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Needs Assessment Part 1: Identifying Common Tasks of 21st Century CM Graduates Using Alumni Feedback

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The need for construction management programs to maintain a curriculum that is relevant to current and future industry needs is a regular challenge. Needs Assessment is a systematic approach to evaluating curriculum to determine the most appropriate structure. The most accessible option for conducting a curricular needs assessment is to do it within the program among the faculty and administration. While it is essential for these stakeholders to be key participants, their view includes only a portion of the critical perspective. A holistic evaluation should include multiple perspectives from key stakeholders, namely faculty, students, and industry. However, little literature on needs assessment incorporates the student perspective. This paper reports on results of employing a focus group approach to gain insight from recent graduates of a CM program to determine the essential activities required of new graduates in the construction management industry within their first three years. Results from two different focus group sessions indicate recent CM graduates conduct numerous technical activities, but more importantly a strong set of soft skills activities.

Key Words: Needs Assessment, Focus Groups, Essential Activities, Soft-Skills, CM Graduates

Introduction

Educational programs are continually challenged with maintaining a curriculum that meets the current and future needs of the industry they serve. In today's environment, students, parents, and employers continue to demand more from colleges and universities. Accreditation agencies and professional organizations provide some guidance to construction programs in developing their academic curriculum. Although both the CIOB (2018) and ACCE (2022) set learning outcomes for students to achieve by graduation, they do not specify the curriculum or topical content. Leathem (2014) points out the ACCE learning outcomes, by design are ambiguous, to allow for varying types of construction programs. Institutions are empowered to develop their own curriculum to meet the standards. Previous work in construction education related to curriculum development, presented below, shows several different approaches to obtaining stakeholder input. Surveys and interviews are a popular method for obtaining information to aid curriculum development. Studies have focused on identifying not only general and comprehensive skills and knowledge construction graduates should acquire, but also more

specific skills or subject matter knowledge. Few have looked at the entire curriculum. This paper provides a framework to one approach called a Learning Needs Assessment and provides details of the first step methodology involving program alumni through focus groups.

The aim of the overall Learning Needs Assessment research is to identify the most important knowledge and skills 21st Century CM graduates need upon entering the construction industry as a means to inform decisions regarding curriculum content and assessment. The approach is guided by the following objectives:

1. Identify the most frequent activities performed by CM graduates within their first 3 years of work post-graduation.
2. Identify key knowledge and skills required to successfully perform the required activities.
3. Compare the required activities, knowledge, and skills to the current curriculum construct.
4. Determine areas of curriculum revision to address the identified need.

This paper articulates the data collection methodology to identify key activities and content themes collected from industry participants as part of needs assessment approach.

The most important skills the construction industry requires from graduating construction management students was the focus of a study using a structured survey administered to construction professionals. Respondents were requested to evaluate 93 skills across seven attribute/skill areas deemed significant for graduating construction management students (Ahmed, Yaris, Farooqui, & Saqib, 2014). Several studies focus on specific skills and knowledge. A questionnaire-based survey was used to gather information from general and electrical contractors in the United States regarding the desired skills of construction management students upon graduation in the area of electrical systems (Tatum & Conradi, 2019). In another study, a list of Heating, Ventilating and Cooling (HVAC) curriculum topics grouped into six subject areas was developed and the importance of each topic evaluated using a 5-point Likert scale by construction industry professionals (Burgett, Perrenoud & Smith, 2018).

Another approach used in construction education to obtain stakeholder input on curriculum development is the use of consultation with individuals or groups of individuals. In an effort to identify construction superintendent competencies and develop curricula to support superintendent education and training, Gunderson (2008) held interviews to identify and rank the skill sets required by project superintendents. Tatum (2013) used interviews with general contractors, construction managers and electrical contractors, together with literature reviews to develop a survey to gain feedback regarding electrical curriculum content. A similar approach was used to develop a BIM curriculum for a construction program (Lucas, 2014).

