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“I Wasn’t Supposed to Be There”: Examining the Experiences of First-Generation Women of Color in Undergraduate STEM Majors

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ABSTRACT

Using intersectionality and ecological frameworks, this study explored the experiences of 22 first-generation Women of Color (FGWOC+) STEM college students at two predominantly white institutions. Participants were part of the NSSA, which supports marginalized students’ persistence in STEM. Four themes were generated that relate to negotiating the expectations of white majority spaces and family and community relationships. For practice, policy, and research, student affairs professionals and faculty members play critical roles in mentoring and supporting students toward persistence and graduation. The findings also lead to implications for career planning and development of FGWOC+ STEM students.

KEYWORDS

Career development;
Women of Color; first-
generation college student;
STEM; sense of belonging

“I am the first one in my family to ever go to college in Mexico or here. My mom grew up in a really traditional home where women don’t go to school. It blows my mind that one generation later I am here.” - Ava

Ava’s reflection is indicative of the road she has traveled literally and figuratively to become a first-generation (FG) Woman of Color (WOC) in Science, Technology, Engineering, and Mathematics (STEM). Her narrative is one of many voices from the present qualitative study that we conducted with a focus on the experiences of FGWOC. This article focuses on this subset of data that reflects the complex intersection of identities these FG women carry and how they negotiate challenges and employ their capital within predominantly white¹ spaces in STEM. Given the ongoing disparities in higher education access and completion among marginalized student populations, WOC who are also first in their family to go to college sit at a unique vantage point to understand and respond to these challenges with an eye to the changing demographics of the U.S. Yet, despite entering STEM fields, they feel like outsiders and often their promise is unrealized.

The need and demand for STEM educated workers continues to grow (Fry et al., 2021), however, underrepresentation of women in STEM continues to vary across job categories (Cabell, 2021; Liu & Barnhardt, 2021; Wang & Degol, 2017). It is well documented that women who hold systematically marginalized identities (e.g., race/ethnicity) continue to be underrepresented in certain STEM disciplines and careers (Dizon et al., 2023; National

Science Board, National Science Foundation, 2020). These intersecting racial and gender disparities are additionally compounded when we consider FG status. About 56% of today's college students, for example, are the first in their family to go to college; of this number 60% are women (Hamilton, 2023). WOC who are FG experience heightened obstacles in STEM. The Pew Research Center reported disparate outcomes between FG college graduates and their peers on economic outcomes indicative of generational-wealth building, in which FG college students are less likely to complete an advanced degree and more likely to incur educational debt (Fry et al., 2021).

The existing disparities and underrepresentation in STEM career pathways call for greater attention to these inequities, especially for students with intersecting identities. The purpose of this study is to explore the experiences of first-generation Women of Color (FGWOC+) college students, who may also be immigrant or refugee and from poor or working class in STEM at predominantly white institutions (PWIs). Although there has been a growing presence of STEM-related scholarly research in the higher education and student affairs literatures (Burt et al., 2023; Convertino & Monarrez, 2021; Riegle-Crumb et al., 2019; Rincón & Rodriguez, 2021), specific gaps in the literature persist. There is limited scholarship focused on FGWOC+ experiences (Bettencourt et al., 2020; Longwell-Grice & Longwell-Grice, 2021; Santa-Ramirez et al., 2022). This is coupled with the increasing number of FG students, Students of Color, and women students in higher education (Hamilton, 2023). Therefore, attention to the lived experience of FGWOC+ who sit at the intersection of these identities and experience systemic obstacles in STEM is critical and timely. The central research question guiding this inquiry is: What are the lived experiences of FGWOC+ at PWIs?

Language and terminology

FG college students are not a monolith and their FG status is intertwined with other social identities including but not limited to race, ethnicity, social class, gender, and immigrant and refugee status. Participants in our study sit at the nexus of these intersections and speak to their multiplicity while also acknowledging the cumulative impact of systemic racism and classism on their familial and individual trajectory in educational institutions (Jehangir et al., 2022b). In our study, FG refers to college students who are the first in their immediate family of caregivers (parents/guardians) to attend and complete a 4-year college degree (Brown et al., 2021; Pagliarulo McCarron, 2022). FG identities are multidimensional and multifaceted, in which the FG identity is imbued with and encompasses multiple forms of social and cultural capital (Pagliarulo McCarron, 2022; Yosso, 2005).

We use WOC to orient our readers to the context and lived experiences of the students in our study who identify as women and Students of Color. In using WOC, we recognize the systemic constraints of educational access and design that actively work against and hinder the success of WOC in STEM spaces. The term WOC, compared to Students of Color, centers the lived experiences of *women students* from communities that have been systematically marginalized.

We use immigrant and refugee to describe experiences that reflect being foreign-born (Stebbleton, 2011) and can encompass the navigation of English language learning, citizenship documentation status, parental involvement and expectations, psychosocial development and acculturation, and career aspirations and life-career development (Kim & Díaz,

2013). The study sample includes a significant number of students who were recipients of the Pell Grant, which is typically awarded to students with a family income of less than 30,000 dollars annually. Pell-Eligibility status is one of few widely and consistently collected student information variables in higher education; however, we also recognize the incompleteness of Pell-Eligibility status as a sole and direct measure of income (Ochs Rosinger & Ford, 2019). Given this limitation, we also recognize that the Pell Grant is a measure of social class aligned with income and is just one way to frame social class. A more holistic view considers how class shapes “opportunity, values, language, beliefs” (Ardoin, 2021, p. 94), and as such we employ the term poor and working class to capture the lived experience of our students.

