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BOARD # 458: Supporting Engineering Transfer Students: Design, Implementation, and Year 3 Outcomes of the EMPOWER S-STEM Program

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Supporting Engineering Transfer Students: Design, Implementation, and Year 3 Outcomes of the EMPOWER S-STEM Program

Abstract

Engineering transfer students, particularly those from low-income or underrepresented backgrounds, often face significant challenges as they transition to four-year institutions. These challenges create what is commonly referred to as "transfer shock" and include adapting to different academic expectations, limited financial resources, lack of mentorship, and difficulty building social connections. In response to these issues, the EMPOWER program, a collaboration between UC San Diego, Southwestern College, and Imperial Valley College, was developed to support engineering transfer students through scholarships, mentorship, and high-impact practices aimed at easing their transitions. The program's design is informed by Schlossberg's Transition Theory, which emphasizes the situational, personal, and support factors that influence how individuals navigate major life changes [1]. This framework helps the EMPOWER program better understand and address the unique challenges faced by engineering transfer students.

The EMPOWER program, funded through the NSF S-STEM initiative and initially described in [2], assembles cohorts of Pell-eligible engineering transfer students and offers a structured support system, including financial assistance, faculty and alumni mentorship, cross-campus visits, cohort-building social events, and research opportunities. These activities are designed to help students navigate the transitions in, through, and out of their four-year institutions and into engineering careers.

In its third year, the program expanded its cohort of transfer students across all participating institutions and introduced enhanced mentorship activities, including incentives for one-on-one meetings between students and faculty. We also organized a range of professional development opportunities, including two cross-campus events and several workshops focused on career readiness, resume building, and industry engagement. These events provided students with valuable networking and mentorship opportunities while also building their confidence and preparedness for their future careers.

Ongoing program evaluation, including survey data from students, has demonstrated a positive impact of the EMPOWER program on students' academic success, sense of belonging, and career development. This paper outlines these insights, detailing the design and implementation of the EMPOWER program, sharing results from Year 3, and highlighting future steps to continue supporting these diverse and ambitious students.

Program Introduction

The transition from a community college to a four-year university often involves significant challenges, including adapting to academic expectations, building connections, and navigating new environments. For low-income students, these challenges are compounded by financial strain, limited career-oriented mentorship, and cultural barriers. To address these issues, the EMPOWER program was developed to support low-income engineering transfer students in navigating the academic, social, and cultural transitions inherent to transferring. Guided by Schlossberg's 4S Transition Theory, **Situation**, **Self**, **Support**, and **Strategies**, the program employed thoughtfully designed activities and structured interventions, including financial aid, mentorship, and community-building, to foster academic success, belonging, and career readiness.

Recruitment and Participation. During the program's initial two years, 44 transfer students at UC San Diego and 63 students from partnering community colleges were recruited. In Fall 2024, the program welcomed 40 additional students at UC San Diego as part of its third cohort, while 36 students were recruited at partnering colleges for their fall semester, with additional students to join in the spring. These cohorts represent a talented and diverse group, many of whom face significant financial and academic challenges. To address financial barriers, the program provided scholarships covering tuition fees and other expenses, laying the groundwork for broader academic and social support.

By the end of the second year of the program, 31 EMPOWER program students from the two partnering colleges successfully transferred to four-year universities. Among these, seven transferred to UC San Diego, while 24 transferred to other four-year institutions. This outcome highlights the program's success in facilitating the academic progression of its participants.

