

Service Learning Project (SLP) Implementation and Assessment in a Construction Management Program – A Case Study

Svetlana Olbina, Mohammed Mehany, and Khristy Jesse
Colorado State University
Fort Collins, Colorado

Service-learning (SL) is one of the ten high-impact practices recommended by the Association of American Colleges and Universities that increases student retention and engagement rates. Service-learning Projects (SLP) use active learning, student-centered approach in which students interact with the community to create solutions for community problems. While SL has been successfully applied in various academic disciplines, its adoption in Construction Management (CM) education has been very limited despite the abundance of opportunities for its application within the CM discipline. The purpose of this study was to introduce a case study of a SL-based CM Cares program at Colorado State University that has been implemented every spring semester since 2011. The study also developed an assessment method (a survey questionnaire) that investigated student perceptions about the SL practices, challenges, and benefits to student learning, professional development, and personal development and growth. The survey was sent to all the course participants (84) enrolled in the CM Cares course from 2011 to 2017. Statistical analysis of the survey responses showed positive results across the spectrum of students' service learning, professional and personal development. The assessment method developed by this study can be potentially used by other CM programs that have been implementing SLPs.

Key Words: Construction Education, Service Learning, Learning Experience, Professional Development, Personal Development

Background

Service-learning (SL) is one of the ten high-impact practices (HIP) recommended by the AACU's education research that increases student retention and engagement rates (Association of American Colleges and Universities 2017). SL is an experiential education method that utilizes a service learning project (SLP) in which participants apply higher education skills to solve a real-world problem, and use participant reflections to learn from the SLP (Senior, 1999; Schmidt, 2008; Cho et al., 2015). SLP uses hands-on, active learning, student-centered approach (Cho et al. 2015, Tinker & Tramel 2002) in which students interact with the community to create solutions for community problems (Cho et al., 2015; Tinker & Tramel, 2002). Community benefits from the SLPs that otherwise might not happen due to lack of funding or skilled labor (Tinker & Tramel, 2002; Holley et al., 2012).

Benefits of Service Learning Project (SLP) Implementation

Students experience multiple benefits from being involved in SLPs such as improved student learning, technical and soft skills, and professional and personal development. Cloud (1997, in Senior 1999) showed that 75% of students thought that they learned more in SLP as compared to a typical classroom education. SLPs enhance student learning by integrating theory with experience (Cooper, 2006 in Schmidt, 2008). Students learn how to apply the course material to the real-life situations (Cho et al., 2015) and understand relevance of what they learn in school to the real world (Tinker & Tramel, 2002). Therefore, participation in SLPs increase student engagement and help them to better understand the course material.

Involvement in SLPs helps students develop technical skills such as hands-on active learning of real-world activities, and technical problem solving (Cho et al., 2015). By interacting with industry professionals and clients, students get exposure to the real world and gain knowledge of the current practices (Holley et al., 2012). In addition, students develop soft skills including problem solving, decision-making, critical thinking, and teamwork (Tinker & Tramel, 2002). They also develop crisis management, leadership, communication and interdisciplinary teamwork/collaboration skills (Senior, 1999; Schmidt, 2008; Cho et al., 2012; Batie, 2007; Bernstein, 2006).

SLP enhances students' motivation, understanding of the real problems people experience and relevance of what they learn in school to the real world. Volunteering in SLPs at undergraduate level has impact on students in their later lives, promotes student personal growth and develops sense of altruism toward the community (Tinker and Tramel, 2002). It also increases student awareness of their future profession and entire society (Cho et al., 2015). At the personal level, SLPs enhance student self-esteem and self-confidence, (Cooper, 2006 in Schmidt, 2008), and help students understand the benefits of community service (Cho et al., 2015).

Implementation of Service Learning (SL) in Construction Management (CM) Programs

SL has been utilized in various disciplines such as education (Lake & Jones, 2008), nursing (Brown & Schmidt, 2016), pharmacy (Hedges et al., 2014), medicine (Essa-Hadad et al., 2015), economics (Paxton 2015), accounting (DeLaune et al. 2010), social work (Li et al. 2016), gerontology (Karasik, 2007), hospitality (Longart et al., 2017), and art therapy (Feen-Calligan, 2007). However, SL has been integrated in Construction Management (CM) programs to a limited extent. Some examples of CM programs that have had an SL component include: John Brown University, University of Arkansas at Little Rock, Brigham Young University, University of Nebraska at Lincoln (Tinker & Tramel, 2002), Louisiana State University, University of Cincinnati, University of North Carolina (Cho et al., 2015), Auburn University (Holley et al., 2012; Farrow & Cramer, 2009), Colorado State University (Clevenger & Ozbek, 2013; Senior, 1999), California State University at Sacramento (Anderson, 2007), East Carolina University (Batie, 2007), and Ferris State University (Schmidt, 2008).

