

## A Comparative Review of Internship and Co-Op in Construction Education

Afshin Hatami, Ph.D., P.E., PMP<sup>1</sup> and Saeed Rokooei, Ph.D., PMP<sup>2</sup>

<sup>1</sup> Mississippi State University, Starkville, MS 39759, USA

<sup>2</sup> Mississippi State University, Starkville, MS 39759, USA

[Ahatami@caad.msstate.com](mailto:Ahatami@caad.msstate.com)

### Abstract

Internships and Cooperative Education (Co-Ops) are crucial forms of Work-Integrated Learning (WIL) in construction education, designed to prepare students for the industry's evolving demands. This study surveys construction students to evaluate how these programs enhance readiness and adaptability, focusing on emerging trends like Building Information Modeling (BIM), construction robotics, and sustainability. Findings indicate that internships and Co-Ops significantly improve students' knowledge, skills, and confidence. However, Co-Ops generally offer more profound and sustained engagements, leading to greater perceived career preparedness and skills acquisition. The study identifies gaps in current WIL implementations and suggests enhancements, such as improved educator support and structured feedback mechanisms. These insights contribute to the WIL literature and suggest practical improvements for internship and Co-Op programs in construction education.

### Keywords

Internship, Co-Op, Construction Education, Work-Integrated Learning, Skill Development, Industry Preparedness.

### 1. Introduction

The construction industry is rapidly evolving due to technological advances and global economic shifts. This dynamic sector demands a technically proficient workforce and is adaptable to new technologies and methodologies, such as Building Information Modeling (BIM), sustainable construction practices, and automation. Internships and Cooperative Education (Co-Ops) programs, pivotal components of Work-Integrated Learning (WIL), are increasingly recognized for their role in preparing students for these industry shifts. These programs provide crucial hands-on experience and a practical understanding of the industry's challenges. Internships offer brief, intensive exposures that may not align with academic terms, providing rapid immersion into industry practices.

In contrast, Co-Ops are more structured, often integrated with academic cycles, and offer deeper, longer-term engagement with the construction environment. Despite their proven benefits, such as enhanced employability and skill development (Leavens, 2017; Abdelaty & Shrestha, 2019), systematic evaluations comparing these two forms of WIL are sparse. Liu et al. (2018) emphasize the crucial roles of workplaces, academic institutions, and students in shaping the learning outcomes from these programs, highlighting the need for a deeper understanding of how these interactions contribute to student success. This gap in the literature is particularly notable in assessments of their efficacy in adapting to construction education's needs across technological and environmental advancements.

At Mississippi State University, the Department of Building Construction Science actively supports and encourages undergraduate students working toward a Bachelor of Science degree to engage in paid summer internships and cooperative education positions with construction companies. These opportunities, which are available any semester before graduation—summer, fall, or spring—enhance classroom experiences and are integral to student education. The department facilitates these opportunities through construction career fairs held each fall and spring semester, helping connect students with industry leading firms. Graduates often find diverse career opportunities in

commercial and industrial construction, taking on roles such as schedulers, estimators, facilities managers, assistant construction managers, and project managers. This practical engagement through internships and Co-Ops is instrumental in bridging academic learning with real-world application, equipping students with the necessary skills and experiences to succeed in a rapidly evolving industry.

This paper seeks to bridge this gap by analyzing the roles of internships and Co-Ops in preparing construction students for the industry's changing demands. Utilizing a survey conducted among students from the Building Construction Science Department at Mississippi State University, coupled with a review of existing literature, this study examines the impact of each program on student readiness and skill development. The findings offer insights into their relative effectiveness and propose recommendations for enhancing WIL frameworks in construction education.

## 2. Background

Work-integrated learning (WIL), including internships and cooperative education (Co-Ops), is crucial in construction education. These programs connect classroom theories with practical experiences, preparing students for the dynamic construction industry. Internships offer short, intense work experiences, usually during academic breaks. They provide students with a quick dive into the construction field, allowing them to apply what they've learned in the classroom to real-world situations. This kind of learning is especially valuable for developing quick decision-making skills and adapting to the fast pace of construction projects. Joseph and Payne (2009) noted the immediate benefits of such real-world applications, where students quickly see the relevance of their academic knowledge. Cooperative education (Co-Ops), on the other hand, involves longer-term commitments and is integrated with students' academic schedules. These programs allow students to alternate between classroom learning and extended work periods, enhancing their understanding and skills through sustained engagement. Co-Ops help students develop a deeper grasp of their field, handling complex tasks and understanding the subtleties of the construction industry over time.

