Nuestro Impacto: An Insider Look into the Connections between Our Past Experiences and Current Teaching and Mentoring Practices

Dr. Idalis Villanueva Alarcón, University of Florida

Dr. Villanueva Alarcón is an Associate Professor in the Engineering Education Department at the University of Florida. Her research areas of interest are hidden curriculum, multi-modal methods, mentoring, and professional development.

Dr. Laura Melissa Cruz Castro, University of Florida

Dr. Laura Melissa Cruz Castro is an instructional assistant professor in the Department of Engineering Education at University of Florida.

Dr. John Alexander Mendoza, University of Florida

John Mendoza Garcia is an Instructional Assistant Professor in the Department of Engineering Education in the Herbert Wertheim College of Engineering at the University of Florida. He received his Ph.D. in Engineering Education from Purdue University, and

Dr. Edward Latorre-Navarro, University of Florida

https://www.eng.ufl.edu/eed/faculty-staff/edward-latorre-navarro/

Mr. Diego Alvarado, University of Florida

Diego Alvarado is an Instructional Assistant Professor in the Department of Engineering Education at the University of Florida. He obtained his M.Eng. in Industrial Engineering from Texas A&M University and his B.S. in Industrial Engineering from Texas A&M University. His research interests involve engineering education research for video development to increase engagement and methods to teach artificial intelligence and machine learning in higher education.

Dr. Lilianny Virguez, University of Florida

Lilianny Virguez is a Instructional Assistant Professor at the Engineering Education Department at University of Florida. She holds a Masters' degree in Management Systems Engineering and a Ph.D. in Engineering Education from Virginia Tech. She has work e

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Abstract

This full research paper discusses the experiences of five Latiné/x faculty in engineering and what motivated them towards developing equity-minded educational practices for their undergraduate students. The five faculty participants provided written reflections on how their life and professional experiences have informed said practices. From a social constructionism paradigm and using narrative inquiry methodology, a combination of *in vivo* and descriptive coding (first cycle) followed by emergent and focused coding (second cycle) were used by the first three authors to generate a codebook. The theoretical frameworks of Community Cultural Wealth, LatCrit, and Hidden Curriculum guided the data analysis and interpretation process. Two layers of member-checking were conducted amongst the last two authors as well as additional Latiné/x faculty in engineering who were adjacent to this work and acknowledged at the end of the paper. From the analysis, four themes were identified: (a) Counter-storytelling, (b) Structural Determinism (c) Language Origins, and (d) Community Cultural- Navigational, Aspirational, Social, and Familial Capital. Two emerging themes identified were Arrebatos and Nepantla; and Hidden Curriculum. From the findings, a collective narrative was generated by weaving the stories and experiences of the authors. From the narrative, we conclude with recommendations for future faculty development programs as they consider faculties' non-Monolithic backgrounds, cultures, languages, and experiences in engineering education. It is the hope of this paper that more consciousness is raised on *nuestro impacto* (our impact) in the practice of engineering education.

Introduction

To support higher education Faculty Development Programs (FDP), national entities, universities, and individual colleges invest large amounts of resources and money to train, mentor, support, and coach these faculty to learn about evidence-based practices for classroom-based activities and interventions (Borrego et al., 2013; Freeman et al., 2014; Prince, 2004). Even though faculty development programs are viewed as integral to support classroom innovation and the scholarship of teaching and learning, there is still a wealth of evidence suggesting that its use and transfer into the classrooms are low (Berger et al., 2022; Laursen, 2019; Stains et al., 2018).

Recent developments in theories of change around faculty development programs point to the need to adopt research-based instructional strategies (Henderson et al., 2011; Henderson & Darcy, 2007, 2009) in several key areas: (a) the linkage between learning theories and specified in-class activities (Borda et al., 2020; Manduca et al., 2017); (b) alignment between specific research-based instructional strategies to culture and context (Lund & Stains, 2015); (c) faculty communities of practice (Borda et al., 2020; Lave & Wegner, 1991); and (d) faculty beliefs and identity (Bouwma-Gearhart, 2012; Brownell & Tanner, 2012). Yet, the literature also suggests that while these needed areas situate students and faculty at the center, many university and national programs still ascribe to a top-down, deficit stance where decision-makers view the faculty and student as needing support rather than carrying strengths (Harper, 2010; Valencia,

2010). In other words, FDPs don't necessarily recognize the multiple funds of knowledge that faculty and students can bring to the classroom (García & Wei, 2014; Gonzalez & Moll, 1995; Paris & Alim, 2017; Yosso, 2005).

The lack of asset-based FDPs in fields like engineering is alarmingly non-existent (Di Stefano et al., 2022). Primary reasons for this lack of implementation are connected to a limited understanding of faculties' cultural pluralism, in other words, the ways that minoritized groups fully participate in the dominant society yet maintain their cultural differences in all aspects of their lives, communities, and professions (Guerrero & Lachance, 2018). Paris & Alim (2014) posit that activities designed to train or mentor educators should not rely "solely on abstract or fixed versions of the culturally situated practices of our communities" (p. 7). Instead, asset-based professional development must lie in "survival […] and [...] changing the conditions under which we live and work by opening up new and revitalizing community-rooted ways of thinking about education and beyond" (Paris & Alim, 2014, p. 13). As such, FDP activities should enable faculty to authentically design, develop, and implement intended outcomes that are intimately connected to the multiple realities and worlds that faculty in engineering face (Mejia et al., 2022).

In this full paper, five diverse Latiné/x[1] engineering faculty reflected upon their stories and how they use their experiences to situate their existing in- and out-of-classroom practices for their students. By sharing their stories, the authors were able to situate threads that weaved their backgrounds to suggest further refinements for FDPs that could include other minoritized groups in engineering. Note that due to the narrative nature of this work, sections of the manuscript will be written in first-person.

