

Service-Learning: A Win-Win Resource for Construction Education

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Service-learning is a form of experiential education that uses the context of a service project to practice academic skills, solve a real project, and learn from the project in a reflective manner. This paper discusses the elements and need for this educational tool, and provides an example of how it was applied to a scheduling course at Colorado State University. The challenges to the adoption of service learning are considered, and a Conclusion section summarizes the discussion and reflects on the future of this approach.

Key Words: Service-learning, Experiential education, Undergraduate education

Introduction

The nature of construction education should require as much emphasis in forming a student's character as in providing the formal knowledge required for planning and managing a project. The hiring policies for new graduates of the vast majority of the construction industry reflect this fact. Although a good academic record is part of the stated requisites, what really makes a difference is the character of a job applicant. Despite its importance, very few pedagogical tools are commonly used to foster a student's character formation.

This paper describes a relatively new pedagogical resource called service-learning. It is a form of experiential education in which the student is guided through a service-oriented project. By offering a high level of autonomy and reflection, it helps significantly in buttressing character along with traditional learning objectives. The philosophy and elements of this tool are discussed here, along with some of the implementation issues found while integrating it into a construction course at Colorado State University. Finally, the challenges of this new pedagogical tool are discussed, followed by a Conclusion section.

Basics of Service-Learning

The National Society for Experiential Education has defined service-learning as "any carefully monitored service experience in which a student has intentional learning goals and reflects actively on what he or she is learning throughout the experience." (Furco, 1994). This definition requires some further discussion, since the term "service-learning" has been applied to many forms of experiential education.

Figure 1 shows the distinctions among experiential programs in a graphical format.

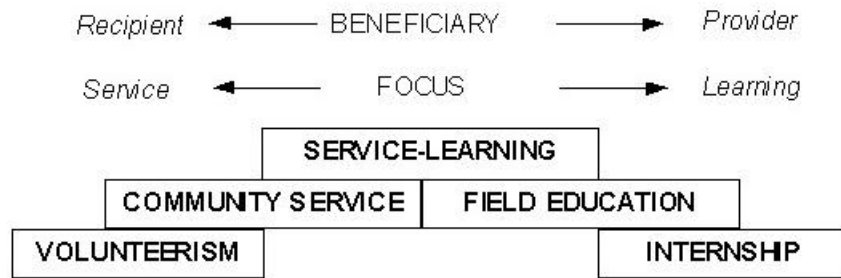


Figure 1. Distinctions Among Service Programs (Furco, 1996)

Figure 1 shows how service-learning requires that both the recipient and the provider benefit from the experience. This is a fundamental distinction between service-learning and community service or volunteerism, where the provider of the service does not intend to realize any personal gain. On the other hand, an internship makes the service component accessory to the technical training, or absent altogether. A mutually beneficial situation could result, for instance, from engaging a class in building a house for *Habitat for Humanity*™. While *Habitat* will benefit from the finished house, the students will also benefit from the experience.

An important element of service-learning is the need for a deliberate learning goal. In the *Habitat for Humanity* example, if students would simply show up to work without any programmatic design from the class instructor, the experience would qualify as volunteerism, but not as service-learning.

Perhaps the most difficult component of service-learning is the need to introduce reflection into the learning experience. However, it is a well established fact that “we learn through combinations of thought and action, reflection and practice, theory and application.” (Kendall, 1988). This implies discussing “intellectual, civic, ethical, moral, cross-cultural, career, or personal [goals].” (Kendall, 1990). Using the *Habitat for Humanity* setting again, some valid topics could be: why should homeless people be given a subsidized or free home? How do other countries deal with the problem of homeless people? How could the cost of the house built be lower? Should the code regulations be different for this type of construction? It is part of the instructor’s duties to think in advance and discuss such topics with the students. Reflection should not be postponed to the end of the experience, but be part of it as it unfolds.

Need for Service-Learning

In order to appreciate the need and advantages of service-learning, it is necessary to locate it in the big picture of today’s higher education. Many recent articles have criticized the current environment in institutions of higher education for their “indifferent undergraduate teaching, overemphasis on esoteric research, failure to promote moral character and civic consciousness, and narrow focus on preparing graduates for the job market” (Jacoby, 1996). This failure to nurture civic character was revealed even more dramatically in a 1993 survey (Levine, 1994), which found that 64 percent of college students were involved in some type of volunteer activity.

This figure was consistent regardless of the type of higher education institution, gender, race or region. For example, it was 68 percent for universities, 67 percent for four-year colleges, and 59 percent for community colleges. Since very few institutions or programs include service as part of their formal goals, it appears that students have undertaken this part of their education on their own.

