

Teaching sustainability through service learning and groupwork: Lessons from the Maine Watershed Project

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Abstract: *In this article we describe three examples of service-learning projects carried out by faculty who have attended the Maine Watershed Project, a ‘greening the curriculum’ workshop that is designed to encourage faculty in all disciplines to address environmental sustainability issues in their teaching. Drawing on in-depth interviews conducted with these faculty members, we highlight how they understand and teach sustainability through service learning carried out in groups and we examine challenges tied to using this pedagogical approach. We also explore how faculty and student experiences with service learning and groupwork increased their sense of connection to local communities, fostered innovation in the classroom, and developed hope-based learning – that is, educational experiences designed to leave students feeling inspired, motivated, and hopeful.*

Keywords: *environmental literacy, environmental sustainability, greening the curriculum, groupwork, hope-based learning, place-based learning, service learning*

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Introduction

‘What will people need to know to live responsibly and well in a finite world?’ (Orr, 1992, p. 133). This question is increasingly being raised within higher education as awareness unfolds about the important contribution that educational systems can make towards fostering the knowledge and skills needed for sustainable development. Administrators, professors, staff and students recognize that higher education should play a major role in the sustainability movement that is emerging around the world (Barlett & Chase, 2004; Barlett, 2009; Battenwieser, 2008; Holmberg, Svanstrom, Peet, Mulder, Ferrer-Balas & Segalas, 2008).

The commitment to environmental sustainability within higher education is changing how institutions operate, conduct research, teach, and interact with local and regional communities. Evidence of the growing enthusiasm for environmentally sustainable campus practices can be seen, for example, in the vast number of institutions that are making systematic, environmentally-friendly changes to their food services, transportation systems, and building practices.

While greening campus operations is important, curricular transformation is identified as the cornerstone of the sustainability movement within higher education. Universities and colleges recognize the need to develop environmentally literate graduates who understand their personal responsibility to sustainability and are therefore taking steps to infuse the study of environmental sustainability across the curricula. There is growing agreement that discussions of environmental sustainability should no longer be isolated in ‘eco-models’ or environmental disciplines (Haigh, 2005; Moody, Alkaff, Garrison, & Golley, 2005; Rowe, 2002).

The quest to ‘green the curriculum’ in higher education is being carried out through a range of strategies. The establishment of interdisciplinary graduate and undergraduate degrees in environmental sustainability is one way in which institutions have provided new opportunities for students to study sustainability (Rowe, 2002; Barlett, 2009). However, an increasing number of universities are infusing sustainability throughout the curricula by offering professional development workshops that help faculty integrate environmental sustainability concepts into their courses. A far-reaching example of this is the faculty development

program at the University of Southern Maine (USM), known as the Maine Watershed Project. Since 2005, more than 70 USM faculty from a broad array of disciplines have participated in the program, and it was recognized at a greening-the-curriculum conference in San Diego in February 2010 as a national example of how such programs can foster bottom-up culture change toward sustainability at universities.

Each of the Maine Watershed Project participants has developed creative, engaging pedagogical practices to foster environmental awareness among their students; several have used service learning as a means to meaningfully shift toward more ecologically sensitive curricula. In this article we describe three examples of service-learning projects carried out by faculty who have attended the Maine Watershed Project. Drawing on in-depth interviews conducted with these faculty members, we highlight how they understand and teach sustainability through service learning and examine challenges tied to using this pedagogical approach. We also explore how faculty and student experiences with service learning increased their sense of connection to local communities, fostered innovation in the classroom, and developed hope-based learning – that is, educational experiences designed to leave students feeling inspired, motivated, and hopeful.

Findings from our interviews point to what has been known of service-learning for some time: when done right, it is a method of curricular delivery well suited for teaching environmental sustainability (Knuth, Nagle, Steuer, & Yarnal, 2007; Sherman & MacDonald, 2009; Wagner & Sanford, 2005). As a review of the literature reveals, there is a rich tradition of using service learning to enliven and deepen the learning experiences of environmental science students (Colvit, 2006; England & Marcinkowski, 2007; Leege & Cawthorn, 2008). Faculty from across the academy are learning from this lesson and are now using service-learning projects to teach environmental sustainability – it is a pedagogical tool that can serve as a powerfully effective interdisciplinary bridge between divergent fields of study.

