



International Conference on Sustainable Design, Engineering and Construction  
Service learning for sustainability: a tale of two projects

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**Abstract**

Service learning is a mechanism used in engineering and construction curricula as a means of engaging students in interesting and complex problems that benefit the community while providing an opportunity to develop competencies that will be essential in professional practice. Such projects are particularly effective in exposing students to issues otherwise difficult to teach in a classroom setting, including critical resource constraints and tactics to overcome them, tradeoffs among possible solution alternatives, integration of systems, and the human and organizational challenges of design and implementation. However, the risks and challenges involved in integrating these projects within classes and managing student involvement lead them to be underutilized in many curricula. This paper describes experiences with two separate community-based service learning projects undertaken as part of a joint undergraduate-graduate class on sustainable facility systems at Virginia Tech. While projects were initially designed to be of similar scope and difficulty, the outcomes were dramatically different from a project management and implementation standpoint, and learning outcomes for students were also different. Lessons learned are presented for the benefit of others considering expanded service learning as part of coursework on sustainability in engineering and construction curricula.

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Peer-review under responsibility of the organizing committee of ICSDEC 2016

*Keywords:* service learning; teaching sustainability; construction

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**1. Introduction**

Service learning in the Myers-Lawson School of Construction (MLSoC) at Virginia Tech occurs in many ways. From international trips to developing countries over spring break to designing and building solutions in the local community, students and faculty in the MLSoC find opportunities to learn while applying while working to help others in many ways. Sustainability-related service learning for construction students is part of these efforts, which author Pearce has led as the primary instructor of sustainability courses within the school. Since 1997, Pearce has incorporated hands-on learning exercises in sustainable construction classes as a means of introducing students to the

challenges of design and construction of a number of projects using alternate means, methods, and objectives. Author Manion has managed more design-based service learning initiatives at the University of Maine, but has recently been doing more hands-on construction projects. This paper first presents a review of literature covering hands-on service learning projects, selection, challenges and applications in sustainability education. Then a new conjoint course experience at Virginia Tech is introduced and the two projects from the spring 2015 semester are presented. Finally, the last section of the paper is a discussion of the lessons learned and recommendations for future projects.

## 2. Review of literature

Community service projects are a natural component of engineering and construction education programs, largely because of the public service orientation of their respective professions. Many students love to get out of the traditional classroom working with their hands and minds to solve real problems and/or build something meaningful. The concept of service learning builds on this tendency, adding explicitly-stated and assessed educational components to create a broader beneficial learning experience. It is not just a recently developed pedagogical approach, having “modern” roots in the social activism of the 1960s, followed by community service for democracy and citizenship in the 1970s and 80s, and finally as an educational tool beginning in the 1990s [1]. Now, many educational practitioners understand that learning through service can be very effective, providing students with opportunities to develop professional and independent learning skills as well. However, many authors, for example as Burr and Martin [2] and Clevenger and Ozbek [3], emphasize the absolute need for sufficient time to reflect throughout and after the service process. Moreover, it is easy to become trapped in the necessity to complete the project, but “A successful project completion is but one of the goals of a service learning class, achievement of the learning objectives is equally important.” [4]

Some of the earliest evidence of documented service learning in construction education is at Colorado State University in the late 1990s [5], where students did residential remodeling as part of a senior-level required course. At that time, the author acknowledged students’ volunteer work with organizations such as Habitat for Humanity, but noted that that a lack of reflection prevented much academic learning from such exercises. Therefore, the early service learning work in construction education was largely based on practices borrowed from the social sciences [5]. Several years later, a survey of Associated Schools of Construction member institutions revealed only three programs with formalized service learning [6]. Both Senior [5] and Tinker and Tramel [6] called for a body of scholarship in construction service learning to be developed, which has been evolving. A recent literature search revealed a number of programs that have documented their hand-on construction service learning coursework, including “Rebuilding Together” at California State University Sacramento [7], a two-credit technical elective with residential remodeling at California Polytechnic State University San Luis Obispo [1], the “Hard Hats” project at East Carolina University [8], a spring break residential construction management project at the University of Nebraska [9], the sustainability-focused “CM Cares” program at Colorado State University [10], a two-course combination of upper and lower division students at Boise State University [11], the American Indian Housing Initiative at Penn State, providing sustainable housing for the Northern Cheyenne Tribe in Montana [12], and in many places throughout a revised curriculum at California State University, Fresno [13]. From the diversity of implementation and styles of these programs, it’s clear that service learning as an educational strategy is growing in many different ways, with a variety of different community partners.

Thus, the body of knowledge for implementation of service learning projects in construction management is growing steadily. For instructors considering service learning, Cline and Kroth [11] present the following list of parameters for a good service learning project, which should:

1. Allow the learner to practice construction management academic skills learned in the classroom using real-life experiential learning;
2. Provide an opportunity for the learner to interact with project recipients;
3. Be feasible, considering the amount of time available in the specific CM course;
4. Be complex enough to allow the learner to be challenged, but not overwhelmed;
5. Contain an element that will allow for learning through reflection;

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