A Collaborative Learning Community on Service-Learning in Energy Conservation and Efficiency

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ABSTRACT

The Construction Management (CM) Program in Lyles College of Engineering (LCOE) at California State University, Fresno recently completed significant revisions in its undergraduate curriculum, which is now featuring hands-on sustainability education. Service-learning has become an integral component of three core courses at different levels: Freshman, sophomore, and senior. Each course mandates a minimum of 20-hour service-learning activities related to construction.

In the fall of 2012, as part of the Southern California Gas Energy Efficiency and Education (EEE) Initiative, the CSU Center for Community Engagement awarded the CM Program a grant in support of the development of a collaborative learning community including CM faculty, university service-learning staff, students, and community-based organizations. The goal was to enhance the quality of service-learning in energy conservation and efficiency. The CM faculty and community partners worked closely together throughout each semester to make continuous improvements in course contents and service-learning project activities. As a result students were provided with proper hands-on opportunities for deeper understanding of their course materials.

This paper shares the learning outcomes from the community development in fall 2012 and spring 2013.

INTRODUCTION

Service Learning (SL)

Service-learning is a unique experiential education program that often gets confused with other service-oriented education programs such as volunteerism, community service, internship, etc. What distinguishes it is SL emphasizes reciprocity by creating a learning opportunity for students while also serving the needs of a community. Therefore, rather than focusing on one or the other, SL highlights both services and academic learning during the same time period (Kretchmar, M, 2001).

The Service-Learning Development Committee at California State University, Fresno have adopted the following definition for service-learning for use on campus:

“Service-learning is a method where students learn by active participation in organized service that addresses community needs and is linked to academic study through structured reflection. The community needs may include direct service to people in need, improvement of community resources, applied research, community outreach and education, or policy analysis and advocacy. The academic study may be
in any discipline or combination of fields.” (Faculty Service Learning Resources Website, California State University, Fresno).

The university campus is located in Fresno, the largest city of the Central Valley in California. The valley is known as one of world’s most productive agricultural areas. However, for decades it has been struggling with a broad range of social, economic, and environmental challenges, such as water supply, air pollution, poverty, housing issues, etc. With the rapid population growth, these problems have become more severe and urgent. Undoubtedly, it’s an area with tremendous needs.

Meanwhile the construction sector was hit the hardest during the recession both nationwide and statewide, and has shown little or no growth since 2010 (Figure 1 and Figure 2). This further worsens the poverty rate and people’s living conditions. Students in construction-related majors are now facing a highly competitive job market that demands individuals with not only proper formal education, but also real work experiences, and the ability to explore and learn new concepts at work.

Despite the significant decrease in the number of paid internships before graduation, abundant SL opportunities are available for students to gain first-hand experience during this economic downturn. Students majoring in engineering and construction management must understand the complex world in which they will work after graduation. The traditional pedagogical models typically focus on theory and conceptual knowledge. Providing smaller, sustainable, and community-based projects can challenge students to apply their knowledge and skills to real-life projects for actual clients. It is also hoped that through this experience, students will grow to understand the needs and challenges of many underserved communities in the Central Valley.
The three SL courses listed in the new curriculum of Fresno State’s CM program are CM1S: CM Orientation (Freshman), CM7S: Construction Materials and Basic Building Systems (Sophomore), and CM180AS: CM Capstone I (Senior). Each requires a minimum of 20 hours of SL through one or multiple community-based organization(s) (CBOs). Expected total enrollment of the three courses is about 80-90 students each semester if all are offered. Depending on the anticipated academic learning outcomes, different courses may target at different SL activities, even if they may all occur on the same project(s). For instance, the materials course directs students to activities related to site review, as well as review of construction materials and components of a structure. Whereas students in the senior capstone course are expected to participate in activities that can practice their key skills on scope development, conceptual planning, business development, scheduling, estimating, bidding, etc.

