

Examining Servingness: The Experiences of Latino Engineering Graduate Students in Hispanic Serving Institutions

Maureen Ondieki, The Ohio State University

Maureen Ondieki is a first-year Ph.D. student in the Department of Engineering Education at The Ohio State University. Her interests center on examining the influence of intersectional identities on student trajectories and persistence within engineering pathways. As a Graduate Research Assistant in the Artiles Research Group, she is actively involved in the CAREER project focused on understanding the experiences of Latino engineering students pursuing doctoral degrees at Hispanic Serving Institutions (HSIs).

Dr. Mayra S Artiles, The Ohio State University

Mayra S. Artiles is an assistant professor in engineering at the Polytechnic School of the Ira A. Fulton Schools of Engineering at Arizona State University. Her research expertise includes engineering doctoral education structure, experiences of underrepr

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The landscape of the United States is rapidly shifting, with minority populations including African Americans, Latinos, and Native Americans, growing steadily. At the same time, the nation faces a decline in its skilled labour force in science, technology, engineering, and mathematics (STEM) fields, particularly among individuals with advanced degrees. These societal changes underscore the urgent need for greater diversity in both education and the workforce to maintain global competitiveness (Long & Mejia, 2016). Early projections suggested that Latinos would become the largest minoritized demographic group in the United States by 2025 (Laden, 2004a). This projection has been realized, the U.S. Census Bureau's Vintage 2025 estimates show the Latino population reached 66.6 million in 2025 about 20% of the U.S. population, making Latinos the nation's largest minoritized group.

Latino's increased participation in engineering graduate education is essential not only for strengthening the country's innovation capacity but also for broadening diversity and representation in STEM professions. However, the number of students with advanced degrees entering the workforce remains insufficient to meet current and future demands (Bahnsen et al., 2023; Rivera et al., 2023). When examining doctoral education, a participation gap persists both in enrolment and completion, largely due to experiences of isolation and limited institutional support (Rivera et al., 2023; Ro et al., 2024). This is where Hispanic Serving Institutions become important.

Hispanic Serving Institutions (HSIs) are accredited public or private degree-granting institutions in the United States that are federally designated to enrol at least 25% Latino undergraduate students. How HSIs enact the "serving" part of their designation has been called "servingness" in the higher education literature. Servingness has been defined loosely as a measure of institutional support for Latino students, provided through culturally adapted curricula and programs that foster social capital and graduate school aspirations (Garcia et al., 2019; Laden, 2004b). While HSIs have demonstrated success in enabling Latinos to access postsecondary education, their increasing numbers and lack of clear guidance on what it means to serve Latino students demand attention from researchers and educational leaders. Establishing clear parameters, such as campus climate, graduation rates, access to support programs, and faculty diversity, will be essential for evaluating servingness (Franco & Hernández, 2018).

While extensive research has explored the undergraduate experiences of Latino students, there is a growing call for scholarship that examines this same concept of servingness at the graduate level (Artiles et al., 2025; Garcia & Cuellar, 2023). This necessitates a deeper understanding of what servingness is and how it should be enacted. Addressing servingness beyond enrolment is expected to improve terminal degree completion rates, thereby enhancing diversity in academia and the workforce. This poster will highlight how this CAREER project investigates the ways in which HSIs support doctoral students beyond mere degree completion. Specifically, we seek to address the following research question: **"How do HSIs' servingness support Latino engineering doctoral student socialization?"** This study, currently in the pilot phase, aims to (1) advance the understanding of servingness in doctoral engineering education; and (2) identify and characterize high-impact practices employed by HSIs that effectively support Latino doctoral student socialization. In this context socialization refers to the process through which students acquire a professional identity (Weidman & DeAngelo, 2020). The purpose of the poster is to present preliminary findings from the pilot study and initiate dialogue on servingness for doctoral engineering Latino students in HSIs.

HSIs come in many shapes and forms (Garcia et al., 2019). Historically, much research has looked at traditional HSIs – which are those institutions that geographically have been always positioned to serve a Latino population. As demographics have evolved, many newly designated HSIs are former historically white institutions that acquired the HSI designation while retaining their existing structures, curriculum, programs, and faculty composition (Gonzalez et al., 2020a; Ro et al., 2024). Unlike Historically Black Colleges and Universities (HBCUs) and Tribal Colleges and Universities, which were specifically established to serve their target populations, HSIs lack a clear mandate on how to serve Latino students (Garcia et al., 2019; Gonzalez et al., 2020a). As a result, these newly designated institutions are left to independently determine how best to support populations that have historically been underserved (Garcia & Cuellar, 2023; Gonzalez et al., 2020a).