Literature review

Given the limited information known about how Faculty Development Programs (FDP) can contextualize and situate faculties' lived and professional experiences, the authors deemed it necessary to apply an insider approach where their own voices are situated to their own cultures and upbringings (Conchas & Acevedo, 2020). By centering these stories, the authors explored and problematized the experiences, strategies, and more importantly, narratives of "paths toward becoming engineers told from their own tongues and authentically interpreted according to their lived realities" (Mejia et al., 2022, p. 56). The intent was to elevate these narratives to situate more nuanced FDP models that are cognizant of the non-Monolithic realities (Revelo et al., 2017) of the authors. To this end, the following frameworks guided the narratives and lens for the analysis.

Community Cultural Wealth

Sociologists Glen Loury, Pierre Bourdieu, and James Colemen began to conceptualize the term 'capital' in the 1970s and 1980s to understand how this term was connected to human relationships, culture, and social structures (Darity, 2008). Whereas Coleman focused on capital

[1] While the word Latiné or Latinx are not officially recognized by the Real Academy of Spanish, these terms were selected to take ownership back to the communities impacted and oppressed by language (Villanueva et al., 2022).

in the form of expectations, information, norms, sanctions, and trust for the public good (Coleman, 1988), Bourdieu focused on the benefits (exchange value) to the individuals that participated in said groups (Bourdieu, 1986).

In the context of educational systems, Bourdieu further sought to find relationships between capital and culture by providing three definitions of capital: embodied, objectified, and institutionalized (Bourdieu, 1977; 1986). Embodied capital involves deeply ingrained habits, dispositions, and styles of communications that signal membership in a particular group. An example is when a person whose hands are smooth is seen by others as a person who is not typically involved in manual labor and being of an upper class. Objectified capital includes material goods that are exchanged for money and used to inculcate certain tastes in children. For example, investing in STEM after-school programs suggests a parents' disposition to help their child develop skills for a future STEM profession. Institutionalized capital represents the academic qualifications that are sanctioned by institutions of recognition. A person with a degree from an Ivy League university is viewed as being more competitive than if they got a degree from another university. In other words, Bourdieu argued that through these forms of capital, educational systems reproduce inequality by recognizing and awarding more those students and their families who are in the know-how:

> By doing away with giving explicitly to everyone what it implicitly demands of everyone, the educational system demands of everyone that they have what it does not give. This consists mainly of linguistic and cultural competence and that relationship of familiarity with culture which can only be produced by family upbringing when it demands the dominant culture (Bourdieu, 1977, p. 494)

While Bourdieu (1986) often criticized educational systems for the inequities they created for their students, many times, Bourdieu's use of the term 'capital' was misused and interpreted by other scholars from a deficit perspective. In 2005, to bring justice to Bourdieu's original definition of capital (1977; 1986), Yosso developed a framework called Community Cultural Wealth (CCW) in where an anti-deficit lens for the term 'capital' was introduced. Further inspired from critical race theory, more specifically Latino Critical Race Theory (LatCrit)[2], Yosso (2005) highlighted that capital should include the unique and valuable information, obligations, and norms that bring together marginalized communities despite their long-standing history of oppression (Solórzano & Villalpando, 1998). In other words, according to Yosso (2005), succeeding despite being oppressed has a capital that is of value.

Yosso's CCW framework (2005) centers around six forms of capital: aspirational, linguistic, familial, social, navigational, and resistance. Aspirational capital results in the person's ability to maintain hope for the future in the face of real and perceived barriers. Linguistic capital situates the need to develop communication skills (verbal and non-verbal) through various experiences.

[2] It is important to note that while LatCrit belongs to a larger family of critical race theory, its focus is distinctive to the internal diversity of Latiné/a/o/x and their relationships to other minoritized populations and their position in domestic (i.e., United States) and global structures of inequality (Valdes & Bender, 2021) that intersect with their everyday lives (Pérez Huber, 2010). LatCrit also critically examines the role of language and immigration in the racialized experiences of Latiné/x people in the United States.

Familial capital relies on the family and community networks that serve as social and personal resources to the individual. Social capital focuses on the networks of people and community resources that offer both instrumental and emotional support to help an individual navigate different institutions and structures of society (Yosso, 2005). Navigational capital refers to a person's ability to navigate social institutions to empower them to maneuver unsupportive or hostile environments. Resistance capital sources come from parents, community members, and a historical legacy to engage in social justice that leave individuals well-positioned to leverage their training to solve challenging societal problems.

CCW is a framework that is growing in popularity in education research and practice yet in the context of FDP in engineering, has only been discussed in rare occasions (Di Stefano et al., 2022; Garza, Rodriguez, & Espino, 2022; Mejia et al., 2022). Moreover, when considering marginalized groups like Latiné/x, we can't disconnect the clashes that many may experience either by their non-Monolithic identities (Revelo et al., 2017) or by the dissonances of the capitals they have acquired in lieu of their professional environments. As such, Anzaldúa's framework of *conocimiento* (Anzaldúa, 1987, 2003) was another framework that the authors deemed could help uncover how Latiné/x engineering faculty construct and navigate their sociopolitical systems of higher education and how these considerations can be included in future FDP programs.

Anzaldua's Conocimiento Framework

Gloria Anzadúa's seminal work (1987) in borderlands theory, created the basis by which people who live in the borderlands (living in symbolic and physical spaces) navigate sociopolitical contexts. More specifically, Anzaldúa's conocimiento framework helps to deconstruct seven stages of how individuals experience conflicts in their identities as they navigate complex and oftentimes dissonant sociopolitical systems.

