

Building Leaders in a Construction Management Undergraduate Program

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The new Student Learning Outcomes (SLOs) required for accreditation by the American Council for Construction Education (ACCE) are a strong mix of technical and managerial skills. In addition to these traits, the construction industry also desires students who will become future leaders. Many construction management programs teach leadership skills through team projects, internships, leadership in student professional clubs, and guest speakers. A few construction management programs have created leadership coursework as a traditional or service-learning experience. This paper describes one program's innovative strategies and the resulting impacts from infusing leadership education into an undergraduate construction management program. The Construction Management program at Colorado State University has created a culture that promotes ownership and participation by all in building a program of excellence. The program values the contributions of students resulting in a sense of ownership and pride. Industry's role has evolved from being advisory in nature to being a full partnership with the program. The increase in program engagement from students and industry has led to a variety of opportunities for students to grow as leaders.

Key Words: Program Culture, Student Leadership, Industry Engagement, Student Engagement, Accreditation

Introduction

Accredited construction management programs strive to meet accreditation standards as well as the needs of the industry that hires the graduates. Much of what the construction industry desires of graduates is outlined in the technical and business topical content areas provided by the American Council for Construction Education (ACCE), the accrediting body for most construction management programs in the United States (ACCE, 2014). Table 1 lists the twenty Student Learning Outcomes (SLOs) for students graduating with a bachelor's degree from a construction education program.

Table 1

American Council for Construction Education student learning outcomes (ACCE, 2014)

Upon graduation from an accredited ACCE 4-year degree program, a graduate shall be able to:
1. Create written communications appropriate to the construction discipline.
2. Create oral presentations appropriate to the construction discipline.
3. Create a construction project safety plan.
4. Create construction project cost estimates.
5. Create construction project schedules.
6. Analyze professional decisions based on ethical principles.
7. Analyze construction documents for planning and management of construction processes.
8. Analyze methods, materials, and equipment used to construct projects.
9. Apply construction management skills as a member of a multi-disciplinary team.
10. Apply electronic-based technology to manage the construction process.
11. Apply basic surveying techniques for construction layout and control.
12. Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process.
13. Understand construction risk management.

14. Understand construction accounting and cost control.
15. Understand construction quality assurance and control.
16. Understand construction project control processes.
17. Understand the legal implications of contract, common, and regulatory law to manage a construction project.
18. Understand the basic principles of sustainable construction.
19. Understand the basic principles of structural behavior.
20. Understand the basic principles of mechanical, electrical and piping systems.

In addition to these outcomes, researchers have called for teaching leadership in construction programs (Becker et al., 2011) and recruiters have identified "leadership", "teamwork" "collaboration skills" and "people skills", as the most desirable traits in a new hire (Ahn et al., 2010). The Industry Advisory Board (IAB) for Colorado State University concurs with this assessment. They want to hire students who not only perform well in technical and managerial duties but who are poised to become the future leaders of the industry.

Although there is not one agreed upon definition of leadership skills, most agree that they differ from managerial skills. Table 2 compares common traits of managers and leaders (Zmorenski, 2014).

Table 2

A manager…	**A leader…**
Administers	Innovates
Is a copy	Is an original
Maintains	Develops
Focuses on systems and structure	Focuses on people
Controls	Inspires trust
Has a short-range view	Has a long-range perspective
Asks how and when	Asks what and why
Focuses on the bottom line	Looks to the horizon
Imitates	Originates
Accepts the status quo	Challenges the status quo
Is a classic good soldier	Is his own person
Does things right	Does the right things

Where, when, and how do you teach leadership skills? Previous research has advocated for more leadership training in the undergraduate construction management classroom (Bain & Bender, 2006). There have been a few successful attempts at teaching construction students leadership skills in the classroom (Mills & Beliveau, 1999; Hynds, 2000; Badger, Wiezel, & Bopp, 2007) and through service learning courses (Stewart, Carr, & Anspaugh, 1994; Gains, 1999). Leadership development has been integrated into the construction management curriculum on a small scale at California State University, Fresno (Hyatt, 2013). Leadership can be learned but it doesn't always lend itself to a traditional classroom setting. So the Colorado State University Construction Management program has looked for ways to provide leadership education and experiences to students beyond the required coursework. Although these efforts have only been established within the past 5 – 7 years in the program, the impact on students and the department has been significant. It began with a conscious effort on the part of the department to create a culture that promotes ownership and participation by all in building a program of excellence. The department refers to the faculty, staff, students, industry, and alumni as members of the "CM Family" and each one plays a vital role in the success of the program. Caring for each other and those in our local, national, and international communities enables everyone to improve. This is strongly reflected in the core values of the department:

- Provide the nation's highest quality construction management education.
- Make a positive difference in the lives of students.
- Be a part of something larger than our individual selves.
- Exhibit professionalism.
- Care for our environment.

