

The Benefits of Incorporating a Service Learning Project into an Engineering Technology Course at Farmingdale State College

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Abstract:

From 2009 to 2015, 208 Construction Design students at Farmingdale State College have completed a service learning project for 7 community partners and 51 buildings were visited, sketched, measured, photographed and drawn as existing condition drawings with energy efficient retrofit details using computer drafting programs. In addition, one section of 22 Graphics I students manually prepared existing condition drawings for one veterans' facility, bringing the total number of students who have completed a service learning project in two different courses to 230 students and 52 building measured for seven community different community partners. Service learning is defined by Bringle & Hatcher as "a course-based, credit-bearing educational experience in which students participate in an organized service activity that meets identified community needs, and reflect on the service activity in such a way as to gain further understanding of course content, a broader appreciation of the discipline, and an enhanced sense of personal values and civic responsibility."¹ This paper will provide faculty with the relative benefits of incorporating a service learning project into an engineering technology course.

Introduction:

"This project was one of my most memorable learning experiences, and beneficial for the community of the Town of Islip," a reflection by a 2014 Farmingdale State College, Construction Design, service learning student.

Farmingdale State College is a college of applied technology, State University of New York, serving a majority commuter student population. Many of students in our two programs - Architectural Engineering Technology and Construction Management Engineering Technology - are from diverse backgrounds, hold down jobs, part-time or full-time, and some support families. With their hectic schedules on and off-campus, they have little time to engage in co-curricular activities outside of class time that would enrich their education. Opportunities to "go into the field" through class site visits and field trips during class time, and individual or team research projects where students gather information from various sources, are welcomed by most students. These opportunities require them to explore their course subject outside of the classroom. Service learning goes further than any of these teaching methods. It embeds the student, individually or in teams, into a credit-bearing learning environment where they have a real community client and a real project, and where they can see, and earn appreciation for, their class work and enhanced civic responsibility.¹ As part of the service learning experience it is

important to for the students to reflect on their learning and the mutual benefit that they and their community partners gain from their work.²

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Background:

The author first incorporated a service learning project into a course titled Construction Design in spring 2009. Construction Design (ARC 282) is a sophomore course that is now required in both of the departmental programs – Architectural Engineering Technology and Construction Management Engineering Technology. Prior to 2016, this course was three credits and was held once a week for 4 hours. Starting in spring 2016 Construction Design is now four credits and held for 5 hours once a week. The current catalog description for Construction Design (ARC 282) states:

“Construction Design is a technology-based design studio emphasizing a methodological approach to the assembly of the building’s envelope, materials and systems. The integration of building code requirements, life safety, accessibility, building energy systems, structure, construction, and materials are central to effectively achieving design intent. Knowledge from Materials and Method of Construction I and II, Energy in Buildings and Graphics are applied to specific drawing assignments. A residential Type V construction, and a commercial Type II or Type III construction, building project will be advanced, resulting in a set of construction documents. Note: This course includes a required laboratory designed to provide extra time for the studio experience.”³

Prior to joining Farmingdale State College, the author was an architect and Community Development Project Supervisor working for the Town of Islip, in Islip, New York. While examining possible ideas for this project and matching them to the course learning objectives, a serendipitous event occurred. United States Congressman Steve Israel and Town of Islip Councilman Gene Parrington contacted our department seeking help with the production of existing condition construction drawings for 12 local veterans' facilities that had fallen into disrepair and needed funding for renovations. Their goal was to apply for renovation grant funding from the House of Appropriations Subcommittee on Military Construction and Veterans Affairs. This project initiated service learning in the Construction Design course. The existing condition drawings that teams of students in this course produced aided in the award of a \$500K government funding to the veterans facilities for building repairs.⁴ In addition students in a freshman Graphics I manual drafting course prepared existing condition drawings for one additional veterans' facility that aided them in the award of a municipal grant to renovate their structure and make it ADA compliant.

