Work Experience Requirement and Expectation of Construction Management Students in ACCE-accredited Construction Management Programs

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Abstract

Undergraduate construction management programs are designed to provide students with construction technology and business management related academic preparation for entry careers into the construction industry. Classroom and laboratory instruction are the major pedagogical styles employed, with practical experience gained through student internships on actual construction related projects. This study stems from the need to define the quantity and nature of skills students should acquire through an internship in order to meet the expectations of hiring companies for their future entry-level employees.

Within the construction management programs accredited by the American Council for Construction Education (ACCE), the exact number of programs requiring internships as part of their defined undergraduate course of study is not readily available. Through a phone survey involving 39 ACCE programs, 23 (59%) have an internship component as part of their degree requirements. Students typically obtain internship positions during summer sessions between spring and fall academic terms. Although summer sessions vary in length, a twelve week internship duration is accepted as a baseline generating approximately 500 hours of experience for the intern. Ten of the 23 programs require more than 500 hours of experience, whereas 11 of the 23 programs require less. Construction companies employing student interns may have differing levels of internship program development. Some have formalized, structured programs, whereas others do not. The tasks and responsibilities assigned to students are often not well defined nor balanced in applying a broad skill set associated with the students’ level of academic preparation. Further inquiries were made into job tasks typically assigned to a student intern.

Thirty-two members of a program’s industry advisory board provided input on task assignments. Many of the tasks identified were management-related. A third constituent involved in internships is the student. Construction management students were surveyed to determine their perception on the appropriate quantity of work hours comprising their internship, and the job tasks assigned. Whereas, all parties expressed value in having students involved in management-related functions, only 1 in 4 students reported these types of tasks were actually performed during their internships.

Findings of this study provide construction management educators and construction industry representatives with relevant information for curriculum and internship program development. Additionally, the results aid students majoring in construction management to evaluate internship opportunities critically so they are best prepared for full-time employment at graduation.

Keywords: ACCE, Construction Management, Co-op, Internship, Students, Work Experience

Introduction

In construction management education, integrating classroom and laboratory learning knowledge with practical experience from real construction projects is widely recognized as important. Reports from the construction industry often stress that any deficiency in students' skills would negatively impact their early career learning curve and students are more exposed to theoretical as opposed to practical knowledge. This concern from construction industry representatives is reasonable as construction management is regarded as an applied discipline. One way of closing
the expectation gap between industry and academics is by offering internship programs that will strengthen students’ practical problem-solving skills. The practical knowledge gained by students through participation in the delivery of actual construction projects supports both their personal development and professional competencies. However, questions remain as to what constitutes a good internship program and what roles and responsibilities are appropriate for student interns. As students, construction management majors are instructed in the managerial functions of the construction process, rather than skill development in craft or labor work. A misalignment may exists between industry and educators on the interpretation of “managerial functions” and the nature of the work performed by interns that will assist students in developing management skills. Upon entering into the industry, construction management graduates will hold varied levels of managerial roles or positions. Therefore, it is important to answer two interrelated questions: 1) how should students be trained during their internships in order to maximize their preparation for management-related roles? And 2) what are the industry’s expectations of entry level construction management graduates? This study sought to address both of these questions.

The study authors are affiliated with a construction management program that has been accredited by ACCE for over 20 years. Since initial accreditation, the baccalaureate program required students to accumulate at least 500 hours of construction related work experience before graduation. Unlike a co-op program, the responsibility to find and arrange work experiences rests with the student. Acceptable work experiences were described to students and industry employers as “construction related work experience under a licensed general contractor or similarly organized entity.” Detailed criteria on the type of work that would satisfy the 500 hours experience requirement had not been widely communicated. Since job functions and responsibilities assigned to student interns varied greatly among construction employers, program educators found it necessary to evaluate the students’ work experiences for verification of the graduation requirement and to assess if duties were preparing students for management-related employment.

The program recently initiated a more streamlined review process of the work experience requirement which has been implemented for two semesters. The streamlined review process utilized a digital documentation process. The graduation requirement remained unchanged - a minimum of 500 hours of construction related work experience. However, an additional specification was implemented requiring at least half of that minimum experience requirement be management-related (a minimum of 250 hours). Under the new process, students submitted electronically a detailed description summarizing their work activities performed. Each student submission was evaluated by a departmental faculty committee to determine if the experience was management-related. Each student’s employer was also contacted to verify the accuracy of the student’s submission in describing their assigned tasks, hours worked, and categorization of the tasks as management-related. After the work experience requirements were deemed met (through internal review and external verification) the student’s degree audit was updated showing the graduation requirement as complete.

