Engineering Educators Bringing the World Together
2025 ASEE Annual Conference & Exposition
Palais des congrès de Montréal, Montréal, QC • June 22–25, 2025 ASEE
Paper ID #47682

From Staff to Students: Centering Critical Relevant Pedagogy and Community Cultural Wealth in an S-STEM program [work in progress]

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Abstract

Fostering a strong and diverse STEM workforce is essential for driving innovation [1]. This qualitative phenomenological research study examines the experiences of academically talented, low-income students in STEM fields who participate in a S-STEM scholarship at a community college, and the faculty and staff that are involved with the S-STEM grant. A key component of this program is a critical seminar course designed with intentional programming focused on STEM and Community Cultural Wealth (CCW) [5]. The study explores the experiences of students, staff, and faculty involved in the program, analyzing how their roles and perspectives contribute to student success and the overall educational environment. By examining how students and educators navigate program resources and engage in critical discussions, the study highlights the integration of academic and community-oriented perspectives in STEM journeys.

Introduction

Community and technical colleges play a pivotal role in diversifying pathways into STEM fields. These colleges serve a large proportion of academically talented, low-income, first-generation, and racially minoritized students who have historically been underrepresented in STEM disciplines [4]. Furthermore, these low-income community college students face significant barriers in accessing and completing STEM programs due to the limited support and resources that are provided – lower rates of transfer into STEM majors, out-of-class resources, and various forms of capital that they non-low-income peers have [6].

To further support students in community college pursuing STEM degrees, federal initiatives like the National Science Foundation (NSF) Scholarships in Science, Technology, Engineering, and Mathematics Program (S-STEM) provide the opportunity for institutions to apply and receive grants to fund students through scholarships. These grants not only provide funding for students, they also intentionally provide space in their grant for faculty and staff to create initiatives that aim on enhancing, supporting student retention and success in STEM.

This paper contributes to the growing body of research on how such programs impact students and educators in the context of community colleges. Through a qualitative phenomenological approach, this study examines the experiences of low-income, academically talented students participating in an S-STEM scholarship and the support program at a community college. Central to this program is a specialized seminar course designed around the concept of Community Cultural Wealth (CCW) [5], which not only fosters students' academic growth but encourages social responsibility and community engagement within the STEM disciplines. In addition, the study explores the roles of faculty and staff involved in the program, providing insights into how their perspectives and practices contribute to student success. By analyzing the interactions between students and educators, this research sheds light on how integrated academic support and community-oriented programming can enhance STEM education, cultivate a sense of belonging, and ultimately contribute to a more diverse and equitable STEM workforce [2].

Theoretical Frameworks

This research is grounded in two complementary theoretical frameworks: Critical Relevant Pedagogy (CRP) and Community Cultural Wealth (CCW). These frameworks provide a lens through which to explore and understand the decision-making processes of students in STEM fields, particularly those engaged in the S-STEM program. The study situates the various dynamics in which CRP and CCW alongside student decision-making continues the complex and often competing priorities that students navigate as they balance academic coursework, transfer opportunities, and long-term career aspirations. These frameworks are critical for understanding the intersection of students' educational journeys with their socio-cultural identities, resources, and the broader structural forces shaping their choices.

Critical Relevant Pedagogy

Critical Relevant Pedagogy (CRP) emphasizes the importance of education that is not only contextually relevant to students' lived experiences but critically engages them in questioning and transforming societal structures. Within the context of this study, CRP encourages students to reflect on their roles and potential as members of the STEM community, while also critiquing the social, cultural, and economic barriers that may impede their success. It positions students as active agents in their educational journey, with the power to make informed decisions about their academic paths and career trajectories. By acknowledging and addressing these broader societal dynamics, CRP advocates for a pedagogy that is deeply connected to the identities and lived realities of students, which is vital in cultivating an equitable STEM workforce.

Community Cultural Wealth

Community Cultural Wealth (CCW), as a framework introduced by Yosso [5], focuses on the role of collaborative knowledge creation within a community of practice. In this study, CCW highlights the importance of shared learning experiences among students, faculty, and staff, and emphasizes the power of dialogue in fostering mutual understanding and problem-solving. It encourages the recognition of diverse perspectives, especially those stemming from marginalized or underrepresented groups in STEM fields, and underscores the collective strength that emerges from this diversity. The CCW framework shows that students are better equipped to navigate their academic and career choices when they are embedded in a supportive, collaborative community that fosters open communication and mentorship.