Learning Communities (LC)

A learning community, as defined by Fulton and Riel (1999), is a group of people who are interested in a common topic or area and engage in collaborative knowledge sharing as well as valued activities. It is viewed as a “continual process of evolving education” for all participants (Fulton, K. and Riel, M, 1999). Woodruff (1999) suggested four cohesion factors for a learning community: function (the goal), identity (membership), discursive participation (the approach), and shared values (the global beliefs that unite the members).

In the fall of 2012, as part of the Southern California Gas Energy Efficiency and Education (EEE) Initiative, the CM Program at Fresno State received a grant
from the CSU Center for Community Engagement to develop a collaborative learning community. The goal of this particular LC was to enhance the quality of SL in energy conservation and efficiency. An inclusive learning environment was created with the following members from a variety of backgrounds: CM faculty (the SL course instructors), university SL staff (the advisors), student liaisons (the team leaders on selected SL projects), and CBOs (the organizations that provided the SL projects). The LC was formed in late fall of 2012 and worked closely together through spring 2013.

**THE SL COURSES**

In spring 2013, there were 15 students enrolled in CM1S (CM Orientation, 1 Unit), 23 students in CM7S (Construction Materials and Basic Building Systems, 3 Units), and 3 students in CM180AS (CM Capstone I, 1 Unit). CM180AS is a new course in the revised curriculum and was offered as an independent study course during this semester. Therefore 41 students needed to fulfill a minimum of 820 SL hours in total. The LC members met in late fall of 2012 to prescreen the potential SL projects for students. During the meetings, the CM faculty presented the learning goals (i.e. a set of key skills students were expected to gain and practice) for each course as well as the desired energy efficiency component. Projects were then selected and tailored accordingly. A CM SL fair was held on campus at the beginning of the spring semester in 2013, where students in SL courses met with the CBOs to learn about the available projects and various SL opportunities. A project sign-up sheet was created online and shared among students, faculty, and CBOs. The sign-up sheet served as a management hub for all projects. It provided information such as project description, location, available volunteering dates and hours, day-to-day SL activities, maximum number of volunteers each day, safety notes, tools required, as well as contact information.

Student liaisons were selected for some projects where CBOs were short-staffed thus more help was needed to recruit student volunteers and coordinate site activities.

LC members met monthly to plan for upcoming activities, discuss ongoing issues on current projects, share best practices, and provide immediate feedback to each other.

Ongoing reflection is a critical part of students’ SL experience. The DEAL model developed by Clayton and Ash (2004) was adopted here. Through in-class presentations, reflection papers, and group videos, students were asked to “describe” their experience in an objective and detailed manner, “examine” their learning regarding academic goals, personal growth, and civic skills, and lastly “articulate” their “learning” in terms of setting new goals for the future (Clayton and Ash, 2004).

**The SL projects**

A wide range of SL projects were provided to students by the CBOs in the LC during spring 2013. Most students participated in one or more of the following projects:
Project A (Provided by Grid Alternatives (GA)): Students attended a mandatory GA orientation seminar on solar panel installation, then installed a solar electrical system for a low-income home in Fresno under the supervision of GA professionals.

Project B (Provided by GA): Students first took a series of energy efficiency training sessions from GA where they learned how to conduct energy audits. Then they were asked to research and evaluate GA’s current energy efficiency curriculum and provide recommendations for improvements. After the recommendations were reviewed, approved, and adopted, students were given the task to deliver energy efficiency training workshops on behalf of GA to GA clients (low-income homeowners of old homes in this case). And lastly they participated in 5 household retrofits providing installation of energy efficient lighting and power saving electrical strips in GA client homes. This project greatly benefited all parties involved and became a model we would like to apply to many of our future SL projects.

Project C (Provided by Stone Soup Fresno): Students conducted energy efficiency upgrades in several Stone Soup’s buildings: Removed a total of 74 single-pane windows, built 2-ft stem walls with R-13 insulation, and installed energy-efficient dual pane windows.

Project D (Provided by Stone Soup Fresno): A small group of senior students examined the existing conditions of Stone Soup’s community center and child care center, developed different renovation options per owner’s request, provided material lists, cost estimates, construction schedules, and potential safety issues during renovation. The same group of students is currently managing the implementation of the proposed renovation (in fall 2013).