To understand how HSIs actualize their mandate, scholars have identified four categories of servingness: **Latino enrolling**-institutions that enrol at least 25% Latino students; **Latino producing**- institutions that demonstrate equitable college outcomes; **Latino enhancing**-institutions that foster an inclusive campus culture through welcoming environments, curriculum, and programming; and **Latino serving**, which encompasses all three dimensions (Franco & Hernández, 2018; Garcia & Ramirez, 2018). The fully realized HSI is Latino serving, integrating enrolment, outcomes, and cultural inclusivity (Garcia et al., 2019).

The overarching grant is grounded in two theoretical frameworks: a servingness framework that addresses HSIs' impact on each student and a graduate student socialization framework that guides the analysis of individual students' socialization within HSIs. Garcia et al. (2019) proposed a multidimensional conceptual framework for servingness in Hispanic-Serving Institutions that distinguishes between indicators of servingness such as measurable outcomes and experiences that reflect how well HSIs serve their campus and structures of servingness, which include organizational dimensions such as curriculum, pedagogy, programs, and support networks for minority students. This study addresses a critical gap by examining how servingness operates in the context of doctoral student socialization within engineering programs, an area that remains underexplored despite its importance for equity and inclusion in STEM.

The role of the Graduate Student Socialization Framework will be to describe factors that affect graduate student socialization and the three phases of the doctorate; the participatory stage, where they are onboarding into the degree program, the informal stage where students learn to navigate the program, and the professional phase, as they progress towards graduation. This framework operationalizes doctoral students' experiences and progress through the doctoral degree while the servingness framework operationalizes how the HSI context impacts such trajectory. Together, the two frameworks provide complementary analytical perspectives: the institution-focused framework reveals how HSIs shape individual student experiences, while the student-focused framework illuminates students' socialization within the HSI environment.

Using a comparative case study methodology we compare how two institutions: a newly designated HSI in the mainland US and a traditional HSI in Puerto Rico support Latino doctoral student socialization. We employ three complementary data sources to examine institutional servingness. First, longitudinal, open-ended video reflections will be collected from students to capture nuanced experiences beyond traditional indicators such as grade point averages, graduation rates, and enrolment figures historically used to assess HSIs. Second, semi-structured interviews will be conducted with graduate education stakeholders to explore institutional structures and support mechanisms that contextualize student experiences. Third, relevant institutional data will be analyzed to provide additional insights

into servingness. Collectively, these data sources are expected to give a multidimensional understanding of each institution's capacity to serve Latino doctoral students.

Data collection and analysis will be run concurrently. The student's data will be theoretically coded using the servingness framework as a lens to understand how students experience servingness and the graduate student's socialization framework to determine their phases. Similarly, stakeholders' interviews will be transcribed and thematically coded to understand how each institution is serving and supporting student socialization. Analysis of institutional data will be dependent on nature and characterization and further subject to the two frameworks.

The study is spread out over five years with the first year covering recruitment of participants, pilot data collection and refinement of data collection tools. Years 2,3&4 will be the broader full-scale data collection, analysis and drafting of the preliminary framework. Year 5 will see the conclusion of data analysis, identification of high impact practices supporting doctoral students' socialization and finalization of the preliminary framework. Analysis of the student data will show how they were served each semester while stakeholder interviews will provide institutional perspective. Together, they offer two views of servingness: students', institutions', and a comparison between institutions. The study will produce a preliminary servingness framework for doctoral students and research-based strategies to support Latino doctoral students.

Upon completion, this study aims to uncover the type of servingness that optimally supports Latino doctoral engineering students throughout their terminal degree. In the long-term, this CAREER project seeks to establish a community of practice where HSI stakeholders share strategies for supporting Latino doctoral engineering students. The key outcomes include a workshop series for graduate program stakeholders to learn research-based strategies for serving Latino doctoral students and a score sheet for HSIs to assess their servingness for doctoral students. While focusing on Latino students, these strategies will benefit all students within HSIs.

This CAREER project will advance equity in doctoral engineering education for underrepresented groups by highlighting students' experiences and guiding HSI stakeholders in applying research findings. Both traditional and emerging HSIs can adopt the research-based strategies to better support Latino doctoral engineering students. Ultimately, this study will inform policies and practices aimed at strengthening the contributions of HSIs in Latino doctoral engineering education.

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