As we underscore, however, the process of groupwork enhanced the effectiveness of the service-learning projects because it fostered collaborative learning. It was also the vehicle that allowed students to work collectively on behalf of social and environmental change. Social movements have always been comprised of small and large groups: the quest to protect our shared planet is no exception – it takes groupwork

(Dudziak & Proffitt, 2012). This was an important lesson for students.

To lay the foundation for a conceptual understanding of the issues at hand, we begin with a succinct overview of some of the major benefits and challenges associated with using service learning to teach about environmental sustainability. We then discuss our methodology, which is followed by three case examples that demonstrate how liberal arts faculty can successfully weave environmental service-learning initiatives into their courses using groupwork.

Exploring the utility of teaching environmental sustainability through service learning and groupwork

In a finely etched essay that explores the value of service learning in restorative ecology courses, Stemen (2003) states: 'To plant is to think' (p.77). Through this statement, he underscores the point that high quality service learning projects – those designed to connect students' service to their academic work – can pay high dividends in student learning. This 'educational payback,' as Steman notes, is why service learning is now an integral part of the curriculum in many universities in the United States.

For those interested in teaching about environmental sustainability, service learning holds the potential to be an effective teaching strategy because it can facilitate environmental literacy, which students will need to respond to the complexities of our rapidly changing planet (Davies, 2010; St. Clair, 2003). Environmental literacy, as defined by the United Nations, 'is a basic fundamental education for all people, which provides them with the elementary knowledge, skills, and motives to cope with environmental needs and contribute to sustainable development' (UNESCO, 1997, cited in Moseley, 2000, p.23).

People do not become environmentally literate overnight, however. Like all forms of literacy, individuals progress along a continuum of proficiency in environmental literacy, starting with environmental awareness and ending with action. It is this last stage where service learning becomes essential; it promotes learning through active participation in stewardship (Moseley, 2000; St. Clair, 2003).

The desire to foster environmental literacy through stewardship was

an important aspect of the climate mitigation service-learning project at Pennsylvania State University in 2003. Because climate change is viewed by many as our most pressing environmental problem, this service-learning project is exemplary. Graduate students, faculty, and research staff collaborated with university personnel to inventory the university's greenhouse gas emissions and establish climate mitigation strategies at University Park, the main campus of Penn State. Students that worked on this project learned how to develop tools for measuring and reducing green house gas emissions, and they learned methods for creating climate change governance networks (Knuth, Nagle, Steur, & Yarnal, 2007).

The promotion of place-based education is also one of the prized qualities of environmental service-learning projects given that they often take place in local communities. Place-based education is premised on the idea that learning can be enhanced when it is grounded in local communities and ecosystems because in these settings students can actively explore communities and ecosystems, listen to and learn from community members, and develop skills necessary to meet community needs (Davies, 2010).

Assessments of service learning frequently provide evidence that it nourishes the learning opportunities tied to place-based education (Davies, 2010; England & Marcinkowski, 2007; Knuth, Nagle, Steuer, & Yarnal, 2007; Stemen, 2003). In a study at St. Francis Xavier University in Canada, for example, virtually all of the undergraduate biology students involved in a service-learning project conducted on local, organic farms reported that the experience of working in the community alongside farmers had a positive impact on the quality of their learning, and a number noted they had developed a much deeper understanding of local farming practices. As one student stated, 'Farms, especially dairy farms, are full of science and require many decisions to be made that are informed by science. The service-learning dimension of our course really helped me better understand that [fact]' (Sherman & MacDonald, 2009, p. 242).

Finally, environmental service-learning projects can facilitate hope-based learning. Hope-based learning is fostered when students leave the experience feeling more capable of making purposeful change, which will be increasingly important to foster as we spiral through the broad array of deepening, disheartening ecological crises we now face, such

as climate change, ocean acidification, and water shortages.