In CM programs, SLPs are conducted as program-based (e.g. Habitat of Humanity); a custom project, or "boutique" efforts (such as Auburn's University Rural Studio) (Holley et al. 2012). The SLP is either integrated into a semester long course (Cho et al., 2015; Holley et al., 2012, Schmidt, 2008, Batie, 2007, Senior, 1999) or it occurs as a one-time short-term event (Anderson, 2007). Scope of SLPs can differ; typically SL in CM has focused on small scale residential projects (Batie, 2007, Bernstein, 2006, Anderson, 2007, Senior, 1999). However, there are examples of larger scale commercial projects (Holley et al., 2012) and a short-term international SLP which built a suspension bridge (Farrow & Kramer, 2009). Activities that students performed in the SLPs varied from hands-on construction, estimating, scheduling (Anderson, 2007), creating teams (Bernstein, 2006), site-logistics planning, sustainability analysis, constructability analysis (Holley et al., 2012), developing safety plans (Farrow & Kramer, 2009), to design, and financial analysis (Senior, 1999). SLPs were typically conducted in teams (Senior, 1999, Cho et al., 2015); some CM-based SLPs utilized multidisciplinary teams (Holley et al., 2012; Schmidt, 2008; Batie, 2007).

Problems Related to Implementation of SL in Construction Management (CM) Programs

Previous research identified several problems related to SLPs implementation in CM programs, which provide opportunities for additional/future research. Senior (1999) pointed out a few challenges experienced during the SLP such as the instructor's need to prove the SLP benefits to others, students' unwillingness to cooperate on the project, obtaining the right project, and the difficulty with implementing the reflective sessions. The integration of SLPs into construction education has been slow (Tinker & Tramel, 2002). Usually SLPs are discipline-specific; there have been a very few examples of interdisciplinary projects due to the various reasons such as inconvenience, lack of interest, and coordination of academic credit (Holley et al., 2012). According to Senior (1999) integrating SLP in CM is different than integrating SLP in other disciplines (e.g. social sciences); therefore, the SLP literature specific to the CM field needs to be developed. One way of creating a body of knowledge in SLP in CM would be to publish new case studies. Testing the hypothesis that SLPs improve education of CM students is needed as well (Senior, 1999). Cho et al. (2015) recommended isolating those aspects of SLP that are most conducive to "enhancing skills of the construction profession". Another research question that Cho et al. (2015) recommended was how to include underrepresented groups (e.g. women, veterans) into SLPs. The literature review also shows that impact of SLPs on student learning was assessed in a very few cases. When assessment was conducted, it included: instructor

observations (Bernstein, 2006; Cho et al., 2012), student reflections (Cho et al., 2012) and/or student exit surveys/evaluations (Farrow & Kramer, 2009; Batie, 2007). The assessment of SLPs materialized into a very few published articles that present these efforts (Cho et al., 2013; Farrow & Kramer, 2009; Bernstein, 2006).

The purpose of this study was to introduce and promote the advantages of using SL in the CM education and assess the student perception of how they benefited and bettered themselves (personally and professionally) through the SL experience. Thus, this study aimed to investigate the existing use of service learning in a CM program at Colorado State University, benefits of SL to students, as well as the challenges they face during SLPs. The secondary objective was to pilot an assessment method that evaluates the SL impact on student education. This assessment method could potentially be used by the other CM programs that would like to evaluate the impact of their SL efforts.

