Safety Training for Students Engaged in Service Learning Projects

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ABSTRACT

There is a growing trend for colleges and universities to include service learning in their curriculums or as extracurricular activities. These service learning programs often include performing construction service projects both inside and outside the United States. At Auburn University, hundreds of students from all majors participate in these projects. While students in engineering and construction management often receive construction safety training, students from other curriculums do not. As a result, students performing service learning projects engage in unsafe practices and take unnecessary risks due to a lack of education and training. To address this training gap, honors students performing service learning were provided OSHA training from certified OSHA instructors. At the conclusion of the training, students that successfully completed all training requirements were issued an OSHA 10-hour card. Participating students completed a series of survey questions prior to the OSHA training to assess their knowledge of construction safety. After the completion of the training and after participation in their service-learning project, the students completed a second survey in order to assess the effectiveness of the program. This paper describes in detail the design and implementation of the safety training program for service learning students as well as an analysis of the program's effectiveness.

Key Words: service-learning, safety, OSHA

Introduction

Progressive service learning (i.e., learning and developing through active participation) provides college students an enhanced learning environment, as opposed to traditional learning methods that are mostly theoretical in nature, not realistic in application, and do not connect the various aspects of a field of study (Burr 2001). Astin et al (2000) describes a longitudinal study of over 22,000 undergraduate students in the United States and found that the most important factors associated with a positive service learning experience are the student's degree of interest in the subject matter, how the experience enhances the understanding of *academic* course materials, and if the service is viewed as a learning experience. Moreover, service learning is a core component of many honors colleges housed in both public and private universities in the United States. Sederberg (2005) categorized the typical characteristics of honors colleges and found that 37.1 percent of programs surveyed offered service learning courses as part of their curricular opportunities. A smaller percentage of programs, 8.6 percent, required honors students to complete service learning as part of the honors program.

Auburn University, a land-grant institution in the state of Alabama, offers incoming freshmen of high academic standing the opportunity to join its Honors College. All incoming freshman joining the Honors College are required to participate in a week of service prior to the beginning of their first semester. This service to the community aligns with the College's theme of addressing poverty in Alabama, the sixth poorest state in the United States (Alabama Possible

2017). The week of service includes lectures, seminars, and three days of working on a service learning project, such as the completion of residential construction projects for those in need.

Based on numerous years of executing the week of service requirements, Honors College administrators observed that the majority of incoming students had little or no previous construction experience, which caused concern that these students were at risk for injury as they worked on service learning projects. The administrators contacted faculty from the University's McWhorter School of Building Science regarding the possibility of providing construction safety training for the service-learning participants in order to aid them in the proper methods of safely completing construction activities. It was determined that this training could be provided using the Occupational Safety and Health Administration (OSHA) 10-hour construction safety course as a basis. Using this approach, the students could also attain a safety credential, namely the OSHA 10-hour Card.

The balance of this paper describes the safety training course that was provided for the Honors College students, including thoughts on the efficacy of the course (based on student responses), and how future renditions of the course may be adapted to best address student needs. A brief background on the OSHA 10-Hour safety training is also provided.

OSHA 10-Hour Safety Training

OSHA's mission is to ensure that every employee working in the United States has a safe and healthful work environment. OSHA develops training programs to educate both employers and employees concerning safe work procedures in addition to developing and enforcing safety standards for the workplace. The basic OSHA safety course for entry-level employees, commonly referred to as the "OSHA 10-Hour Course," is tailored to address specific hazards in different industrial sectors such as general industry, construction, maritime, and agriculture. In the case of construction, training focuses on areas that cause the most accidents and fatalities in the industry. After successful completion of the training, participants are entitled to receive what is commonly referred to as the OSHA 10-Hour card.

The minimum required content for the construction-based OSHA 10-Hour Course is contained below in Table 1. OSHA has recently changed the training requirements by reducing the minimum time for covering "Introduction to OSHA" from two hours to one hour, and the time for "Optional Subjects" was increased from one hour to two hours. However, at the time the training was conducted for the Honors College, the minimum content requirements in Table 1 were still in effect.