This approach was noted as a strength of the program during the ACCE accreditation review in 2009. The visiting team wrote that "Teamwork and a feeling of belonging to a family were words frequently heard by the visiting team." This is also supported by a department head who leads and teaches in the servant leadership style. Servant leaders are concerned with growth of people, stewardship, and building community (Bonanno et al., 2008).

Engaging Students in the Program

The department makes deliberate efforts in all of its actions as well as its interactions with students to make it clear to the students that meeting the minimum graduation requirements will not be enough for them to be successful as a lifelong learner. They are encouraged to get involved and create opportunities to improve the program, not only for themselves but for the students who will follow them. Students are highly encouraged to participate in extracurricular activities, serve as an ambassador for the program with industry and our community, get involved in development activities with the department head, and seek out leadership opportunities. With 12 different construction professional clubs and 14 different student competition teams, there are plenty of opportunities for students at various levels to gain leadership experience. Each year, approximately 90 students participate on competition teams. By the time they graduate, about half of the students participate in extracurricular activities offered by the program. As an example, of the 46 students who graduated in Fall 2014, 21 students participated on a competition team, 18 participated in a professional club, 9 were leaders of student clubs, and 5 participated in CM Cares, the program's service learning initiative. In addition, many of the required construction courses have team projects that provide all students with short-term, targeted leadership opportunities in a controlled setting.

The program strives to provide the best quality education in the world, but recognizes that there is always room for improvement. To aid in this effort, the department head holds an open forum with the undergraduate students twice a year. There is no set agenda. It is designed as an open dialogue to address any issues of concern the students may have. The meeting is organized by the students. They survey the student body for topics of concern, missed opportunities, and recognition of areas of excellence. Topics in the past have included: curriculum, facilities, teaching effectiveness, budget, etc. These bi-annual meetings helped set the culture of transparency and open dialogue between the students and the program leadership. These meetings are usually held near the end of each semester. Even though students are busy with team projects and studying for finals, they have made the time to engage the department head in this forum. In Fall 2014, approximately 100 students participated in the forum. The results of engaging the students in their education program has created a sense of ownership and pride in the program. An excellent example of this is the story of how a professional fee was created for the undergraduate program.

Creation of the Professional Fee

In 2009, the students were concerned and inquired about the impact of another round of budget cuts on the department for the upcoming academic year. The department head held a separate meeting to address the students' concerns. He shared the department budget and the cuts and identified the resulting impacts on advising, internships, and career placement services; ability to work with the top technology; access to scholarship support; and the opportunity to interact with national industry leaders. The students asked how they could help. Their response was, "We need to invest in our education." They wrote a petition to institute a construction management student fee, took the petition around to their classes, and within two days, collected 301 signatures. It was submitted to the University President who was surprised that students were asking to have their fees increased. The President took the request to the University Board of Governors for approval. It passed and became the first undergraduate program with a professional fee. The students were not asked to do this but they were empowered and engaged by the structure of the program and took it upon themselves to provide the resources needed to support the mission of the program. That kind of engagement in decision making and problem solving has allowed the program to create a culture of leadership. Upon learning of the students' efforts to create a self-imposed fee to support program quality, the construction industry was impressed with these forward-thinking students.

Student-Funded Scholarships

Often alumni will fund scholarships after they have become established in their careers as a thank you to the program where they received their education. In 2009, three students in their final semester started a new tradition of giving back to the program prior to graduation by sponsoring a scholarship for future CM student leaders, the CM Board of Directors Student Leadership Award. As former officers of the CM Board of Directors (CMBOD) student club (an umbrella club for all professional construction management student clubs) and members of the College's Dean's Council, and members of CM competition teams, the three students recognized the importance of participating in leadership activities while in school. "We have seen the positive impact and benefits of student leadership activities, and we want to give other students the ability to pursue them as well. Because of our involvement, we have received amazing employment opportunities to work internationally. We want to start a tradition of support coming directly from past student leader alumni to current student leaders in the CM Department," noted one of the students. They established the scholarship to lift some of the financial burden of paying for college from students, so they can participate more fully in leadership and extracurricular activities. This scholarship has helped motivate students to continue the department's growing tradition of leadership and success. In fact, more graduating student leaders have continued the tradition of donating to the scholarship. The scholarship has been awarded every year to a deserving student leader since its inception.