Research Methods

In order to accomplish the research objectives, a case study that focused on the SL-based CM Cares program in the Department of Construction Management at Colorado State University was conducted. This research used a survey instrument for a selected “targeted” sample which included only student participants in the CM Cares program that was offered through an elective CON 464 “Construction Leadership” course. The survey was developed based on a literature review and multiple brainstorming sessions that included the faculty and staff involved in the CM Cares program. The survey questionnaire consisted of the following sections: (1) student demographics questions that help understand the type of students attracted to SLPs; (2) project specific questions to discern the used practices and challenges in the SLP; (3) questions about SLP’s benefits to student learning experience; (4) questions about SLP’s benefits to student professional development; (5) questions about SLP’s benefits to student personal development and growth; and (6) course specific questions for course assessment and continuous improvement. Most of the questions were based on a 5-point Likert scale (with 1 being the lowest and 5 being the highest score) in addition to some open ended questions. The survey was administered using Qualtrics and it was distributed to all the students (84) that participated in the CM Cares/CON 464 course during the years 2011-2017. In other words, 8.7% of 961 students that graduated during that time period participated in CM Cares. The reason for this enrolment is that only juniors and seniors can apply for the course (which ranged between 200 and 360 students during the past seven years) and only 12-15 students can enroll in the course per semester due to the limited number of available projects and availability of resources. In summary, this study involved the following research steps: (1) providing a description of the CM Cares program structure and objectives; (2) developing the SLP assessment method (survey instrument); (3) selecting the target sample of students involved in the SLP program; (4) distributing the survey questionnaire to the selected sample; (5) collecting data/survey responses to examine the research objectives; and (6) analyzing the collected data using descriptive statistics (e.g. frequency count of responses and mean of responses for the Likert-scale questions).

Results

Service Learning Project (SLP) Case Study: CM Cares Program

In 2011, the Department of Construction Management at Colorado State University (CSU) established CM Cares program that uses SL approach to help students develop and improve their leadership and team building skills as well as ethics through community SLPs. Students, faculty, staff, community, and industry partners collaborate on construction-related projects. CM Cares usually serves people with special needs or local community service agencies needing assistance that cannot be provided by other sources. SLPs typically focus on residential projects for family with disabled children or disabled elderly family member, or helping non-profit organizations that serve community (such as sexual assault victims, domestic violence victims, etc.). Some examples of completed projects include remodeling of bathrooms, accessibility modifications (e.g. wheelchair access), and bedroom additions.

Since 2011, every spring semester CM Cares has been delivered through the undergraduate (junior/senior) level CON 464 “Construction Leadership” course that incorporates leadership and service learning as course objectives.

The course covers the following material: leadership and ethics, team building, communication, negotiating, volunteering on projects that make a difference in the lives of others, and mentoring construction management students. The course includes sponsored guest lectures from industry leaders on the non-technical aspects of running a successful business (Department of Construction Management, CSU, 2017). In this course students serve as leaders for the service projects.

CM Cares has established structured selection of students that wish to enroll in the CON 464 course and participate in an SLP. To apply for the course students need to submit an application and recommendation forms that are made available in the fall semester. As part of their application students need to explain their current/past leadership experience and provide a recommendation by at least one CM faculty. Students that have construction experience through past internships are highly desirable as they bring knowledge and ability to complete the projects successfully and efficiently. The minimum GPA required to enroll in this course is 3.25. Typically 12-15 students enroll in the course; they are divided into two to three teams of about five members. Normally, two to three SLPs are selected each year and each of the student team completes one project. Since 2011, 21 SLPs were completed through the CM Cares program/CON 464 course.

The CM Department has also established a structured process for selection of SLPs. The Selection Committee consists of the CM Cares Program coordinator, two instructors of the course, two administrative staff members from the CM Department and one outside member; usually a faculty from the another University Department. Industry representatives also help with the selection of the project; they have an advising role and are not formal members of the selection committee. CM Cares has an open application process for the projects. Interested community members and non-profit organizations can send their applications anytime from May to August. The CM Cares Program Coordinator works closely with community-based organizations/members (e.g. case workers, social workers) and present to them opportunities to help e.g. individuals with disability (children, elderly) through CM Cares.

Potential CM Cares projects are also presented to the CM Department Professional Advisory Development Board (PADB) during their Fall meeting. PADB industry members provide their feedback about project feasibility and their willingness to donate for a project which are taken into consideration when selecting the projects. The Selection Committee also considers the following criteria when choosing the projects: a need, which is not necessarily only a financial need; whether the construction site would be a safe environment for the students; if a family could work with the students for 16 weeks during the semester; if a project presents an opportunity for CM students to develop leadership skills, learn how to recruit and manage volunteers, and complete estimating, scheduling and material procurement for a project. Projects need to be located within maximum 15 miles from the University campus so that students are able to easily reach the site. A diverse team from the CM Department visits the potential construction sites prior to selection of the projects.

