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# **Construction and Engineering Faculty Internships: A Reflective Case Study**

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#### Abstract

Faculty internships provide construction and engineering educators with a valuable opportunity to engage directly with industry, gaining hands-on experience that enhances their teaching and research capabilities. This paper reflects on the experiences of a faculty member (author) who participated in the Associated General Contractors of America's Robert L. Bowen Industry Residency Initiative, which allowed them to work closely with a multinational construction company on a major medical center expansion project. The internship spanned various aspects of the project, including safety management, pre-construction planning, communication strategies, and business development. The paper emphasizes the immediate benefits of this internship, such as deeper insights into modern construction technologies, safety protocols, and project management practices. It also discusses the long-term impact, which extends to curriculum improvements in construction and engineering programs, the incorporation of real-world challenges into academic discussions, and the enhancement of faculty-student engagement. The internship experience fostered stronger ties between the academic program and industry partner members and positively influenced student development by providing up-to-date content, new pedagogical approaches, and expanded career opportunities. Additionally, the paper underscores the importance of internships in promoting faculty professional development, strengthening industry partnerships, and advancing construction and engineering education. These internships play a critical role in closing the gap between theory and practice, ensuring educators stay aligned with evolving industry standards and technologies, ultimately leading to a richer learning experience for students.

#### **Introduction & Literature**

'Internship' is a word typically reserved for undergraduate and graduate students, but seldom is it used in the context of faculty. Student internships generally serve as a link between the classroom and the profession, but they also engage industry and faculty [1], just not in the direct sense. The symbiotic relationship between theoretical knowledge and practical application has always been its cornerstone in higher education. Similarly, the relationship between construction programs and industry is a foundation for this symbiotic relationship, with industry learning from academia and vice versa.

Construction programs have traditionally valued industry experience among faculty and considered master's degrees terminal degrees for tenure-track faculty [2]. Even though it has been showing diminishing value over time compared to acquiring a doctoral degree [3], many construction programs still place a significant value on faculty having professional experience [4]. One way to obtain that construction experience is through a professional internship [5][6][7]. Reginato [7] states that a professional internship benefits the faculty member and the company. The faculty can learn a specific skill set and convey the rigors of industry work. In contrast, the company receives temporary help and has an advocate in their degree programs for that company.

Faculty internships stand as a testament to the power of merging the facets of theory and practice, offering a unique avenue for educators to transcend traditional academic boundaries and engage with the dynamic realities of the construction industry. As the landscape of education continues to evolve in response to changing pedagogies, technologies, and student expectations, the role of faculty members is likewise undergoing a significant transformation. The faculty professional internship is a pivotal bridge, spanning the gap between pedagogical theory and classroom practice while propelling educators toward more incredible pedagogical innovation and enriched student experiences. In consideration of this, the Associated General Contractors of America's Education and Research Foundation (AGC-ERF) launched a professional paid internship initiative for construction faculty in 2013 called the Robert L. Bowen Industry Residency Initiative [4], and this was the opportunity that was taken advantage of by the author.

# **Faculty Internship Experiences in Construction**

Faculty internships in construction are not new. Hynds [6] presents insight into the reasoning for an internship and the various considerations when seeking and engaging in a professional faculty internship in construction. Lin, Kim, and Dossick [8] highlight the impact on junior faculty who participated in a faculty internship. They found an effect on junior faculty scholarship and that the internship experience can also enhance the quality of their academic scholarship.

Shaurette [9] discusses the purposeful use of the faculty internship to identify and define subject areas not currently in the construction curriculum and finds that prospective employees should become more competent in demolition. Holliday, Reyes, and Robson [2] provide insight into developing an industry-academic internship program to allow faculty to gain general and BIM-specific construction experience. They found that students could receive a direct benefit because of this program. Manion [10] found that a summer faculty internship in the construction industry provided valuable opportunities for improving quality, planning, and productivity through firsthand involvement with a heavy earthwork contractor. The internship included site visits, productivity analysis, and surveys of superintendents and foremen, offering insights into the practical aspects of construction operations. Manion emphasized the mutual benefits for the faculty member, the university, and the industry partner, suggesting that such internships could serve as a model for similar collaborations in the future.

## Purpose

Literature has provided some insight into the impact of the professional internship on construction faculty, but it is certainly not exhaustive. This qualitative reflective single-subject [11][12] paper aims to delve into the multifaceted dimensions of the faculty internship from a participant's point of view, unraveling the significance of the potential immediate and longitudinal benefits others in construction academia may experience.

