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Bridging the Opportunity Gap: Developing Intentional Industry Partnerships for Community College Engineering Students Success

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I. Introduction

Internships and other work-based learning experiences help engineering students apply theoretical knowledge to work settings, develop technical and professional competencies, and gain career-relevant experience [1-3]. Prior research consistently links internship participation to improved persistence, professional identity development, and early career outcomes for engineering students. Furthermore, internships significantly improve post-graduation employment outcomes, reinforcing their importance as early-career indicators [2]. However, access to these high-impact experiences remains uneven across institutional contexts.

National data indicate that community college students are approximately half as likely to participate in internships as their counterparts at four-year institutions [3-7]. This disparity disproportionately affects underrepresented and first-generation students, who are more likely to begin their postsecondary education at community colleges. Despite demonstrated academic achievement and transfer intent, community college engineering students often face limited access to internships due to employer recruitment practices that prioritize four-year institutions.

Drawing on program implementation and employer engagement data, City Colleges of Chicago School of Engineering (CCC SOE) has directly witnessed how internships can influence persistence, confidence, and long-term career outcomes. However, access to these opportunities is often determined less by students' abilities than by perceptions of institutions. Community college students are less likely to be hired as interns than their four-year counterparts [4]. This reality became especially clear to CCC SOE while developing new industry partnerships. Although CCC SOE assessed its students as intern-ready based on their academic achievement and leadership involvement, recruiters deny opportunities because of the students' current institutions [8]. Even when some employers pride themselves on having a robust, multi-state internship program, their response can be *"We don't hire community college students for internships."* The statement was not framed as a critique of students' talent or motivation, but rather as an accepted norm within their recruitment practices. For students at City Colleges of Chicago - many of whom are high-achieving, transfer-bound engineering majors - this norm represents an invisible but consequential barrier.

This disconnect stands in contrast to the role internships play in engineering career paths [6]. Yet within community college contexts, students are often funneled into apprenticeships or direct-to-work programs that, while valuable, may not align with bachelor's degree transfer pathways [9]. Although the term "workforce" may encompass experiential learning, transfer, and post-baccalaureate professional employment [10], at City Colleges of Chicago it was historically narrowly defined as post-associate-degree work. Within CCC SOE, engineering students intend to transfer to four-year institutions, and many transfer to highly selective engineering programs; nonetheless, employer assumptions about community college curricula and student goals can limit access to internships that support this trajectory.

Although prior research establishes the value of internships for engineering students' academic and career outcomes [2,11], much of the existing literature focuses on four-year institutions or short-term research experiences rather than scalable, industry-aligned internship models situated

within community colleges. Systematic reviews broadly summarize work-integrated learning but offer limited insight into how employers and community colleges collaborate for mutual benefit [2,3]. Studies involving community college students often examine isolated or grant-funded initiatives, with limited attention to strategies for creating employer partnerships or institutional structures that enable internship access at scale. Moreover, few studies explicitly address how employer recruitment norms contribute to unequal access for community college engineering students or how intentional relationship-based approaches can reshape these dynamics.

CCC SOE is a multi-campus engineering program modeled after a highly successful initiative first established at Wright College. Between 2015 and 2025, enrollment within Wright College's engineering program grew from nine students to approximately 650, with retention and transfer rates among the highest nationally for community college engineering programs. This success led to the expansion of the program across four additional campuses. The CCC SOE curriculum is intentionally aligned with transfer requirements at highly selective engineering universities through the Holistic and Programmatic Approach to Transfer (HPAT) model [12], which emphasizes early engagement with four-year partners and the development of STEM self-efficacy and professional identity.

Despite these strengths, CCC SOE students continued to encounter barriers to internship access based on institutional affiliation rather than academic preparation. CCC SOE sought to explore how intentional, relationship-based industry partnerships influence internship access for community college engineering students. To address this inequity, CCC SOE developed an intentional, equity-driven internship model grounded in sustained industry collaboration. The model integrates industry engagement into the curriculum, creates discipline-specific internship recruitment events, and establishes cohort-based internship partnerships designed to support transfer-aligned engineering pathways.

This paper presents the design, implementation, and outcomes of CCC SOE's industry partnership model. The study examines employer perceptions, internship participation rates, and preliminary post-bachelor's employment outcomes to offer a replicable framework for expanding equitable access to engineering internships for community college students.

II. Methods

CCC SOE employed a multi-component intervention designed to increase access to transfer-aligned engineering internships through intentional employer engagement. The model consists of four integrated strategies: (1) industry-integrated engagement, (2) engineering internship fairs, (3) cohort-based internship partnerships, and (4) structured professional skills development. Data were collected through employer surveys, case study interviews, internship placement tracking, and longitudinal employment outcomes.