Projects are conducted for 16 weeks during spring semester as a part of the CON 464 course. Classes are held twice a week on campus for the first eight weeks. During this time, one faculty mentors students on developing leadership skills and project planning. During the remaining eight weeks, students execute the project by spending two eighth-hour weekend days on the construction site and are mentored by the second faculty. In both cases, students are engaged in active/independent learning of the course material and its application in a real-life project. Instructors are not pivotal to this process; they are involved only as the facilitators of student's learning. In addition to the two instructors that teach the course, there is an opportunity for any other faculty member to participate as a mentor.

The major goal of the CM Cares course is that students develop their project management skills. Student leaders enrolled in the course manage student volunteers that are not enrolled in CON 464 course. About 100 student volunteers per Spring semester come from different disciplines (construction management, interior design, business, occupational therapy, landscape architecture) and perform hands-on activities. In addition, Student Clubs from the CM Department organize member volunteers to commit to a scheduled work day on the CM Cares project. Students collaborate with permitting agencies, utilities, etc.; this collaboration exposes them to the real-world process. During the CM Cares projects students also have a rewarding experience during which they can collaborate and interact with families and individuals that might have less than they do.

There is an opportunity to provide sponsorship for projects by multiple construction companies such as general contractors and specialty contractors. Companies typically help with material procurement (e.g. by buying material directly or providing sponsorship), sending their employees (e.g. carpenters, superintendent, administrative staff) to

volunteer on site during weekends and to mentor students to develop leadership skills. Construction industry organizations (e.g. AGC, ABC) also send volunteers that are employed by their member construction companies. Often the CM alumni that were involved in the previous CM Cares projects and that now work for construction companies, come back and participate as construction industry volunteers on the new CM Cares projects.

Survey Results

The survey was distributed to 84 CM students and alumni that participated in the CM Cares program between 2011 and 2017. Six students/alumni could not be reached, reducing the sample size to 78. At the time of the study, 33 (42.3% response rate) of the students/alumni had participated in the survey and their responses were analyzed. Analysis of the background data showed that most of the students attracted to SLPs had the following common traits and experience: (1) a past volunteering experience in CM Cares (55%) or other community services (94%); (2) past internship experience (100%); (3) valuing the importance of community service (94%); (4) feeling engaged with their community (91%); (5) considering themselves as community leaders (62.5%); and (6) working well in teams (91%). The participants have utilized most of the practices identified (design 63%, estimating 81%, scheduling 88%, site logistics 72%, contract administration 28%, material procurement 97%, constructability analysis 50%, hands-on construction 97%, safety plan development 38%, sustainability analysis 16%, coordinating volunteers 94%). Material procurement, hands-on construction, volunteer coordination, estimating and scheduling were the most utilized practices while the contract administration and sustainability analysis were the lowest utilized ones. In regard to the challenges during the SLP execution, the participants identified eight different challenges, with the time management (23%), large amount of effort needed to complete the project (20%) and team members' coordination (16%) being the most commonly reported challenges they faced.

When asked about the benefits of SLP to their learning experience, the students reported a greatly positive learning experience across all identified categories (Figure 1). The “enhanced learning beyond classroom knowledge” was the highest reported learning experience (mean score of 4.56) and the “enhanced understanding of the different construction related controversies from different perspectives” was relatively the lowest (mean score of 4.1).