Program Activities. The program's activities were categorized into two primary domains: *Community Building* and *Mentoring and Professional Development*. Each was designed to align with the 4S framework, addressing the critical dimensions of students' transitions. Community-building activities were designed to address **Situation** by helping students adapt to new environments and establish connections with peers and faculty. At UC San Diego, events such as the *Halloween Breakfast Bash* and *Study Recharge sessions* offered informal opportunities for students across cohorts to socialize and share experiences. Faculty members attended these gatherings, creating a supportive environment where students could seek advice and guidance. For students at partnering colleges, the primary community-building activity was the biannual cross-campus events, held during the fall and spring terms. These events brought together participants from all three institutions, fostering a sense of belonging and integration into a broader academic community. Mentoring and Professional Development activities aimed to address **Self** and **Support** by cultivating a strong sense of identity, resilience, and readiness for professional success. At UC San Diego, activities included *Faculty Mentorship Lunches*, where students engaged with faculty in informal settings to discuss their academic and career trajectories, and the *Transfer Engineering Alumni Event*, where alumni shared their personal strategies for success as transfer students. Five to ten faculty or alumni attended each one of these events. At the partnering colleges, a variety of activities were offered to enhance students' professional skills and engineering identity. These included the *Night with Industry*, which provided networking opportunities with professionals; *Resume and LinkedIn Workshops*, which equipped students with practical career-readiness skills; and the *STEM Identity and Enculturation Symposiums*, which focused on strengthening students' connections to the engineering field. Other events, such as the *Math Festival*, offered collaborative learning opportunities to enhance technical confidence. Across all institutions, an average of five to eight events per term kept students consistently engaged.

Specialized Summer Programs. To further support students' transitions, two specialized summer programs were offered, addressing critical aspects of **Strategies** and **Support**. The Summer Internship Preparation Program, a 4-week synchronous remote program, combined technical and professional tracks. Participants engaged in technical hands-on engineering projects using materials provided in custom kits and support from tutors, ultimately presenting their final project in the final session. For some students, this was their first engineering project

suitable for their resumé. They also obtained professional support through interactions with engineering student organizations, alumni, and faculty to gain insights into how to best position themselves for career success. This program was accessible to all engineering students at UC San Diego and the EMPOWER program students from the partnering colleges, with fees waived for EMPOWER program students to ensure full participation. During the first two years of the program, three EMPOWER program students participated in this program while an additional 20 students from non-partnering community colleges also participated. The *Summer Research Program* connected EMPOWER program students at University A with faculty mentors for a 10-week research experience. Supported by stipends, students worked on projects in fields such as Electrical, Mechanical, and Computer Engineering. This initiative not only enhanced students' research skills but also fostered a deeper sense of belonging within the academic and engineering communities. During the first two years of the program, 11 EMPOWER program students participated in this program.

By embedding the principles of Schlossberg's 4S Transition Theory into its design, the program's activities holistically addressed the multifaceted challenges faced by engineering transfer students. Through financial aid, community-building events, mentorship, and professional development opportunities, the program provided an integrated support system to empower students in their transitions to and through their four-year engineering programs.

Program Evaluation

Feedback surveys were conducted in the Spring and Fall of 2024 to evaluate the EMPOWER program's impact on students' academic success, sense of belonging, and career development. These evaluations provide insights into how the EMPOWER program addressed the 4S dimensions, **Situation**, **Self**, **Support**, and **Strategies** through its activities.

Sense of Belonging (Self and Support). The Fall 2024 survey assessed students' sense of belonging at UC San Diego, focusing on the **Self** and **Support** dimensions. Students were asked to rate their agreement with statements such as I feel accepted at UC San Diego, I feel comfortable at UC San Diego, and I feel supported at University A. Using a 7-point Likert scale ranging from 1 (not at all true of me) to 7 (very true of me), 46 EMPOWER program students from university A provided responses. On average, students rated their sense of belonging at 5.3

out of 7, indicating a moderate to high level of comfort and acceptance within their academic environment.

Program Effectiveness (Strategies and Situation). The Spring 2024 survey evaluated the program's effectiveness in supporting students' transitions, addressing **Strategies** for navigating new environments and challenges associated with their **Situation**. 30 EMPOWER program students from UC San Diego and partnering colleges participated in this survey. Participants highlighted the program's role in fostering community and providing tailored support through events like campus tours, faculty and alumni mentorship, and cross-campus events. These activities helped students connect with peers, access resources, and build confidence during their transition. The program also addressed financial and emotional challenges by offering financial aid and mentorship. Faculty encouragement was frequently noted as a motivating factor, helping students overcome obstacles and explore academic and career pathways. Survey participants emphasized that these interactions fostered a sense of belonging and preparedness for academic success.

Conclusion

The EMPOWER program has had a positive impact on students' academic success, sense of belonging, and career development by addressing the dimensions of **Situation**, **Self**, **Support**, and **Strategies**. Through financial aid, community-building, mentorship, and professional development, the program has empowered engineering transfer students to navigate their transitions and achieve their goals.

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