While evaluating the students’ submitted work summaries, the authors had difficulty in determining what constituted “management-related” experiences. This research effort sought to provide guidance on work tasks and skills classified as management-related. Findings from this
study will be valuable not only to construction employers but also to construction management students. Study objectives were achieved by surveying students, construction employers, and educators from ACCE accredited construction management programs regarding their perceptions and expectations of construction internship programs. Our findings compared expectations between the construction industry, academic programs, and undergraduate students.

**Literature Review**

Relevant articles on construction management internships published in the Associated School of Construction (ASC) proceedings and journals database and the American Society of Civil Engineers (ASCE) database were reviewed and analysed. The authors focussed on the perceptions of the construction management (CM) programs that require internships for their students, employers’ perception of internships, and students’ perception of internships as documented in the literature.

A study conducted by Weber in 1998 indicated that only about 10% of all the member programs of Associated Schools of Construction had an internship requirement. Chapin et al. (2003) did a similar study a few years later and found that of the 45 schools responding, 26 (58%) had a mandatory internship requirement and 19 (42%) did not. The impacts of structured internships on student’s performance have been studied and well documented. Rondinelli et al. (2000) conducted a study which suggests that participation in a formal internship program will have a positive effect on academic performance. Some have identified the benefits of internships for participating students, such as permanent future placements with sponsoring companies, clarification of career choices, and an increase in self-esteem. Hauck et al. (2000) investigated construction management students’ performance in subsequent coursework after the internship. The GPA’s of the internship group increased slightly (~1%), but was not statistically significant. Results of this research were inconclusive. Overall the internship group outperformed the non-internship group in subsequent academic performance but the improvement was not statistically significant. In contrast, the focus of this research effort was to investigate the expectations of both industry and students with regard to student internships experiences and discover if any gap in expectations exist among the two groups.

Cannon and Arnold (1998) shared that it is important for industry sponsors and academia to fully understand the role perceptions and expectations have on the experiences of student interns and the success of internship programs. Tener (1996) concluded that industry, university, and graduating construction engineers all benefit exceptionally if students are required to complete internships (i.e. working in construction) as part of the degree. The effectiveness of the industry-university partnership can be maximized by adopting a mandatory internship program. Most construction management programs stipulate the required core and concentration courses that comprise their degree requirements. In such instances, adding internship credit hours to the degree requirements would mandate that an existing course is removed. This trade-off is often impractical in terms of university and accreditation requirements. Therefore, required internships in most programs are managed as zero credit hour courses. However, Moore and Plugge (2006) found from a survey of 62 industry partners, that a majority of the respondents desired required
internships be assigned academic credit. They also found that the preferred internship duration was three months.

Some programs have structured internship programs where the intern’s roles and responsibilities are rotated over the multiple internship periods. The CM Program at Roger Williams University has developed such a structured internship program where the roles are categorized as follows:

1. Superintendent’s Assistant (100% jobsite). Entry sophomore level w/ construction curriculum coursework
2. Site Intern (75% field; 25% office trailer). Entry junior level w/construction curriculum coursework
3. Office Intern (100% home or field office). Entry senior level w/construction curriculum coursework

Similarly, Virginia Tech’s internship programs structured progressively in three primary areas:

1. Field Operations - Work as laborer, helper, or technical assistant, assisting in surveying, checking material delivery, timekeeping, cost control, submittal processing, filing, drawing controls, schedule checking, and subcontract monitoring.
2. Office Operations – Perform quantity take-offs, working with vendor and subcontractor contracts, developing estimates, and performing scheduling functions, checking drawings and specifications for completeness and discrepancies, attending bid openings and conferences, handling the paperwork.
3. Project Management – Perform management, field engineering or office functions at the advanced level of a mature intern.

In order to make the internship experiences more valuable to students, it is imperative that students take the opportunity to reflect upon their experiences and document it in the form of a journal or a portfolio. Within the literature, various means of evaluating internships have been identified. One example is Millers (2006) who outlined the internship program evaluation process at Rogers Williams University. Employers provide mid-term and final evaluations. Students submitted a portfolio including a term paper that is presented at the end of the internship program. Grading (pass/fail or letter grade) is assigned for the completed internship activity as agreed upon before the student begins the internship program.