The key difference between internships and Co-Ops lies in their structure and depth. Internships are shorter and provide a snapshot of the professional world, offering students a brief yet broad exposure to the construction industry. Co-Ops are more comprehensive, providing a continuous blend of education and work that deeply embeds students in their professional roles. Research supports the effectiveness of these programs in boosting employability. Abdelaty and Shrestha (2019) highlight how these experiences are crucial for preparing students for the job market by providing them with essential field experience. Community-engaged learning (CEL) programs, like those at Mississippi State University, demonstrate how integrating community service with academic learning can enhance student outcomes and engagement with real-world issues (Rokoei et al., 2021).

However, despite their benefits, the precise impacts of internships versus Co-Ops on skill development and career readiness have not been fully explored, especially as the construction industry evolves to include a greater focus on sustainability and digital technologies like Building Information Modeling (BIM). Abdelaty and Shrestha (2019) underscore the value of these experiences in field settings, but there is a growing need for educational programs to integrate these emerging technological trends more effectively. Al-Atroush and Ibrahim (2022) emphasize the role of Co-Ops in smoothing the transition from university to career by equipping students with necessary modern management strategies and soft skills, suggesting a model for integrating new industry demands into WIL frameworks. This paper aims to address these gaps by examining how well current internship and Co-Op programs at Mississippi State University prepare students for the challenges of modernizing the construction industry, with the goal of enhancing WIL programs to better serve both educational and industry needs.

## 3. Methodology

This study adopted a quantitative approach to examine the impact of internships and Co-Ops on construction students' readiness and skill development. One hundred and eight students who had recently completed either an internship or a Co-Op program in the construction industry participated in this study in Spring 24 semester.

*Participants:* Participants were sourced from Building Construction Science at Mississippi State University. They were categorized into two groups based on their most recent WIL experience: (only) Internship (68 students) and Co-Op (40 students). The selection was purposeful to balance representation from various types of construction sectors.

*Data Collection:* Data were collected through an online survey that included a closed-ended Likert scale and open-ended qualitative questions. The survey was designed to capture:

- Duration and type of WIL experience.
- Sectors of the construction industry in which the participants worked.
- Skills developed during the WIL experience.
- Self-reported readiness for the construction industry post-WIL.

The survey also included demographic questions to contextualize the results. Before distribution, the survey was piloted with a small group of recent graduates to refine the questions based on feedback.

*Data Analysis:* Quantitative data from the Likert scale responses were analyzed using descriptive statistics to determine trends and patterns in participants' skill acquisition and readiness levels. Comparative analysis between the Internship and Co-Op groups was conducted to identify significant differences in outcomes related to the duration and structure of the WIL experience.

*Ethical Considerations:* The study followed ethical guidelines to protect participants' confidentiality and anonymity. All participants provided informed consent, ensuring they were aware of the study's purpose and their right to withdraw at any time (IRB-24-011).

## 4. Analysis

The data obtained from 108 participants were analyzed using descriptive statistical tools. The demographic data showed that 68% of participants had internship positions, while the rest had Co-Op experience, with or without internship experience. Since the nature of expected activities in construction internships and Co-Ops differs, participants were classified into "Internship" and "Co-Op."

The first section of the survey evaluated the general experience effectiveness of students. While 52% of students in the Co-Op group reported 3-6 months of work experience, and 48% stated that they had over 6 months of work experience, 49% of students in the Internship group reported less than three months of experience, 44% had 3-6 months of work experience. Only 7% reported more than 6 months of work experience. In the next question, participants specified the sector in which they were involved. Table 1 shows the percentage of each sector for both groups.

Table 1. Work Experience in Construction Sectors

Sector	Commercial	Healthcare	Industrial	Residential	Other
Co-Op	49	3	12	9	27
Internship	52	5	16	15	12

In the next question, participants rated the extent to which their internship/co-op prepared them for the construction industry's demands. A five-level Likert scale was used to quantify the perceptions into five levels: Poor, Fair, Good, Very Good, and Excellent. The percentage of each level for both groups is shown in Figure 1.