Sentiments of hope frequently do appear in student feedback about service-learning experiences. By way of example, environmental biology students at Georgia Southern University who were involved in a river cleanup reported feeling a shift in attitude – a belief that they could do something positive for the environment. As one student stated, ‘The fact that it was a class assignment no longer mattered. We had a purpose’ (Leege & Cawthorn, 2008, p. 35).

Although service learning can be a very effective pedagogical tool, it is not without critique. Four major sources of concern about service learning, in general, also apply to environmental service-learning projects. First, if the project is not connected to students’ academic work, the learning value of the experience can diminish dramatically. Students need to be able to make ‘analytical sense’ of the tasks they perform with the ideas examined in class: lectures, class discussions, and reflection papers are essential to this process (Sherman & MacDonald, 2009; Stemen, 2003). Second, service-learning projects can hurt local businesses and agencies that are located near universities if the student volunteers are replacing paid labor. Service-learning projects should be completed in organizations that do not have funds to support the service provided by the students (Talbert, Farnkhopt, Jones, & Houghtalen, 2003). Third, the student and faculty time commitment necessary to complete a service-learning project can be arduous. Some faculty have been able to minimize this concern by making sure the service was not an added assignment and, in turn, by connecting with well-established organizations that helped with the planning and implementation of the project (Sherman & MacDonald, 2009). Finally, some fear that service learning can shift students’ attention away from the larger, structural solutions to social and environmental problems given its focus on short-term volunteerism. Discussing macro solutions in class and asking students to include this perspective in their reflection term paper can help address this concern.

Most of the common problems associated with service learning, however, were not part of the experiences of the faculty that participated in the Maine Watershed Project. In general, the faculty felt the experience was worthwhile, useful, and enjoyable, as the case narratives readily demonstrate. Concomitantly, the faculty indicated that groupwork tied to the service learning was also a valuable learning process for

themselves and their students. For example, one faculty member indicated that by serving as a reference person who helped students understand their task, negotiate their roles, and form groups, she had learned how to use the classroom as a laboratory to model groupwork. Shantih (2100) notes that this is one of the latent, often-unexpected benefits of groupwork in classroom settings.

The students, in turn, were able to advance their interpersonal and communication skills through the experience of collectively managing the service-learning task. Equally as important, as one faculty member noted, was the fact that the groupwork gave students direct experience with social action. All too often, as Dudziak and Proffitt (2012) lament, educators presume that '[i]f students espouse a commitment to social justice, then somehow they will instinctively or magically translate this into action... [H]owever, we know that action does not automatically follow education' (p. 236). What is needed, as they underscore, is learning that occurs through the process of engaging in social action. Groupwork outside of the classroom provides that arena, as the faculty in the Maine Watershed found over the course their groupwork exercises. All of the above cited achievements are highlighted in the below interview summaries.

Methodology

As noted earlier, the three environmental service-learning projects profiled in this article were completed by liberal arts faculty that had participated in the Maine Watershed Project. Launched in 2005, the Maine Watershed Project is a 'greening the curriculum' initiative that offers workshops to encourage faculty in all disciplines to address environmental sustainability issues in their teaching. The goals of the project are to enhance faculty and student understanding of connections between human communities and the natural world, produce graduates who contribute to the social, environmental, and economic welfare of local and global communities, and help create a campus that models the principles of sustainability.

To demonstrate that faculty across the curriculum could meaningfully integrate environmental sustainability into their courses, we selected service-learning projects that had been completed in three liberal arts

disciplines – economics, art, and criminology. We conducted in-depth interviews designed to explore (1) various facets of their service-learning projects; (2) how their projects addressed environmental sustainability; and (3) the benefits and challenges of participation in the service-learning projects, both for students and faculty.

Environmental Service-Learning Projects

Course: Graduate Grant Writing (Department of Economics).

The goal of this course was to help graduate students become effective grant writers. Each week, students were provided with examples of sustainability issues important to the state of Maine. The course explored facets of different local, state, and regional funding bodies and examined how grant proposals could be written to satisfy their interests. The students – who represented a broad array of disciplines – worked in teams of two and were required to write a grant proposal that addressed a sustainability issue important to a community partner in Maine. Grants were written for nonprofit agencies, with whom the students consulted throughout the process. Concomitantly, the entire class held a grant writing workshop open to the community and university. The workshop, which was fully enrolled and lasted 2.5 hours, was organized around six training stations. Participants rotated through the student-run stations where they learned, for example, how to read a ‘Request for Proposal.’ Each participant left with a detailed handbook and set of exercises created by the students.