The conocimiento framework positions those who only live in-between worlds and who have the capacity to help others who are caught in-between worlds to create customized bridges for wholeness and agency. In engineering and STEM education, some researchers have drawn from some aspects of borderlands theory (Aguilar-Valdez et al., 2013; Gámez et al., 2021; Garza et al., 2022; Gutiérrez 2012, 2013, 2015; Mejia et al., 2017; Mejia et al., 2022), as well as several studies in higher education (Acevedo-Gil, 2017; Conchas & Acevedo, 2020; Garcia & Mireles Rios, 2020; Gaxiola Serrano et al., 2019) to inform and establish counter-stories for liberation and praxis (Mejia et al., 2017).

The seven stages of the conocimiento framework are: (1) El Arrebato, (2) Nepantla, (3) Coatlicue, (4) El Compromiso, (5) Coyolxauhqui, (6) A Clash of Realities, and (7) Transformation/Spiritual Activism (Anzaldúa, 1987, 2003; Moraga & Anzaldúa, 2015; Vallone, 2014). It is worthwhile to mention that these seven stages do not necessarily occur in a specified order or time. Also, conocimiento acknowledges that "there are intersectional stories accumulated from a life of contradictions and that researching such narratives merits similar consideration" (Mejia et al., 2022, p. 57).

To summarize, the first stage called '*el arrebato*', involves triggering events that cause a person to question their own belief system, values, feelings, forms of expression, ways of being, thinking, and doing. These events can vary in degree of magnitude and intensity such as mild, strong, internal, external, or life-altering. Nepantla, the second stage, represents a liminal space where individuals seek to make meaning of those conflicting realities and worlds, while helping themselves understand and recognize their relationship with their surroundings, to challenge hidden truths and oppressions (Mejia et al., 2017). Coatlicue, the third stage, occurs when an individual sees themselves as who they are and who they want to be simultaneously, (Elenes, 2013; Galván, 2014; Moraga & Anzaldúa, 2015; Vallone, 2014). El compromiso, the fourth stage, provides a pathway for an individual to ignite self-healing (Moraga & Anzaldúa, 2015). Coyolxauhqui, the fifth stage, results in a restructuring of reality where one can shift from feeling victimized to being empowered (Keating, 2009). A clash of realities, the sixth stage, occurs when individuals begin to challenge the actions that aim to erase their identities and experiences (Moraga & Anzaldúa, 2015). Finally, the seventh stage called transformation and spiritual activism, involves a person learning from their lessons and applying them to equip a larger community.

While Anzaldúa posits that these seven stages are internalized battles that a person faces amid their sociopolitical positionings (1987), these stages are also intimately connected to their interactions with their environment, culture, and upbringing (Conchas & Acevedo, 2020). For this reason, narratives discussed below helped to bring context and light into how these faculties' experiences led to an unfolding of strategies and approaches that may not typically be considered in existing engineering FDP programs.

Methodology

Research Design

A narrative methodology from a social constructivism paradigm was used for this work (Creswell & Plano-Clark, 2018). The authors wanted to focus on their experiences to explore not just the content of their narratives but also to interrogate the experience and the language used to retell their stories (Clandinin & Connelly, 2004; Polkinghorne, 1995). The authors attempted to place their experiences in their families, upbringing, education, and profession into a narrative self-reflection that was merged. However, this narrative also captured the different experiences that each shared.

Positionality

The authors of this work are all engineering faculty with ties to their Latin American roots and heritage. At the time of this writing, they all work in a large, Southeastern research-intensive R1 higher education institution in the United States. Some of the authors do not self-identify as Latiné/x but rather by their home country (Villanueva et al., 2022). All authors have differing levels of educational experiences, both in their home country and in the United States. All have commonly migrated to the United States as part of their professional growth. Each of them considers themselves to be insiders of their Latin heritage and culture but outsiders to the experiences the other authors have faced. All recognize that their identities are non-Monolithic

(Revelo et al., 2017) and that their experiences may not necessarily translate or transfer to all Latiné/x contexts and sub-contexts.

Participant Sampling:

This study took place in a large public Southeastern research-institution between 2022 and 2023. The participants were self-selected from an open email call to Latiné/x faculty in the home department of the authors. Most faculty participants are considered contingent (adjuncts, part-timers, and non-tenure track) (Fetcher, 2019) and one is tenure-track. This sampling is both critical and sensitive (Lincoln & Guba, 1985) to "permit maximum application of information [. . .] to attract attention" (p. 102) to the experiences of these faculty and ways to translate some of their shared approaches to be considered for future FDPs.

Method:

Interested faculty participated in an individual written reflection that consisted of reflecting upon and responding to following research question: *In what ways do the life and professional experiences of Latiné/x faculty in engineering inform equity-minded educational practices for faculty development?* It is important to mention that while the faculty participants did not specifically outline specified equity-minded practices, all of them shared knowledge with their students from the context of their professional and personal experiences. On average, each faculty provided 2-3 paragraphs of written response, with an average paragraph size of 173 words.

Qualitative Analysis:

The first three co-authors participated in the qualitative coding of the reflections, guided by recommendations for analyzing narratives (Clandinin & Connelly, 2004). One important item to note is that faculty were allowed to write their reflection in their preferred language (English or Spanish). Since the research team is multilingual and multicultural, the data was not translated but rather was analyzed simultaneously in English and Spanish. Translation issues in qualitative studies have shown the importance of situating the participants' languages with the research teams' languages for more accuracy in the interpretation of the data (Oxley, Günhan, Kaniamattam, & Damico, 2017). In the case of this study, the team members' knowledge of the language and the culture of the participants informed and supported the analysis and member-checking process and discussions, fluidly in the two languages.