Literature review

Navigating inhospitable spaces

FGWOC+ students pursue and persist in STEM despite the systemic barriers. E. O. McGee (2016) found that students maintained success in STEM by employing “an arsenal of strategies” (p. 1626), including stereotype management, to challenge overt, covert, and ambiguous racial assaults by altering their racial, cultural, and/or ethnic identity to prove themselves as capable and socially acceptable within their STEM majors. Rodriguez et al. (2020) noted that students engaged in internal and external transformational resistance to critique racist, sexist, and classist STEM structures. Rodriguez and colleagues found that students challenged both oppressive ideas within themselves (e.g., their role in STEM) as well as within inequitable STEM environments (e.g., hostile STEM settings).

Additionally, students also negotiated STEM climates through valuing their families and communities and using them as reference points for positive self-evaluation. Various researchers have found that this form of value-negotiation is reflected in students’ own emphasis of their own cultural assets, such as their linguistic and communication skills, that equips them with the skills to navigate through challenges and resist various forms of institutional oppression (Gibson & Espino, 2016; Jagers, 2020). E. O. McGee (2016) found, for example, that Students of Color sought out teachers, peers, administrators, and the larger STEM community to validate their intellectual and academic credibility. Through these institutional agents and interpersonal relationships, students were able to form counterspaces that were affirming, supportive, safe, and validating (Choi, 2023; Wofford et al., 2023). Those who did not have access to role models representative of their own backgrounds within their STEM fields looked outwards toward organizations and groups within their institution or in their communities (aligned with their social identities) for validation and a sense of belonging (Holland Zahner & Harper, 2022; Rodriguez & Blaney, 2020; Salazar et al., 2022).

Barriers to STEM programs for FGWOC+ immigrant and first-generation college students in STEM spaces

Within STEM spaces, FGWOC+ students may encounter hostile campus climates that endorse and perpetuate racial and ethnic stereotypes and meritocracies (Burt et al., 2023; Ong et al., 2018). For example, WOC in STEM may be subject to racist remarks

targeting both their STEM abilities (e.g., depicting them as incompetent and undeserving) and their belonging within STEM fields (E. O. McGee, 2016; Rodriguez & Blaney, 2020). As a result, WOC may be required to expend extra effort, in addition to keeping up with academic demands, to address and combat racial and ethnic microaggressions and stereotypes about their aptitude and identities (Jones, 2023; E. O. McGee, 2016). The management of racial and ethnic microaggressions and stereotypes may lead to chronic fatigue and exhaustion (Willis et al., 2019). Through negotiating gendered-racial microaggressions, WOC students may also feel discouraged from speaking and engaging within academic settings, and instead choose to self-silence (Jones, 2023; Saunders et al., 2023). This self-silencing may further perpetuate extant inequities in higher educational settings.

With multiple intersecting underserved and oppressed identities in STEM, another barrier to success for WOC students is the “double-bind” phenomenon (Dortch & Patel, 2017; Rodriguez et al., 2020). WOC students are marginalized due to their racial, ethnic and/or gender identity, and are frequently required to prioritize those identities separately (Saunders et al., 2023). WOC in STEM are expected to meet masculine ideals held by STEM culture, in which measures of success are centered on the experiences of privileged men (Parson & Ozaki, 2018). For example, Dortch and Patel (2017) described how STEM culture promotes competitiveness and outspokenness as aspects that men have traditionally been socialized to encompass. Navigating a STEM culture that is white and masculine can elicit, for WOC students, the feeling that their lived experiences and cultural capital are not valued in similar ways (McWhirter & Cinamon, 2021). WOC students in STEM who are not pushed out of STEM majors due to negative interactions with, and discrimination from, institutional agents may find that racial, ethnic, and gender disparities become reinforced and exacerbated (Dizon et al., 2023).

For WOC, being FGWOC+ adds additional layers of obstacles. Compared to continuing-generation and non-immigrant students, FG and/or immigrant students, for example, have less access to academic and generational wealth, are more likely to have jobs while enrolled in college, and may have cultural and familial responsibilities that take precedent or interfere with their education (Dika & D’Amico, 2016; Soria & Roberts, 2021; Sy & Romero, 2008). In addition, the familial, linguistic, and navigational capital that FG students do hold is devalued in the academy, which may further perpetuate a deficit narrative about their success in STEM (Yosso, 2005). To understand the barriers to STEM programs for FGWOC+ students, each aspect of their identity needs to be acknowledged, for each of their social identities will be salient as they navigate STEM education and workforce (E. O. McGee, 2016; Oseguera et al., 2022). It is also imperative to frame FGWOC+ students as bringing richness (e.g., cultural capital and familial strength) to higher education spaces as they negotiate the increasing systemic and institutional barriers to their academic success and endeavors (Brown et al., 2021; Pagliarulo McCarron, 2022; Santa-Ramirez, 2021).