**Research Methodology**

The purpose of this research was to explore how internships are perceived with regard to length of time and type of work activities performed from three perspectives: the employer, the academic program, and the student. By analyzing these perceptions, the authors’ aim was to bridge any gap in expectations between the parties.

To gain the perspective of academic programs, the authors conducted a phone survey of ACCE accredited undergraduate programs. According to the ACCE website, as of 2017, there were seventy-five accredited baccalaureate degree programs. The phone survey asked program representatives if their baccalaureate program had an internship requirement for graduation and,
if so, how many hours were required. Of the 75 accredited baccalaureate programs, the research team successfully reached and documented responses from 39 programs (52%). Responding programs represented seven of the eight regions categorized by Associated School of Construction (ASC). The eighth region, representing international construction management programs that are ASC members, was not included in the phone survey. The responding programs also varied significantly in the size of their undergraduate program.

To capture the employers perspective on job functions perceived as most suitable and beneficial for construction management interns, the authors sought out construction employers’ opinions on the roles and responsibilities assigned to interns within their companies. This data was gathered during a break out session of the program’s Industry Advisory Board (IAB) meeting held in October 2016. IAB members are owners, contractors, sub-contractors, and suppliers within the residential, commercial, and infrastructure sectors. IAB members were asked to list the typical job functions or task descriptions assigned to interns, particularly those tasks that IAB members deemed “management-related.” Approximately 50 IAB members participated in the break-out session with 32 responses received.

For the student perspective, the authors surveyed enrolled construction management students during the Fall 2016 semester. The authors distributed a questionnaire using an online survey tool. The survey consisted of a variety of questions regarding the student’s perceptions of their internships. In order to compare student perceptions with those of employers, students were asked to identify what they thought were the most useful job functions and roles performed during their internship. Additionally, students were asked to share their perception on the appropriate length of an internship, and if it should be a graduation requirement. Construction management students within the authors’ classes were invited to participate in the survey. A total of 109 valid student responses were received. Any duplicate responses by the same student were discarded.

Results

The results of the research efforts are presented in the form of charts. These charts show the number of responses or the percentages of responses from the ACCE accredited undergraduate construction management (CM) programs, industry (employers), and students (interns) regarding the research questions posed to each party pertaining to internships.

Construction Management Programs

Figure 1 indicates that out of all the 39 CM programs reached through the phone survey, 23 (59%) had an internship component as part of the program’s degree requirements. Among those having an internship requirement, the duration of the internship (measured in hours) varied widely. The minimum requirement was 225 hours; the mode was 400 hours (6 programs), and 980 hours was the maximum requirement. As noted previously, a summer internship duration of three month (12 weeks) equates to about 500 work hours and is therefore used in this research as the benchmark for comparison purpose. Approximately half of the 23 programs required less than 500 hours of work experience to meet the minimum requirement for graduation.
Construction Industry (Employers)

From the 32 responses received from construction employers, 27 different job functions were identified. The 14 most frequent responses have been categorized and shown in Figure 2 below. The frequency of similar responses from the employers are shown on the vertical axis of Figure 2. The employers were asked to be specific about the job functions that would be categorized as management-related. The most frequently listed internship activities that were deemed management-related were estimating/takeoff functions, and planning and scheduling functions. These two tasks descriptions were submitted by more than 50% of the responses.

There were other job functions that were less common (identified by 3 or less respondents). These activities included:

- Lead crews
- Assist project manager/superintendents/project engineers
- Communicate with architects and engineers/clients
- Testing
- Building inspections/punch list
- Assist LEED
- Hands-on training (carpentry, steel working, equipment operation)
- Learn product types
- Warranty returns
- Surveying
- Participate and observe leadership development training
- Development (lot) requirements/lot scheduling
- Job site cleanup

Figure 1: Number of CM Programs requiring Internships and Hours
Figure 2: Employer’s Perception of Management-Related Functions Assigned to Interns