Project E (Provided by FUND): Students helped remodel an old veteran’s home in downtown Fresno. Work included mostly interior finishes and landscape.

Project F (Provided by Self-Help Enterprises): Students participated in new home construction at various stages for low-income families in Reedley, CA.

SUMMARY OF FINDINGS

Students’ feedback
Out of the 41 students who completed their SL courses in spring 2013, 40 (98%) completed the mandatory 20 hours of SL. A separate survey was conducted in CM7S (Construction Materials and Basic Building Systems). The result showed that 18 out of 23 (78%) students completed 30 or more hours, which was significantly higher than the CM7S class in fall 2012, where only 3 out of 21 (14%) students completed 30 or more SL hours. In addition, 8 out of 23 (35%) students in CM7S worked on more than one project. One student wrote in his reflection paper: “I developed a sense of compassion towards my work, and wanted to see it finished regardless of the time I spent on it.”
The survey results indicated that majority of the students had a very positive experience on their sites. 96% students answered either “Agree” or “Strongly Agree” to the following statements: (1) Their tasks/assignments were clear; (2) Their time was used effectively; (3) They had enough contact with their supervisors; (4) Other staff onsite were supportive of them and their work; (5) They felt their service was appreciated; and (6) Overall the SL experience helped them better understand the course content.

All students stated in the survey that they would like to continue to serve at the site(s) they worked at. A student liaison wrote: “My team took pride into what we were doing and wanted to do the best we could. It feels satisfying that every time I pass by Stone Soup. I can say I was part of this positive impact.”. Another student who participated in both GA projects (solar installation and energy audit) commented: “The most important lesson that I feel I was reinsured this semester was the joy that one gets from helping those in need, and the opportunity that I was given to better the lives of my fellow man.” A well-planned SL project clearly has a lasting positive effect on a student’s personal and interpersonal development, as well as the sense of social responsibility and citizenship skills.

CBOs’ feedback

All CBOs were invited to attend the student presentations at the end of the spring semester. A post-semester survey was also conducted among the CBOs with similar questions to the student survey. Again the responses were very positive. A FUND representative wrote: “This year was one of great growth in the effectiveness of our program to offer a more comprehensive service learning experience to the students who participated with us. Thanks to the entire faculty who are so diligently working to make this an integrated part of their student’s educational experience and your patience with us as we continue to discover and refine our role in this process.” A GA representative commented: “I felt that there was good communication between the instructors, students, and our agency. Our project ran smoothly.”

Working with industry professionals on actual projects increases career awareness and engagement of students in their coursework and programs. It’s the first time we placed student liaisons on our SL projects and we had a great experience. Even though it’s an unpaid leadership position, these students took ownership and played a central role on their assigned projects. We observed increased student participation and better-organized activities onsite. Having students be in charge of a small part of a project helps engage them in the work they do and stimulate more interests. The CBOs were very pleased with the improved outcomes. As a result, at the end of the semester, three agencies offered paid internships to our students.

Challenges

The major obstacle for the CM faculty as the SL organizer was logistics: Balancing the demands and needs from both students and CBOs. Keeping various projects on schedule with sufficient amount of student volunteers was challenging. Some other obstacles were: Ensuring students demonstrate proper professionalism on volunteer work and receive purposeful mentoring onsite. We were able to solve most of these issues as they were addressed during our LC meetings.
Future development

Our next goal is to focus on strengthening different sets of skills for students at different levels through the SL projects, with the support of the LC. A more rigorous and sustainable project selection process will be developed and implemented. Students in senior capstone courses will be planning and managing future SL projects with volunteers from the freshman and sophomore level SL courses. Guidelines on project documentation and best practices for SL processes and procedures also need to be developed to ensure an effective learning environment.

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REFERENCES


Faculty Service Learning Resources Website, California State University, Fresno: <http://www.fresnostate.edu/academics/cesl/facultysl//one/definition.html> (Sept 16, 2013).