The obstacles experienced by FGWOC+ students in STEM are intrinsically structural inequities rooted in the ecology of institutions that offer STEM opportunities, particularly at PWIs (E. O. McGee, 2016; Morton, 2021; Rodriguez et al., 2020). These institutions are traditionally rooted in white and masculine values and norms (Carlone & Johnson, 2007), as well as oppressive whiteness-centered college spaces (Santa-Ramirez, 2021), which elicits a STEM culture that may be a mismatch with the racial and ethnic cultures of FGWOC+ students.

Furthermore, these white and masculine ideals and spaces lay the foundation for racial stratification, in which Black or African American or Hispanic or Latine² students may be placed on the lower rungs of a racialized hierarchy (E. McGee, 2023). For FGWOC+ students, this racialized hierarchy is also intertwined with classist structures within institutions of higher education (Dizon et al., 2023; Rodriguez et al., 2020). Intentional or not, these structural inequities that persist within STEM higher education perpetuate a deficit ideology of who students are, their capabilities, and their so-called “fit” in these fields of study (Choi, 2023; E. O. McGee, 2016, 2020).

FGWOC+ college student experiences in STEM spaces

Noting the underrepresentation of STEM education, FGWOC+ students strive to persist within STEM for a multitude of reasons. For example, researchers have highlighted that FGWOC+ students pursue and persist within STEM to positively influence and transform society and/or their own communities (Jaggers, 2020; Rodriguez et al., 2020). In addition to being motivated to succeed academically, for FGWOC+ students, the pursuit and persistence within STEM may be motivated by their desire to uplift their families economically and socially (Dika & D’Amico, 2016; Kezar et al., 2022; Sy & Romero, 2008).

Researchers have noted the critical role of family support for students within higher education contexts (Johnston et al., 2021). For example, family support positively influences academic aspirations and academic decision-making among FG students (Dominguez-Whitehead et al., 2021). Beard (2021) also found that Latine FG college students are able to build ties and bridge connections with institutional agents (e.g., faculty) by relying on social support (e.g., encouragement and motivation) from trusted family members. As a result of the interdependence, resilience, and familiarity with maintenance of academic, familial, and cultural obligations that they have achieved, FG students are adept at using help-seeking strategies and self-earned social capital to navigate higher education (Payne et al., 2021). Therefore, it is evident that additional supports from institutions and institutional agents (e.g., positive peers, faculty, and mentor relationships), as well as increased availability of and access to instrumental resources (e.g., career centers and career fairs), can serve to further enable FGWOC+ college students toward achieving their academic, social, and professional goals within STEM spaces (Park et al., 2022; Perez et al., 2023).

The literature review underscores how the experience of FGWOC+ in PWIs and STEM fields is often shaped by a deficit narrative (e.g., about what a student knows and can do) that can perpetuate stereotypes about their place and competency in these fields. Hidden curriculum practices are also embedded explicitly and implicitly into program, policies, language and mores of disciplines and field, and serve to operationalize this deficit narrative through minimizing the role of the institution in gatekeeping. Instead, the onus is placed on the individual student. We define the hidden curriculum in higher education to encompass unspoken academic, social, and cultural messages and expectations that are either communicated or not communicated to students (Jehangir & Molengraff, 2023; Margolis, 2001). The hidden curriculum in higher education manifests in how the cultural wealth and capital of systematically marginalized students are devalued or ignored in higher education spaces (Jehangir, 2010).

Theoretical frameworks

Intersectionality

Our study employs two frameworks to situate our work and to attend to the complex lived experiences of our FGWOC+ student participants in the context of the environments they negotiate and inhabit. Intersectionality serves as the first conceptual framework, and it brings attention to the overlapping identities of the FGWOC+ students (Crenshaw, 1992). The framework highlights the ways in which identities that are systematically marginalized experience multiple and simultaneous forms of oppression. Researchers, whether adhering to qualitative or quantitative paradigms, have used intersectionality to emphasize the unique [oppressed] experiences faced by students from systematically marginalized communities (Jang, 2023).

Our student-participants are WOC, but represent Black, Indigenous, and Latine communities as well as immigrant and refugee experiences. Many are also the first in their family to go to college and are poor and working class (Ardoin & Martinez, 2019). Intersectionality reflects how identities such as race, ethnicity, gender, class, and other social identities “do not function independently but, rather, act in tandem as an interlocking or intersectional phenomenon” (Manuel, 2006, p. 175). Intersectionality considers how “oppressive structures are dependent and intersecting” forms of constraints, operationalized by overt and covert policies, practices, and design (Santa-Ramirez et al., 2022, p. 2). The use of intersectionality in this paper is also a call and acknowledgment to the ways in which structures of inequities and oppression can be unveiled and transformed in support of students rather than remain a source of academic status quo (Harris & Patton, 2019). We employ intersectionality by centering the nuanced voices of our FGWOC+ students, and through recognizing that their experiences in STEM are not demarcated by one singular identity.

Bioecological theory of human development

The second framework we use for understanding the experiences of FGWOC+ is Bronfenbrenner’s Bioecological Theory of Human Development (Bronfenbrenner & Morris, 2006; Tudge et al., 2016). The Bioecological Theory of Human Development is a systems-based approach which provides a comprehensive framework for understanding how different dispositional and environmental factors affect students’ psychosocial development (Bronfenbrenner, 1977). Bronfenbrenner posited that the environment is arranged as nested systemic dimensions that affect students in interrelated ways, arranged from most proximal to distal.