II.1 Industry-Integrated Engagement

Since 2016, CCC SOE has offered an Engineering Success Seminar for first-year students, integrating professional skill development with exposure to engineering careers [13]. Each semester, at least 15 professionals from diverse disciplines serve as guest speakers, project judges, and mentors. These interactions provide students with early industry exposure while allowing employers to observe students' communication, teamwork, and technical reasoning.

Outside of the classroom, CCC SOE has invited industry professionals to participate in panel discussions or other networking opportunities. In partnership with student chapters of national organizations, Industry participants also provide formative feedback on student professionalism and preparedness, contributing to continuous program improvement. This sustained classroom-based engagement serves as an early mechanism for employer relationship building and helps students become more competitive candidates.

II.2. Engineering Internship Fairs

In 2021, to attract engineering employers more intentionally than Wright College's general career
fairs, CCC SOE held Engineering Internship Fairs, proactively increasing the number of employers and student attendees. The Engineering Internship Employer participants were initially identified through personal relationships, which grew through social media outreach and employer endorsements.

To ensure students are ready for these engineering hiring events, CCC SOE has held workshops, encouraging students to research companies, practice professional communication, and develop informed questions. CCC SOE partnered with the Society of Hispanic Professional Engineers chapter to recruit students and brought in previously hired interns to give their perspective on how to successfully prepare for the internship fair.

II.3. Cohort Internship Model

In the early years of CCC SOE, students were inconsistently hired for internships or research opportunities. The cohort-model internship was developed to address inequities in the hiring of engineering interns from community colleges compared with 4-year institutions. The CCC SOE strategically engaged engineering professionals to advocate for hiring a cohort of community college students at their workplace. The Industry partners allocated two or more positions of incoming interns from CCC SOE. While CCC SOE students applied through the companies' general application websites, CCC SOE endorsed top candidates for the position.

II.4. Skills Development

Employers hire interns based on previous work history, leadership experience, and demonstrated interest in their chosen field. CCC SOE introduced practices to help students develop these skills to increase their chances of being selected. The CCC SOE employs students as assistants for meaningful responsibilities and projects. Through grants, CCC SOE hires peer tutors and mentors, allowing students to practice technical communication and leadership. Students receive professional feedback and learn how to convey their work on resumes and through interviews. Beyond paid work opportunities, officer positions are available in ten chapters of national engineering organizations.

II.5. Assessment

The instructor of the Engineering Seminar seeks feedback from employers on their interactions with students, both during class and in subsequent interactions. Judges for the final project provide specific feedback on professional and technical skills through a consistent rubric. During each internship fair, CCC SOE interacts with employers to inquire about their experiences interacting with students. Shortly after, each participant is provided a survey to share about how well the internship fair helped them identify candidates, the preparedness of students, and the

perceived interest from students. Qualitative feedback was analyzed using thematic coding focused on perceptions of preparedness, institutional fit, and hiring intent. CCC SOE meets with cohort internship employers to gather feedback and drive continuous improvement. In one case, CCC SOE joined a summer-end presentation to witness the skills developed during an intern's project. To capture hiring outcomes for internships and full-time roles, CCC SOE relies on direct relationships with students and employers to document the positions.

III. Results

Through multiple methods of interventions, CCC SOE is slowly improving the outcomes for students while also changing the narrative of how community college students participate in internships and the workforce. Every year, the number of Professional Engineers interested in speaking to students increases. The number of industry partners participating in Engineering Internship Fairs and ultimately hiring students has also increased.

III.1 *Industry-Integrated Engagement*

More than 100 industry professionals have visited the Engineering Success Seminar and served as judges. An increasing number of hiring partners participate in student-led engineering organization activities. Attendance by employers and students has generally increased since initiating engineering specific internship fairs, except for 2022, when the modality changed from virtual to in-person. Table 1 summarizes the Internship Fair attendance and modality.

	Spring 2021	Fall 2021	Fall 2022	Fall 2023	Fall 2024	Fall 2025
Employers	8	12	9	10	15	19
Students	42	69	67	121	232	243
Format	Zoom	Zoom	Hybrid	In person	In person	In person

Table 1. CCC SOE Engineering Internship Fair Attendance

Fifty-two respondents (over one-third of attendees) since the 2021 events offered positive and constructive feedback. One attendee validated how students are qualified by sharing they "have a chance to be hired for an internship," while another recognized students' event readiness. "It was great to have them come up with specific questions." Others identified the need for improvement, as one employer stated, "a few that showed a lack of preparation."

Overall, hiring has increased for external internships, both through industry and academia (R1 research institutions), as seen in the table below.

AY	19-20	20-21[1]	21-22	22-23[2]	23-24	24-25	Total
Industry Internship	2	7	16	25	45	62	157
Research Internship	3	11	7	20	33	18	92
Total	5	18	23	45	78	80	249

[1] 2021: first Engineering Internship Fair. [2] 2023: start of Cohort Internship Model.