For this work, two cycles of coding took place. The first cycle of coding was a combination of descriptive and *in vivo* coding (Saldaña, 2016), with memoing being conducted independently by the coders. After the first coding cycle, the first three authors met and discussed the categories, and agreed upon the strategies for the second coding cycle. This second cycle consisted of a combination of open, focused, and *a priori* coding. While the *a priori* coding primarily used CCW and the conocimiento frameworks to guide the analysis, LatCrit (Valdes & Bender, 2021), and hidden curriculum (Apple, 1980; Bourdieu, 1986) frameworks were also taken into consideration due to their close relationship with CCW, particularly in the context of engineering (Villanueva et al., 2020). Therefore, authors also kept an eye out for additional categories related to these two additional frameworks in the analysis.

After these two cycles, a first iteration of the codebook was discussed amongst the coders to achieve consensus. A codebook of four themes, four sub-themes and the descriptions of the themes, was shared with the remaining authors for member-checking. Member-checking consisted of sharing the preliminary findings with the other three authors for (1) verification of the de-identified reflections, (2) their level of agreement to the identified themes, including justifications to this (dis)agreeance, and (3) additional insights or recommendations they wished to share. Subsequently, the codebook was refined once more (Appendix 1) by the coders until consensus was achieved. A second round of member-checking was conducted through editing of the first draft of this paper and through a neutral, third party Latiné/x faculty in engineering that did not wish to be acknowledged. After the coding process, the analysis yielded four themes and two sub-themes.

Following the final set of themes and sub-themes discussed in this work, the authors identified representative quotes from the participants' reflections. This was done a week after the themes to allow time for the authors to see the reflections with a fresh set of eyes. Finally, from the themes, we created a narrative that encompassed the experiences of these five faculty members. The narrative was constructed by selecting the experiences that most closely captured the common themes across the participants, with a keen eye for those differentiating (sub)themes in recognition of their non-Monolithic identities (Revelo et al., 2017). To maintain confidentiality, the narrative is fictional, while still keeping the essence of the participant's quotes. The narrative was written in the form of a case story with the intent of using this or a similar story as a conversation-starter for future FDPs in engineering.

Results

In the analysis, the authors identified four primary themes and two sub-themes: (a) Counterstorytelling, (b) Structural Determinism, (b) Language Origins, (c) Four capitals of Community Cultural Wealth (navigational, aspirational, social, and familial). The sub-themes were: (a) Arrebato and Nepantla and (b) Hidden Curriculum, respectively.

Theme 1: Counter-storytelling; Sub-Theme: Arrebato and Nepantla

In our analysis, we found that counterstorytelling was integral for the participants to speak to the different intersectionalities and cultural changes experienced by the faculty. We found that counterstorytelling, derived from LatCrit as well as Anzaldúa's conocimiento framework, also discussed elements of arrebato and nepantla (sub-themes). A prevalent talking point for this theme was the importance of a life event that caused an arrebato (a rupture, shock, loss of ground, or fragmentation) leading to nepantla (a seeking of meaning of their conflicting realities and worlds). Most participants described this arrebato as stemming from the life event of moving geographically and being able to live both the advantages of having been a majority in their home country and the struggle of becoming a minority when arriving to the United States. This arrebato allowed them to be able to see themselves in the eyes of their students, many of whom were experiencing their engineering education for the first time. Whether telling their own stories or exalting that of others, the unheard/untold stories of this cultural change were deemed important to the faculty. For example, gender at the intersection of their Latinidad was described

as resulting in competing personal and professional roles expected from both their culture and profession. Other participants reflected upon their professional opportunities in coming to the United States, how they viewed the importance of expanding their own circle of opportunities to impact higher education, and how navigation strategies are important to share with students who come from different cultures and societies to equip them for success.

> While at [U.S. Institution of Higher Education, removed for de-identification], I learned the hardships many students suffer. Anything from food insecurity to ... microaggressions that you might not even know are affecting people around them. – Participant 1

> Coming to the US was a challenging experience. For the first time, I was not in the majority. I was part of a box containing such diverse people that I could not believe it was possible. The first time I checked Hispanic/Latino, I was unaware of what it meant. As years passed, my experiences as a Latina in the US studying science and engineering started to accumulate. Multiple instances of racism, xenophobia, and microaggressions led me to understand what being part of a minority group meant. I had to live with stereotypical comments that lower my confidence, and with the pressure of giving 100% more than anyone else. – Participant 5

Theme 2: Language Origins

This theme was found to be a combination of both Language and Bilingualism (LatCrit) and Linguistic Capital (CCW). More specifically, in this theme, participants recognized the importance of being fluent in one language other than English. They viewed a partner language (i.e., Spanish) as an asset and indicated its value in the classroom.

> Some of the practices I adopted here were communicating with the students in their preferred method or language (if possible) and creating opportunities for the students to get to know me and my different experiences. – Participant 1

> Adicioné en el syllabus mis visiones de inclusión dirigidas a estudiantes con special needs, población LGTBIQA, Afro americanos, Latinos, y personas cuyo segundo idioma es el inglés (como yo) [*Translation: I have added in my syllabus my visions for inclusion that is directed for students with special needs, the LGBTQIA community, African Americans, Latinos, and people whose second language is English (like me)*] – Participant 3

> I have dealt with students who have experienced language barriers and how it feels like to know that you are smart but feel like you are not based on the perception of English-dominant peers. – Participant 4

Theme 3: Structural Determinism

We found that most participants recognized the existence of structural inequities in society that impact the outcomes of individuals. Deriving from LatCrit (Valdes & Bender, 2021), structural determinism provides how individuals can recognize privilege, how societal structures are

prevented or allowed, and how these affordances can vary by historical factors, legality, geographic location, race, ethnicity, and others.