Overview of Bronfenbrenner levels

The microsystem is the first most proximal structural level and most closely related to the student (FGWOC+ in STEM). The microsystem encompasses the direct relationship(s) between the student and their environments. The microsystem for FGWOC+ students includes their family, STEM college instructors, and peers they befriend in college. The mesosystem refers to the different interrelated structures that connect and link the different dynamic microsystems. The mesosystem can be thought of as a system of microsystems

(Bronfenbrenner, 1979), such as a classroom or work environment. Examples of the mesosystem for FGWOC+ students in STEM include the STEM labs in which students interact with faculty members and peers, as well as the cultural and spiritual organizations that bring together students' peers and family.

The exosystem is an extension of the mesosystem and includes the structures that albeit do not contain the student, does, however, influence processes within the environment that the student is situated in. For FGWOC+ students in STEM, the exosystem may be the government agencies that fund the college/institution that a student and their peers reside in, as well as the agencies that fund the students through financial aid. The macrosystem, or the overarching blueprint of a student's environment, consists of characteristics and patterns of the micro-, meso-, and exosystems that are embedded within a culture or subculture (Bronfenbrenner, 2005). For FGWOC+ students in STEM, macrosystem-level factors can include colleges enacting anti-racist policies and training, funding of student organizations, and developing paid research opportunities in STEM. Finally, the chronosystem reflects change or stability over time, which for FGWOC+ students, may be reflected in how the COVID-19 pandemic reduced the number of research opportunities that students could leverage for future career endeavors.

Researcher positionality

The research team included graduate students and faculty in a higher education program. The graduate students included students who identified as FG college students and Students of Color, including a FG, low-income, immigrant, Southeast Asian scholar. The principal investigators include two faculty members, one who identifies as an immigrant WOC and the other as a white man. All researchers have engaged in research projects rooted in student development and equity with particular focus on FG, immigrant and refugee students, and/or Students of Color across different higher education contexts and spaces.

Method

Participants

We conducted semi-structured interviews with 44 Students of Color involved in research/internship experiences across two institutions in academic year 2018–19 as part of a larger study examining the STEM experiences of systematically marginalized students in higher education. Of the full sample of Students of Color, 70% of students were WOC ($n = 31$). Of those 31 WOC students, 71% were FG ($n = 22$), 48% were immigrants ($n = 11$), and 77% were Pell-eligible ($n = 24$). Student demographics are found in [Table 1](#). In this study, we focused on the voices of 22 FGWOC+ students in STEM.

The first institution is a public research PWI that enrolls over 50,000 undergraduate, graduate, professional, and non-degree seeking students. Approximately, 26.4% of the undergraduate student population at the first institution identify as Students of Color. Additionally, 24.3% of the undergraduate student population are FG college students. The second institution is a small, private liberal arts institution that enrolls approximately 3,000 undergraduate and graduate students. Approximately 58% of the student population at the second institution are Students of Color, and 51% are FG college students. Both

Table 1. FGWOC+ participant demographics.

Demographics (<i>N</i> = 22)	<i>n</i>
First-Generation Status	
Yes	22
No	0
Race/Ethnicity	
Black/African/African American Only	12
Latine/Chicanx/Hispanic Only	7
Multiracial	3
Immigrant Status	
Yes	11
No	11
Pell-Grant Eligibility	
Yes	19
No	3

Of the 31 WOC students, we focused on the 22 FGWOC+ students in this manuscript.

institutions are situated within a metropolitan area, are investing heavily in STEM student success, and are a part of the Minnesota-based Louis Stokes Alliance for Minority Participation partnership: North Star STEM Alliance (NSSA). NSSA is a STEM diversity program within higher education that supports students underrepresented in STEM at 2- and 4-year institutions to achieve a STEM baccalaureate. NSSA funds institutions that endeavor, through the development of STEM research opportunities, professional development programs, and career-based internships, toward increasing the number of underrepresented students completing a 4-year STEM degree and going into the STEM workforce (Burt et al., 2023).

Procedure

This study looked at the lived experiences of FGWOC+ college students in STEM who participated in NSSA. We recruited NSSA students who were juniors or seniors, who identified with an underrepresented identity in STEM, and who had also participated in research, internship, or professional organizations with support from NSSA staff, academic advisors, and student groups. Students were identified and recruited through e-mail, newsletters, and in-person at NSSA affiliated events. After an initial screening, participants who matched our criteria were interviewed for 45–60 minutes. The interviews were conducted in private rooms and were audio recorded. Students completed the informed consent process. Students were asked about their experiences at their institution, STEM interests (How did you become interested in science?), STEM engagement (How did you find, access, and/or fund these experiences?), and future goals and directions in STEM (Where do you see yourself in the future?). At the end of the interview process, students were given a demographic information sheet and were compensated with a gift card for their participation.

Data analysis and trustworthiness

The interviews were transcribed professionally, and data were organized through Dedoose software version 9.0.46 (Consultants, 2021). The team for this study included

the two higher education faculty principal researchers and a team of graduate students. The research team initially reviewed interview transcripts individually, and then met to compare and analyze the data over the course of several phases. Inductive codes based on thematic categories were identified and discussed (Braun & Clarke, 2006; Creswell & Poth, 2018). A codebook was developed and each research team member used the codebook to analyze the interview data. The thematic analysis process involved several phrases. First, the team engaged in a process of meaning making by individually deriving emergent categories for eight randomly selected interview transcripts. The emergent categories were then cross-checked with other participant interview data, which resulted in themes. To ensure trustworthiness, this process continued in phases until there was a saturation of categories and the team saw no more emerging categories. Three total phases were conducted.