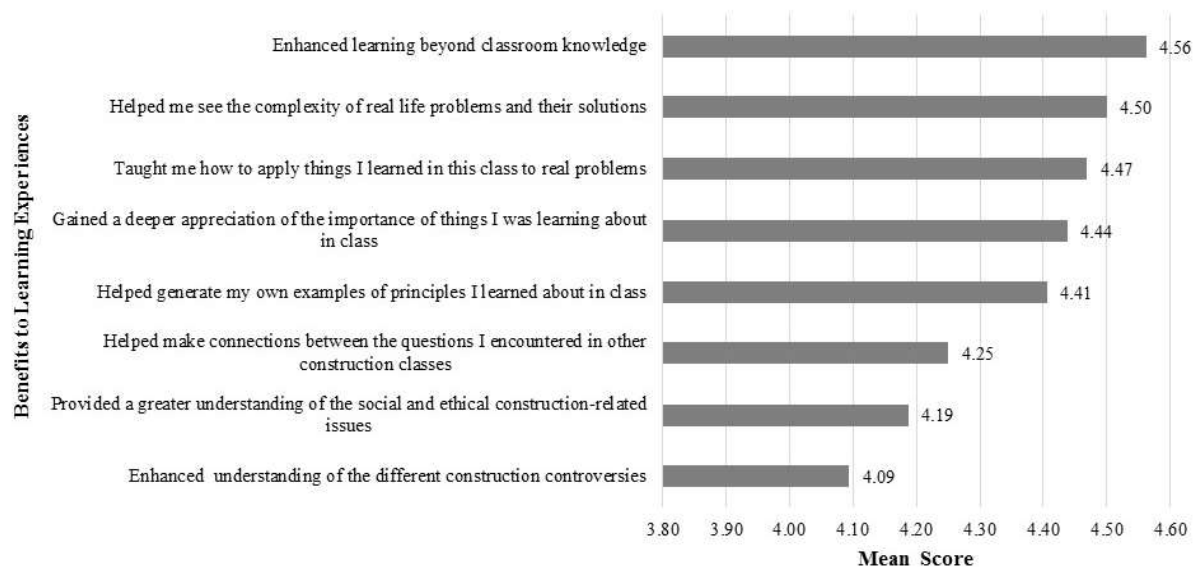


Figure 1: Benefits of SLPs to student learning experiences

Similarly, the students also reported high scores regarding the SLP's contribution to their professional development (Figure 2). The “leadership skills” was the highest reported professional development gained skill (mean score of 4.56) while the “written communication skills” was relatively the lowest (mean score of 3.84).

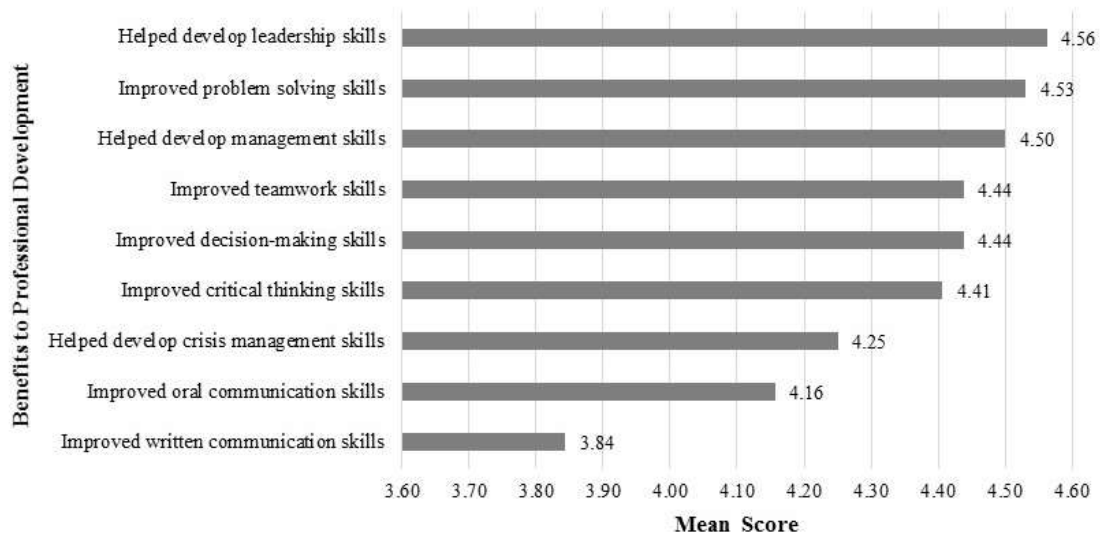


Figure 2: Benefits of SLPs to student professional development

The student also reported some of the highest scores regarding the SLP's contribution to their personal development and growth (Figure 3). The "improved relationship with classmates and instructor" was the highest noted personal development improvement (mean score of 4.55) while the "self-esteem enhancement" was relatively the lowest (mean score of 4.0).