In this class the professor had always used a partnership approach, with collaborative projects that grouped students from diverse backgrounds. As she noted, the course teaches students that ‘grant writing is only a small degree about writing. Successful grants emerge from working effectively with others to draw out ideas. . . Grant writing is increasingly a team building activity.’ After participating in the Maine Watershed Project, she revised the course and found it to be enhanced by linking course material to the concept of reframing, a central means of accomplishing sustainability goals. Reframing is important because ‘sustainability’ is a somewhat abstract, even stratospheric, concept that often has little practical utility until it is reframed in the distinct local

context of a particular situation. For example, because of the large variety of contexts in which the term 'sustainability' is used, a Google search on the word by itself will be relatively useless for most applied problems. Grant writing presents a similar challenge: to write a successful proposal one cannot simply submit the same proposal to many sources and expect success; one needs to continually reframe issues for different funding sources. The professor was able to link reframing, grant writing, and sustainability in this way, using the diversity of the students' educational backgrounds (twelve disciplines were represented) and the community members' interests, to write a grant tailored to particular needs and opportunities. The group process in this course, then, was the pedagogical element that facilitated 'reframing' and gave students an opportunity to deepen their active listening skills. By engaging in dialogue with diverse populations, students were able to frame their proposals in ways they had not conceived of prior to working in groups.

Student experience.

The grant-writing projects embedded in this course provided experiences that helped students develop their civic capacities. As the professor noted, 'Working with [community] partners, students recognize the challenges they face in the future and are much better prepared to deal with them. They understand that their knowledge is ready to be applied.' Essentially, the students learned that community planning and networking were skills that warranted careful honing and development, but through their service-learning experiences, realized that both were within reach. The students also described their increased understanding of the complexities of working with groups. They came to see that their spoken group goals were as important as the unspoken ones, and also how to watch out for ways groups can fail to develop coherent and consistent approaches to problems they are trying to solve.

The professor also noted that the service-learning projects simultaneously allowed exploration of networking- and connectivity-related themes of sustainability, because in reframing an issue for a different audience, linkages are discovered and it becomes impossible to *not* see how interconnected things tend to be. Students reported seeing more new connections as a result of the approach than the professor had seen in earlier iterations of the course. Because the class was interactive, the diversity of backgrounds further contributed to

this result. For example, in one regular exercise where the professor brought in a news clipping (e.g., ‘City to hire a new bike and pedestrian staff person’), groups had the task of determining the best ways to frame a grant proposal around issues represented by the story. Students reported that hearing many ways of framing an issue helped them see new connections between topic areas. The student experience was also enriched by a service-learning component that culminated in conducting a grant writing workshop for faculty, staff, and community stakeholders on a local, sustainability-related project. This end-of-semester exercise allowed students to integrate themes they had learned into an organized package and present the material to interested parties. In moving into an ‘educator’ role with their new information, they enhanced their own learning retention while providing a community service.

Faculty experience

The course was a good example of hope-based learning: she found student responses to mean they left the course feeling inspired about their potential to help solve difficult environmental problems in society (e.g., ‘It was very hard, but great’ and ‘It’s not an approach I’d have taken before but now can see how linked my interests are to everything else. So many little and big connections!’). One of the goals of the course is to leave students with an enhanced sense of community and connectedness – the groupwork tied to grant writing and the community workshop seems to have hit that pedagogical target.

The professor also indicated that the course revisions she completed after participation in the Maine Watershed allowed her to evaluate benefits and drawbacks of using a central theme (reframing) that interweaves different types of content throughout a course. The experience was sufficiently positive for her to have since used a central theme approach in another class entitled Stakeholder Research and Participation.

Course: The Public Canvas: Art, Design, and Social Change (Art Department).