Findings

The analysis of data from our larger study resulted in nine themes, some of which are featured in other publications (e.g., Jehangir et al., 2023). For this paper, our primary focus will be on four themes beginning with the theme *Navigating the Ecology of a PWI*. We begin with this theme because it situates the context that encompasses and shapes the experience of students, revealing both intersectional constraints and capital of our students (Jehangir et al., 2022a). The three other themes are: *Incongruent Expectations: Negotiating Familial and Academic Roles*; *Uplifting Each Other: Building Communities of Belonging*; and *Drawing Upon Family and Community Capital*. In this paper, we situate data from each theme that specifically speaks to the experiences of the FGWOC+ STEM students in our study.

Navigating the ecology of a PWI

This overarching theme titled, navigating the Ecology of a PWI, addresses the intersecting identities of FGWOC+ students within STEM contexts. This theme speaks to the ways in which the ecology, that is the interaction of students and their environment of campus, classrooms, and college community, was alienating and isolating for many students (Jehangir & Molengraff, 2023). The subset of data shared here specifically attends to how FGWOC+ negotiates this ecology. Elena, a Latina student, named the way representation itself impacted her comfort and confidence level in one of her science courses. She stated:

So going into the classes and being the only Person of Color was really weird to me. I kind of felt like I wasn't supposed to be there. Kind of like that weird feeling of, "Was I supposed to be here – is this the wrong room?" It was kind of disappointing and made me doubt my own skill, too, because I felt like no one would listen to me regardless of what I said.

Yamina, a Black, immigrant, student resonated with this feeling and goes on to describe how her isolation and hypervisibility as a Black Muslim woman generated awkward exchanges with peers:

I feel like as a Black Muslim woman I would never have struggled that much if there was just some diversity . . . I remember one of my group members, he was like, "You're the first ever Black Muslim woman I'm meeting." I'm like, "Okay." He's like, "Yeah, interesting."

Having to negotiate predominantly masculine and white spaces extended beyond isolation to feed into imposter phenomenon for FGWOC+, where they reported not only doubting their own skills but also finding that their peers actively challenged their intellectual contributions.

Yamina expresses these navigating predominantly white peer groups:

I feel like it was a cultural shock for both the students and I feel like for me too 'cause I've never had all-white dominant class and have to prove myself constantly. I remember when we would work in groups, they would always tell the professor we're not doing our part, we're not equally contributing even though we always were.

To be present in these environments was not only feeling alone and visible but also trying to determine how to respond and challenge these misconceptions. Lola, a multiracial, FG student stated:

I was the only female again and I hate to say it—I kind of overcompensated a little bit. In addition to wanting to get a good grade—because I do — and overcompensating a little bit, being the oldest person in the group, and being from the military with leadership experience, I kind of maybe sort of became the leader by accident.

These voices illuminate the ecology that FGWOC+ constantly negotiates and demonstrates the emotional and intellectual labor it requires. It is important to note that students' educational experiences do not begin and end at the gates of the academy, and as such the themes below take up points of intersection between family, community and peer groups.

Incongruent expectations: Negotiating familial and academic roles

This theme addressed the ways in which FGWOC+ name how their life roles, responsibilities, and familial and educational histories shape their journey to and through college. Their narratives counter institutional assumptions about students' decision-making and about the types of support that students may need in college. Many FGWOC+ shared how their view of their student journey was not the individualistic view that institutions often have of students. Their decisions and their commitment were not a solo experience but shaped by familial roles, expectations, and collective decision-making.

Some women like Waartu, a Black, FG student, talked about both the privilege and the stress associated with being the first in her family to go to college. She shared:

I'm the oldest child, and I have two younger siblings. And then my mom is currently in nursing school, so she's trying to get her degree so she can better support the kids . . . I'm in a position where I really feel a huge responsibility to help my siblings and my mom at the same time. I'm kind of in the middle, where I'm held up to the highest expectations on both sides.

Elena, a Latina student, shared how these expectations play out in daily life and how these expectations include being an interlocutor for her family. Elena explained:

Pretty much every weekend throughout my college career I have been going home. Helping my parents pay bills – kind of like navigating the online banking systems and doing checks for them, and just if they don't understand a contract or something that's in English, I have to read it for them and then kind of explain it . . . I translate . . .

The roles that Elena named above extend to caring for siblings and aging grandparents and also deeply shape the choice of where one goes to college and whether to pursue graduate school. Fawzia's, a Black, immigrant, FG student comments speak to communal ideology in stark contrast to individualistic expectations of higher education: "I really wanted to go to graduate school. I can't. Because I feel like — I don't want to say it's a selfish thing, but I don't come from a family where I can just do whatever I want."

In addition to family roles and transportation challenges, some women talked about balancing motherhood with their student identity and how access to resources and events do not align with parental responsibilities. Leymah, a Black, immigrant FG student confided: "I'm so pressed for time sometimes I bring my son to lectures. I'm a parent. So I rarely have time for those meetings they talk about. I can't come back at 6 pm for Pie with Professors."