Table 1. Minimum content for OSHA 10-Hour Course

Mandatory Subjects (7 Hours)	Minimum Time (Hours)
Introduction to OSHA	2.0
Focus Four Hazards	4.0
Falls	
Electrocution	
Struck-By	
Caught-In or -Between	
Personnel Protective Equipment	0.5
Health Hazards	0.5
Electives (min 0.5 hrs/subject)	2.0
Cranes, Derricks, and Hoists	
Excavations	
Material Handling and Storage	
Scaffolds	
Stairways and Ladders	
Hand and Power Tools	
Optional Subjects (min 0.5 hrs/subject)	1.0

Description of Safety Training for Honors College Students

Two faculty from the McWhorter School of Building Science delivered the OSHA 10-Hour training to the incoming freshman class of Honors College students, which consisted of 71 students from various majors of study (shown in Table 2 below). These faculty members were OSHA certified to teach the course and issue students the 10-Hour OSHA cards upon completion. The training occurred over two days in August 2017. Table 3 contains the actual training conducted. The students received 11 hours of actual instruction, which is one hour more than the minimum amount required by OSHA. This additional training was provided in specific areas that the instructors felt would address that the students would complete during their service learning activities. The students were also issued personal protective equipment (PPE) including a hardhat, reflective safety vest, two pairs of safety goggles (clear and shaded), and work gloves.

Table 2. Composition of Honors College cohort

Anticipated Major	Number of Students
Engineering	29
Medical Sciences	15
Liberal Arts	14
Math and Science	6
Architecture	3
Business	2
Undeclared	2
Total	**71**

Table 3. Course content for Honors College safety training

Subject	Time (Hours)
Introduction to OSHA	2.0
Focus Four Hazards	
Falls	2.0
Electrocution	1.0
Struck-By	0.5
Caught-In or -Between	0.5
Personnel Protective Equipment	0.5
Health Hazards	0.5
Electives (min 0.5 hrs/subject)	
Material Handling and Storage	0.5
Scaffolds	0.5
Stairways and Ladders	0.5
Hand and Power Tools	1.0
Optional (min 0.5 hrs/subject)	
Concrete and Masonry	0.5
Fire Prevention and Protection	0.5
Hand Tool and PPE Lab	1.0

Efficacy of the Training

Research Methodology

The researchers conducted a two-part survey to evaluate the effectiveness of the safety training; the initial survey was completed at the end of the training, and a follow-up survey was completed at the end of the student's week of service. The survey was structured to elicit responses regarding the students' perception of the safety training's benefits and areas of importance. Answers to each question were provided with a range of five answers (tied to a Likert Scale) or a list of possible answers that the students were asked to rank. Students were also surveyed as to their experience with construction tasks and construction safety requirements.

Survey Results

A total of 71 survey responses were collected for the first part of the survey, representing 100 percent of the students that participated in the training. 60 students completed the second part of the survey, representing 84.5 percent of the students that participated in the training.

Students were asked about their experience working on construction projects/tasks, and their experience with construction safety in the initial survey. 93 percent of students (66 out of 71) responded that they had either no experience, very little experience, or some experience with construction projects/tasks, with the most prevalent response being very little. 87 percent of students (62 out of 71) responded that they had no experience, very little experience, or some experience with construction safety, with the most prevalent response being some experience. Tables 4 and 5 contain the full results of these two questions.

Table 4. *Describe your level of experience working on construction projects/tasks.*

Response	None	Very Little	Some	A Great Deal	Expert	Mean Value
Scale	1	2	3	4	5	
Initial Survey	23	22	21	5	0	2.11

Table 5. *Describe your level of experience when it comes to construction safety.*

Response	None	Very Little	Some	A Great Deal	Expert	Mean Value
Scale	1	2	3	4	5	
Initial Survey	9	25	28	9	0	2.52

In both the initial and follow-up survey, students provided their opinion concerning how beneficial the safety would be/was during their service-learning project and in the future while working at home or on the job. In the initial survey, 85 percent (60 out of 71) responded somewhat, helpful, or very helpful with the most prevalent answer being helpful. In the follow-up survey, 70 percent (42 out of 60) responded somewhat, helpful, or very helpful. Again, the most prevalent answer was helpful. Tables 6 and 7 contain the full results of these two questions.