As part of a comprehensive review at Purdue University, faculty used industry input to establish undergraduate educational competencies and revise the curriculum within guidelines. An industry panel was used to develop and rank competencies that students should acquire prior to graduation (Benhart & Shaurette, 2014). As part of an Australian government sponsored national endeavor, a series of 14 workshops and follow-up questionnaires was convened to examine the preferences of a building discipline group to develop "Threshold Learning Outcomes." Many of the workshops were for academic staff of construction programs, while others were for industry practitioners and employers, current students and recent graduates (Newton & Goldsmith, 2011).

In a study to identify the competencies that construction companies expect from construction graduates (Attallah, Mahfouz & Jones, 2019) used semantic analysis to analyze job descriptions and

identify the most significant competencies expected for certain jobs. In similar studies outside the field of construction education, Hartmann & Jahren (2015) analyzed seven years of job posting data from engineering companies to first understand the frequency and use of the word "leadership" in job descriptions. A content analytic approach was used to examine active job postings for entry-level business analytics positions to offer insights for those seeking to develop academic programs in this area (Cegielski & Jones-Farmer, 2016).

Method

This qualitative study used focus groups and the Nominal Group Technique (NGT) to identify themes of knowledge, skills, and abilities most frequently required among recent graduates (within the last 5 years) of a large construction management program in the southeast United States. Focus groups are small, structured groups that have a specific purpose, used to explore individuals' views and experiences through group interaction (Krueger & Casey, 2000; Litosseliti, 2003). Krueger (1994) identified a focus group as "a carefully planned discussion designed to obtain perceptions on a defined area of interest in an open-minded, non-threatening environment". Widely used within social sciences as a tool to inform policy and practice, focus groups are effective in program evaluation (Hennink, 2007). Table 1 highlights the challenges of focus groups identified by Rodríguez et al. (2011).

Table 1.

Potential Focus Group Barriers

Participation
• Failing to meet participants need for a perceived sense of closure • Lack of participation by participants due to fear of publicly contributing new ideas • Dominant group members overpower the direction of the discussion • Easily create off-topic discussions between group members
Information Generation
• They tend to generate quick answers without careful consideration • Pressures from dominant members for other participants to conform answers • Potential researcher bias in directing the conversation

Aspects of Nominal Group Technique (NGT) were used to provide a more structured approach and alleviate some of the challenges associated with focus groups. The technique incorporates a more orderly approach for obtaining thoughts and ideas from the group participants (Ven & Delbecq, 1972). Figure 1 illustrates the NGT structure and process.

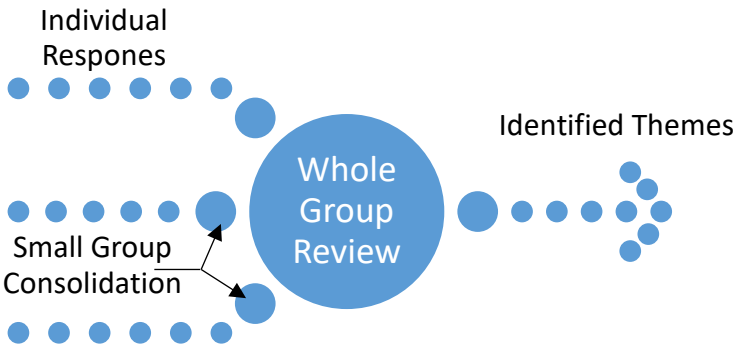

Figure 1. Nominal Group Technique Process

Prior to arriving at group discussions, participants are given the opportunity to develop individual responses to each question, problem, or topic posed. All individual responses are then used to drive subsequent discussions that advance from small groups to the whole group. This approach allows all participants thoughts to be considered with reduced potential for bias from other participants. It also reduces potential for researcher bias when the researchers serve as the focus group facilitators.

The study was targeted to alumni of the program that currently work in the construction management profession who graduated from the program within the last 10 years. To target this population, members of the program's Industry Advisory Board (IAB) were targeted. The program's IAB is made up of alumni who graduated from the program within the last 10 years. Emails were sent to potential participants approximately 6 weeks prior to the scheduled focus group with RSVPs requested. Participation was completely voluntary but did include lunch.