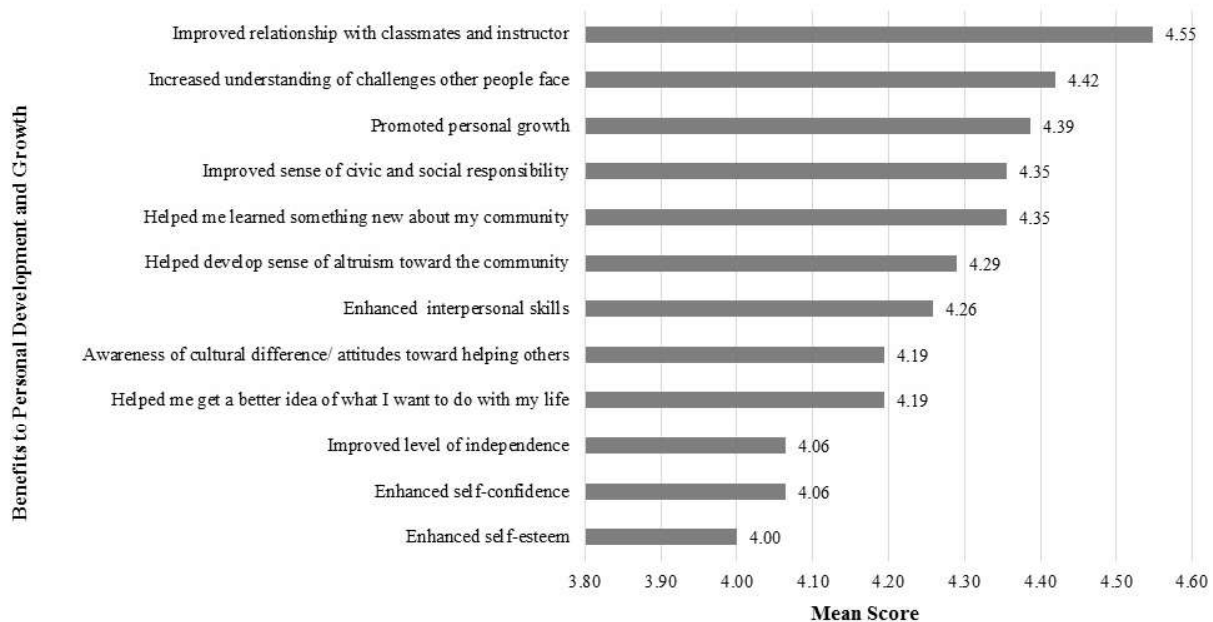


Figure 3: Benefits of SLPs to student personal development and growth

Finally, the students favorably rated the overall course experience in all categories such as: clear communication of course scope and objectives (mean score = 4.40); timeliness of instructor's feedback (mean score = 4.48); course organization and preparedness (mean score = 4.35); and grading fairness and consistency (mean score = 4.55).

Conclusions

The aim of this research was to present a case study of a longstanding SLP-based CM Cares program at Colorado State University and to explore the benefits of SLP implementation in a CM education program to support the rapidly evolving construction industry beyond the traditional curriculum. This paper has demonstrated a SLP CM Cares program that has been structured around the students, the community and the construction industry. The study confirmed the plethora of benefits in the SLP implementation and showed the SLP's contribution as a learning experience and its effect on the professional and personal developments of students. The study also identified several characteristics of the group of students who were most interested in such SLPs such as a strong teamwork and community belonging, affinity to serve and leadership identity, all of which are characteristics of servant leaders.

This study results confirmed many of the benefits identified by the previous research such as hands-on and community interaction (Cho et al., 2015; Tinker & Tramel, 2002), student learning, personal and professional development (Cloud, 1997 in Senior, 1999). The study results also showed a great integration of different practices and their utilization which varies from estimating and scheduling to material procurement and constructability analysis; a feat that is extremely hard to achieve in the regular curriculum/courses. In addition, while the most obvious difficulties/challenges faced by the students in such tedious and unique learning experience are mostly time management, team member coordination and the large amount of effort needed to complete these projects, these are also some of the most valuable lessons that are difficult to teach in a classroom. These same difficulties/challenges are also the same day to day difficulties that those students will face in the construction industry workforce on a daily basis. Hence, these challenges are definitely preparing them to become more capable and compassionate leaders. The contribution of this study is in presenting the benefits of CM Cares/SL model that could answer some questions that other programs starting or have been developing SL components may have. Others can replicate, build on, or use this as a starting point for their own SL programs. Another contribution is an assessment tool developed by this study that could be used by other programs to evaluate their SL efforts.

This study had a few limitations. It focused on only one service learning (SL) program and, thus, the results cannot be generalized to the other CM programs. The survey was sent only to the students that had been enrolled in the course, that is, the CM students. In terms of future research, the authors aim to increase the sample size and explore the different perspectives of SLP. The future research could also include different SLPs from other CM programs and different schools within the AEC community (such as architecture and engineering). These perspectives include (but are not limited to) the difficulties and challenges faced by instructors and programs during the SLP establishment as well as during the SLP implementation. The future study could include all the project participants such as volunteers that come from different majors, faculty members, industry participants, community/family that benefitted from the SLP, and the SLP coordinator. A future study could also compare perceptions of two groups: 1) students that participated in the service-learning course and 2) students that have not participated.