In this undergraduate course, students explore the history, theory, and practice of participatory art projects. Central to the course is an examination of how collaborative art projects within communities

help build connectedness and serve to raise awareness about social, political, and environmental issues. Through participation in the Maine Watershed Project, the professor came to understand issues of intergenerational equity in new ways. He revised his course and in the next semester presented 'The Intergenerational Community Art Project' as a primary activity. In this partially online course, students majoring in art and art education were able to conduct service-learning projects in multiple locations, including with high school students in Portland, Maine, and adult learners (age 40+) through Biddeford Adult Education (via the University of Maine Center at Saco).

Student experience

In Portland, students worked with high school art students and helped them prepare and digitize their art portfolios as supplements for their college applications. In Saco, students worked with adult learners at University College to use their artwork as a vehicle for describing their personal story and identifying future interests. The professor observed that student responses to the notion of 'connection between community artists' was greatly enhanced via the range of service-learning projects. Through conversation between students on different projects, the sense of young becoming old, of each generation being connected to the next – combined with art creation – allowed students to reflect in new ways on the core question of 'What do we leave for our children?' Most student discussion in this direction occurred in an online forum, where the sense of 'Aha, now I see...' was prevalent. In particular, whereas experiencing the joy of personal art expression is almost a given for an art major, involving the community in intimate discussions and art projects was novel for them, and connected them with a new impetus for their work: 'I have this gift and I want to share it and improve the lives of others.' The service-learning projects thus became a vehicle of hope for the students, that they could use art to create relationship and community – central goals of sustainability taught in the Maine Watershed Project. Importantly, work in small groups was an essential part of these service-learning experiences. For example all students communicated in online discussion boards about not only their class work but also details about how best to approach their group service learning projects. Similarly, for the community partnerships formed through the service-learning model, students were given strategies

for building community and trust *in the small groups* of the external constituencies (students) they worked with.

Faculty experience

The professor reported new understanding of how engaging the public in creative efforts can help communities become sustainable. Having observed creation of social capital through his class projects, he now structures other courses to span generations and categories of people. He also reported that in the national community art movement, little attention has been given to longer-term partnerships that live beyond the life of a project. His sense is that social capital generated through multi-generational service-learning can provide the depth necessary to render partnerships more long-lasting. He feels empowered because he is creating something with longevity outside the university; tangible benefits for local communities; and greater awareness of our obligations to future generations.

Course: Crimes Against the Environment: (Department of Criminology)

This course was designed to expose undergraduate criminology majors to many of the prominent controversies and challenges associated with defining, measuring, and responding to environmental degradation. Central to the course is the concept of hope-based learning. Drawing on both micro and macro environmental policies, the professor is interested in teaching students ways to turn the world in a different direction. Her goal is to have students leave the course feeling more capable of making change, both in their own lives and at the structural level of national policy. Service learning is one of the pedagogical elements she uses to teach both micro and macro environmental policies. The students always work in groups as the professor believes this helps them understand that people can come together for a common cause and make social change. Students in the course have, for example, removed invasive plants, changed the flow filters on water faucets, and conducted campus energy audits. After each project students have written a reflection paper that included a macro solution to the environmental problem addressed in their service.

Through participation in the Maine Watershed Project, the faculty

member became more confident about her ability to teach students how to winterize homes, an important carbon mitigation mechanism (winterizing homes entails looking for and addressing energy and heat loss areas, to permanently reduce energy bills and create less drafty structures). Because a variety of crises are emerging with climate change, giving students direct experience with carbon mitigation fits quite logically into the course. Armed with a caulking gun and a desire to foster hope-based learning, she designed a service learning-project that entailed winterizing the homes of low-income home energy assistance program clients. Winterization supplies were provided by the state agency responsible for dispersing energy assistance funds to low-income families in Maine.

Students worked in teams of four and each group winterized two homes over the course of one day. The students formed their groups in class. They were encouraged to ask their classmates sitting next to them to form a group, rather than friends. The hope was that students would work in more varied groups and get to know new people, thus enhancing their interpersonal skills.