Two focus groups were held in different cities. One session was hosted by a construction firm, and one was hosted by the local AGC office. Each session lasted approximately 6 hours with a 1-hour lunch break. The authors served as facilitators for the focus groups. Questions posed to participants are listed below. They were open-ended and allowed a broad range of responses and perspectives from participants (Krueger & Casey, 2000). Care was taken to develop questions that were non-directional to reduce potential of researcher bias by steering the participants toward specific types of responses. The research goal was to find out what tasks recent graduates perform, their frequency, and criticality of the task. Results can then be used to evaluate the current curriculum to identify gaps and overlaps. Results were reviewed with the participants to develop task themes, and related knowledge and skills.

(1) Thinking about your first three years out of school, what are/were the tasks that you most perform(ed) as part of your job?

(2) How would you categorize the frequency of how often you perform each task you listed?

Regular = At least once daily
Frequent = At least once weekly
Seldom = Maybe once a month

Questions were given separately in the order listed so as not to direct the participants' thoughts. Each participant was asked to write down responses to the questions on a response worksheet provided to them.

Following the individual answer session participants were asked to work in small groups of 3 to 4 and discuss their answers. The goal of this session was to identify the range and frequency of tasks. Each small group was provided post-it-notes to document the task and how many in the group identified the particular task. When all groups were done, the facilitators guided the groups in posting the notes to common areas around the room so that all identified tasks were noted (Figure 3). During this process the participants identified themes for the common tasks identified.

Figure 3. Group Consolidation of Tasks

After all tasks and related themes were identified, the groups were then assigned the different themes and asked to develop a list of knowledge and skills required to successfully complete the tasks within each of them. Groups documented the related knowledge and skills on large post-it-notes and displayed them on the wall with their related theme (Figure 4). When all groups were done the facilitators led participants through a discussion of the identified knowledge and skills associated with each theme. This process was intended to establish consensus among the participants that all tasks and their associated knowledge and skills had been accurately identified.

Figure 4. Knowledge and Skills Incorporated to Themes

Results

Focus groups were conducted in Atlanta, GA and Birmingham, AL over the summer of 2023. Each focus group was scheduled for a 6-hour period, including one hour for lunch. Prior to each session, the accessible sample population was contacted via email to solicit participation. A general description of the event and agenda were provided in the email. Participants were asked to RSVP for the event. Two reminder emails were sent leading up to the event to encourage participation. The goal was to have 15-20 participants for each focus group. In total, there were 33 people representing 20 different companies that participated between the two sessions. Job titles for participants ranged from senior management, such as President or Director, to entry level, such as Field Engineer or Assistant Project Manager. Table 2 provides descriptive statistics of the participants.

Table 2

Participant Descriptive Statistics by Focus Group

Focus Group	Male	Female	Avg. Years	Companies	Position Level	(n)
Atlanta	15	1	10	12	Entry	4
					Mid-Level	4
					Mid-Management	5
					Executive	3
Birmingham	14	3	8.5	8	Entry	7
					Mid-Level	4
					Mid-Management	3
					Executive	3

For the question “Thinking about your first three years out of school, what are/were the tasks that you most perform(ed) as part of your job?”, participants first worked individually to answer this question, then in small groups. The groups developed a list of the tasks and related frequencies of those tasks identified by all their group members. Results were communicated through post-it notes. The collated results were displayed on walls and a theme for each group of tasks assigned. The process continued until all tasks identified by participants were represented on the wall in a theme. That Atlanta and Birmingham groups identified 15 and 18 original themes, respectively for their activities. After collating results from both groups 15 common themes were determined. Table 3 shows the final themes with associated tasks and frequencies identified by at least 33% of the participants. Items identified by less than this were removed for purposes of brevity.

A total of 60 different tasks made up the different themes. The Atlanta group identified 46 tasks and the Birmingham group identified 55 tasks. Both groups indicated 42 similar tasks. The most frequent of these were Quantity Takeoff (94%), Prepare Meeting Agendas and Minutes (91%), Review Submittals (88%), Review/Develop/Negotiate Subcontractor Scopes (82%), and Write RFIs (76%). Both groups identified the use of various types of software as a common task. The Birmingham group identified five specific construction software platforms as specific tasks. Other tasks the Birmingham group identified that the Atlanta group did not, include OSHA Enforcement, Promoting a Safety Culture, Subcontractor Walk-Thru’s, Negotiating Subcontractor Pricing, and Prequalifying Subcontractors.