Engaging Industry in the Program

The department encourages industry members to become involved with the program in a variety of ways. As with many construction management programs, the department has an actively-engaged Industry Advisory Board (IAB). Members of the IAB are guest speakers in classes and for student clubs, host field trips, and sponsor students for their required internships. Beyond the common ways that IABs support programs, the construction management program at Colorado State University has seen the benefits of an enhanced relationship with the construction industry.

Speaker Series

In addition to guest speakers in classrooms, the program now enjoys a sponsored speaker series to bring nationally-recognized construction leaders to campus to engage the students in discussions on the topics of leadership, construction trends, and current practice. In 2013, an alumni committed funding to the construction management program to host industry speakers on campus and engage students in the possibilities of their future careers. "Colorado State University played an important role in my growth and education," said the graduate. "I saw this speaker series as a way to support and deepen my connection with the University." The unique aspect of the speaker series is that the majority of the process is in the hands of the students. They must submit a request for funding a presentation or a seminar with significant impact on advancing construction education and leadership. Once approved, the students organize the visit, market to students across multiple disciplines, and host the guest during their visit. In spring 2014, students brought two nationally-known construction leaders to campus including a vice president of Clark Construction and a senior executive of Fluor Construction. As a result of the success of the initial offerings, the sponsor decided to continue funding the speaker series. The department is currently working to create an endowment to support the speaker series indefinitely.

CM Cares

The recently developed CM Cares program plays a major role in accomplishing the mission of the program by providing CM students the opportunity to serve their communities through projects that apply their classroom skills to real-world situations. CM Cares, established in spring 2011, is a service learning program sponsored by the CM Department to infuse the traits of community service, leadership, team building and ethics throughout the culture of the CM program through construction-related community service projects. The program includes a Construction Leadership course involving guest lectures from industry leaders on the non-technical aspects of running a successful business, such as leadership, ethics, team building and creating company culture. Students from this course serve as leaders of the various CM Cares projects and work on identifying community service agencies in need, fundraising, matching volunteers from specific CM classes to the projects' needs, and mentoring and organizing the volunteers. Students must be nominated and apply to be part of the CM Leadership course. The

criteria for selection includes: participation in competition teams, student club leadership, academic performance, and volunteer experience on community service projects.

To date, CM Cares has completed 16 projects valued at over $250,000. It has given the students excellent leadership opportunities and has helped them develop a sense of service to others that is so strong in the construction industry. One of the projects, the James and Libby Project, was highlighted nationally by ABC's Good Morning America (http://abcnews.go.com/blogs/headlines/2013/05/3000-pound-wheelchair-swing-built-for-twins-with-cerebral-palsy/). In 2013, with the help of several construction companies, one of the CM Cares Leadership teams created a wheelchair-accessible, kid-friendly backyard space including a giant swing for twins who are both wheelchair-bound with cerebral palsy.

Students who participate in CM Cares truly believe that they are a part of something much greater than their individual selves. This is often lost in an academic culture of exams, grades, and graduation. Industry has recognized the impact that CM Cares has had on helping to create the future leaders of the construction industry by announcing a $1 million endowment to support CM Cares. In addition, with the recognition that CM Cares has received locally and nationally, it has helped to change the impression/image of construction management with the public and within the university.

IAB Relationship

These opportunities wouldn't have been possible under the traditional one-way relationship of an IAB where their role is only advisory. The department changed the relationship with industry from a one-directional role of industry support to a mutually beneficial industry-academy partnership. As a partner, industry members see the return on investment from upgrading classroom facilities, sponsoring faculty scholars and faculty internships, in the higher quality of our graduates. Together, IAB members have created an executive council that works with the department head to enhance the program by working with university administration to support the program's mission, vision, and goals. Like the students, industry has gained a sense of pride and ownership in the quality of the program and the success of the students.

Future Work

There is clearly a need for leadership education in undergraduate construction management programs. With the institution of the Student Learning Outcomes for ACCE, construction programs will have more flexibility on content rather than having to provide a set amount of credit hours for each historic construction management topic. This will allow programs to find creative ways to incorporate leadership education and opportunities for their students. The next steps will include surveying construction management programs nationally and internationally to determine their approach to teaching leadership skills. The survey will take into account variables such as: program size, geographic location, size of local industry, type of institution (teaching/research, public/private), etc.

From this, a best practices guide can be created to address both curricular and extracurricular opportunities, recognizing that "one size fits all" does not apply. Insight might also be achieved from non-construction management programs' approaches to teaching leadership, especially at the undergraduate level. In addition, research on construction management academic program culture and its impact on students, faculty, staff, and industry is needed.

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