PURM

Perspectives on Undergraduate Research & Mentoring

Culturally Responsive Mentoring in Undergraduate Research: Enhancing Student Success at Minority-Serving Institutions

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Introduction

At the California State Polytechnic University, Pomona (Cal Poly Pomona), the Office of Undergraduate Research (OUR) wanted to know what factors contribute to student enrollment and engagement. This research effort began with the definition of student success that led to OUR's authorization in 2013. OUR was built on the latest evidence that college students who engaged in research along with faculty mentoring and team collaboration were more able than those without such experience to persist in their studies (BrckaLorenz et al., 2017; Fechheimer et al., 2011; Jones et al., 2010; Kuh, 2008; Lopatto, 2010). Between 2015 and 2020, the OUR at Cal Poly Pomona conducted a longitudinal study with over 6,000 unique students and determined that students who participated in research-related activities were almost twice as likely to graduate as students who did not participate in research-related activities (Dong et al., 2024). A follow-up study determined that an increase in the quality and quantity of mentoring was responsible for the sense of self-efficacy, which was significantly related to this increase in graduation rates. Hence, to maximize the benefits of undergraduate research, the OUR created intentional student mentoring in all of its programs.

All students in OUR funded undergraduate research programs at Cal Poly Pomona are provided three levels of mentoring -- faculty research mentors, program mentors, and peer mentors. Additionally, students are provided opportunities to meet potential mentors from various disciplines, personal backgrounds, and industries. This spectrum of mentoring is designed to afford students the capital to successfully navigate the academic, cultural, and professional spaces that may not be familiar to them at the beginning of the research process. Training is provided for all mentors through workshops (faculty and staff) or a semester-long course (peer mentors).

This paper focuses on intentional mentoring practices that foster students' academic and personal development in undergraduate research programs, especially those who are the first in their families to attend college, come from low-income backgrounds, or are from minoritized communities. With the increasing diversity of student populations at California State Universities (Cal Poly Pomona Institutional Research Planning & Analytics, 2024, 2023, 2022), it is essential to establish effective mentoring practices to support these students. As the university's central office prioritizes expanding access to undergraduate research, we aim to offer a comprehensive guide for practitioners. Drawing on existing literature and the authors' extensive and diverse experience in providing undergraduate research programs at a Hispanic-serving Institution (HSI), we present a framework that highlights successful strategies, challenges, and opportunities to assist students in higher education settings. Mentoring can take various forms, ranging from formal to informal arrangements. In our context, mentoring is defined as a relationship in which an expert, faculty member, staff, or trained peer

mentor supports students in their professional development and navigational knowledge and builds meaningful connections with students, with a focus on their professional growth, sense of belonging, and readiness for life after graduation (Turner, 2015).

Starting with understanding the importance of mentorship practices within Cal Poly Pomona's Office of Undergraduate Research, we will explore existing best practices and derive a guiding framework. The OUR's practices are informed by research on faculty and peer-led mentoring and multiple years of collecting qualitative and quantitative data on HSI-funded programs from the National Science Foundation and Department of Education. The following literature review aims to highlight proven strategies for effective mentoring in diverse academic settings, commencing with faculty utilizing undergraduate research, emphasizing the importance of culturally relevant mentoring, harnessing the impact of peer mentors, and concluding with a comprehensive framework for undergraduate research programs.

Leveraging Faculty-Directed Undergraduate Research for Academic Achievement
Undergraduate research (UR) as a high-impact practice alone has great potential to support students' success. Still, when paired with mentoring, the effect may be increased by addressing academic and non-academic factors to student persistence (Bachkirova et al., 2021; Kuh, 2008; Kuh et al., 2010). Influential faculty mentors may play multiple roles, including guiding students through research, fostering a sense of belonging, and encouraging professional skills development. According to a recent study, introducing undergraduate research in a course impacted student researchers' academic and personal growth, enhancing their research skills and promoting a deeper understanding of their field of study (Pratoomchat & Mahjabeen, 2023). Furthermore, a longitudinal study tracking student success at a Hispanic-serving institution showed that engaging in research-related activities doubled the likelihood of graduation compared to their peers (Dong et al. 2024).

Effective research mentoring relationships can significantly enhance student success, retention, and educational attainment. For instance, Crisp et al. (2015) emphasize that mentoring at HSIs provides crucial support in navigating the academic landscape, fostering a sense of belonging, and encouraging the persistence of Latinx students in higher education. In a research study that examined 71 Latinx students, scholars' findings pointed out that students' self-efficacy and the presence of mentoring played a significant role in predicting their retention in their majors, suggesting that providing support and mentorship to minoritized students can positively impact their identity in the major and sense of belonging to the campus (Bordes-Edgar et al., 2011). When research mentorship considers the intersections of students, that may also provide a positive context for historically marginalized students to thrive.

