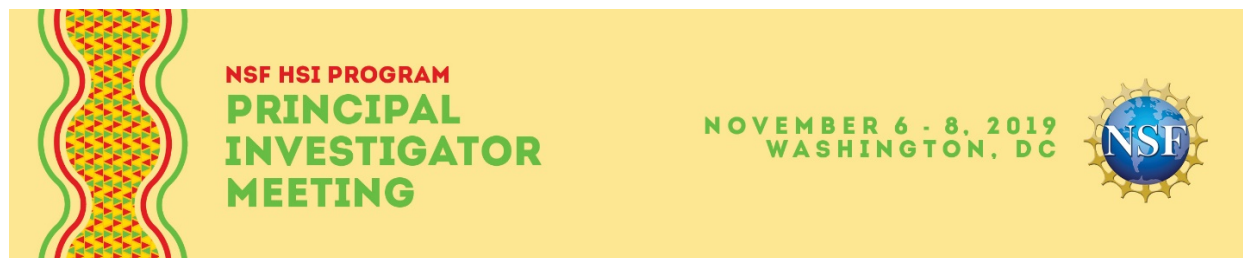


NSF conference



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Poster Title

Building Capacity via Micro-Internships: Engaging STEM Transformational Experiences for Early Momentum (ESTEEM)

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Discipline: STEM Education

Abstract Title

Building Capacity via Micro-Internships: Engaging STEM Transformational Experiences for Early Momentum (ESTEEM)

Need/Motivation (e.g., goals, gaps in knowledge)

The ESTEEM implemented a STEM building capacity project through students' early access to a sustainable and innovative STEM Stepping Stones, called Micro-Internships (MI). The goal is to reap key benefits of full-length internship and undergraduate research experiences in an abbreviated format, including access, success, degree completion, transfer, and recruiting and retaining more Latinx and underrepresented students into the STEM workforce. The MI are designed with the goals to provide opportunities for students at a community college and HSI, with authentic STEM research and applied learning experiences (ALE), support for appropriate STEM pathway/career, preparation and confidence to succeed in STEM and engage in summer long REUs, and with improved outcomes. The MI projects are accessible early to more students and build momentum to better overcome critical obstacles to success. The MI are shorter, flexibly scheduled throughout the year, easily accessible, and participation in multiple MI is encouraged. ESTEEM also establishes a sustainable and collaborative model, working with partners from BSCS Science Education, for MI's mentor, training, compliance and building capacity, with shared values and practices to maximize the improvement of student outcomes.

New Knowledge (e.g., hypothesis, research questions)

Research indicates that REU/internship experiences can be particularly powerful for students from Latinx and underrepresented groups in STEM. However, those experiences are difficult to access for many HSI-community college students (85% of our students hold off-campus jobs), and lack of confidence is a barrier for a majority of our students. The gap between those who can and those who cannot is the “internship access gap.” This project is at a central California Community College (CCC) and HSI, the only affordable post-secondary option in a region serving a historically underrepresented population in STEM, including 75% Hispanic and 87% have not completed college. MI are designed to reduce inequalities inherent in the internship paradigm by providing access to professional and research skills for those underserved students. The MI have been designed to reduce barriers by offering: shorter duration (25 contact hours); flexible timing (one week to once a week over many weeks); open access/large group; and proximal location (on campus). MI mentors participate in week-long summer workshops and ongoing monthly community of practice with the goal of co-constructing a shared vision, engaging in conversations about pedagogy and learning, and sustaining the MI program going forward.

Approach (e.g., objectives/specific aims, research methodologies and analysis)

Research Question and Methodology: We want to know: How does participation in a micro-internship affect students’ interest and confidence to pursue STEM? We used a mixed-methods design triangulating quantitative Likert-style survey data with interpretive coding of open-responses to reveal themes in students’ motivations, attitude toward STEM, and confidence. Participants: The study sampled students enrolled either part-time or full-time at the community college. Although each MI was classified within STEM, they were open to any interested student in any major. Demographically, participants self-identified as 70% Hispanic/Latinx, 13% Mixed-Race, and 42 female. Instrument: Student surveys were developed from two previously validated instruments that examine the impact of the MI intervention on student interest in STEM careers and pursuing internships/REUs. In addition, the pre- and post (every 6 months to assess longitudinal outcomes) -surveys included relevant open response prompts. The surveys collected students’ demographics; interest, confidence, and motivation in pursuing a career in STEM; perceived obstacles; and past experiences with internships and MIs. 171 students responded to the pre-survey at the time of submission.

Outcomes (e.g., preliminary findings, accomplishments to date)

Because we just finished year 1, we lack at this time longitudinal data to reveal if student confidence is maintained over time and whether or not students are more likely to (i) enroll in more internships, (ii) transfer to a four-year university, or (iii) shorten the time it takes for degree attainment. For short term outcomes, students significantly increased their confidence to continue pursuing opportunities to develop within the STEM pipeline, including full-length internships, completing STEM degrees, and applying for jobs in STEM. For example, using a 2-tailed t-test we compared means before and after the MI experience. 15 out of 16 questions that showed improvement in scores were related to student confidence to pursue STEM, or perceived enjoyment of a STEM career. Finding from the free-response questions, showed that the majority of students reported enrolling in the MI in order to gain knowledge and experience. After the MI, 66% of students reported having gained valuable knowledge and experience, and 35% of students spoke about gaining confidence and/or momentum to pursue STEM as a career.

Broader Impacts (e.g., participation of underrepresented minorities in STEM; development of a diverse STEM workforce, enhanced infrastructure for research and education)

The ESTEEM project has the potential for a transformational impact on STEM undergraduate education's access and success for underrepresented and Latinx community college students, as well as for STEM capacity building at Hartnell College, a CCC and HSI, for students, faculty, professionals and processes that fosters research in STEM and education. Through sharing and transfer abilities of the ESTEEM model to similar institutions, the project has the potential to change the way students are served at an early and critical stage of their higher education experience at CCC, where one in every five community college student in the nation attends a CCC, over 67% of CCC students identify themselves with ethnic backgrounds that are not White, and 40 to 50% of University of California and California State University graduates in STEM started at a CCC, thus making it a key leverage point for recruiting and retaining a more diverse STEM workforce.