Community Partners:

Since the first service learning projects with local veterans' organizations, the students in Construction Design have worked with different community partners including fire districts, and different local municipalities. In some cases, the community partner has approached the faculty member/author for assistance with projects and in other instances the faculty member/author has contacted local nonprofit agencies to offer service learning course project assistance. The service learning community partners that we have worked with on this project need the students' help to produce existing condition construction drawings, and energy efficient retrofit details, for their facilities. Many of them do not have any usable drawings of their facilities due to the fact they were not required to apply for building permits for their own facilities, or drawings were lost. They need drawings for a variety of reasons including space planning, emergency preparedness and to initiate renovation and building addition projects with architects. In this service learning project, student teams serve local non-profits by visiting their facilities, discussing the building with the site management staff, measuring and photographing each building, inside and outside, and returning to the computer lab to digitally draft the building into construction drawings (plans, sections, elevations and details.). Students are also required to research energy efficient construction, and analyze the building exterior walls and roof and design energy efficient renovation details. The Construction Design service learning project is the first of its kind in the School of Engineering Technology, Farmingdale State College, and is performed to date without extra funding or support.⁴

Construction Design Service Learning Goals and Benefits:

This section is broken up into initial intended goals and additional beneficial goals. The initial intended goals of integrating a service learning project into Construction Design were to achieve the following:

1. Revise the second project in this course which required the students in teams of two, to prepare construction drawings of a simple commercial building, with an active service learning team project that provides the students with an opportunity to practice their newly learned skills while aiding a local nonprofit. In this new project they visit, sketch, measure and draw a building in the community, during class time, and research and design possible energy saving retrofit construction details. These are marketable skills.
2. Provide a non-profit community partner with existing condition drawings of their buildings and include possible ideas to increase the buildings' energy efficiency. Many non-profits such as local governmental agencies do not have existing condition drawings of their older facilities.
3. Provide our students with the opportunity to interact with a "real world" client in a professional manner.
4. Have class discussions on the students' projects and encourage reflection on their learning and community engagement activities. "Study without reflection is a waste of time, reflection without study is dangerous," according to Confucius. Reflection is essential to

benefit fully from service learning. Per the Association of American Colleges and Universities (AACU) Civic Engagement Value Rubric, a service learning class is: “A course-based educational experience in which students participate in an organized service activity and reflect on the experience in such a way as to gain further understanding of course content, a broader appreciation of the discipline, and an enhanced sense of personal values and civic responsibility.”⁵

5. Fulfill the Mission of the College by increasing student engagement, connect with community partners and complete real world work outside of the classroom. The Mission Statement of our college includes a commitment to “service to society,” “enhance student activities and services beyond the classroom in order to support and enrich learning and promote career, social, and personal development for diverse student populations” and offering programs that “meet the needs of regional employers.”⁶

Additional Unintended but Beneficial Outcomes:

The following are additional benefits that resulted from this project:

6. An unexpected benefit for a community partner was the use of the drawings in the wake of Super Storm Sandy. The community partner informed us that they used the student-produced existing condition drawings to plan how they could move seniors and town offices affected by the hurricane’s wind and flood damage to other senior centers that were not affected.
7. Students felt empowered and proud of their achievements – both academic and civic. Markus et al. note that “Students in service-learning sections of the course were significantly more likely than those in the traditional discussion sections to report that they had performed up to their potential in the course, had learned to apply principles from the course to new situations, and had developed a greater awareness of societal problems. Classroom learning and course grades also increased significantly as a result of students’ participation in course-relevant community service.”⁷
8. This service learning project provided a collaborative learning activity to increase student-to-student and student-to-faculty interaction. Per a number of studies, students who are engaged in service-learning projects state that they have stronger faculty relationships as a result of the service learning than those who are not involved in service-learning projects.⁸ This has been shown to increase student retention.⁹ Students work closely together in teams on their own assigned buildings to fulfill the sequence of parts needed to complete the project – site visit, sketches, measurements, photographs, generation of energy efficient retrofit detail ideas, draft drawing and submissions, and final drawings and submissions.
9. Student leadership and time management skills were improved through this exercise. Students are in teams of two for this project. One student in each team is the team leader in the field for drawing, measuring and photographing their assigned building, and the other student is the team leader in the classroom for drawing production. Students have draft and final drawing submissions that are at set deadlines, similar to normal construction project drawing deadlines. Per one service learning student in this course, “There is a big difference between learning in a classroom and actually going into the field. This project helped me get

used to working in teams on the field. We assigned each other specific tasks and started working. I am proud to have this project in my portfolio to show to a potential employer one day.”

