decisions, collaborating and creating systemic solutions—skills necessary for facilitating sustainable change.

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Appendix A: Interview Questionnaire, Energy Use Research Project

What is your position on campus: Student Staff Faculty

If student,

What year are you in school?

What is your major?

Where do you live?

What type of community did you come from?

Do you own/drive a car?

Gender: Female

Habits:

1. What are the major ways you use energy on campus?
2. In what ways do you conserve or try to conserve energy on campus?
3. Did your family conserve energy? If so, in what ways?
4. Has this affected the way you use energy now?

Knowledge:

5. By what process does the college get our energy?
6. How do you think the college pays for energy?
7. If you knew how much energy cost and how much you are paying for it, would it change your behavior? Do you think it would change your friends' behavior?

Attitudes/Perceptions:

9. Do you feel like you can make a difference environmentally by using less energy? Why or why not?
Does this attitude affect your willingness to conserve energy or to educate yourself on these issues?
Who or what has influenced your views on energy conservation? In what ways?
Do you think the way energy is used affects the environment?

Open-Ended Questions:

13. What would be the most creative way to get students to turn off the lights?
14. What makes you remember to turn off the lights?
15. If you could change anything with energy conservation on this campus, what would it be and how would you do it?

Appendix B: Campus Survey, Energy Use Research Project

Where do you live?

- In college-owned housing
- In a rented house/apartment off-campus
- In a house I own

Other (please specify)

2. Which statement best describes how you get around on campus?

- Mostly walk/bike
- Walk/bike and drive equally
- Mostly drive

3. Which of these best describes where you grew up?

- Urban
- Rural
- Suburban

4. In this region, our primary fuel source for electricity is

- Coal
- Natural Gas
- Nuclear
- Hydro
- Don't know

5. Please choose the answer that best describes how you feel about the following statements.

Strongly Agree

Agree

Neither Agree
Nor
Disagree

Disagree

Strongly Disagree

I care about energy
conservation

Recycling is important to
me

I feel that I have made an
impact on the college's
energy consumption

I care about climate
change

I care more about energy
conservation since I started
college

I am willing to make
changes to reduce my
energy consumption

6. Do you have a thermostat in your room or office?

- Yes
- No
- Don't know

7. If yes, what temperature range do you keep it at in the winter?

- Above 75
- 70-75
- 65-70
- Below 65
- Don't know
- I can't adjust my thermostat

8. Do you turn the lights off when leaving a room for more than 5 minutes?

- Almost never
- Some of the time
- Most of the time
- Almost always

9. When you go to sleep, do you leave electronic devices (computer, lights, stereo, etc.) on?

- Yes
- No

10. Growing up, did your parents remind you to conserve energy and water, like turning off the faucet when you brush your teeth or closing the fridge door?

- Yes
- No
- Can't remember

11. Please choose the answer that best describes how you feel about the following statements.

Strongly Agree Agree Neither Agree
Nor Disagree Disagree Strongly Disagree

I consider myself knowledgeable about environmental issues

Before throwing something away, I check to see if it can be recycled

I try to limit the length of time I am in the shower

Given the choice, I would pick convenience over conservation

I would like to know more about how much energy the college uses

12. What is your gender?

Male

Female

13. What is your relationship to the college?

Student

Faculty

Staff

Alumni

Other (please specify)

14. If you are a student, which best describes you?

Freshman

Sophomore

Junior

Senior

Graduate

15. What is your race/ethnicity?

Check as many as apply.

White

Black or African-American

American Indian or Alaskan Native

Asian

Native Hawaiian or other Pacific Islander

Hispanic

Other (please specify)

16. Which best describes your political affiliation?

Republican

Independent

Libertarian

Democra