## Methodology: The Residency (Internship)

During the summer of 2021, the author (n=1), an assistant professor, completed a 2-month AGC Robert L. Bowen residency with a multi-national construction company (GC), employed as a full-time employee working on a 48-month-long expansion of a medical center that included a 3-

story, 180,000 SF vertical expansion, a 3-story, 87,000 square foot north wing and a horizontal expansion and miscellaneous renovations in various departments. Initial goals were set up to guide the residency as part of this process. The author maintained a detailed daily log of activities, documenting significant tasks, new experiences, workflow approaches, interactions with project personnel, major events, and potential curriculum enhancements. The author did not participate in any weekend activity, and there were no weather delays as most of the work was indoors.

Initially, the author expected to be more involved with pre-construction to enhance a class on construction estimating, but this original intent expanded into several identified themes. Those themes were safety, communication, owner-client relations, business development, people development and management, cost control, construction technology, and community engagement. From these themes, an array of topics has changed the author's mindset as an educator about curriculum, pedagogy, and student activities.

At the beginning of the internship, the author was given the same orientation as other student interns and, on their first day on-site, was provided a modified "intern roadmap," which challenged the author to coordinate with various team members to learn and get insight on 64 task items that are job duties typically of a project engineer, project manager, superintendent, and a project executive. With this roadmap, the author was involved with several activities, including testing, coordination, scheduling, and project pre-planning. The author participated in executive meetings and ran project coordination meetings. The author completed various internal training courses to refresh and enhance the author's knowledge of several key topics in construction. To get the most out of the residency, the author's approach involved disregarding all previous theoretical knowledge and the author's industry experience to be fully immersed as an intern.

#### Results

*Safety* was a genuine priority for the GC. At 7:00 am each morning, every project participant participates in "stretch and flex" activities, from field personnel to office staff. The author was fortunate enough to lead one of the "stretch and flex" activities; it got the author involved with the safety culture. Shortly after, activities of the day were discussed, and the GC and their trade partners completed a "daily hazard analysis" to discuss all hazards, triggers, controls, environmental issues, and site-specific concerns.

In addition, the author has had the opportunity to walk with a superintendent to learn about safety in the field. A few lessons were learned, but what stuck out was when they said that you must let people know you genuinely care about their safety. The author witnessed this individual stop work twice in less than an hour, provide each crew a real hazard story based on their activity, and educate (not reprimand) workers on his job site in real-time. This showed the author that safety is not only about paperwork and protocol but also must be a genuine concern and effort by all parties involved. This information was shared with the construction program's safety instructor and construction students enrolled in an undergraduate degree program.

*Communication* was vitally important for such a complex project. The GC helped the author understand the value of effective communication by involving the author in several activities. The author was involved with various meetings such as 'hotlist' meetings, subcontractor meetings, OAC meetings, and business development meetings. The author has learned from these meetings how important it is for students to understand the value of meetings, how to run meetings effectively to get the most out of them, and when a meeting is needed versus an alternative approach such as an email or a phone call.

Quite possibly, the biggest lesson with communication is the importance of pre-task planning. The author was lucky enough to be part of a mini project to investigate an issue about condensation issues. Even though it was a 'small' project, the GC followed a proper pre-task planning protocol to ensure its success. This was important as the requirements of infectious control and risk assessment (ICRA) were still being applied. What was done as part of the process was identification of the issue, walking the project space to document the issue, discussing what can be done as a team, discussing initial plans with the owner's representative(s), i.e., PMs, kitchen managers and revise, as necessary, discussing plans and coordinating with pertinent subcontractors, creating an actual schedule, and communicating with the project team and execution of the changes. This was incorporated into the curriculum discussion for the construction program to enhance student learning.

*Owner-client relations* are an important value of the GC. The author witnessed interactions that were very collegial between the owner and GC. The author learned how the owner-client relationship was built and nurtured. One reason seemed to be the open communication between both parties. However, another was the way the GC interacted not only with the owner's representatives but also with the occupants of the facility. One such example was when there was an emergency in one of the work areas. Everyone got involved to resolve the issue and assist. The GC quickly responded to resolve the issue. The GC's representative bought breakfast sandwiches for all the staff with handwritten apologetic thank you notes to show their appreciation for the staff and their understanding of the situation. This was incorporated into the curriculum discussion for the construction department to enhance student learning.

**Business development** is not something the author was particularly familiar with. However, the author has learned that it involves much more than running after any project and bidding on all public work. The author has learned that the GC's approach involves building relationships with owners and trade partners long before a project lead is posted. It involves ideas from marketing specialists and gaining insight from project personnel. The author has also learned that business development involves reputation and doing things right in every job you take on. The author has incorporated this discussion in the author's estimating class and with the department for student learning enhancement.