As service-learning is a form of experiential learning, it offers all the advantages of expanding knowledge acquisition with practical exposure. In virtually all-modern learning theories, the need for such hands-on opportunities is a central component. For example, Bloom's Taxonomy (Bloom et al., 1956) identifies six major divisions of cognitive domain: knowledge, comprehension, application, analysis, synthesis, and evaluation. Service-learning applied to construction does not address directly the knowledge domain (i.e., the technical facts required to solve a problem), but fits very well into the others. Solving a typical service-learning problem requires a deeper understanding of the meaning of technical alternatives than the simple aggregation of technical facts (comprehension domain). It also requires the application of these facts in a particular concrete situation (application domain); the breaking down of a relatively complex problem into manageable pieces, and then finding a wholistic solution to these pieces (analysis and synthesis domains). A reflective assessment of the problem and the applied solution (evaluation domain) is a central element of service learning. A similar coherence can be found between service-learning and other learning theories such as Perry's Theory of Development of College Students (Perry, 1970; Culver, 1985) and Kolb's Learning Cycle (Kolb, 1984).

The strengthening of character through service is less discussed in the literature, and here the construction industry can offer excellent testimonies of improvement and even dramatic change in the character of many participants in internships and similar practical experiences. Time Magazine conducted a survey of 608 middle and high school students with some previous exposure to community service. It found that 75 percent of the students said that they "learned more during community service than in a typical class." (Cloud, 1997). Although some judgement must be exerted to extrapolate these results to construction students engaged in service-learning, they show that Bloom's taxonomy (Bloom et al., 1956) seems to hold true insofar as the educational value of service in general.

Implementing Service-Learning at Colorado State University

Colorado State University (CSU) has had many successful cases with service-learning integration. For instance, a business management course was recently modified to include service-learning. Students in the class volunteer in elementary schools to introduce principles of economics to first to sixth graders, using a variety of teaching techniques. It was reported "college students that participate in this program walk away with greater self-confidence and a better understanding of not only what they learn in class, but how they can make a difference in the community" (CSU, 1997).

There have been few attempts to integrate service-learning in the construction curriculum. This section discusses how IS-461, *Construction Project Scheduling and Cost Control* (now

designated as MC-461) was modified to integrate a module of service-learning. A more complete review has been presented elsewhere (Senior, 1998). IS-461 is a required senior course in the Construction Management curriculum at CSU. It is offered in all regular semesters, and has an average enrollment of 28 students for each section, who typically have taken courses on estimating (a prerequisite), safety, and can take construction administration concurrently. A traditional lecture/laboratory format, slightly adjusted to accommodate each instructor's teaching style, had been used for many years to deliver its contents. Although service-learning can be introduced in other courses such as in a capstone experience, the circumstance of the author being the instructor for IS-461 for the 1997 spring semester (when this module was introduced) was the primary reason to choose this course.

A local service agency called Neighbor-to-Neighbor (N2N) was offered a relatively old house that was going to be demolished to make space for a subdivision development project. N2N was interested in converting the house into a two-family condominium that could be sold at a profit. The house was in good condition. However, N2N had no in-house expertise to develop such a project. The role of the IS-461 students was to provide a design of the remodeled project, and a total, although preliminary, report to N2N of its technical and financial implications. CSU has a Service Integration Project, which operates as an independently staffed unit of the Office of Community Services. This office was instrumental in obtaining the N2N project.

The original house owner, N2N's executive director, a financial agent, and a contractor specializing in total house relocations participated in a brainstorming session with the IS-461 students to develop the project scope. After discussing what was required to help N2N, the tasks shown in Table 1 emerged.

Table 1

Tasks for the N2N Project

1. Proposed new layouts.
 2. Technical and resource requirements.
 - a. Moving.
 - b. Renovation alternatives.
 3. Administrative requirements.
 - a. Regulations.
 - b. Risk avoidance.
 4. Preliminary estimate.
 5. Preliminary schedule.
 6. Final report.
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The class was divided into groups of three to four students, each in charge of one of the tasks presented in Table 1. The Construction Management program at CSU tends to include non-traditional, older students, who have had construction experience. In this particular case, the class included an architect; the owner of a restaurant with the consequent business experience; several students with prior construction experience, and several officers of the program's professional student chapters. However, more than 15 of the 30 students registered for the class had no prior business or construction experience. Unfortunately, good students and leaders tended to team up with other good students and leaders. This fact resulted in a disparity in the

quality of the teams. A solution to this could have been forcing the team composition, but it was felt that doing so would have made the experience feel like an imposition. It was decided to leave the teams, as they were naturally composed. The solution to this dilemma of quality control was to designate two non-traditional, experienced students to control the overall quality of the effort. The instructor confirmed any problem reported by the “QC inspectors,” and helped in solving it.