Culturally responsive Mentoring Practices
Crisp et al. (2015) illuminate how faculty mentoring helped students build social and academic capital vital for their success in their educational and future professional careers. Such relationships are particularly impactful in HSIs and other minority-serving institutions, where a culturally responsive approach to mentoring can address minoritized students' unique challenges, ultimately leading to improved academic outcomes and increased graduation rates (Hurtado & Alvarado, 2015). Therefore, programs that encourage intentional faculty mentoring are essential for advancing and empowering students in a changing higher education context. Furthermore, mentors who adopt culturally responsive practices can better address the diverse needs of their mentees, leading to improved student outcomes (Fuchs, 2023).

Culturally responsive mentoring involves integrating students' cultural backgrounds into their research motivations. When mentors provide culturally responsive support, students feel a greater acceptance and diminished imposter experience, leading to academic and personal growth. These

programs emphasize recognizing and valuing research mentees' cultural backgrounds and experiences and seek to address their specific needs and challenges within their communities (Santamaria & Santamaria, 2016). One of the ways that mentors can embrace the students' intersectional identities and experiences is by building trust and respect by being open, learning about and from mentees, sharing their own lived experiences as to how they navigated the educational system, and exposing themselves to professional development opportunities on culturally responsive teaching (Apple, 2016; Castagno, 2012; O'Leary et al., 2020).

When mentees feel that their cultural identities are valued and respected, they feel more connected to their academic community and persist, build confidence, and gain greater self-efficacy. Employing a grounded theory approach at an HBCU, Williams et al. (2021) highlights how culturally-affirming strategies, administrators, and faculty members can create environments that center and root pedagogy and research in the generation, organization, and transmission of knowledge in Black cultural contributions, learning about their communities, and connects research, pedagogy, and cultural to elevate critical consciousness about both global and local Black communities. Similarly, Gay (2018) provides a framework for practitioners where cultural responsiveness in the context of education means that along with academic achievements, there should also be cultural affirmation and exchange, community building and personal connections, and individual self-worth.

Peer mentoring and Near-Peer Mentoring Approaches in Research
A valuable strategy for developing comprehensive, holistic approaches is the integration of peer mentors. Research indicates that peer mentoring—where formally trained students assist their peers as guides or advisors—can significantly enhance feelings of belonging and contribute to academic success, particularly when executed effectively (Bachkirova et al., 2021; Kachaturoff et al., 2020; Raymond & Sheppard, 2017). In two nursing program contexts with high-stress environments for students, students who received peer mentoring pointed to decreased levels of stress and loneliness and greater self-efficacy, supporting the overall mental well-being of students (Kachaturoff et al., 2020; Raymond & Sheppard, 2017). In-depth research into the effectiveness of peer mentoring as an intervention for improving student belonging and academic success highlights its potential to yield positive outcomes when executed thoughtfully. Peer mentoring programs are a commonly used resource to facilitate sharing knowledge from students who have been trained, becoming institutional agents that share knowledge, skills, and social capital (Alman et al., 2012; Bensimon et al., 2019; Garcia & Ramirez, 2018).

Near-peer mentoring is a broadly used strategy in higher education, especially within Hispanic-Serving Institutions (HSIs), where individuals with more advanced experience can support those new to a research lab or project. Research indicates that near-peer mentoring serve as a vital form of social capital as Moschetti et al. (2018) evaluated a peer mentoring program at an HSI and found that mentees perceived their mentors as sources of emotional and academic support, leading to increased integration and connection with the university, compared to non-mentored students. Similarly, Cruz et al. (2020) examined a peer-to-peer coaching program aimed at Latinx STEM students during their first college year. The study revealed that such programs positively impact student persistence and success, highlighting the importance of culturally relevant support systems in promoting academic achievement among Latinx students. Beyond student outcomes, near-peer mentoring also benefits mentors. Ho (2019) explored the leadership development of peer mentors at an urban HSI, finding that mentors exhibited exemplary leadership behaviors and anticipated applying their communication and relationship-building skills in future careers.

The distinction between near-peer mentoring and peer mentoring is subtle. Near-peer mentors are typically advanced students who assist younger or newer students in a project. At the same time, peer mentoring involves students at any grade level who receive formal training to support advanced

and new students. This training focuses on essential strategies in advising, counseling, navigational skills, campus resources, and effectively utilizing existing campus support for referrals.