Table 3

Identified Themes and Associated Activities

Themes	Tasks	Response (n)			
		Bham	ATL	Total	Rate
Estimating	QTO	17	14	31	94%
	Pricing	10	10	20	61%
	Buyout	6	12	18	55%
Meetings	Prepare Agendas & Minutes	18	12	30	91%
	Lead OAC/Sub Meetings	7	4	11	33%
Submittals	Review Shop Dwgs/Submittals	17	12	29	88%
	Track/Facilitate Review Process	8	6	14	42%
	Procure Submittals	8	5	13	39%
Subcontracts	Develop/Negotiate/Review Scope	15	12	27	82%
Communications	Writing RFIs	13	12	25	76%
Scheduling	Schedule Review/Coordination	10	12	22	67%
	Create/Update Schedules	5	12	17	52%
Sub Relations	Talking with Subs	13	9	22	67%
Project Tracking / Coordination	Document Control/Mgt.	9	10	19	58%
	Daily Jobsite Walks/Reports/Photos	7	8	15	45%
	Project Changes	10	4	14	42%
	Order/Track Material	3	8	11	33%
Field Operations	Labor Tracking	13	8	21	64%
	Subcontractor Mgt. & Coordination	8	11	19	58%
	Layout Verification	12	4	16	48%
	Conducting Layout	7	4	11	33%
Cost Management	Billing / Pay Apps	4	12	16	48%
	Cost Projections	5	10	15	45%
	Verifying Progress	3	8	11	33%
Closeout	Punch List Mgt.	7	9	16	48%
	Collect Closeout Docs	5	6	11	33%
Project Documents	Reading Plans & Specs	4	8	12	36%
Quality	Jobsite Walks	7	8	15	45%
Safety	Safety Management	4	7	11	33%
Construction Technology	Using Various Software	7	4	11	33%

Analysis and Conclusions

This study used alumni from a construction management program to identify tasks commonly executed by CM graduates within their first three years of work. Overall, the themes and associated tasks were relatively common to what most programs address. Some tasks and related themes that were of note related to Meetings, Communications, and Sub-contractors. The results indicate that CM graduates are highly involved in creating Meeting Agendas and taking Minutes of Meetings. Leading meetings was also indicated by at least 1/3 of the participants. New graduates are also involved in many aspects of critical written and oral communication. Including writing RFI's, negotiating with subcontractors, talking with subcontractors for various purposes from resolving disputes, coordinating with other subs, and soliciting bids. Another interesting theme identified was Personal Organization. Many participants mentioned how critical it was to be extremely organized in how you manage documents and time. When asked to elaborate on the relationship of time to organization the respondents explained that time management was a key to staying organized in their schedules and daily responsibilities/deliverables. They also mentioned personal organization as a component to clear communication with work partners – especially immediate supervisors, and the ability for others to be able to access information you're in charge of when you're not around is very critical.

The authors acknowledge that the results and subsequent conclusions are not without limitation. First, this study was delimited to graduates of a specific program. Further research will look at comparing the identified themes and activities in a broader population. Second, the results only focus on activities and do not consider deeper aspects of essential knowledge and skills associated with the activities. Further research should explore this aspect. Despite the identified limitations, the study provides thought provoking information about possible strengths and weaknesses in CM higher education syllabi and serves to advance educational effectiveness of the discipline. While the results of this study have shown some outcomes that may be considered somewhat obvious, they provide an up-to-date look at how the activities of new CM graduates have remained similar but also how they are different. The study also provides an approach to incorporating alumni and industry into executing a curricular needs assessment. As construction educators it is imperative that remain current with the needs of industry and that we are continually looking to how we can better prepare our students for their profession. With this information we can now make informed curricular decisions based on current-day information.

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