The next step was a field trip to the house. It gave a much more concrete sense of the project to the students, and began the actual work in the project. The contractor specializing in house relocation provided a tour of a house nearby that was being moved. This provided a better understanding of the relocation requirements, and by the unusual nature of the operation, gave students a sense that there were technical lessons to learn from the project.

A total of four weeks were allocated to actual work, including writing the final report. This relatively tight schedule was due to the need of N2N to meet a deadline to compete for government funds. During this period, the student groups met with outside consultants, authorities and N2N executives. The level of cooperation from these external sources was, in general, remarkably good.

After the report was delivered, a lecture session was devoted to reflecting about what was learned from the project. This reflective analysis proved to be crucial for the internalization of the experience, and to put its importance in perspective.

The reflection session had the structure recommended by CSU’s Service Integration Project (more information can be requested at ccleary@vines.colostate.edu) and others. It began with an objective description of what was done, then an assessment of what the experience meant at the student’s personal level, and finally, some discussion of what should be done next. In general, several reflective sessions are recommended for a service-learning experience. The fact that only one was conducted in this case reflects more the instructor’s inexperience in this field than any deliberate decision.

Overall, the service-learning experience was very positive for the majority of the students in the class. In the student evaluation of the course at the end of the semester, service-learning was consistently considered to have enhanced the learning of the course contents.

Challenges to Service-Learning

Although the previous sections have shown that service-learning is a powerful pedagogical resource, its challenges and limitations must also be discussed.

The first challenge to service-learning comes from the recentness of its application to technical fields such as construction management. In areas of study such as social work, students are expected to gain a deep understanding of their community. There is an evident link between service-learning and their educational goals. This is not the case in construction education. An instructor trying to implement service-learning in a course has the burden of the proof to convince others of the merits of this approach. An extensive literature search was conducted

before implementing this project, and it became apparent that another consequence of this absence of precedent is that there is no “little black book” of lessons learned specifically for construction education. In contrast, there is a sizable body of literature offering insights about experience gained from implementing service-learning in the social areas. However, even though this literature has been developed by social scientists, they can be valuable tools to guide the construction educator.

Another challenging area for an instructor implementing service-learning is the nature of the subjects typically emphasized in the reflection component of the experience. A few possible topics were mentioned in the *Habitat for Humanity* example. Some of these topics may seem too ideological to many construction instructors, and distant from the typical scope of construction education. Discussing such subjects is an important component of service-learning, and perhaps the awkwardness of the typical construction instructor when dealing with social issues is the best testimony of the chronic deficiency of the construction education system to address this important area.

Many specific implementation problems were exposed during the integration of service-learning to IS-461 described in the previous section. For example, coordinating efforts with N2N was particularly demanding. Its executive director was difficult to contact, and shifted his own objectives with respect to the project several times. At the end, N2N obtained financing for the project, but decided to abandon the idea and proceed with a more traditional building approach. (This happened after the end of the semester. The students were never aware of this outcome).

A challenging aspect in the IS-461 case was dealing with students not willing to cooperate with the project. Although only a few, these students jeopardized the quality of the project by delaying their part until the last possible moment, and then providing a mediocre contribution to the final report. Parallel to this topic was the question of grading: how much effort should be required from students? How can an instructor assign a fair grade? At CSU, the Service Integration Project recommends 5 hours of work for each course credit. This level of effort seemed satisfactory for the IS-461 project. A basic grade was assigned to each group, which was then re-distributed among the participants. Feigenbaum and Holland (1997) discuss this process in detail.

A willing instructor can control the above aspects. However, other issues are generally outside the control of anyone in particular. Such an issue is getting an appropriate project in the first place. In this case, the Service Integration Project at CSU provided the appropriate contact. It was not the first or only contact. Other contacts led to uninteresting projects, which were discarded after interviewing representatives from the involved agencies. Even when an appropriate project is found, it has to be at the right point to be workable into the semester. For instance, if the present project had been developed for the following semester, it would have been useless for any practical purpose. Finally, the reflective session (reflecting about what was learned from the experience) proved difficult to implement. The session strayed at times into arguments about the lack of cooperation from some students. Keeping focus in such situations requires substantial effort from the instructor as mediator.

Conclusion

Help in implementing service-learning is readily available in many campuses. Most instructors are likely to have access to some level of institutional support through their office of community services (or similar name). There, they can usually find literature and get help in procuring suitable service projects, modifying the course syllabus, and other initial tasks. CSU even offers grants to help in the start-up of such efforts. Unfortunately, these grants come with many strings attached (such as the number of required hours of service, reflection components, etc.) that discourage their use. In general, service integration seems to have political momentum. The State of Maryland now requires 75 hours of community service from all high-school students. Miami began requiring 75 hours in 1996, and Chicago will demand 40 hours starting in 1998 (Cloud, 1997). Although revolutionary by American standards, these requirements are still shy of the much stricter service system in place for decades in Germany, Austria and other European nations. Furthermore, the current administration is pushing for service-learning as a requisite for federal grants and local service programs (Cloud, 1997).