Table 2. CCC SOE External Internships Completed

In addition to external internships, more than 150 students have been employed through high-impact experiences. These include short-term professional development experiences hosted by companies, or on-campus tutor and leadership roles.

III.2. Cohort Internship Model

An intentional partnership was developed with four highly regarded national and global companies. More than 30 students have completed internships through these collaborations since 2023. Remarkably, several students received return internships, and seven (7) alumni ultimately received full-time engineering offers.

Case Vignette: FinTech Industry Partnership

Context. City Colleges School of Engineering (CCC SOE) established a pilot internship partnership with a fintech employer ("FinTech") that traditionally recruited from four-year institutions and had not previously hired community college interns.

Intervention. Through targeted outreach and program-level alignment, FinTech agreed to pilot a fellowship-style internship for CCC SOE students. Employer feedback from the initial hiring cycle informed subsequent student preparation and curricular refinement.

Outcomes. Following a successful pilot internship, FinTech sustained its engagement by participating in Engineering Internship Fairs and interview preparation activities. Over three years, the company hired multiple CCC SOE interns, several of whom received return offers and leadership roles within intern cohorts. One alum received a full-time engineering job offer prior to completing their bachelor's degree.

Student Perspective. "I recently accepted a full-time offer at [FinTech], which will start when I graduate next year. I will be a Software Engineer I and have been offered six figures in total compensation… I could not have done this without the [CCC SOE], and I attribute getting my foot in the door with the fellowship at [FinTech] to you three :) thank you so much!!!!!!"

Significance. This vignette illustrates how sustained, relationship-based engagement can shift employer recruitment practices and create transfer-aligned internship pathways for community college engineering students.

IV. Discussion

These outcomes did not emerge organically; they required sustained relationship-building, employer coaching, and institutional commitment to aligning workforce preparation with long-term academic and professional goals.

Barriers to Entry

Even with intentional efforts to facilitate internship hiring, many employers continue to stigmatize the community college experience, and consequently, the students. A group of highly talented students attended a regional National Society for Black Engineers Conference. Several employers engaged in polite conversation, and yet mentioned that students would not be considered once they realized the students attended community college.

Large companies with established internship programs often have established recruiting practices. They may prioritize, or even restrict recruiting and hiring to a limited number of schools, further hampering a student's ability to secure an internship. In addition, employer websites are not consistently designed to facilitate internship applications from community college students. When students select an associate degree as their current academic status, they may be immediately eliminated from the hiring pool with the assumption that most students who enter a community college will complete a terminal degree or certificate, or no credential at all [14-16]. Contrasting this metric, most CCC SOE students intend to transfer, and over 75% transfer within three years of starting college.

Employer interaction and feedback are essential to increasing opportunities for community college students. As one internship attendee keenly recognized, "the majority of students are 1st and 2nd year students with limited Career Fair experience. Internships for those students are more challenging.

Importance of Intentionality

Although City Colleges of Chicago has hosted general career fairs for many years, these events have been largely ineffective in connecting engineering students to technical internships. Open to the broader community, the fairs include employers recruiting for a wide range of roles, resulting in unfocused student–employer interactions. Employers have noted that these engagements often lack alignment with their technical fields, reducing their interest in recruiting at City Colleges of Chicago. Consequently, few SOE students have secured engineering internships through these events.

Some engineering employers reserve internship recruitment for university-focused events and instead use community college fairs to hire technicians or part-time workers. While a subset of CCC SOE students seeks part-time employment, most are pursuing professional summer internships aligned with transfer and bachelor's degree completion. Similarly, apprenticeship models, though financially attractive, may slow degree progression and often conflict with students' goals of timely transfer and graduation [16]. As employers seek to develop early talent pipelines, CCC SOE targets employers who consider first- and second-year students.

Even employer participation in engineering-focused internship fairs required refinement. A regional water district attended multiple fairs with limited hiring until a facilitated convening enabled direct engagement between leadership and students. This interaction led to the development of a cohort-based hiring model that successfully placed qualified students, despite a complex civil service process.

Labor Intensive Efforts

CCC SOE has deliberately worked to expand its network and connections to grow industry-based opportunities. Some contacts were initially skeptical, which required CCC SOE to convince recruiters that CCC SOE students' skills matched those of their university counterparts. Two employers who attended the initial engineering internship fair hired students that same year. These students' lives were transformed and now have full-time engineering roles at global companies, partially due to the skills they gained and the experience that propelled them into future careers. Unfortunately, when internships are based only on personal relationships and not

institutionalized, opportunities for community college students end when personal connections, such as recruiters, change jobs, and companies cease attending internship fairs. Building a cohort-model internship reduces the time needed to convince employers to engage.