**People development and management** can be tricky, but the author has experienced firsthand how the GC addressed people development. From day one, the author was invited to over 20 training courses to teach the author different areas of construction, different software, workflows, and how the GC operates. The GC has also provided opportunities for their employees to take charge of innovative initiatives such as a 'green' network team. The GC also provides employees with the agency to make their own mistakes and learn from them to improve as employees and

construction professionals. This is something that the author thinks is important to share with students so they know what they should be looking for in a company - one where they can think and grow.

*Cost control is an essential function of a PM team*, yet only one project success metric exists. The author has learned how the GC did their cost control and has learned about the art of the give and take of cost control to ensure your project runs smoothly and so that you can maintain relationships with owners and trade partners. There is so much more than changing orders, claims, and disputes over money. The author learned that cost control often involves balancing money and people to ensure a harmonious project.

**Construction Technology** knowledge is essential to PM teams. The author was able to interact with key technology used in the project. Project management software included Prolog Manager and Procore, while field operations utilized BIM 360. For scheduling, Primavera P6 was used for the baseline schedule and schedule updates. The project also incorporated the Autodesk software suite for Building Information Modeling and BIM coordination. The author was also part of an organizational drone training for project use. The author provided insight into the competencies expected of graduating seniors regarding the use of technology and included this as part of the construction technology-based class.

*Community engagement* is a priority for the GC. The author was temporarily part of the GC team because of their commitment to the department where the author worked. Within the first few weeks, the author was part of a group that taught high school students about construction drawings in a construction education program.

Throughout the residency, the author has learned many things from each project team member, but there are key takeaways from each team member. The *Project Executive* taught the author how to ensure client satisfaction by incorporating techniques not traditionally considered part of a project execution plan. The *Communications Specialist* taught the author that care for the customer should be a priority, but there must be a balance between client satisfaction and the contract. The *Senior Project Manager* provided the author with information on their approach to project execution. However, a key lesson the author has learned is communication with the project team to get things done and knowing how to manage personalities more than the project. The *Project Manager* taught the author that you should consider innovation and innovative techniques for the project, such as using drones to acquire projects and project administration. The *Project Engineer* has taught the author about commitment to your passion by spearheading the 'green' network team. They also taught the author about commitment to the project and the need for students to take on new challenges.

The author learned about commitment to everyone's safety and welfare from a *Superintendent*. From another, the author learned about commitment to education and teaching future generations as the author joined him and the PM in a class where they taught high school students about construction drawings. The author learned about task management and being efficient using time from another. From the *Assistant Superintendent*, the author learned that you should always be a lifelong learner, study your craft constantly, and work toward perfecting it. The author has

learned much more than stated, but these are some key observations and lessons from everyone the author had the opportunity to work with.

## Beyond the Classroom Skills

There are a variety of skills that students should be able to exhibit upon completion of their degree program per requirements of accreditation; however, there are other intangible skills that they should possess – some of the things that can be taught and other things that are a bit more challenging to cover in a construction and construction engineering curriculum. From discussions and observations throughout the internship, a few key intangible skills were noted, which included knowing the following:

- 1. When should you email versus picking up the phone and calling?
- 2. How to communicate effectively to get things done.
- 3. How to provide effective feedback.
- 4. How to host meetings, listen, and properly document pertinent items.
- 5. How and when to ask for advice.
- 6. How to be decisive.
- 7. How to learn from your mistakes and make up for them.
- 8. How to conduct yourself professionally.
- 9. What to do in emergencies.
- 10. When to take on challenges and when to know your limitations.
- 11. How to continuously learn.
- 12. How and when to take on extracurriculars and memberships in associations.
- 13. How to grow as a professional.

All items were incorporated into key concepts as part of the author's various classes and were presented for curriculum review to the department for discussion.

## What the GC may have learned

By being part of the residency, the author believes that with reporting and constant communication, the general contractor's team was able to understand the construction management curriculum a bit more and was able to provide additional guidance on the current curriculum based on having in-depth knowledge. Also, the team was given insight into the program's construction students and how they can recruit better, e.g., guest lecturing a class or aiding with competition teams.

## Discussion

# Longitudinal Impact & Benefits

The value of this internship was experienced long after its completion. Two years later, the author and the department where they worked experienced key benefits as a direct result of the internship.