Such momentum does not guarantee ultimate success. Time Magazine entitles “involuntary volunteers” an article dealing with community service, and explains that even though 91 percent of students polled agreed that they should be “encouraged” to participate in community service, only 36 percent think that they should be required to participate (Cloud, 1997).

At the more immediate level, untenured construction instructors may face the dilemma of keeping their teaching within the comfortable realm of traditional lecturing, or entering into relatively uncharted territory with service-learning. As Morton notes, “the growth of service-learning will require that executive officers, from department chairs to presidents, find ways to recognize and reward different teaching styles, assign equitable teaching loads, [...] and otherwise protect and promote the careers of faculty who wish to commit to the integration of service and learning.” (Morton, 1996). Is construction education there yet?

It is the author’s opinion that service-learning presents a uniquely positive opportunity for construction students and their community. This paper has not attempted to offer statistical proof of the benefits of service learning. However, anecdotal evidence suggests that solving a complete problem, reflecting on the experience and enjoying a high level of autonomy tends to foster the creation of character while improving the technical skills of the participants. The informal comments of most prospective employers interviewing at CSU are that this combination is fundamental for a successful construction career. This case study shows how the implementation of service-learning in construction education requires attention to detail. After an exhaustive search, it appears that service-learning does not enjoy the literature support found in the social sciences. A basic question is that of an adequate reward system for the faculty willing to integrate service-learning into their programs. In the author’s opinion, everyone needs to feel that this is a win-win resource to assure its success.

It is the author’s opinion that an essential element to the adoption of service-learning for construction education is the creation of a body of literature specific to this discipline. The publication of new case studies should be encouraged to achieve this objective. This case study shows encouraging, but informal, indications that the students in IS-461 benefited from the

experience. Formal research should examine the hypothesis that service-learning indeed improves the education of construction students.

References

- Bloom, B. S., Engelhart, M., Furst, E., Hill, W. and Krathwohl, D. (1956). *Taxonomy of educational objectives. Book I: cognitive domain*. New York, NY: David McKay.
- Cloud, J. (1997). Involuntary volunteers. *Time Magazine*, December 1, 1997, 76.
- Colorado State University (1997): CSU News Release, April 2, 1997.
<http://www.colostate.edu/Depts/PR/releases/news/share100.htm>
- Culver, R. S. (1985). Applying the Perry model of intellectual development to engineering education. *Proceedings, ASEE/IEEE Frontiers in Engineering Education Conference*, New York, NY, 95-99.
- Feigenbaum, L. and Holland, N. (1997). Using peer evaluations to assign grades on group projects. *Proceedings of the 33rd Annual Conference, ASC*, D. Koehler, ed. Seattle, WA., 75-80.
- Furco, A. (1994). *Partial list of experiential learning terms and their definitions*. Raleigh, NC: National Society for Experiential Education.
- Furco, A. (1996). Service-learning: a balanced approach to experiential education. *Expanding boundaries: serving and learning*, Vol 1. New York, NY: The Corporation for national service learn and serve America: higher education.
- Jacoby, B. (1996). Service learning in today's higher education. *Service-learning in higher education: concepts and practices*. B. Jacoby et. al, ed. San Francisco, CA: Jossey-Bass, Inc.
- Kendall, J. C. (1988). From youth service to service-learning. *Facts and faith: A status report on youth service*, A. C. Lewis, ed. Washington, DC: William T. Grant Foundation.
- Kendall, J. C. (1990). Combining service and learning: an introduction. *Combining service and learning: a resource book for community and public service*, Vol1. Raleigh, NC: National Society for Experiential Education.
- Kolb, D. A. (1984). *Experiential learning: experience as a source of learning and development*. Englewood Cliffs, NJ: Prentice Hall.
- Levine, A. (1994). Service on campus. *Change*, July / August 1994, 4-5.
- Morton, K. (1996). Issues related to integrating service-learning into the curriculum. *Service-learning in higher education: concepts and practices*. B. Jacoby et. al, ed. San Francisco, CA: Jossey-Bass, Inc.

Perry, W. G., Jr. (1970). *Forms of Intellectual and Ethical Development in the College Years: A Scheme*. New York, NY: Holt, Rinehart and Winston.

Senior, Bolivar A. (1998). *Incorporating service-learning into a construction-planning course*. Proceedings of the 1998 ASC Region IV annual meeting, Kansas City, MO.