CCC SOE staff is responsible for student support from recruiting through transfer. This means there is no dedicated personnel for employer relations, unlike many engineering universities. Similarly, the City Colleges of Chicago Career Center serves many employment needs, and does not have discipline expertise nor the bandwidth to develop sufficient engineering specific opportunities.

Building an Internship-Seeking Culture

Just as employers may initially overlook community college students for internships, students themselves may enter City Colleges of Chicago, assuming such opportunities are unavailable. Alumni who did not intern while at City Colleges of Chicago have later sought endorsements after struggling to secure internships post-transfer, underscoring the importance of early exposure. Embedding employers in curricular and co-curricular activities encourages students to pursue internships earlier and demystifies the hiring process. Incorporating guests who are also CCC SOE alumni increases impact and acts as an effective way to inspire CCC SOE Students.

Beyond employment outcomes, these interactions support students' professional identity development [1]. Respectful, substantive engagement with employers increases students' confidence that they belong in engineering, even when an internship is not immediately secured. Most students identify a speaker or two who influenced their decision to persist in their pursuit of engineering. Students who return from internships report that their skills are comparable to those of their peers at the university, and their peer-to-peer sharing further motivates current students to engage with employers and apply for internships.

This growing internship-seeking culture also introduces tradeoffs. Some students have expressed increased anxiety when they do not secure an internship early in their studies, adding pressure to an already demanding engineering and transfer pathway. Without appropriate guidance and expectation-setting, this pressure may detract from academic focus.

Improving the Community College Brand

Misperceptions may prevent community college students from being considered as hirable. Once employers have meaningful interaction with CCC SOE students, their mindset is often changed. Even one of the employers who provided some of the most critical written feedback in their post-internship survey hired CCC SOE students in the past two years. It is becoming more common for companies to repeatedly hire once they host a successful intern.

Some employers have become such strong advocates that they have brought in peer organizations. One of the cohort internship employers recently invited a consortium of technical companies to attend the engineering seminar final project as well as the engineering internship fair. This past year, a city department was so impressed with the students during their first internship fair attendance that they implored another division to get involved.

In some cases, alumni from City Colleges of Chicago are becoming leaders in their field and helping their employers recognize the value of community college. In one case, an employer who hired an CCC SOE alumna was convinced to seek students through the CCC SOE institution based on her strong performance. Although CCC SOE has not tracked promotions to date, the fact that CCC SOE students have received full-time job offers before completing their bachelor's degrees supports the hypothesis that CCC SOE students are as qualified as their university counterparts.

Summary

This study shows that intentional, relationship-based industry partnerships can substantially improve access to transfer-aligned engineering internships for community college students. By integrating industry engagement into coursework, redesigning recruitment events, and establishing cohort-based internship pathways, CCC SOE increased internship participation, strengthened employer relationships, and improved early employment outcomes.

The findings indicate that limited internship access is driven less by student preparation than by employer recruitment norms and institutional assumptions. When employers engage directly and consistently with community college engineering students, perceptions shift and hiring practices expand. Several students in this study secured internships while enrolled at City Colleges of Chicago, continued these experiences after transfer, and received full-time engineering job offers prior to completing their bachelor’s degrees.

Although the model requires sustained institutional effort, it offers a replicable framework for community colleges and employers seeking to build earlier, more inclusive engineering talent pipelines and strengthen workforce alignment.

V. Future Work

CCC SOE intends to build upon the momentum to nurture current relationships and refine practices. While relationships take sustained effort, there are ways to build on the strong connections already in place. As the alumni base of CCC SOE grows, there will be opportunities to leverage these relationships for more hiring. There may be opportunities to connect with even recent alumni as they obtain subsequent internships after transfer.

With the expansion of CCC SOE to four additional campuses within City Colleges of Chicago, there are opportunities to adapt existing relationships and expand geographically.

Student chapters of organizations are getting more attention across the country. One chapter recently won a national award. Others have been invited to regional networking events with potential employers. This type of exposure can be replicated with the other CCC SOE organizations to increase possible employment.

Companies that have hired one or two students as interns can be approached to consider a cohort internship model, demonstrating the outcomes from current cohort employers. Additionally, organizations that already have a relationship with City Colleges of Chicago, who have hired apprentices, offer scholarships, or made donations can be approached to consider becoming an

employment partner. It is important to have more than one key relationship at employers, to ensure consistency even when individuals may change companies.

CCC SOE's methods for improving access, retention, and transfer have been consistently demonstrated since 2015. There is high confidence that the students will continue to be prepared to participate in coveted engineering internships. The continued emphasis will be on developing trust and sustainable relationships with employers, so they can benefit from the contributions of CCC SOE's well-prepared students

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