10. Students participate in a project that produces drawings and plans that they can use to start their architecture/construction management resumes, portfolios and graduate school applications.
11. These Construction Design service learning projects have been featured in two newspaper articles and on the College website, and two municipalities have awarded citations to the students and the faculty member for their work on these projects. This public recognition has reinforced the students’ pride in working on a project that has aided their community.
12. Through presentations on these service learning projects, the author has shared her experience and inspired other faculty members, in various fields of study, to consider and embark on service learning activities in their courses and programs.⁴

Service Learning Project Facilitator Preliminaries:

The initiation of a service learning project encompasses a number of items to consider and a considerable amount of time. This project discussed here has been performed without any additional funds or compensation. Although the following list is specific to the Construction Design Service Learning project discussed here, the intention is to provide a guideline for a prospective facilitator’s consideration:

- a. Examine your course, institution and accreditation outcomes statements and explore the possible service learning activities that you can incorporate.
- b. Brainstorm ideas for your service learning project and reach out to potential community partners to discuss ideas and receive their feedback.
- c. Select the project that meets the needs of your institution, department, course, students, community partner and your goals for the project.
- d. Question if your project goals can be performed by your students in the time frame given. Redesign and re-evaluation may be needed to fit the time frame.
- e. Examine to what extent students can perform service learning project tasks without encroaching on the work of professionals in your field.
- f. Discuss your service learning idea with your department and institution and seek approval if warranted.
- g. Seek guidance from your campus administration and support services regarding legal waivers that the students and/or community partner must sign to proceed with your project

- h. Visit service learning site locations, inspect where students will be working and speak with various members of the community partner's group.
- i. Obtain and keep a list of all contacts and distribute this information to everyone involved in your project.
- j. Prepare all off-campus travel request paperwork, and liability waivers, and submit by necessary deadlines.
- k. Prepare and facilitate an in-class meeting with your students prior to the service learning project start date and distribute paperwork and assignments.
- l. Visit each student group at their service learning project locations and answer questions and provide guidance on their project.
- m. Facilitate work draft and final production, and discussion and reflection on the project when students return to the classroom.
- n. Deliver project outcomes to the community partner at a campus reception or at their headquarters. Encourage student involvement in the celebration of the conclusion of their project.
- o. Document the learnings from each project to inform future project planning.⁴

Conclusion:

The Construction Design Existing Condition Construction Drawings Service Learning Team Project changed an existing classroom-based drafting project where students copied drawings on a sheet of paper into the computer, to a real project for a real client. In this new project students examined, sketched, measured, photographed and drafted the structure in addition to researching, analyzing and designing how they would improve its exterior construction for energy efficiency of an actual building, for a real client. Students of all backgrounds worked in teams during class time to help a community partner who needed their skills. Everyone involved in this project has benefited by the newly formed relationships and work produced. Considering the relative benefits of this type of project, faculty are encouraged to consider the incorporation of service learning into their courses.

¹ Bringle, R. B., & Hatcher, J. A. (1996). Implementing service learning in higher education. *The Journal of Higher Education*, 67(2), 221.

² Jacoby, B. (1996) *Service-learning in higher education: concepts and practices*. San Francisco, CA: Jossey-Bass.

³ Farmingdale State College 2015-2016 Catalog <http://www.farmingdale.edu/registrar/pdf/fsc-college-catalog-2015-2106.pdf>, 118

⁴ LoPiccolo, Orla, (2015), *Promoting Social Justice Through Service Learning*, presented as part of "Social Justice Across Farmingdale State College: In the Classroom, Via Co-Curricular Efforts, and through Community

Outreach” at the Faculty Resource Network 2015 National Symposium: "Advancing Social Justice From Classroom to Community," Washington D.C., November 20-21, 2015

⁵ AACU Civic Engagement Rubric <https://www.aacu.org/civic-engagement-value-rubric> retrieved 02.28.16

⁶ Farmingdale State College Mission of the College, <http://www.farmingdale.edu/about/mission.shtml> retrieved 02.28.16

⁷ Markus, G. B., Howard, J. P. F., & King, D. C. (1993). *Notes: integrating community service and classroom instruction enhances learning: results from an experiment*. *Educational Evaluation and Policy Analysis*, 15: 410-419. doi: 10.3102/01623737015004410

⁸ Astin, A.W., & Sax, L.J. (1998). *How undergraduates are affected by service participation*. *Journal of College Student Development*, 39, 251-263

⁹ Schulte, L., et al, Undergraduate Faculty and Student Perceptions of the Ethical Climate and its Importance in Retention, *College Student Journal*, Dec 2001, Vol., 35 Issue 4, p565