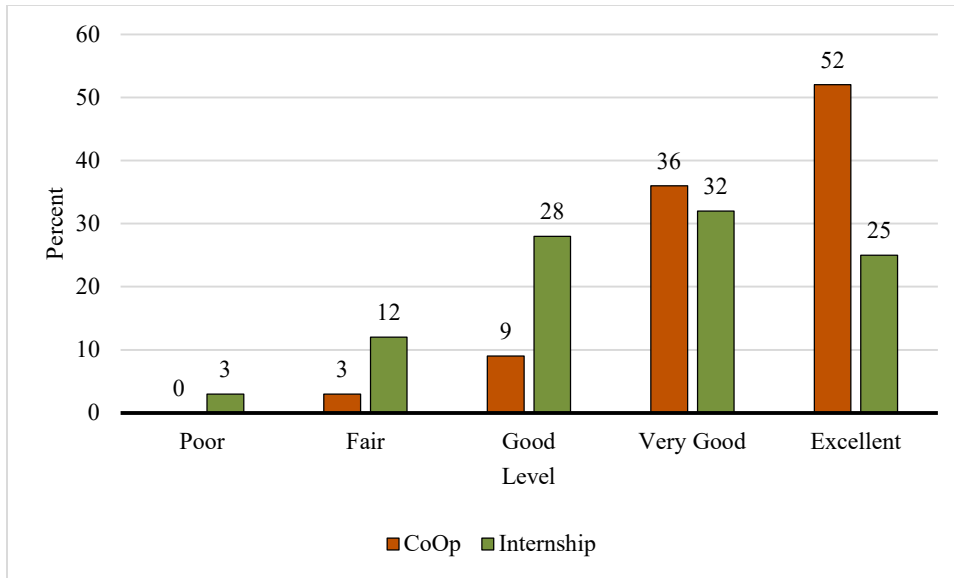


Fig 1. Impact of work experience on preparedness level for future career

The next section of the survey assessed how participants perceived skills acquisition because of their work experience. Various construction skills and practical knowledge were rated using a five-level Likert scale, including energy efficiency, compliance with environmental regulations, problem-solving skills, software, technical writing, BIM, emerging technologies, and sustainability. A quantitative value was assigned to each level in an ordinal way (i.e., Poor:1, Fair: 2, Good: 3, Very Good: 4, and Excellent: 5), and the average of these numbers (out of 5) was calculated for each group. Figure 2 shows the calculated average of each skill/knowledge area for both groups.

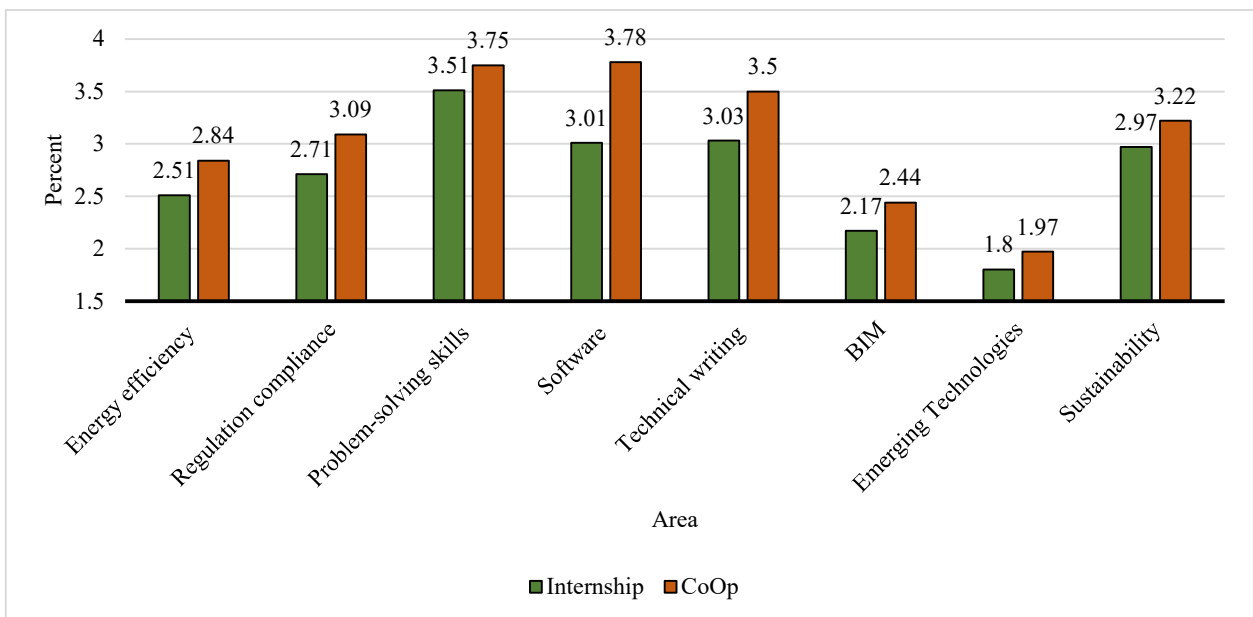


Fig 2. Technical knowledge/experience improvement

In the next question in this section, participants were asked to rate their confidence in using key project management techniques in construction. Participants rated a set of knowledge areas and skill sets using a Likert scale. The average of each area (out of 5) was calculated. Table 2 shows the average of each area in both groups.