As noted previously, many students spoke from the place of being FG and poor or working class. In addition to familial and communal roles, financial concerns were real and opting for jobs that paid the bills was not a choice but a necessity. Asha, a Black, immigrant, and FG student stated:

I was determined to do a biology degree and complete it. I had to work two jobs to kind of pay for myself. So I was working like a minimum wage and I didn't drive so I was dependent on public transportation . . .

Despite messaging about the value of internships and research-based experience, many WOC recognized the challenges in committing to unpaid experiences that did not contribute to cost-of-living. Naomi, a Black, immigrant, and FG student, shared that her decision to be a college advisor in the residential hall is a strategic effort to address housing and food insecurity, noting:

As CA {community adviser} . . . you get a stipend. So instead of using that money to buy food, I used it to just pay my tuition and I'd do other little jobs, to help pay for food and stuff . . . I have to hustle.

Linda, a Latina, immigrant, and FG student, noted that responsibilities for bills include supporting her parents and underscore the meritocracy built into unpaid internships as networking and learning opportunities. Linda shared: "So I would really love to work at a lab but unpaid internships can't pay the bills. I can't afford that because I need to pay for rent and pay for school and pay for my mom's stuff too."

This theme demonstrated the ways in which structures of higher education in programmatic activities and resources are *not* designed for WOC. To engage in these spaces is to experience hostility or to find ways to assimilate, both of which create dissonance and further challenges for the students. Several participants from immigrant communities also spoke to the balancing act of negotiating STEM and higher education, which elevated individual decision-making and choice with collectivist values and familial expectations of their home communities.

The next theme speaks to ways in which WOC sought to resist these environments and find sites of belonging.

Uplifting each other: Building communities of belonging

This theme captured the different ways by which students sought to create their own sites of belonging in the academy to sustain their journey. Students shared the ways in which they

created their own support systems in both an academic context and also social and co-curricular spaces. These spaces were typically not formalized or institutionally derived, rather they were developed by the students themselves and signal potential gaps or needs that institutional programming has not covered.

Given the isolation and hypervisibility that WOC students experienced, they often talked about a particular friend, often another WOC, who served as their lifeline, their community, and their partner in negotiating the ecology of the PWI. Nyala, a Black, immigrant, FG student, refers to the process of creating her own study group and shared “I’m kind of leading myself. I have a friend, Vanessa . . . We support each other a lot because it is too difficult and crazy out here.”

Waartu expanded on the challenges of negotiating multiple unknowns in an environment that is less than welcoming. She shared how her supportive relationship with a peer sustained her and gave her confidence to keep on going:

I think the biggest thing was social support, because I feel like if I came in by myself, I probably would’ve been really lost and even gone into a sort of depressive state. Because it was really hard. But we went through the classes together . . . our major requirements together . . . schedule advisor appointments together. We did everything together, so it helped. And it pushed me to do it more.

When speaking of the importance of peers who share similar experiences and challenges, many FGWOC+ students spoke about being transfer students and about how entering a challenging and competitive environment as a transfer student heightened the anxiety and isolation they encountered. Some referenced connecting with other transfer students to create social circles and study groups, because as Kowsar, a Black, FG student noted “as a transfer student, it was hard for me to poke holes into established friend groups in order to make my way in.” Other students also spoke about the necessity to connect with a critical mass of Peers of Color who may be outside of their discipline or major, and even outside of their STEM field, like multicultural sororities with the purpose of inspiring and supporting each other to navigate the institution.

Given the racialized and gendered experiences of many FGWOC+ in STEM, discovering and cultivating spaces with other FGWOC+ students was also a source of sharing capital and building institutional support systems, as well as engaging with external groups that lift and reinforce them.

Maria, a Latina, FG student, named the inherent challenges of being FGWOC+ in STEM and argues for efforts to create undergraduate research spaces that are supportive and intentionally designed to pull back the curtain on hidden curriculum. She says:

Some of my friends are currently involved in a chapter of an organization called Science for the People. It is basically expressing need and the importance of talking about race, talking about gender, talking about class in STEM specifically. It is crucial . . . especially with research, when institutions historically have been known to take advantage of communities they’re researching in.

Other students talked about extending leadership opportunities into participation in professional organizations in STEM for Indigenous and People of Color. This was one form of engagement with established and institutionally sanctioned organizations that was most helpful and empowering. Linda described her emotions attending a Society of Hispanic Professional Engineers (SHPE):

They were all Hispanic and they were all engineers. They were playing salsa music and speaking Spanglish. And they were all actually engineers! It was the first time I ever met someone who was Hispanic and graduated college. Much less be in a room full of people who were incredibly smart and successful and helping the community. And I cried: It was incredible.

Linda's quote underscores the importance of representation and the ongoing weight of negotiating the ecology of PWIs for FGWOC+ students. In addition to creating and finding these niches of belonging our students addressed the role of family and kin as extensions of their support system.

Drawing upon familial and community capital

The FGWOC+ students in this study reflected on the isolation and hostility they experienced in the STEM field and in predominantly white spaces. They also noted how these individualistic environments created push and pull factors given the expectations of family. Yet, they also emphasized how the constant pride and support their families and broader community had for them was an important touchstone to their persistence. Several students made references to spiritual and religious communities like Mundeer (temple), church, or tenets of faith as an internal guide that kept them moving forward, in spite of the racialized and gendered experiences they encountered. For some like Ava, a Latina, FG student, going to church was a way to feel her mother's pride and the support of an extended community of women around her. Ava elaborated by saying:

I haven't been to church in a while, but I went back on Sunday and all these women stopped me and hugged me . . . they're so invested in us. That's important for me, too, that I don't let those people down. I think most of my motivation comes from the people around me.