**Students (Interns)**

A total of 109 students responded to the survey; the majority being in their junior or senior year of the undergraduate program as shown in Figure 3. The vast majority of student respondents (84%) had completed a work experience event to meet their program’s minimum 500 hours.
Most students had either worked in the commercial sector (48%) or the residential sector (35%); only a few had worked in other sectors. Also related to their experiences within specific industry sectors, students were asked a follow-up question about their desired career path sector. Figure 4 displays the comparison of their responses. Figure 4 shows that their past work experience is highly correlated with their desired career path. An interesting fact was also revealed from the students’ responses. Approximately two out of three (67%) of the students indicated that they already had some form of construction experience before enrolling in the undergraduate construction management degree program.
When students were asked which category best described their primary job function assigned while an intern, the craft function was the most frequent response. Figure 5 displays the categorization of student responses. Craft functions included carpenter, laborer, operator, ironworker, welder, mason, etc. A quarter of all students surveyed indicated that they had performed some type of management-related function during their internship. The job titles included in this category included project manager, general superintendent, engineering manager, discipline superintendent (civil, mechanical, concrete, etc.), contract manager, and labor relations manager. Other functions included in student responses were operations-related (office estimator, scheduler, cost engineer, field estimator), engineering-related (construction engineer, field engineer, project engineer, civil surveyor), foreman positions (craft superintendent, craft foreman), and purchasing positions (contract/subcontractor administrator, field expeditor, purchasing agent).

As previous researchers had found, interns gain valuable knowledge from performing a variety of job functions during their internships. Experiences that build progressively toward management-related functions help prepare students for future employment positions.

![Figure 5: Students Primary Job Function as an Intern](image)

The literature review indicated that there is a general agreement within industry and academia on the positive impact of internships on construction management students. However, documentation is limited on how student perceive the value of internships. The authors desired to find out if student interns valued the internship in the same way as the industry employers did. More than two thirds of the students surveyed saw the benefit of interning before taking a full time job, as shown in Figure 6. Figure 7 shows that the vast majority (84.6%) of students felt an internship should be mandatory for graduation.

Students were also asked to identify what was the right duration (amount of hours) for the internship. As shown in Figure 8, more than 85% thought that 500 hours and above was the preferred number of hours. The reason for having 500 hours as the comparison basis was to match with the existing requirements of the responding students’ degree program. In general, the authors have found the 500 hour quantity to be equivalent to working full time during one summer term (3 months or 12 weeks).
Figure 6: Students Perception on Doing Internship before Taking a Full-time Job

Figure 7: Students’ View on Mandatory Internships

Figure 8: Students Preferred Amount of Internship Hours
To explore deeper beyond assigned job function assigned to interns, the research team asked students an additional question. Students were asked to identify the type of job activities they performed as an intern. This question was similar to the one asked of employers. The question asked of industry employers was an open-ended question with no particular choices. The students’ responses were based on selecting from a listing of 26 job activities. Students selected the job activities applicable to their past work experiences or the ones they preferred to do. Figure 9 shows the percentage of students who selected each of the job activities as applicable or preferred in order of increasing frequency or preference. Planning/scheduling/monitoring, assisting project engineer/manager/superintendent, reviewing plans and specs, estimating/takeoff, and job scheduling/scheduling subs were identified by the students as their most frequent or preferred job activities.

Figure 9: Students Perception of Internship Job Activities
Discussion of Results

Although only 39 of the 75 ACCE accredited baccalaureate programs were included in this study, results indicated about 59% of these construction management programs had a mandatory internship requirement. Comparatively, a significant growth over the last two decades in the number CM programs requiring internships was evident. Internships are considered an integral component for academic achievement and successful job placement by most undergraduate construction management programs. When questioned on the specific number of hours required to satisfy internship, about half of those programs that had mandatory internship required 500 hours or more whereas the other half had less than 500 hours. This 500 hours is approximately equivalent to one full summer (3 months or 12 weeks) of full time work for the interns.

Similarly, students also highly valued their internship experiences within the construction industry. Practical industry experience was seen as complementing their educational pursuits. Recognizing that two out of three students had already had construction-related work experiences before enrolling in an undergraduate program, 85% of students perceived the one summer session (approximately 500 hours) requirement as appropriate. Students understood what a career in construction involves and their internship experiences greatly influenced their career aspirations. Whereas the authors’ affiliated program is predominately commercial based, it was expected that the majority of student respondents preferred to work in the commercial sector and their prior internship experiences were in the same sector.