> I learned during these experiences that being considered from a small town created microaggression about my education and ability to compete. – Participant 1

Theme 4: Four capitals of Community Cultural Wealth; Subtheme: Hidden Curriculum

Most of us acknowledged four out of the six types of capital of the Community Cultural Wealth framework (Yosso, 2005): navigational capital, aspirational capital, social capital, and familial capital. For each of these capitals, faculty viewed them as a motivator by which they can create, open, and adapt opportunities for their engineering students. More specifically, they used the lessons acquired from their experiences to expose the hidden curriculum of their engineering education (Villanueva Alarcón et al., 2022) in different ways.

For navigational capital, faculty spoke about understanding the importance of equipping their students to navigate their educational landscapes and environments. They understood that students need to be taught how to navigate both their professional and cultural environments to thrive. At the same time, they saw that their role as including the creation of classroom structures that are fair and universally designed (Wiggins & McTighe, 2005) to break down the barriers that limit some students from succeeding.

> As a faculty, it is my obligation to be accommodating to any need from the students and provide a fair opportunity for success, where success is defined by, for example, course outcomes, and not by my beliefs or convenience. – Participant 2

> I do this by including flexible options in my course/syllabus, allowing for multiple modes of assignment delivery, finding ways to be language-accessible (e.g., closed-captioning), creating opportunities for students to know me and know each other in class, and find alternative ways to traditional grading. – Participant 4

For aspirational capital, faculty understood the importance of supporting students' hopes and dreams. As stated by some of the faculty, each of them had an aspiration in their youth that led them to operate in an environment that positioned them to further support the dreams and goals of their students today. They viewed their role as being more than an educator; they viewed themselves as a living resource for students' lives and education.

> Therefore, I measure my success by the opportunities I have given them to succeed.
>
> – Participant 2

> I work hard to ensure every student understands they can do it...building their confidence and helping them understand that I care.
>
> – Participant 5

Social capital was viewed by the faculty participants as being important in leveraging existing community resources and connections to help their students build a network of support. They recognized that it is not enough to support students' hopes and dreams if they are not opening

venues and structures by which students can network to establish strong ties and relationships, including opportunities towards circles of influence and power.

> Now that I am in the classroom, I make it a point to incorporate many of my lessons learned during my experiences to create a safe and welcoming learning environment for a different student population. I create opportunities for the students to get to know me and my background so they can find similarities with their lives. – Participant 1

> For me, more than anything, my experiences of being Latiné (at the intersection of my other identities: gender, cultural, etc.) have helped me to connect to my students (especially minoritized and international students) in ways that my peers cannot.
>
> – Participant 4

Familial capital was connected to faculties' home cultures and the capital they acquired from them. More specifically, they viewed their families as embedding the norms of their culture and that through these, they could acquire cultural and social acceptance. This acceptance allowed them to feel a sense of belonging to their cultures and communities. They recognized that while cultural and social acceptance is important, it is not sufficient to acquire social mobility to be positioned for influence and power. At the same time, they viewed that having a strong sense of 'familia' was important in conveying compassion to their students and extending the sentiment of 'familia' to their students so that they too can feel they belong.

For all these capitals, hidden curriculum (Villanueva Alarcón et al., 2020) was directly mentioned by some of the faculty as being a classroom strategy that they can use to create structures that would communicate these four forms of capitals to their engineering students. The faculty also recognized that while marginalized, they still carry privilege. They view their privilege as a mechanism by which they can challenge their own meritocratic ideals and help to further advocate to uncover negative forms of hidden curriculum.

> … I do believe that there are other ways for students to demonstrate them knowledge without necessarily giving an exam or a metric that may be riddled with biases and assumptions of who the student is and what they know. – Participant 4

> I challenge concepts of meritocracy and make sure acknowledging our privilege are part of my hidden curriculum. – Participant 5

Discussion:

Faculty professional development research that includes engineering faculty is scant (Coso Strong, Kendall, & Henderson, 2023; Villanueva Alarcón & Muñoz, 2023). Furthermore, at institutions of higher education where Latiné/x faculty are the minority, research impacting their access and application of FDPs in the classroom is also rare (Kendall et al., 2021; Nuñez et al., 2015). The work presented in this paper is novel in that it centered the voices and experiences from five Latiné/x engineering faculty and through their stories, who knowingly identified areas that could merit further consideration for future FDPs.

The results showed that, for the five Latiné/x engineering faculty in this study, counterstorytelling was integral to experience arrebato and nepantla, both of which helped them make meaning of their conflicting worlds, contexts, and the intersectionalities of their social and cultural identities (Crenshaw, 1991). More specifically, these faculty reflected upon these experiences and consciously tried to create spaces for their students so that they can mutually engage in humanizing conversations (Freire, 1970). Freire (1970) posits that for liberatory education to occur, reflection, praxis, and action are needed. In engineering, previous work has found that many engineers lack opportunities for reflective experiences for consciousness raising (concientização) and praxis (Mejia, Revelo, Villanueva, & Mejia, 2018; Revelo, 2015; Villanueva et al., 2019). However, for this population, this was not necessarily the case. Perhaps, understanding the structural determinants (Pérez Huber, 2010) of their walk of life and positions of privilege, led them to have reflections about their biases with intercultural humility (Bibus & Koh, 2021). The arrebatos these faculty experienced appeared to have resulted in a nepantla, (Anzaldúa, 1987; Anzaldúa & Moraga, 2015) which they used to share their acquired capitals to their students.

For these faculty, they also viewed themselves as a source of at least four forms of capital- aspirational, navigational, social, and familial. Recent research has suggested that for engineering faculty, at least those who work at Hispanic-Serving Institutions, motivation for FDPs is not just limited to improving their teaching competencies but to also learn about ways to better support their students (Coso Strong et al., 2023) by improving faculty-student relationships (Guzzardo et al., 2021) and by creating community to augment educational innovation (Cross et al., 2021; Mestre et al., 2019). Furthermore, it was clear that it was not enough to acquire capital but to also share it, even if what they know or have acquired is little. In other words, they see themselves as a bridge by which capital can be shared (Villanueva Alarcón, Sellers, Paul, & Smith, 2023; Yosso, 2005) rather than seek to keep it (Villanueva Alarcón et al., 2023).