Ava's comment reflected that this sense of being part of something bigger than oneself and one's nuclear family also comes with some pressure, but that is part of what must be negotiated for FGWOC+ students. Naomi, a Black, immigrant, FG student, unpacked this idea further by recognizing that in occupying worlds that are unknown to each other, she must be explicit about her needs to get specific support from her family.

So it comes in waves, like I have to be very transparent with them for me to receive that support. If I am not, then it looks like I am hiding something. Maybe I am, but I should just be more open with them to receive that support. Otherwise, they would not know what's going on.

Her experience demonstrated what it means to be a FGWOC+ student in STEM and to sit at the intersection of these multiple identities in both home and school spaces. Yet, despite the fact that family and extended kin may not be able to share school specific advice, their faith and belief in their daughter was an important reflection of familial capital. Ava's story at the top of this article speaks to the power of this support. She adds:

My grandma came here by herself. That, for me, has been my biggest motivator, that my grandma came here from scratch with nothing and she still accomplished some things. You only have to keep building off of that. We don't destroy what we built, we keep building off that.

Each of these themes amplifies the experience of FGWOC+ students in STEM, but specifically calls attention to the intersectional nature of all that they negotiate. This intersectionality of identities, as well as systemic oppression, are constantly being navigated

within multiple ecologies, suggesting that more nuanced and contextually relevant supports are critical to their success. Their voices also confront the deficit narrative that can become attached to FGWOC+ students in predominantly white spaces and demonstrate how they engage community capital toward their goals.

Discussion

The purpose of this inquiry was to explore the lived experiences of FGWOC+STEM students enrolled at a PWI. The themes represented in this article are unique; yet they also overlap. As viewed through Bronfenbrenner's ecological framework, these narratives highlight that students interact with a variety of factors, or dimensions within their environments as part of an integrative system. Many of the students discussed the challenges of being both invisible yet highly visible as a result of their systematically marginalized identities. Students also conveyed how microaggressions diminished their experiences and sense of belonging on campus. These experiences of chilly reception from peers and/or student affairs educators often raised doubts for FGWOC+ students by calling into question their intellectual ability or capacity to compete in class or in their career. The hidden curriculum in STEM and higher education is often derived from white, normative, and masculine expectations. As such, the environment can work to internalize the uncertainty of success for FGWOC+ students.

For many of our students, the demands of negotiating a place not designed for them were exacerbated by familial expectations and parents or community who had limited access to the context of higher education. These access-related challenges were heightened for FG, immigrant WOC, who described having to hustle between worlds that have competing value systems, in which gendered expectations in both STEM and home worlds required a complex balancing act that was often challenging, unnamed, and took significant emotional labor.

Students felt a great sense of responsibility for family and community roles, which often conflicted with academic demands and challenges of attending a PWI. Notably, these interviews were completed prior to the onset of the COVID-19 global pandemic which likely exacerbated these challenges. This positionality of being between worlds with competing expectations was underscored for FGWOC+ students. For example, when Waartu talked about the expectation to care for her siblings, she highlights that this is not only a minoritized student experience but the experience of a minoritized woman.

Students also acknowledged the support that they draw upon from their immediate and extended kin, including spiritual support such as their church or temple or faith community. This source of support is a particularly nuanced aspect of this data in that it demonstrates that students clearly felt both challenged by familial/communal expectations but also deeply supported by their kin. For example, the support presented itself in forms of capital that are rooted in communal beliefs and expression of community pride, such as the sharing of food as an expression of love, and the ongoing sacrifices in kind to allow for their daughters to continue in college. FGWOC+ students in this study recognized that challenge, and the navigational capital they were developing as they negotiated between these worlds, but it is complex. Naomi discussed the need to be explicit and communicative with her family regarding what she needed from them during challenging times.

The students talked about the ways that they garnered support by building their own communities of belonging to negotiate and even protect themselves from the ecology of

a PWI. Students articulated a desire to connect with a critical mass of FGWOC+ students in order to feel connected and have shared experiences. Several of these students accomplished this by creating study groups, joining student organizations or identity-affinity groups on campus. The findings can also be further explored through the ecological lens as students foster connections in their micro- and meso-systems to hold agency in their academic and non-academic lives and contexts, including connections with faculty members (Matias Dizon et al., 2023).

The way in which our students created their own spaces of community suggests that institutional programming and resources must shift to meet the needs of FGWOC+ students in STEM. Our students suggest that attention to schedules, transportation, and spaces where their identities are considered assets rather than liabilities are critical. In particular, attention to experiences of FGWOC+ transfer students, who are negotiating all of the themes above but doing so in a new culture and physical space, requires more tailored programmatic bridging. In sum, these data raise questions about how institutions frame narratives of who constitutes a *successful* student and invites consideration of both the historic impact of the hidden curriculum in higher education and also the capital of FGWOC+ scholars.