Table 6. *In your opinion, how beneficial do you think the 10-hour OSHA Training session will be/was during your service learning project work?*

Response	Not Helpful	Slightly	Somewhat	Helpful	Very Helpful	Mean Value
Scale	1	2	3	4	5	
Initial Survey	4	7	11	36	13	3.66
Follow-up Survey	1	17	14	25	3	3.20
Δ	-3	+10	+3	-11	-10	-0.46

Table 7. *In your opinion, how beneficial do you think the 10-hour OSHA Training session will be in the future while working at home or on the job?*

Response	Not Helpful	Slightly	Somewhat	Helpful	Very Helpful	Mean Value
Scale	1	2	3	4	5	
Initial Survey	6	19	16	23	7	3.08
Follow-up Survey	6	20	18	15	1	2.75
Δ	0	+1	+2	-8	-6	-0.33

In both the initial and follow-up surveys, students ranked the subjects they perceived as being the most beneficial. In the initial survey, students ranked fall protection as the most beneficial followed by the PPE and Hand Tool Lab and the module on PPE. In the follow-up survey, students ranked the Hand and Power Tools module as the most beneficial followed by the modules on PPE and fall protection. Table 8 contains the full results of this question.

Table 8. *The following is a list of the subjects covered during the OSHA 10 Hour training. Select the three topics that you feel were the most beneficial. Rank the top three in order. ("1" being the most beneficial).*

Subject	Rank	
	Initial	**Follow-up**
Introduction to OSHA	11	11
Fall Protection	1	3
Electrical	5	6
Struck-By	11	10
Caught-In or -Between	10	14
Health Hazards	4	9
Material Handling and Storage	9	8
Personal Protective Equipment (PPE)	3	2
Hand and Power Tools	8	1
PPE and Hand Tool Lab	2	4
Stairs and Ladders	6	5
Scaffolds	14	12
Concrete and Masonry	11	13
Fire Protection and Prevention	6	6

Students also ranked the subjects they perceived as being the least beneficial. In the initial survey, students ranked the Introduction to OSHA as least beneficial followed by the Concrete and Masonry module and the Scaffolds module. In the follow-up survey, students ranked the Concrete and Masonry module as the least beneficial followed by the Introduction to OSHA and Scaffolds. Table 9 contains the full results of this survey question.

Table 9. *The following is a list of the subjects covered during the OSHA 10 Hour training. Select the three topics that you feel were least beneficial. Rank the three that you select in order. ("1" being the least beneficial).*

Subject	Rank	
	Initial	**Follow-up**
Introduction to OSHA	1	2
Fall Protection	13	6
Electrical	11	7
Struck-By	11	7
Caught-In or -Between	5	12
Health Hazards	14	11
Material Handling and Storage	4	4
Personal Protective Equipment (PPE)	7	10
Hand and Power Tools	7	12
PPE and Hand Tool Lab	10	14
Stairs and Ladders	6	9
Scaffolds	3	3
Concrete and Masonry	2	1
Fire Protection and Prevention	7	5

Discussion of Results

The survey answers concerning construction experience and safety experience (Tables 4 and 5) confirmed the perception of the Honors College administrators that, as a group, incoming Honors College students have very little construction experience. This confirms the need to conduct safety training for students before they begin working on service-learning construction projects in order to minimize the risk of injury and to mitigate liability for the University.