OUR's Peer Mentoring Model

At the OUR, the training model for peer mentoring is based on an existing framework utilized by the Cal Poly Pomona psychology and sociology departments. This model involves a formal semester-long course in which students learn about mentorship, culturally responsive teaching, counseling, and practice scenarios. Participants are assigned to mentee groups of five to seven students and meet with them four times each term. After five weeks of lectures and mock scenarios under the guidance of a faculty instructor, peer mentors apply their mentorship skills in practical situations. Throughout the course, students also learn to utilize research skills to address issues in higher education relevant to Hispanic-serving institutions while ensuring we highlight all students' voices and not exclude other racial and ethnic groups on campus. Students delve into research methods that are crucial for developing interventions aimed at promoting student success. Topics of study include student mental health in the post-COVID-19 landscape, understanding institutional barriers faced by underrepresented students, and exploring student engagement on campus and its correlation with retention, among other relevant issues.

Equity-Minded Student-Centered Research Programs

The framework presented in this paper integrates insights from both existing literature and the author's extensive experience in developing and managing undergraduate research programs at a Hispanic-serving Institution (HSI). Based on evidence-based practices, the framework incorporates strategies to enhance student engagement and success, such as culturally responsive mentoring, intentional program design, and a multi-layered support system. These elements are aligned with findings from prior studies that emphasize the importance of fostering a sense of belonging, self-efficacy, and professional growth among underrepresented student populations. Combining theoretical perspectives with practical, on-the-ground implementation offers a comprehensive approach to creating equitable, student-centered environments that promote academic achievement and personal development in diverse higher education contexts.

The framework in Figure 2 below illustrates how 1. *undergraduate research* as a primary intervention should include a 2. *multi-layer*, 3. *holistic*, 4. *culturally responsive*, 5—*reflexive* approach via *assessment and data collection,* creating a student-centered strategy for establishing undergraduate research programs. The framework we use at the Office of Undergraduate Research highlights the significance of multi-layered mentoring involving faculty, staff, and peer interactions as significant elements in supporting diverse student communities. Faculty mentoring offers students academic guidance and fosters critical thinking and scholarly identity development. Staff mentoring provides the navigational capital for insights into how to be successful in the program while also passing on knowledge to students, enabling students to navigate institutional complexities. Peer mentoring provides a safe space that fosters a community of shared experiences, essential for retaining and advancing underrepresented students.
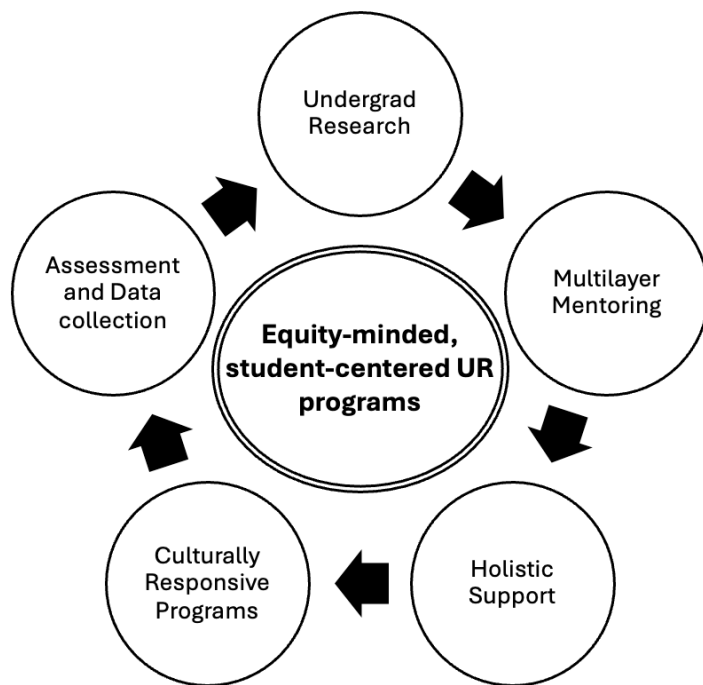
Figure 2. *Holistic Student-Centered Undergraduate Research Programs*

Culturally responsive programming elements are fundamental to this framework, ensuring that students' diverse needs are addressed in a manner that respects and celebrates their cultural backgrounds. By prioritizing students at every level, this approach strives to create an environment where all students, particularly those from marginalized communities, can excel academically and personally. The emphasis on culturally responsive mentoring at Cal Poly Pomona is critical to the program's success in providing workshops and institutes to students and faculty focusing on diversity, equity, and inclusion issues. The OUR leverages the expertise of faculty and diverse speakers who present to students, including a research seminar series where speakers from diverse disciplines and intersections present, role model, and network with students. Furthermore, with collaborations with campus departments such as Academic Innovation, the OUR also provides conference themes and sessions on mentoring best practices, and faculty present on their mentoring approaches. By integrating students' cultural identities into the mentoring process, including training faculty mentors, the Office of Undergraduate Research provides tools to faculty to understand diversity and inclusion, recognize microaggressions, and learn strategies for inclusive research environments.