Out of the four forms of capital mentioned, perhaps familial capital carried the most weight. For these five Latiné/x engineering faculties, it was essential that they extended a sense of 'familia' to their students. While not much is understood on the reasons behind their desire to extend 'familia', previous work on Latiné/x engineering identity has suggested that nurturing an engineering 'familia' is essential in helping them establish a sense of belonging that many times are lacking in their larger 'engineering families' at their home institutions (Revelo, 2015; Villanueva, Revelo, & Mejia, 2019). For these faculty, 'familia' is not necessarily tied to a connection to their positionality, culture, or language backgrounds (although verbal and non-verbal language was still viewed as important in their practice), but rather 'familia' was seen as a value that they carry and openly share with all students in their classrooms. This 'familia' value was a deeper personal element that did not stem from FDPs necessarily but that they saw essential to ensure that their pedagogical practices were equitable, inclusive, and necessary to equip students towards becoming a whole person and not just a technical expert in engineering. This was also intimately connected to compassion, or empathy in action, and care (Noddings, 2012) where they viewed their compassion as a tool to help all students in their different walks of life and not just in extreme situations of distress. During member-checking discussions with the faculty, some expressed that many FDPs are only limited to the worse-case scenarios and not

tailored to the day-to-day situations of the classrooms. Some expressed lament for not having FDPs that properly train them to become counselors and mentors as they suggested that because of their roles in the classroom, they are usually put in these positions with minimal training for them (Gillian-Daniel, Greenler, et al., 2021).

Finally, some of these faculty recognized a lack of understanding about how hidden curriculum of their institution (Villanueva et al., 2019) influenced how they positioned themselves in relation to classroom power structures (Freire, 1970; Freire & Macedo, 1987). A lack of reflective opportunities (Freire, 1970) made it clear from the narratives that there is a deeper need for FDPs to be more humanizing and reflexive. A humanizing education, including FDPs, should include a pathway by which individuals not only become conscious about their presence in the world but in where they can "act and think when they develop all their capacities, taking into consideration their needs, but also the needs and aspirations of others" (Friere, Betto, & Kotscho, 1985, p. 14-15). Yet, to humanize education and by extension FDPs, it is essential to examine the multifaceted demands of faculty roles more comprehensively (including the invisible and visible labors they carry) and envision pathways through which universities and individuals may more meaningfully support and legitimize the contributions of Latiné/x and other minoritized faculty in educating the next generation of engineers.

Narrative

From the collected reflections, a fictional narrative was constructed by selecting the experiences that most closely captured the themes across the participants with a keen eye for those differentiating (sub)themes in recognition of their non-Monolithic identities (Revelo et al., 2017). Although the essence extracted from the participant quotes were kept, many of them were masked to maintain confidentiality of the written reflections. The narrative was written in the form of a case study that could be used as conversation-starters for future FDPs in engineering. Themes and sub-themes found in this study were bolded in the narrative.

As Dani rushes into the university's main building excited to attend a workshop for faculty teaching undergraduate engineering students, they feel the excitement of sharing with other professors their experiences and the struggles that they have overcome during the last couple of semesters. They enter the room and sit down. They look at familiar faces and yet Dani is reminded that not many people sitting in the room look like them. They continue to pay attention to the moderator, and they realize that maybe there is not going to be enough time for a conversation. The FDP moderator asks the faculty to write down a reflection of their best classroom practices answering the following question: "What am I offering to my students to make sure everyone has the resources to succeed?" While reflecting, Dani is taken back in time...

While Dani was born in the U.S., their family decided to move to their home country of Honduras where he was raised for over 20 years. In Honduras, Dani has enjoyed the benefits of a ***social*** *network, a* ***family*** *that has encouraged them along the way, and a school that has offered science, mathematics, and sports despite living in a small town, farther away from the city. During their school years, Dani thrived in STEM subjects. Therefore, Dani joined the best university in the country to pursue their* ***aspirations*** *to become an engineer after completing their bachelor's degree. Although adapting to this new city takes time, Dani's large network of family,*

*friends, and sports teammates proved crucial to their **navigating** this degree and successfully completing it. Dani graduated with honors from the engineering program, and then, encouraged by their professors, traveled to the U.S. to join a graduate program.*

*Although Dani had **language** exposure to English because of their educational and socioeconomic advantages, this is the first time they are immersed in a non-Spanish-speaking country as an adult. In addition, culture and social norms are different, which makes them reflect on many things they have never thought about before. For instance, during orientation week, Dani was tasked to complete an application form to attain a U.S.-based student I.D. As Dani was completing the form, they noticed a demographic question on "Race and Ethnicity." Dani was unsure what to complete as they had never really had to consider themself as a minority, yet it made them wonder why **a structure** like this university would care about this question.*

*A few months passed and living in the U.S. came with new barriers. At the time, Dani did not have words to express their feeling different. Their connections with their peers and professors were weaker compared to Honduras. Role models were absent. Furthermore, some instances of microaggressions caused disruptions, or **arrebatos**, that made Dani wonder about their upbringing. Dani began to understand that they were privileged in Honduras and recalled how many people in their home country lacked opportunities and faced systemic barriers that prevented them from achieving their educational goals. Dani saw the differences in both countries' educational systems, which further revealed **educational issues** that they unconsciously experienced in Honduras, perhaps due to a lack of institutional resources compared to what they had in the U.S. Soon after graduation, Dani became motivated to be an engineering advisor to help students **navigate** their academic institutions. Later discovering that advising was not enough, Dani became faculty in an engineering program in the U.S.*