Students desired to apply their management-related skills as evident by their listing of preferential job activities. The listing of management-related job functions by industry employers were well matched to the students’ preferences. However, only 25% of the students reported prior work in management-related job functions. A large proportion of students did craft work during their prior work experiences. A gap is evident between what students report doing, and the expectations of the academic programs and the responding industry employers. Whether the employer has a formalized internship program may partially account for this discrepancy. Within formalized programs, students are more likely to have the opportunity to perform management-related tasks as they move through progressively more complex tasks. As more employers develop formal internship programs, student involvement in management-related tasks should increase. Academically, ACCE accreditation’s learning outcomes also puts more emphasis on management-related education and training. Therefore, programs will need to help bridge the gap by collaborating with industry employers to support their assignment of more management-related job activities to student interns.

Another important observation made highlighted the similarities and differences between students and employers regarding the job activities offered to an intern. Planning/scheduling/updating activities were most frequently identified by both the groups. Estimating/takeoff was also frequently noted by the employer whereas the students ranked it at number four. Safety orientation/inspection was number three for employers but was listed in thirteenth place for students. Managing subcontractors/field employees was at fourth place for employers among the most important job activities and was at the fifth place for students. Ordering/tracking materials was at the fifth place for employers and ninth for students. Another
job activity considered important by both groups was reviewing plans/specs which was at the sixth place for employers and third place for students. The comparison revealed that although there exists some commonalities between the opinions of the two groups, differences do exist between the perspectives of employers and students.

An interesting fact revealed from the students surveyed was that two out of three students (67%) had already had some type of construction work experience before enrolling in their undergraduate program. This corroborates the fact that students perceived real benefits of internships and willingly worked as an intern even before their degree required them to do so. This could be attributed to the fact that a large proportion of students enrolling in construction management programs come from a family with ties to the construction industry.

When students were surveyed to explore if they were getting internship opportunities in their intended career path there appeared to be a close match. A majority of students preferred to work in commercial construction sector and most of the internship experiences were in commercial construction. When working as interns, only about a quarter of the students got an opportunity to work in management-related job functions. A large proportion of students did craft work. This is where there is a major gap in the expectations of the industry, construction management programs and students. Although no internship requirements are mandated to be included as part of the ACCE construction baccalaureate curriculum, student learning outcomes demand sufficient education and training in management-related job functions. Therefore, this gap in expectation and reality should be bridged by encouraging employers to offer more management-related job activities to student interns.

**Conclusion and Recommendations**

This study investigated perceptions regarding student work experiences from three perspectives: the academic program, the construction industry employer, and the undergraduate student involved. Using the information obtained, the authors sought to identify if gaps exist between the three groups’ perceptions. Regarding the value of internships, all three groups were consistent in recognizing the positives. Although, not all construction management programs were found to require internships, the number of programs that do is increasing. Employers recognize internships as an effective method to “try out” a future permanent employee, and mold that candidate’s skill set in ways advantageous to their company. Similarly, students recognize the value of internship experiences as a means to apply their academic skills to real situations. Their satisfaction with their internship experiences greatly influence their desired career path.

When focusing on the job functions students will perform as interns, the authors did discover some discrepancies in perceptions. Academic programs are emphasizing more management-related skill developed as part of their learning outcomes and students are receptive to performing those tasks as evidenced by their identification of those tasks as preferred. What constituted management-related tasks was quite consistent between students and employers. However, students’ reporting of actual job tasks frequently performed did not involve management-related functions. Knowing this, students may benefit from referring to the job function listing shared in Figures 2 and 9 when evaluating as internship description. With this information, they may be able to discern if an opportunity will advance their management-related
growth. Some employers may need assistance from the academic programs to develop components within their internship programs to address management-related job junctions. It has to be emphasized here that construction management programs should not discourage students from taking craft-related opportunities as part of their work experience but those experiences should be complemented with exposure to managerial functions. That is why students should be encouraged to find companies that offer structured internship programs. If companies do not have structured programs, the academic programs should offer guidance on the development of programs.

Communications and collaborations between industry employers, academic programs, and students are needed to ensure internship expectations are closely aligned. All participants have a vested interest in ensuring successful internship opportunities exist and the outcomes of such opportunities help prepare the future professionals of the construction industry.

References