The OUR peer mentoring program was created after the office's inception in 2013, so that student mentors who share similar cultural backgrounds with mentees can create a supportive network that helps students navigate the challenges of academic and non-academic life. The peer mentoring program often includes regular check-ins, cultural events, and academic support tailored to the needs of culturally diverse students, with training ranging from one semester-long through a peer mentoring course. Creating a robust peer mentoring program with training and oversight from staff allows mentees to connect with others who share similar career goals, cultural backgrounds, or interests, which can foster a strong sense of community. We have seen that peer mentors often provide emotional support, share resources, and collaborate on research projects, enhancing the belonging and self-efficacy of student mentees.

Faculty Training

The OUR provides a range of workshops and conference training specifically designed for faculty mentors. We have hosted two professional development conferences, one of which focused on the concept of Servingness, as introduced by Dr. Gina Garcia and colleagues (Garcia et al., 2019). This framework emphasizes the importance of enrolling a substantial number of Latinx and other minoritized students and intentionally supporting their success. In addition, in collaboration with the Office of Academic Innovation at Cal Poly Pomona, the OUR has also facilitated several faculty institute conference sessions on mentorship for faculty and staff. These sessions cover culturally responsive mentoring practices and incorporate Dr. Tara Yosso's (Yosso, 2005) concept of community cultural wealth, particularly within the context of mentoring at Hispanic-serving institutions. Additionally, we have organized workshops that engage faculty in role-playing games to explore the challenges and opportunities of incorporating diverse perspectives and experiences into research. The OUR leadership has also received formal training from the Center for the Improvement of Mentored Experiences in Research (CIMER) to provide workshops to faculty on campus.

Continuous Improvement

To measure the impact of the research intervention programs, the OUR employs quantitative and qualitative assessment strategies such as surveys and interviews. The goal is to gather feedback from student experiences, perceived sense of belonging, and mentoring impact on student success. These instruments capture self-reported research skill attainment, confidence in navigating college environments, and overall satisfaction with mentoring relationships. Moreover, we track students' progress with institutional-level data on retention and graduation rates and conduct comparisons with the campus population. Our findings suggest that research and intentional mentoring relationships play a part in the retention and graduation of students (Dong et al., 2024). We continue improving our assessment methods by informing our teams through professional development opportunities, conference attendance, institutes, and reflexive on ongoing changing context to ensure that the OUR remains responsive to the evolving needs of the diverse student population.

Discussion

Implementing culturally responsive programming within the Office of Undergraduate Research (OUR) at Cal Poly Pomona presented several challenges, specifically in the areas of faculty development. One of the primary challenges in implementing more culturally responsive programming in research is time and funding. Faculty development in this area often requires a significant shift in teaching and mentoring paradigms, moving from traditional, research content-focused approaches to more inclusive, student-centered methods that recognize and value students' diverse cultural backgrounds. Some faculty members may need to be more open to altering their established research and mentoring structures. More if they need to familiarize themselves with the principles of culturally responsive education. Despite these challenges, gradual progress is being made, driven by a growing recognition of the importance of these initiatives and the university providing on-campus professional training institutes supported by the Office of Undergraduate Research and Academic Innovation.

Creating effective faculty development programs requires significant resources, including time, funding, and expertise. Developing and delivering training on culturally responsive practices, providing ongoing support, and creating materials tailored to the needs of diverse student populations can strain existing resources. However, awareness of the benefits of culturally responsive practices is increasing among faculty, staff, and administrators. This awareness is often driven by advocacy from within the institution, including from the OUR, which has made culturally responsive mentoring a central component of its programs. As more stakeholders recognize the value of these approaches, support for faculty development and institutional initiatives is gradually growing. Collaborative efforts between the OUR, academic departments, and campus offices focused

on diversity and inclusion foster a more integrated approach to culturally responsive programming. By working together, these entities can better pool resources, share expertise, and build a more robust institutional foundation for these initiatives.

Conclusion

This paper emphasizes the crucial role of culturally responsive mentoring in improving students' academic success at minority-serving institutions, particularly within undergraduate research programs. At Cal Poly Pomona, the OUR has shown that a deliberate, comprehensive mentoring approach involving faculty, staff, and peer mentors can significantly improve students' persistence and graduation rates, especially those from underrepresented backgrounds. By integrating culturally responsive practices into its mentoring frameworks, the OUR aims to enhance students' sense of belonging and self-efficacy while addressing systemic inequities that often hinder their academic and professional development. However, there are challenges involved in this work. Resistance to change, limited funding, and the need for ongoing professional development for faculty and staff reveal the complexities of implementing culturally responsive practices on a larger scale. Future efforts must focus on establishing sustainable faculty development programs, forming partnerships across campus, and improving assessment tools to measure the nuanced impacts of mentoring on diverse student populations.

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