**Relationship building** was one of the most important longitudinal benefits observed by the author, the undergraduate construction department, and the project team. The project team and the author would periodically meet for lunches and informal meetups as industry friendships and partnerships were established. The project team has sponsored and allowed the author to participate on their team in clay shooting and fishing tournaments to raise funds for student scholarships and cancer research.

This experience also *enhanced faculty recruitment*. The author observed that one of the superintendents on the site had significant knowledge of electrical work, and they also taught print reading, as mentioned above. Since an electrical systems class at the time had no instructor, they were recruited as an adjunct professor.

*Student development* was experienced in several ways. The immediate and longitudinal impact on the classroom content cannot be understated, as new content was added to courses based on the feedback from the author's experience. Also, the project team assisted with student competitions and the provision of various materials to guide students on properly preparing a response to a request for proposal.

*Student employment* was certainly a win-win for the academic-industry team. From experiences and interactions with students, the author provided a testament about the quality of the GC for whom the author employed students, and two students, in general, took an interest. The author was able to give feedback about those students to the GC, and offers for internships were made to those students based on the author's recommendation, which was two years after the completion of the internship.

## **Implications for Construction & Construction Engineering Faculty**

Integrating faculty internships into construction and construction engineering programs has significant implications for educators and the academic institutions they serve. These internships provide faculty with firsthand industry experience, enabling them to enrich their teaching and better align academic content with industry needs. By understanding the following implications, academic programs can better prepare students for the challenges of the modern construction industry.

*Enhanced Curriculum Integration*: Faculty internships provide construction and engineering educators with direct exposure to current industry practices, allowing them to integrate real-world challenges and contemporary technology into their curriculum. This alignment ensures that students gain practical skills and knowledge that are directly applicable to the evolving needs of the industry.

*Strengthened Industry-Academia Relationships:* Such internships foster stronger ties between educational institutions and industry partners, creating opportunities for collaborative projects, guest lectures, and student internships. This can enhance the relevance of academic programs by staying updated with industry trends and needs.

**Professional Development for Faculty:** Faculty members who participate in internships gain updated skills and perspectives, leading to more innovative teaching methods and the ability to mentor students with a deeper understanding of professional realities. This contributes to the continuous improvement of faculty expertise in project management, safety, and technology use in construction.

*Increased Student Engagement and Opportunities:* Through the insights gained from faculty internships, educators can better prepare students for the workforce by introducing practical examples and case studies into the classroom. This also supports better alignment between what students learn in the classroom and what is expected of them in professional roles.

*Improved Student Employment:* Faculty with direct industry experience are better positioned to guide students toward potential employers and provide strong recommendations, thus improving students' job prospects in the industry.

# Limitations

While faculty internships offer valuable insights into bridging academic knowledge with practical experience, this research has limitations. The methodology employed, particularly the single-subject reflective case study, presents certain challenges regarding generalizability and objectivity. Understanding these limitations is essential for interpreting the findings and guiding future research on the impact of faculty internships in construction education. The reflective nature of the study means that the findings are heavily influenced by the author's personal perspective and interpretation of the internship experience. This introduces a potential bias, as the conclusions are based on one person's observations and reflections rather than a broader data set. The study does not include comparisons with other faculty members who might have undergone different types of internships or those who did not participate in any. Such comparisons could provide a more comprehensive understanding of the internship's impact on professional development and curriculum improvements. Since the study is based on a single internship experience with one construction company, it may not capture the full diversity of industry practices or challenges faced by faculty in different construction industry sectors. The lessons learned are, therefore, specific to the context of this internship.

## Conclusion

The AGC Robert L. Bowen Industry Residency provided a transformative experience that significantly enhanced the author's professional development and expanded their perspective on construction education. By immersing fully in the day-to-day operations of a large-scale construction project, the author gained valuable insights into industry practices, ranging from safety protocols and project management to business development and client relations. This hands-on experience allowed the author to integrate practical knowledge into academic teaching, enriching the curriculum and providing students with real-world examples that bridge the gap between theory and practice.

The internship also underscored the importance of effective communication, team collaboration, and continuous learning, skills essential for industry professionals and students. As a result, the

author was able to contribute new content to courses, foster stronger connections between the university and the industry, and inspire students through updated teaching methods. The residency experience demonstrated the mutual benefits of faculty internships for academic institutions and industry partners, providing a model for other educators.

Overall, this internship exemplifies how faculty members can leverage industry engagement to enhance their teaching and better prepare students for the dynamic realities of the construction field. It serves as a testament to the value of faculty internships in promoting innovation, fostering lifelong learning, and strengthening the ties between academia and industry, ultimately enriching the educational experience for students and educators.

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