*As an engineering educator, Dani is compassionate. They feel and act upon the needs of their students and create **socially** inclusive classroom environments. Dani understands that only some have had the privilege of having different kinds of support needed for success, and therefore, Dani does everything in their hands to provide their students with **familial** support. Dani is aware that everyone needs different types of support and spends time finding and providing the best strategies to eliminate barriers and provide a safe and welcoming learning environment because it is of foremost importance. Dani accommodates students' needs and understands that **language** can be a barrier, especially for students who are second language learners. Dani helps their students **navigate** their academic path and uses all what they learned from past experiences to help their students learn the academic content and professional skills, while equipping them with what is necessary to thrive. Dani connects to their students, hoping to provide a **bridge** with other **social** actors and further support their students' aspirations. Dani has understood that while the classroom is a place for learning, not all that is taught is visible, but many times it is invisible. Therefore, Dani sees themself as a holder and sharer of lessons that are **hidden** but needed to help their students succeed.*

...Dani is excited to share their story. "Ok, moving on, this [list of evidence-based practices] is what you should be doing in your classroom" said the FDP moderator. Dani was puzzled. Dani's reflection, put on a Google survey, was left there written. "Will the FDP people read it? I wonder how faculty around me in this room feel? Are they struggling like me? I wish I had someone I could share my story with. This is a lot of good information but how does it connect with my reflection, my story?", thought Dani. "That is all the time we have. Thank you for

coming!", said the FDP moderator. Dani picked up their things and went to teach their next class with a new list of items to include in their classroom practices.

Implications for Faculty Development Programs in Engineering and in General:

This work situated the reflections of five different Latiné/x engineering faculty seeking to understand how their past experiences formed their current teaching and mentoring practices. We sought to build a framework that allowed us to partially describe our process of becoming faculty in the U.S. with a consideration to their differing experiences. Desiring to transcend praxis into action (Freire, 1970), we provided the readers with resources (e.g., case study narrative, recommendations) that can be used as conversation starters for FDP programs to help make sense of the experience of Latiné/x faculty. While we can't say that these experiences are the same for all racial, ethnic, and cultural identities because we are non-Monolithic (Revelo et al., 2017), we hope that our voices, actions, and recommendations are heard and used to improve existing FDPs in engineering.

Recommendation #1: *As FDP programs evolve, these programs need to shift to be socially constructed and culturally responsive.*

To communicate with faculty effectively, FDP needs to center cultural responsiveness. FDPs could be more effective if the recommendations draw from faculty experiences and bring upfront the value that faculty offer to students and the academic community. FDP programs could improve communication with minoritized faculty who could struggle to see the value of their teaching and mentoring efforts or who might feel uncomfortable sharing with others their strategies due to their marked differences with those from more represented faculty.

FDP programs need to shift to a socially constructed paradigm. It is of foremost importance to create an FDP that allows faculty to learn from each other, to construct knowledge rather than acquire knowledge. This could potentially facilitate the conversation as knowledge becomes dynamic, and faculty feel their voices are heard and their efforts seen. For instance, FDP programs could include training for faculty to reflect on their experiences, focusing on experiences of privilege as well as the way they overcome struggles. Strategies drawn from intentional conversations could help faculty relate to these strategies while these strategies could enrich FDP with new strategies drawn from faculty accounts.

FDPs need to include more responsive metrics (e.g., rubrics, promotion criteria) for teaching and mentoring that would acknowledge the contributions of minoritized faculty in engineering. Particularly, to account for those impactful yet unacknowledged practices. For instance, directly from this work, measures that account for language, familial support, community support, and hidden curriculum could be considered.

Recommendation #2: *Leverage arrebatos*

During this study, arrebatos was important to the experiences of Latiné/x engineering faculty. These arrebatos shifted their paradigms and make them more conscious about the struggles of others. Therefore, we believe that there is an opportunity for FDP to facilitate develop activities in where not only faculty reflect and communicate these arrebatos but allow the stories to guide strategies that can equip them towards handling the arrebatos experienced by their students.

These activities must acknowledge that not everyone has the support to overcome these arrebatos and that many students will not be able to succeed without our support. Many times, FDPs focus only on the extremes (e.g., students in distress) without considering the everyday challenges that a student may experience. Equip faculty for the day-to-day arrebatos instead.

Recommendation #3: *Students as Familia*

We clarify that our teaching practices should not be understood as being skewed towards the Latiné/x student population, but on the contrary, our experiences allow us to be compassionate for and support all the students in the classroom despite their origins, or race, color, gender, age, or identities. Our awareness of our experiences across varying contexts makes us sensitive to supporting students who struggle in the classroom because of hardships. We see our students as 'familia', and therefore we believe that our differing Latiné/x conceptions of 'familia' could be elevated in FDP programs to transmit 'familia' values to students to nurture inclusion in the classroom. In a similar vein, other cultures bring different views of supportive 'familias' that should be considered as well. In addition, while we understand that these recommendations may appear insurmountable, these are practices that many minoritized faculty do on a daily basis. It implies bringing humanity to the classroom rather than separating these out in both personal and professional contexts.

Recommendation #4: *Other voices must be heard*

Even though we offer some recommendations that derived from the analysis of our experiences, other voices should be heard. Our Latiné/x voices are not the only ones that have not been accounted for or heard in FDPs in engineering. Faculty bring their cultural wealth, assets that carry value and weight to academic institutions and to their classrooms. Allow some of these stories to inform or strengthen existing evidence-based practices. Remember, that most evidence-based practices are not necessarily generalizable and should be adapted to the context and needs of the faculty and their students. Bringing faculty voices into FDP programs will produce more contextual FDP that listens to all voices and accounts for (non)visible teaching and mentoring practices that many of us carry.