Implications and recommendations

The findings of this study inform several strategies student affairs professionals should implement for practice, policy, and research. Administrators and faculty members play critical roles in supporting FGWOC+ students in STEM disciplines. These results speak to the need for student affairs educators to be more intentional in their efforts to acknowledge the unique assets and experiences of FGWOC+ students, and to foster relationships where students feel more supported and recognized in their environments (Yosso, 2005).

Implications for practice

We offer the following strategies and implications that follow from the findings. First, educators and administrators can help create intentional supports and bridge structures for FGWOC+ students. It is vital to help students create a sense of belonging and community and to support students in this transition process. So often FGWOC+ students (and other systematically marginalized students) expend resources on *unpacking* the hidden curriculum, including trying to negotiate their physical campus structures and institutional bureaucracies. Early opportunities where these norms and mores are named and owned by the institution is one way to uncover the hidden curriculum and render it less powerful in perpetuating doubt and imposter phenomenon (Jaremka et al., 2020).

The language and messaging of orientations, advising sessions, and classrooms should actively decode the language of academia and normalize questions about the process, protocol, and policy for FGWOC+ and for all students. These spaces also provide an opportunity for student affairs educators to articulate how different ways of knowing are valued in the academy and that FGWOC+ students do not come to the academy empty-handed. Given the impact that positive interpersonal relationships can have on FGWOC+ students in STEM, how faculty and staff validate FGWOC+ students in STEM can signal clear expectations of climate and culture. Among institutional agents, faculty can serve as

effective career influencers that reinforce viable career pathways in STEM (Ho, 2019; Jehangir et al., 2023).

Institutional leaders can ensure and increase the amount of direct aid, scholarships, and emergency funds available to students in need. Students discussed the many challenges of navigating academics along with other life roles. Often, this included managing financial obligations and expenses that were often not anticipated. Although students in this study did not directly use the term *food insecurity*, it was clear that several students struggled with meeting food and housing needs, including how to manage expenses of the family. These food scarcity situations are now likely amplified by the pandemic, and evidence suggests that college students are increasingly experiencing higher prevalence rates of food and housing insecurities (Laska et al., 2021). The insecurities also reflect the constraints of generational racism and classism and how it impacts and perpetuates poverty systemically.

Many leaders at universities and colleges have developed food pantries on campus; yet students are often reticent about using such services because there is often a stigma attached to using food resources. Some students, for example, may feel that their situation is not as severe as other students (Jehangir et al., 2020). Additionally, it was evident from the findings that many students were balancing multiple responsibilities, such as managing expectations around work and family care tasks, which reflects the hustle culture that is common for many students (Adjei, 2019). Breaking down these misperceptions around food insecurity (and overall financial insecurity) needs to become a priority and student affairs play important roles here. Furthermore, administrators should aim to provide longer term solutions to these types of challenges on behalf of students in need.

Finally, student affairs educators and faculty occupy a vital role in fostering students' intellectual, emotional, and spiritual wellbeing, especially when working from a holistic framework (Evans & Reason, 2001). This holistic approach is grounded in the foundational history of the student affairs profession (McGuire, 2019; Means et al., 2018; Riggers-Piehl & Sax, 2018). Student affairs professionals can serve students by connecting them to communities of belonging around shared identities, including interests and affinity groups within STEM (e.g., specific engineering groups such as the Society of Hispanic Professional Engineers).

Implications for policy and research

In terms of policy implications, leaders within admissions and institutional research offices need to do a better job of identifying and supporting students who possess multiple, intersecting identities. Additionally, many students in the study discussed financial challenges and how they struggled to maintain their progress in school. Applying Bronfenbrenner's ecological framework that acknowledges factors that influence students at the exosystem level, educational leaders and decision-makers need to implement strategies designed to provide financial support to all students, specifically marginalized student populations. These challenges that alleviate financial burdens would allow students to focus on their academics and their STEM progress toward graduation, and less on financial stressors, such as student debt.

There are at least two implications for future research. First, more scholarly inquiries need to be longitudinal in nature so that scholars can follow the trajectories of students over

time. One of the limitations of this study is that there was only one interview at one point in time of the students' journey. Second, future research can explore the benefits and results of intentional interventions and efforts designed to support students in STEM disciplines. This study highlights FGWOC+ students' experiences, focusing on the assets and strengths they bring to the academy. That stated, one of the contributions of this study was the focus on the intersection of identities of the FGWOC+ students in the research. More inquiry needs to be done to explore the dynamics of these intersecting identities and the impact on STEM persistence toward graduation and beyond.

Conclusion

Greater representation across STEM occupations is a critical need in the global marketplace. Finding innovative and inclusive ways to support FGWOC+ students in STEM undergraduate majors and programs will become even more imperative moving forward. As this study demonstrated, educators, including faculty members, can find strategies to support students across the various dimensions of their ecologies and mitigate the impact of systemic structures that often serve as barriers toward persistence and degree completion for FGWOC+ students and other systematically marginalized students underrepresented in STEM. A holistic approach, one which is grounded in the foundations of student development theory and practice, will serve students as they persist toward their professional objectives in STEM careers, and utilize their much needed capital to serve generations who come after them.

Notes

1. We choose to not capitalize white to not elevate whiteness and rather to emphasize the lived experiences of our first-generation Women of Color participants.
2. We use Latine to describe the multifaceted gender identity of Latino/a/x individuals in the United States and globally. When it refers to our participants' self-reported identities, we use language consistent with what they reported (e.g., Latina).

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