The students' work included insulating water pipes, installing low-flow showerheads and compact florescent light bulbs, sealing drafty windows with plastic and caulk, and spraying foam into cracks in foundations. The groups divided up the work among themselves, and were therefore engaged in negotiation, information exchange, and problem-solving: the richness of group task roles were at play and seemed to work well, in most instances (Navickiene and Pevceviute, 2009).

Student experience

Class dynamics shifted after the service-learning project. Because students were required to work together to assess the winterization needs in each home, they had to strategize and solve problems collectively. Through this group experience, they came to know each other better, and as a result seemed less self-conscious about participating in class and were often more engaged in lively conversation with each other before class. The groupwork had helped develop their communication competence.

In their reflection papers, many students seemed genuinely moved by the experience of giving back to their community. As one group wrote

in their paper, 'When the group arrived at the house we winterized, we were welcomed with open arms. The couple gave us free rein over their house. Our entire group greatly appreciated the trust the couples had in us to take care of their home, and we know they appreciated our efforts as well.' This comment and others signaled that many students had developed a deeper understanding of the importance of civic engagement by working collectively in their communities.

During a class discussion, however, some students expressed frustration about winterizing homes of people who, in their minds, were not the 'deserving poor.' They commented on the size and good condition of the homes, and on the quality of consumer items in them. These comments led to a productive teaching moment: it allowed the class to discuss how quickly a middle-class family can slip below the poverty line through such forces as unemployment, disability, or lack of health insurance.

Faculty experience

As a community activist, the professor reported feeling exhilarated by the experience. She was delighted that her students were able to provide support to low-income families, and that they had also learned how to winterize buildings, which is a skill they could then use in their own homes to save money and cut down on carbon emissions. It was a powerful hope-based learning experience for the students, as she noted, 'given that the service-learning project provided a hands-on skill to help address the oil crisis in Maine, which is the most oil dependent state in the US.' She also noted that by helping set up the groups, negotiating and responding to questions and concerns from the students, and serving as a reference person, the project had helped her model groupwork in the classroom, which was an important pedagogical discovery.

The project, however, demanded significantly more time than simply assigning a traditional term paper, and it was not without small, micro disasters. One group of students sprayed a very rapidly expanding sealant foam on the inside windows of a home – an error that took a lot of energy and time to fix. Nonetheless, the professor left the experience feeling more prepared to expect-the-unexpected in subsequent service-learning initiatives. On balance, she felt time devoted to the project was rewarding and worth the extra effort, particularly since it was a way to foster a sense of civic responsibility in students.

Conclusion

As the case examples highlighted in this article suggest, service-learning projects do more than provide students with practical ways to see how concepts apply in the real world, and more than help the 'client' communities solve a problem. They also help the host university in a process of culture change toward principles of sustainability. Within that process, they also help individual faculty identify connections between their discipline and other fields of study they may not have seen before. In turn, faculty can become more empowered to address the community needs that are identified by students during their work in service-learning projects. In this way, the reciprocal applied-academic relationship between professor and student is enhanced over time, and the academy is allowed to embrace an organic, evolving role that is more responsive to societal needs.

Based on the number of revised course syllabi submitted to the Maine Watershed Project, the faculty participants have reached approximately 5,000 students with course improvements of the type described in this article. Additional support for the Maine Watershed Project continues from senior University administrators, and faculty demonstrate their unbending interest in the goals of this initiative through continued participation. In this manner, a bottom-up culture change has been launched toward learning outcomes that will help create a more sustainable future for USM and beyond. This culture change is also demonstrated by recent and major reform of USM's general education core, which now includes sustainability-related clusters and themes within and among majors.

In turn, the students' experience of 'learning by doing' was deeply enhanced through the vehicle of groupwork. In all of the service-learning projects, students were engaged in problem-solving tasks within groups that led to more effective service and interpersonal skill development. Their work entailed listening to each other, becoming aware of the strengths and weaknesses members brought to the group, and responding to members' concerns. Equally as important, students learned that groups could be organized to affect social action and change. As we spiral forward into a broad array of complex environmental challenges such as climate change and ocean acidification, now more than ever students need to believe that they can be change agents by working together with others, which is what groupwork can offer our students.

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