Limitations and Strengths

This section was purposefully titled as Limitations and Strengths in that while the study had its limitations, each of the reflections shared had assets, strengths, and values that should not be ignored. From a study perspective, while the stories were few and the amount of follow-up from the reflections were few (e.g., no interviews), the authors were intentional in respecting the space and time that most of the participants could offer to this work given their professional roles as contingent faculty. Literature shows that Latiné/x faculty make up only 3.8% of all engineering departments (Roy, 2019), the majority of whom are contingent and not holding a full-time position (AAUP, 2018). Literature suggests that minoritized contingent faculty are burdened by excessive service duties (e.g., administrators appointing them as informal mentors to other minoritized students and peers) (Moule, 2005; Stanley, 2006) that are seldom recognized or supported (e.g., Coso-Strong, Kendall, Henderson, & Basalo, 2019; Villanueva & Muñoz, 2023). Furthermore, Urrieta and Chavez (2010) suggest that "Latinx/é faculty's sense of obligation to

their respective communities has often come in conflict with what institutions define as service" (p. 225). For these reasons, the time and stories that these faculties shared while not necessarily generalizable, are recognized as transformative, transferable, valuable, and impactful.

Another limitation of the study was in the member-checking stage where it was difficult to determine if the counter-storytelling theme connected to arrebato was a Latiné/x specific experience or connected to other minoritized groups. Like naming issues of Latiné/x populations as recently was pointed out in engineering education and research (Villanueva Alarcón, Mejia, Mejia, & Revelo, 2022), there are issues connected to international experiences and immigration to the U.S. that should not be ignored (Valdes & Bender, 2021). It will be important to further understand how different experiences, contexts, considering their environments and systems, affect these academic roles amongst varying faculty roles.

Finally, a limitation of the study was that while the narrative was done from the collective themes, we recognize that we are all non-Monolithic (Revelo, 2017) and as such, FDPs should consider differences in identities. Some of us were educated with differing levels of privilege, socioeconomic status, U.S. citizenship, access to STEM programs, to name a few. All of us have suffered racism, xenophobia, sexism, and other –isms based on our positionalities and contexts in differing degrees. All of us have risen above our barriers to extend our 'familia' sense to others (including students) as we view that our strengths come from many sources. Our strength is in our core values and how we arise despite the oppressive systems and structures that surround us:

They tried to bury us. They didn't know we were seeds. - Mexican Proverb

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Appendix

Appendix 1: Codebook

The following table corresponds to codebook developed from the frameworks of Community CommonWealth framework (CCW) (Yosso, 2005) and Conocimiento framework proposed by Anzaldúa (1987). Additional themes identified included frameworks of Latino Critical Race Theory (LatCrit) and Hidden Curriculum (HC).

Framework	Category	Definition
Conocimiento	Arrebatos	This category intends to encapsulate the instances in which participants express experiences of arrebatos (fragmentations). Arrebatos are experiences that lead to a shift of their worldview that causes cognitive and emotional discordance from which they are faced with an imminent challenge that will require them to understand and partition their own identity to form a new identity (Bobel et al., 2006).

Conocimiento	Nepantla	Nepantla, a seeking of meaning of their conflicting realities and worlds, was expressed by many of the faculty related to their move from their home country to the United States. Faculty saw this transition as an important pivotal point that prompted them to seek to equip their students for similar transitions in their engineering education.
LatCrit	Structural determinism	This category relates to experiences or concerns with issues related to a system, in which the outcomes of certain individuals are predictable and pre-determined/fixed by both oppression for certain groups and advantages for other groups (Clegg & Bailey, 2007)
LatCrit	Counter storytelling	This category corresponds to narratives that intend to magnify underprivileged communities' stories, experiences, narratives, and truths (Delgado & Stefancic, 2017). It could also be found as attempts to "tell the stories of those people whose experiences are not often told" (Solorzano & Yosso, 2002, p.32)
LatCrit	Intersectionality	This category corresponds to experiences expressed by the participants as complex and cumulative in which multiple forms of discrimination (such as racism, sexism, and classism) intersect when navigating a system (Crenshaw, 1991)
LatCrit	Language and bilingualism	This category represents the participants' experiences with being bilingual or learning a second language. For example, it could express their difficulties when navigating a country in which the language spoken was different from their mother tongue, or it could be the participant observing or acting on the difficulties of those who did not dominate the primarily spoken language.
LatCrit	Educational issues	This category relates to experiences with issues related to quality and access to education. It could be expressed as the comparison between two educational systems, in which one lacked an asset of the second.

LatCrit	Immigration and citizenship	This category represents the possible experiences that participants might include in terms of immigration or related to citizenship. For example, it could be expressing barriers or issues that arose due to their immigration, important connections with their country of birth, or issues related to identity when belonging to two different countries.
CCW	Aspirational	This category represents instances in which participants reflect on experiences in which they received educational support that gave them the tools to grow toward their goals. It could also be found as instances in which they provide their support to students for them to reach their goals.
CCW	Linguistic	This category represents instances in which participants receive support as students or provide support to their students in aspects related to language and communication.
CCW	Familial	This category represents instances in which participants reflect on their educational experiences or describe support to their students as community support, particularly in a way that a close-knitted community, 'familia', would act to support a member of the family.
CCW	Navigational	This category represents instances in which the participant reflects on experiences in which they receive or give help to navigate institutions; this could be, for example, interactions with support and staff that lead to a better understanding of how institutions work and how to access resources needed to thrive.
Hidden Curriculum	Hidden Curriculum	Hidden curriculum, unwritten and unacknowledged rules of a learning or working environment, was viewed as important for the faculty to equip students to navigate their educational and professional environments and that it was their role as faculty to make known this hidden information.