References

- Association of American Colleges and Universities (2017). High-impact Educational Practices. [WWW document]. URL: <https://www.aacu.org/leap/hips>
- Anderson, M. (2007). Rehab in a day: A service learning project. *Proceedings of the 43rd Annual ASC Conference*, Flagstaff, Arizona, USA.
- Batie, D. (2007). West End project – A “Hard Hats” service learning class. *Proceedings of the 43rd Annual ASC Conference*, Flagstaff, Arizona, USA.
- Bernstein, S. (2006). Using a service learning project to enhance collaborative learning in a construction curriculum. *Proceedings of the 42nd Annual ASC Conference*, Fort Collins, Colorado, USA.

- Brown, J.M., & Schmidt, N. A. (2016). Service-learning in undergraduate nursing education: Where is the reflection? *Journal of Professional Nursing*, 32(1), 48–53.
- Cho, C., Mazze, E.C., Dika, S.L., & Gehrig, G.B. (2015). Enhancing construction education: Implementing Habitat for Humanity projects as service-learning for construction materials. *International Journal of Construction Education and Research*, 11(1), 4-20.
- Clevenger, C., & Ozbek M. (2013). Teaching sustainability through service-learning in construction education. *International Journal of Construction Education and Research*, 9(1), 3-18.
- Department of Construction Management, Colorado State University. (2017). *CM Cares*. Retrieved from <http://www.cm.chhs.colostate.edu/cm-cares/>, January 20, 2018.
- DeLaune, D.L., Rakow, J.S., & Rakow, K.C. (2010). Teaching financial literacy in a co-curricular service-learning model. *Journal of Accounting Education*, 28, 103–113.
- Essa-Hadad, J., Murdoch-Eaton, D., & Rudolf, M.C.J. (2015). What impact does community service learning have on medical students' appreciation of population health? *Public Health*, 129(11), 1444-1451.
- Farrow, B., & Kramer, S. (2009). Faculty exploration of a short term, service learning, study abroad opportunity in Quesimpuco, Bolivia. *Proceedings of the 45th Annual ASC Conference*, Gainesville, Florida, USA.
- Feen-Calligan, H. (2007). Service-learning and art therapy in a homeless shelter. *The Arts in Psychotherapy*, 35, 20–33.
- Hedges, A., Miller, S., Scott, M., & Persky, A. (2014). Current environment of service learning within the school of pharmacy. *Currents in Pharmacy Teaching and Learning*, 6, 884–890.
- Holley, P., Emig, J., & Albright, E. Collaborative professional services: A case study in graduate outreach. *Proceedings of the 48th Annual ASC Conference*. 2012; Birmingham, UK.
- Karasik, R. (2007). Pedagogy meets practice: Service-learning in gerontology and geriatrics. *Journal of the American Medical Directors Association*, 8, 284–289.
- Lake, V.E., & Jones, I. (2008). Service-learning in early childhood teacher education: Using service to put meaning back into learning. *Teaching and Teacher Education*, 24, 2146–2156.
- Li, S., Wu, C.S.T., & Wong, H.T. (2016). School safety and children health in a post-disaster community: Implications to collaborative care and service learning in school health. *Journal of Acute Disease*, 5(1), 46–50.
- Longart, P., Wickensb, E., Ocaña, W., & Llugshaa, V. (2017). A stakeholder analysis of a service learning project for tourism development in An Ecuadorian Rural Community. *Journal of Hospitality, Leisure, Sport & Tourism Education*. 20, 87–100.
- Paxton, J. (2015). A practical guide to incorporating service learning into development economics classes. *International Review of Economics Education*, 18, 25–36.
- Senior, B. (1999). Service-learning: A win-win resource for construction education. *Journal of Construction Education*, 4(1), 17-25.
- Schmidt, J. A. (2008). Case study in using student service learning as a tool to acquire an AISC structural steel teaching sculpture. *Proceedings of the 44th Annual ASC Conference*, Auburn, Alabama, USA.
- Tinker, A., & Tramel, M. (2002). Incorporating service learning courses into construction management programs. In: *Proceedings of the 38th Annual ASC Conference*, Blacksburg, Virginia, USA.