A majority of the students perceived that the safety training session for construction would be beneficial as they worked on their service-learning project (Table 6). This is a strong indication that the students learned new concepts and skills. However, the mean value for this answer was 3.66 for the initial survey and 3.20 for the follow-up survey, a decrease of 13 percent. While no additional questions were asked to pinpoint the reason for this decrease, this difference could be explained by the fact that the students did not use all of the training they received while working on their service learning projects. Therefore, the students may perceive that the training they received was too long and/or intensive for the immediate benefit they received.

Fewer students perceived any future value of the training going forward in their life when compared to the perceived value when working on their service learning projects (Table 7). The mean value for this answer was 3.08 for the initial survey and 2.75 for the follow-up survey as compared to 3.66 and 3.20, respectively. Again, no attempt was made to determine why this was the case. However, one explanation could be that these students do not see themselves pursuing a career in construction nor do the majority see useful application for safety training doing projects at home. Table 7 also shows an 11% decrease in the mean value between the initial survey and the follow-up survey. This is very similar to the decrease in the mean value for the previous question and is therefore likely attributable to the same factor or factors.

In the initial survey, the students perceived the top three most useful subjects covered during the training were Fall Protection, the PPE and Hand Tool Lab, and PPE (Table 8). Throughout the training, the instructors emphasized falls as being the number one cause of death on construction projects. This emphasis may be the reason students selected Fall Protection as the most beneficial. In order to impart some practical skills on to the students, the instructors decided to teach a hands-on PPE and hand tool lab as one of the optional topics covered. It is evident from the response to this question that this was one of the most popular aspects of the training. The proper use of PPE was the third most beneficial topic according to the students. In the follow-up survey, the Hand and Power Tool module replaced the PPE and Hand Tool Lab in the top three most beneficial subjects (Table 8), and Fall Protection fell from one to three on the list compared to the initial survey. These shifts are likely due to the nature of the work the students performed on their service learning projects. Fall hazards were not present on the service-learning projects; therefore, the students were not able to use the knowledge they had learned. It is likely that their perceptions of which topics were more beneficial shifted based on what training topics they used during their week of service.

In both the initial and follow-up surveys (Table 9), the students chose Introduction to OSHA, Concrete and Masonry, and Scaffolds as the three least beneficial modules. The Introduction to OSHA module contains a history of OSHA and also goes into detail concerning employers' responsibility and workers' rights. Therefore, it is not surprising that the students failed to make the connection between the content in this module and the work they were about to perform on their service learning project. OSHA recently shortened this module from two hours to one hour due to years of receiving complaints about its length in relation to the overall length of the OSHA 10-Hour course. It is unclear why the students perceived that the Concrete and Masonry module and Scaffolds module were not beneficial. Perhaps it is because these subjects are somewhat technical in nature and the students did not perceive they were applicable to their service-learning projects.

Conclusion

Based on the student responses to the survey, it is evident that construction safety should be required for all students prior to their participation in service learning projects for their own well-being and to limit the University's liability. However, based on the survey data obtained from the students, revisions in the training are in order.

For instance, it is not as clear as to whether or not students should be required to complete the full OSHA 10-Hour construction safety course. Although students completing the OSHA safety course receive a safety credential, the 10-Hour OSHA card, further consideration is required to determine what benefit students derive from this credential if they are not going to pursue a career in construction. Some of the mandatory training modules (Introduction to OSHA, Struck-By, and Caught-In or -Between) were some of the subjects the students deemed least beneficial. Based on the work performed on the service-learning projects, the students' perceptions appear to be correct.

If the OSHA 10-Hour course is continued, the subject matter should be revised to make the training more relevant to the students' work on service-learning projects. As Astin et al (2000) found in their study, the single most important factor associated with a positive service learning experience is the student's degree of interest in the subject matter. Two of the elective subjects (Concrete and Masonry and Scaffolds) were also deemed to be not beneficial. Therefore, further work is required to determine what safety subjects would be more relevant to future service-learning projects and the safety-training curriculum revised accordingly.

Safety training for students engaged in service-learning construction projects should be required. As this program moves forward, further research and evaluation is needed to ensure that the training will provide students the knowledge they will need to work on these projects in a safe manner.

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