By integrating CRP and CCW, this research seeks to understand how students' decisions are shaped within a community-based seminar environment that fosters collaboration, dialogue, and collective learning. The seminar, which brings together students, faculty, and staff, serves as a critical space for knowledge exchange, idea generation, and mutual support. This interaction is not only integral for shaping students' individual decisions as well as plays a key role in developing the skills and competencies necessary to contribute to a diverse, inclusive, and innovative STEM workforce.

This theoretical approach aligns with existing research that highlights the positive impact of community-based learning and mentoring on student persistence and success in STEM disciplines. Specifically, studies by Wang & Wickersham [3] have demonstrated that fostering collaborative relationships and providing a supportive community are crucial for students' academic development and career decision-making. In line with these findings, this research

centers that the community-based seminar provides a rich and dynamic platform for students to engage with one another, reflect on their experiences, and make informed decisions about their academic and professional futures.

Research Questions

To explore this S-STEM seminar and its students, staff and faculty, the research is guided by two central questions:

1. How do S-STEM students perceive the impact of a CRP and CCW community-based seminar on their decision-making regarding coursework, transfer opportunities, and career aspirations?
2. In what ways do staff and faculty experiences shape the support and resources available to students in a scholarship program focused on STEM, CRP, and CCW?

Methods

This research study utilized a phenomenological approach to examine the lived experiences of 8 undergraduate, low-income S-STEM students majoring in at a community college who were and five faculty and staff who were managed and taught the S-STEM and taught the S-STEM program seminar. Phenomenology enables the research to discover meanings, or "essence" by exploring experiences in depth, and providing rich detail of the meaning making process of an individual through a particular phenomena [7]. During data collection, participants were recruited through an email invitation by the research team to their S-STEM Program team. During the recruitment and scheduling phases, participants (students and staff) were assigned a pseudonym and interviewed.

Data collection consisted of a semi-structured interview protocol. Interviews were conducted virtually by a research team member. These interviews were recorded and transcribed verbatim. In the data analysis process, thematic analysis approach was conducted using NVivo software. The research design and interview protocol were reviewed and approved by the institutional research board for human subjects compliance at a major research university.

Findings

Through this work in progress paper, three prominent themes are emerging: (1) Impact on Career Aspirations, (2) Critical Awareness, and (3) Staff and Faculty Perspectives.

Impact on Career Aspirations: Preliminary findings suggest that engagement in the seminar positively influences students' career aspirations. Participants are likely to pursue opportunities that align more closely with community needs and personal values, highlighting the seminar's role in bridging academic pursuits with real-world applications.

Critical Awareness: Students are demonstrating increased critical awareness of social issues relevant to their fields, indicating that the seminar effectively cultivates a mindset oriented toward social responsibility. This critical consciousness, rooted in CRP and CCW, empowers students to advocate for equity and justice within their disciplines, fostering a generation of socially aware STEM professionals.

Staff and Faculty Perspectives: Insights from staff and faculty reveal how their involvement in the seminar shapes their teaching and support strategies. Educators emphasize the importance of recognizing and valuing students' cultural wealth, which can enhance engagement and retention, contributing to a more inclusive educational environment.

These preliminary findings provide valuable insights into the experiences of S-STEM students and underscore the need for further research focused on enhancing support initiatives, particularly in facilitating the transition of community college students into the STEM educational pipeline and ultimately into industry roles.

Conclusion

These findings provide valuable insights that highlight the need for further research to strengthen support initiatives that encourage broader participation and ease the transition of community college students into the STEM pathways, into industry careers. Through this ongoing research, the [MASKED] aims to continue to generate and share knowledge that will continuously support both researchers and practitioners in understanding the decision-making processes and pathways of academically talented, low-income STEM students, especially while using critical frameworks like CRP and CCW. Ultimately, this work will contribute to creating a more equitable and effective strategy for developing the STEM workforce.

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