Table 2. Project management skill improvement

Area	Planning and scheduling	Resource management	Cost Estimation	Quality management	Team Coordination	Materials and Technologies
Internship	2.98	2.81	2.9	3.14	3.58	2.99
Co-Op	3.32	3.24	2.96	3.56	3.84	3.22

In the next question, participants were asked which skill or knowledge area they most significantly developed during their internship/co-op. Several non-inclusive items were provided to participants. The percentage of each area is shown in Table 3.

Table 3. Most skill sets developed

Area	Adaptability	Communication	Site management	Problem-solving	Project management	Quality control	Safety	Sustainability	Teamwork	BIM	Contracts	CM Software	Others
Co-Op	19	3	21	15	21	6	3	0	6	0	0	0	6
Internship	5	26	15	7	22	0	0	3	8	3	4	1	6

In the next question, participants were asked to report preparedness to engage in the construction workforce, considering their skills in project management, collaboration, and technical proficiency. A five-level Likert scale was employed to quantify the perception. Figure 3 shows the percentage of each level for both groups.

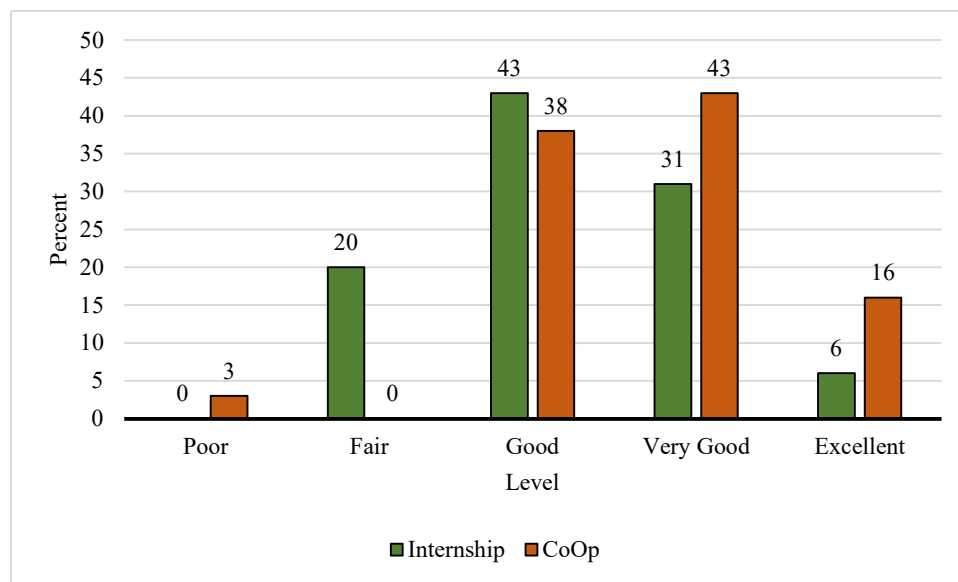


Fig 3. Reported level of preparedness to work

In addition, participants were asked to specify in what areas they felt their internship/co-op did not adequately prepare them for the construction industry. They were provided with a list of common areas/skill sets for their selection. Table 4 shows the percentage of each area in both groups.

Table 4. Improvement Areas

Areas	BIM	Stakeholder management	Communication	Sustainability	Financial management	Contracts	Problem-solving	Project management	Quality control	Safety	Others
Co-Op	42	6	0	9	9	28	0	0	3	0	3
Internship	33	7	1	4	13	7	6	15	6	7	1

## 5. Discussion

The findings from our survey of 108 construction students highlight significant differences and similarities in the impacts of internships and Co-Ops on their professional development and readiness.

### 5.1 Work Experience and Job Types

Co-op and internships offer students real-world construction industry experience; however, the nature and extent of that experience differ significantly. Co-Ops typically provide longer work periods, allowing for a deeper engagement with ongoing projects and offering a broader scope of responsibilities. This extended duration contributes to a more intensive learning environment, as Abdelaty and Shrestha (2019) noted, who emphasized the value of sustained workplace engagement in building professional competencies. Despite these differences in duration and depth, the types of construction jobs accessed through both programs are largely similar, supporting the notion that both WIL modalities expose students to fundamental industry practices.

### 5.2 Impact on Preparedness and Skills Acquisition

Students from Co-Op programs reported higher levels of preparedness and more substantial skills acquisition, likely due to these programs' structured and extended nature. They felt better equipped to handle the demands of the construction industry, aligning with the study by Al-Atroush and Ibrahim (2022), which noted the effective transition Co-Ops provide from academic settings to professional roles.

### 5.3 Skills Development and Outcomes

While the types of skills developed in both internships and Co-op are similar—encompassing technical, managerial, and soft skills—the outcomes show a slight advantage for Co-op. This could be attributed to the repeated cycles of work and study in Co-Ops, which reinforce skill development through repeated application and reflection, as

discussed by Joseph and Payne (2009). This iterative learning process helps consolidate hard and soft skills more effectively than the shorter, more intense periods characteristic of internships.

## **5.4 Identification of Skill Gaps**

Interestingly, internship participants more frequently identified gaps in their skills and areas needing further development. This observation suggests that the shorter, more condensed nature of internships might limit the depth of skill acquisition, highlighting the need for educational programs to tailor these experiences better to address specific learning needs, as Kathleen M. Short (2013) suggested.

## **6. Conclusions**

This study has comprehensively analyzed how internships and Cooperative Education (Co-Ops) programs at Mississippi State University impact the readiness and skill development of students in construction education. The findings, derived from a survey of 108 participants and a review of existing literature, present the unique benefits and challenges associated with each form of Work-Integrated Learning (WIL).

The results indicate that Co-Ops significantly enhance career preparedness among students. These programs, characterized by their structured and sequential work terms that closely align with academic learning, provide a robust integration of practical and theoretical knowledge. Students in Co-Ops reported feeling more confident and ready for the construction industry, benefiting from the extended duration that allows for deeper immersion and repeated application of skills.

In contrast, internships, though invaluable for initial industry exposure, often led students to recognize considerable gaps in their skills and areas needing further development. The shorter and more intensive nature of internships may not allow adequate time for comprehensive skill acquisition, underscoring the need for these programs to be more strategically designed to target specific learning outcomes.

Based on these observations, it is clear that academic institutions need to refine their WIL offerings to better prepare students for the dynamic and rapidly evolving construction industry. This requires providing structured support during internships and ensuring that Co-Op programs maintain their comprehensive approach while incorporating the flexibility to adapt to diverse student needs and industry advancements.

Future research should explore the long-term impacts of WIL programs on career progression and retention within the construction industry. Investigating the role of ongoing mentorship and professional development after completing WIL experiences could also provide valuable insights into how continuous support influences career trajectories and professional growth.

This study underscores the critical role of well-structured, integrated WIL programs in equipping construction students with the necessary skills and experiences to thrive in a rapidly changing industry. By continuing to adapt and innovate the design and implementation of these programs, educational institutions can not only meet the current demands of the construction sector but also anticipate and prepare for future challenges and opportunities.

## References

- Abdelaty, A., & Shrestha, K. J. (2019). Current Practices of Experiential Learning in Construction and Technology Programs. In D. Ozevin, H. Ataci, M. Modares, A. Gurgun, S. Yazdani, & A. Singh (Eds.), *Interdependence between Structural Engineering and Construction Management* (pp. 1-6). ISEC Press. ISBN 978-0-9960437-6-2.
- Al-Atroush, M. E., & Ibrahim, Y. E. (2022). Role of Cooperative Programs in the University-to-Career Transition: A Case Study in Construction Management Engineering Education. *Journal of Engineering Education*.
- Gardner, P., & Maietta, H. (2018). An initial examination of the link between internship/co-op participation and leader talent recruitment. World Association for Cooperative Education.
- Joseph, A., & Payne, M. (2009). The Impact of Cooperative-Education Internships on Full-Time-Employment Salaries of Students in Computing Sciences. *Journal of Cooperative Education*.
- Leavens, D. S. (2017). Analysis of the Construction Management Co-op Program at California Polytechnic State University. *Journal of Construction Education*.
- Liu, Q., Kovalchuk, S., Rottmann, C., & Reeve, D. (2018). Engineering co-op and internship experiences and outcomes: The roles of workplaces, academic institutions, and students. *Journal of Engineering Education*.
- Rokooei, S., Garraway, M., & Karji, A. (2021). Community-Engaged Learning in Construction Education: A Case Study. *Journal of Construction Education and Research*.
- Short, K. M. (2013). The Impact of Experiential Learning: Assessing the Outcomes of Internship Experiences for Students Entering the Construction Industry (Doctoral dissertation, University of Education).
- Wandahl, S., Olsen, W., & Ussing, L. F. (2011). Relevance of Academic Internship to the Quality in Construction Management Education. *Journal of Construction Education and Research*.